New Zealand Historic Places Trust Pouhere Taonga



# Heritage Buildings, Earthquake Strengthening and Damage

# The Canterbury Earthquakes September 2010-January 2012

# Report for the Canterbury Earthquakes Royal Commission

Final

8 March 2012

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*Mihi-Greeting*

*Tena koutou katoa - To all the communities of Canterbury whose lives have been irrevocably changed by the earthquakes.*

*We remember those who died, especially as a result of collapsed buildings that have been included in this report –*

- *Durham Street Methodist Church*
- *Press Building*

*We also do not forget those who were injured.*

*We hope that the report of the Royal Commission will help ensure improved earthquake risk reduction and readiness in the future.*

## Executive Summary

The Canterbury Earthquakes Royal Commission (the Royal Commission) requested that the New Zealand Historic Places Trust Pouhere Taonga (NZHPT) provide information about seismic retrofitting that has taken place involving heritage buildings in Christchurch and the current condition of these buildings following the Canterbury earthquakes, as requested by letter (dated 28 September 2011, Appendix 2).

The NZHPT provided a progress report to the Royal Commission in response to the information request on 21 November 2011.

This finalised report focuses on earthquake strengthening of heritage buildings in Christchurch and the performance of these buildings during the earthquakes of September 2010-January 2012.

The research for this report has involved a selected sample list of 100 heritage buildings. The majority of these buildings were included in Appendix 3 of the NZHPT's submission to the Royal Commission being a list of 84 key heritage buildings within Central Christchurch.

All buildings in the list of 100 were damaged by the Canterbury earthquakes, occurring between September 2010 and January 2012.

The research provides summary information for each of the 100 heritage buildings which includes:

- Building name.
- Location.
- Architect.
- Registration status under the Historic Places Act 1993.
- District plan listing status under the Resource Management Act 1991 (RMA).
- Photograph.
- Brief significance statement.
- As-built construction type.
- Earthquake-prone status under the Christchurch City Council earthquake-prone policy, Building Act 2004 prior to September 2010.
- Building condition prior to September 2010.
- Brief earthquake strengthening history.
- Level of earthquake damage.
- NZHPT's post-earthquake response.
- Current status of the building (as at 24 February 2012).

In addition to the individual building information, the report provides an overview of the development of earthquake risk and heritage issues in Christchurch since the 1970s with an explanation of the development of heritage listings and rules under planning and building legislation. Further, comment is provided on the role of conservation plans and earthquake strengthening. Appendix 1 also provides a summary of New Zealand's earthquake-risk and heritage legislation and policy.

Damage during the September-December 2010 earthquakes was either minimal or moderate for all of the 100 heritage buildings, except for the Manchester Courts building which was severely damaged and subsequently demolished.

The January-June 2011 earthquakes resulted in severe damage, major damage or collapse of 54 of the 100 buildings. Another 32 buildings suffered moderate damage.

Additional damage has occurred as a result of the July 2011-January 2012 earthquakes which means that the future is uncertain for many of the remaining buildings as damage is reassessed by engineers.

In terms of current status as at February 2012, 40 of the 100 heritage buildings have been demolished in addition to the 3 that collapsed on 22 February 2011. Another 21 buildings are pending demolition or the future is uncertain and demolition may be a possibility.

| **Current Status, 100 Heritage Buildings, February 2012** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Earthquake collapse | Demolished | Demolition pending | Secured but future uncertain | Partial demolition & make safe work | Secured, made safe, repairs pending or under action | Repairs completed or building open with minimal/no damage | Other/Unknown |
| **3** | **40** | **2** | **19** | **5** | **20** | **5** | **8** |

Heritage building survival is often dependent on a range of interventions to secure a place from many different risks such as development, vandalism, fire, earthquakes, flood, market failure and neglect.

With regard to earthquakes, the nature and type of earthquake and specific geotechnical ground conditions will be strong determinants of heritage building survival. Survival is also influenced by the construction type of the building (URM, timber-framed or other type) and the extent and nature of earthquake strengthening.

While any conclusions are tentative, it is suggested that of the 100 heritage buildings, building survival during the Canterbury earthquakes has been enhanced by:

- Buildings that are timber-framed, steel or reinforced concrete.
- Unreinforced masonry buildings (URM) that had been strengthened.

Incentives and grants provided by central and local government made a difference to support earthquake strengthening of heritage buildings.

Conversely, heritage buildings that were severely damaged or destroyed were largely URM that had not been strengthened, partially strengthened or where strengthening was limited to bracing and ties.

The table below portrays the heritage buildings having minimal damage from the January-June 2011 earthquakes. This list shows that buildings with minimal damage were either strengthened URM, reinforced concrete or timber-framed in good condition. Also, the majority of the strengthening work for these buildings aimed towards the 67% of the new building code standard (NBS) or above and as indicated much of the strengthening work was supported by grants and incentives from public funds.

| Heritage Buildings having minimal damage following January-June 2011 earthquakes (of 100 heritage buildings) | | | | |
|---|---|---|---|---|
| **Heritage Building** | **Ownership** | **Construction type** | **Condition** | **Earthquake strengthening (* indicates public funding support for strengthening work)** |
| **Wellington Woollen Manufacturing Co. 96-98 Lichfield Street** | Private | URM/Reinforced concrete | Good | |
| **Canterbury Museum, 9 Rolleston Ave** | Public | URM | Good | Strengthened * |
| **McDougall Art Gallery, 9 Rolleston Ave** | Public | Reinforced concrete | Good | |
| **Former Canterbury Society of Arts Building, Environment Court** | Public | URM | Good | Strengthened * |
| **Old Government Buildings, Heritage Hotel** | Private | URM | Good | Strengthened * |
| **St Lukes Vicarage, 185 Kilmore St** | Private | Timber-framed | Good | |
| **Antigua Boat Sheds** | Private | Timber-framed | Good | Strengthened * |
| **St Lukes Chapel, 275 Hereford Street** | Private | Timber-framed | Good | |
| **Former Majestic Theatre, 122-126 Manchester Street** | Private | Reinforced masonry | Good | Partial strengthening |
| **Shop, Residence, 40 Cranmer Square** | Private | Timber-framed | Good | |
| **Dwelling, 2-storey (Christ's College), 4 Armagh Street** | Private | Timber-framed | Good | |

## Research methodology

The research methodology has been guided by the information request of the Royal Commission (Appendix 2). Following communication with the Royal Commission, the NZHPT understood that the primary scope of the research would be based on information held by the NZHPT relating to heritage buildings within the Christchurch Central Business District (CBD), details of earthquake strengthening and the performance of these buildings during the Canterbury earthquakes.

The primary information sources for this report have involved a search of NZHPT files, conservation plans and structural assessments and other relevant publications held by the NZHPT.

In terms of the NZHPT's archival record, most of the primary files only date back to the 1970s/1980s for heritage places. It is recognised, therefore, that this research provides only a partial and summary history of earthquake strengthening related issues despite earthquake-related issues has a long history dating back to the earliest days of Canterbury settlement. For example, earthquake-related issues having considered during the planning and construction of buildings such as the Christchurch Cathedral during the 1870-1880s. For this reason, strengthening work that may have taken place prior to the mid-1970s is largely absent from this research report.

The NZHPT's record is dominated by the complex issues of earthquake strengthening multifaceted buildings such as the Arts Centre, Canterbury Museum, Canterbury Provincial Government Buildings, Christ's College and many other heritage buildings. These buildings have generated substantial earthquake-related information in the form of engineering reports and assessments authored by the Holmes Consulting Group, Opus International Consultants and other engineering firms. Many conservation plans have also proved to be sources for historical information about alterations and earthquake strengthening and general earthquake-related information.

The research focus for this report has involved a selected sample list of 100 heritage buildings. The majority of these buildings were included in Appendix 3 of the NZHPT's submission, dated 14 October 2011, to the Royal Commission being a list of 84 key heritage buildings within Central Christchurch.

As directed by the Royal Commission, the sample list is limited to heritage buildings within the Christchurch CBD with the exception of 4 buildings from Lyttelton.

The term 'heritage building', for the purposes of this report, has been limited to buildings listed in the heritage schedule of the Christchurch City Plan and Banks Peninsula District Plan and/or registered as a historic place or historic area under the Historic Places Act 1993. Except for New Regent Street or Ward's Brewery Historic Area, this report has not examined urban conservation areas of Christchurch.

The 100 heritage buildings represent approximately 10% of the 930 listed heritage items in the Christchurch and Banks Peninsula district plans.

The sample list aimed to include a variety of heritage buildings: commercial, residential, public, monuments and bridges. The sample list was also chosen on the basis that most of the buildings had some experience of historical earthquake-strengthening related issues and historical documentation was available on the NZHPT's building files.

In reality, the sample includes more than 100 buildings as it contains some large and complex heritage places which compromise of a number of buildings which were constructed over periods of time. The following table provides a summary of complex heritage places:

| **Summary of complex heritage places** | |
|---|---|
| **Name** | **No. of buildings or major sections** |
| **Arts Centre of Christchurch** | 26 primary heritage buildings |
| **Christ's College** | 12 primary heritage buildings |
| **St Michael's of All Angels** | 3 primary heritage buildings |
| **Community of the Sacred Name** | 3 primary heritage buildings |
| **Ward's Brewery Historic Area** | 7 primary heritage buildings |
| **Cranmer Centre (Former Christchurch Girl's High School)** | 4 primary heritage buildings/wings |
| **New Regent Street** | Terrace shops on both sides of the street |
| **Dorset Street Flats** | 8 primary apartments and converted stable block |
| **Former Canterbury Public Library** | 4 primary heritage buildings/sections |

The 100 heritage buildings are all buildings as defined in the Building Act 2004, which includes structures. The basic background information includes:

- Name.
- Address.
- Photograph.
- Date of construction.
- Architect.
- Registration status under Historic Places Act 1993 as at September 2010.
- District plan listing status under RMA as at September 2010.
- Ownership type.

While the building summary information states that the place is registered by the NZHPT, classification will have been removed (or in the process of removal) for places destroyed or demolished.

Most of the photographs shown are of places prior to September 2010. All photographs are sourced from the NZHPT unless otherwise stated.

Each individual building summary has a short significance statement. This information is sourced from the NZHPT Register, Christchurch City Council's heritage schedule or from the NZHPT's files. It is noted that the significance statements relate to the buildings prior to September 2010.

All research, quotations and documentation are sourced from the NZHPT's building files unless otherwise indicated in the footnotes.

As noted above, the research provides summary information based only on the NZHPT's knowledge and NZHPT building files. Most of this information comes in the form of concept plans and project descriptions relating to resource consents or building consents that involve consultation with the NZHPT. The research for this report, therefore, may be incomplete since the NZHPT does not have information on all changes involving heritage places and often repair and maintenance work (and other minor works) is carried out without NZHPT involvement or consent processes.

## The Canterbury Earthquakes

New Zealand is an 'earthquake country' and Canterbury is part of a dynamic geography created by the collision of two tectonic plates. With regards to Canterbury, a useful summary of earthquake history was provided by the Seismological Observatory of the Department of Scientific and Industrial Research (DSIR) for the *Arts Centre Christchurch Conservation Plan* of June 1991.[1] The summary commented that Christchurch experiences 'at least one shock whose intensity is MMIII or more', each year, with three of the 'sixteen New Zealand earthquakes that have had magnitudes of 7 or more have occurred within 100 km of Christchurch.'[2] The summary list of earthquakes provided by the DSIR in 1991 (excluding those earthquakes which have caused superficial damage) is outlined in the table below.

As indicated in the table, Canterbury had experienced little activity since the Banks Peninsula earthquake of 24 January 1968. This changed dramatically with the Darfield earthquake of 4 September 2010. The earthquake was of a magnitude $M_w$ 7.1 with a depth of 10 km, centred near Darfield, inland Canterbury. Aftershocks followed the Darfield earthquake with a severe quake occurring on Boxing Day, 26 December 2010. These earthquakes are termed the 'September-December 2010 earthquakes' for the purpose of this report.

Jason Ingham and Michael Griffith note that the Darfield earthquake subjected buildings to an earthquake load that was around 67%-100% of NBS (corresponding to NZS 1170.5 Class D, Z = 0.22).[3] Consequently, buildings with a structural capacity of less than 67%NBS would have expected to sustained damage. Following the Darfield earthquake, an estimated 290 listed heritage buildings sustained structural damage with 84 buildings being assessed to be structurally unsound. Demolition, however, of NZHPT registered heritage places was limited to the Kaiapoi Courthouse, Homebush Homestead, Manchester Courts and the Methven Bakery buildings.

On 22 February 2011, another severe earthquake occurred at 12.51 pm. This earthquake was centred 10 km south-east of Christchurch and measured $M_w$ 6.3 with a depth of 5 km (the Christchurch earthquake). Peak ground acceleration was recorded in the Christchurch CBD as between 57.5 %g and 80.2 %g.[4] Aftershocks followed this earthquake with a number of large earthquakes occurring in June 2011, including a $M_w$ 6.3 earthquake on 13 June 2011. These earthquakes are termed the 'January-June 2011 earthquakes' for the purpose of this report.

The Christchurch earthquake had subjected buildings to an earthquake load of around 150-200% of NBS. Accordingly even buildings with a structural capacity of 100%NBS may have sustained damage.[5]

Since the Christchurch earthquake, the NBS for Canterbury seismic zone has been increased in terms of factor Z to 0.30 (NZS 1170.5 Class D).

Following the January-June 2011 earthquakes, it was estimated by the Christchurch City Council that about 40% of listed heritage buildings in Christchurch were severely damaged.

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[1] Chris Cochran and Rod Cook, *Arts Centre Christchurch Conservation Plan*, for NZHPT, Vol III, Appendices 2-13, June 1991
[2] ibid, Appendix 4
[3] Jason Ingham and Michael C. Griffith, *The Performance of Unreinforced Masonry Buildings in the 2010-2011 Canterbury Earthquake Swarm*, Report to the Royal Commission of Inquiry, August 2011, pp 15-16
[4] It is noted that peak acceleration is recorded at 30 locations within Christchurch and these recordings do not provide specific data for all individual building sites: http://www.geonet.org.nz/var/storage/images/media/images/news/2011/lyttelton_pga/57159-2-eng-GB/lyttelton_pga.png
[5] ibid, pp 15-16

More large shakes occurred on 2 January 2012 ($M_w$ 6.0) with a series of aftershocks taking place up to 15 January 2012. These earthquakes are termed the 'July 2011-January 2012 earthquakes' for the purpose of this report.[6]

| DSIR Christchurch Earthquake Summary, 1855-1991 | | | |
|---|---|---|---|
| **Date** | **Magnitude ($M_w$ or MMI)**[7] | **Location** | **DSIR Comment** |
| **23 January 1855** | M 8 | Wairarapa | Contemporary reports speak of swinging lamps and long duration, no goods thrown down or structural damage |
| **5 June 1869** | MMI VII | Banks Peninsula | Intensity about MMVII in Christchurch |
| **31 August 1870** | | Banks Peninsula | Some property damage in Christchurch. Size of felt area makes it likely that this was structural damage |
| **5 December 1881** | | North Canterbury | Damage to Cathedral spire and to chimneys and ceilings |
| **1 September 1888** | $M_w$ 7 | Near Glen Wye | Intensity in Christchurch area at least MMVIII. Cathedral spire again damaged |
| **27 December 1888** | | North Canterbury | Possibly an aftershock of 1 September 1888. Reached MMVI in Christchurch. No confirmed reports of structural damage |
| **4 August 1895** | MMI V to MMI VI | | Chimney damage |
| **16 November 1901** | MMI VII | Cheviot | Cathedral spire again damaged. MMIX at Cheviot |
| **25 December 1922** | MMI VII (at Rangiora) | North Canterbury | Some fallen chimneys and cracked walls in Christchurch |
| **9 March 1922** | | Arthur's Pass | MM IX in the epicentral region. Fallen chimneys and other minor damage suggests MMVII in Christchurch |
| **17 June 1929** | $M_w$ 7.3 | Murchison | Damage in Christchurch was limited to falling chimneys |
| **6 February 1941** | $M_w$ 5 | Lake Coleridge | Widely felt in Christchurch and accompanied by numerous aftershocks, but does not appear to have caused damage |
| **21 February 1960** | $M_w$ 6.4 | Southern Nelson | Minor damage in Murchison and Kaikoura, but no apparent damage in Christchurch |
| **24 January 1968** | $M_w$ 5 | Banks Peninsula | An earthquake of special interest because the epicentre probably lies within the urban boundaries. Intensities reach MMV |
| **24 May 1968** | $M_w$ 7 | Inangahua | Average intensity in Christchurch about MMV. Isolated instances of damage to older structures indicate local intensities of MMVII or more |

[6] For more detailed information about the history of earthquakes in Canterbury, see http://www.geonet.org.nz/earthquake/

[7] $M_w$ = Magnitude of total amount of energy released as measured by the Moment magnitude scale; MMI = Modified Mercalli scale measures intensity of shaking at a given place.

| **Significant Canterbury Earthquakes of magnitude 5.0 and above since 4 September 2010, Canterbury Region** (Source, Geonet.org.nz)[8] | | | |
|---|---|---|---|
| **Category for purpose of this research report** | Date | Earthquake/Location | Magnitude $M_w$ |
| **September – December 2010 earthquakes** | 4-8 September 2010 | Darfield earthquake | 7.1 and associated 9 quakes measuring above 5.0 |
| | 4-19 October 2010 | Darfield & Christchurch | 3 quakes measuring 5.0 |
| **January – June 2011 earthquakes** | 20 January 2011 | Christchurch | 5.1 |
| | 22 February 2011 | Christchurch earthquake | 6.3 and associated 4 quakes measuring above 5.0 |
| | 20 March 2011 | Christchurch | 5.1 |
| | 16 & 30 April 2011 | Christchurch | 5.3 & 5.2 |
| | 10 May 2011 | Christchurch | 5.3 |
| | 6-21 June 2011 | Christchurch | 5 quakes measuring from 5.4 to 6.3 |
| **July 2011 – January 2012** | 22 July 2011 | Christchurch | 5.1 |
| | 9 October 2011 | Diamond Harbour | 5.5 |
| | 23-24 July 2011-January 2012 | Christchurch | 5 quakes measuring from 5.0 to 6.0 |
| | 2-15 January 2012 | Christchurch | 5 quakes measuring from 5.0 to 5.5 |

[8] Note, the list excludes the Boxing Day earthquake of 26 December 2010 as it was recorded as a 4.9 magnitude earthquake

## Earthquake strengthening and heritage buildings in Christchurch - Overview

Jason Ingham and Michael Griffith have provided an outline of the European settlement of Christchurch, the history of URM buildings and the evolution of New Zealand's building codes.[9] As a consequence, this overview is limited to a focus on the management of earthquake-prone heritage buildings since 1968.

Following the Municipal Corporations Act 1968, territorial authorities were empowered to classify earthquake risk buildings and require owners to remove or reduce the danger.[10] Earthquake risk buildings were those buildings (or parts of buildings) that were assessed to be of a strength less than half the earthquake loading of the standard required for new buildings in NZS 1900, 1965.

Under the Building Act 1991, the term 'earthquake-prone' building was introduced to mean URM buildings with a seismic load level that was less than 10% (0.5g) of full code load levels (NBS).

Currently, the Building Act 2004 defines earthquake prone buildings as buildings are those which will have their 'ultimate capacity exceeded in a moderate earthquake.'[11] A moderate earthquake means, in relation to a building:

> an earthquake that would generate shaking at the site of the building that is of the same duration as, but that is one-third as strong as, the earthquake shaking (determined by normal measures of acceleration, velocity, and displacement) that would be used to design a new building at that site.[12]

In simple terms, a building may be considered earthquake-prone if it is assessed to be less than one-third of the current standard for new buildings (<33%NBS). This provision relates to all types of buildings, not just URM, with the exception of residential unless the residential building comprises 2 or more storeys and contains 3 or more household units.[13]

Earthquake loading standards have always been adopted by territorial authorities at varying levels.[14] During the 1970s/1980s, Wellington City Council adopted the most active and high profile approach:

> Wellington City, in particular, took a proactive stance to identifying and removing perceived earthquake risk buildings from the mid-1970s to the late 1980s. While the action by Council to remove (by demolition) earthquake risk buildings in Wellington was driven by a desire to safeguard people, the Council was also criticised by the heritage community for failing to prevent the demolition of important heritage buildings.[15] This resulted in a number of high profile preservation campaigns such as the Public Trust Building, Wellington Town Hall and St James Theatre during the late 1970s and early 1980s.[16]

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[9] Jason Ingham and Michael C. Griffith, *The Performance of Unreinforced Masonry Buildings in the 2010-2011 Canterbury Earthquake Swarm,* Report to the Royal Commission of Inquiry, August 2011, pp 4-15
[10] Robert McClean, 'Towards improved national and local action on earthquake-prone heritage buildings, NZHPT, 8 July 2010, p 27
[11] Section 122(1)(a) Building Act 2004
[12] Building (Specified Systems, Change the Use, and Earthquake-Prone Buildings) Regulations 2005
[13] Section 122, Building Act 2004
[14] Robert McClean, 'Towards improved national and local action on earthquake-prone heritage buildings, NZHPT, 8 July 2010
[15] Victoria University School of Architecture and NZHPT, 'New Lives for Old Buildings' Conference, April 1980
[16] Robert McClean, 'Towards improved national and local action on earthquake-prone heritage buildings, NZHPT, 8 July 2010, p 27

In Christchurch, the Municipal Corporations Act 1968 and the establishment of the New Zealand Society of Earthquake Engineering (also occurring in 1968), resulted in growing awareness about earthquake risks to existing buildings. The School of Civil Engineering at the University of Canterbury also contributed towards public information and knowledge about earthquake-related risk. Another significant influencing agency was the Ministry of Works and Development (MWD) who provided primary advice and assistance about Government-owned buildings.

This awareness aimed to change complacent views in Christchurch about earthquake risk. For example, the *Christchurch Press* reported in 1973 that Professor R. Park of the University of Canterbury considered 'there was so much complacency about earthquakes in the public mind here [Christchurch]. One reason of course is that we have had few earthquakes in urban areas. Christchurch, I agree, has just as much chance of bearing the brunt of an earthquake as Wellington or Napier have.'[17]

Structural assessments of buildings have contributed towards improved understandings about earthquake risk at an individual property level. As an example, Morrison Cooper Ltd provided the following structural performance table for the Nurses Memorial Chapel structural strengthening feasibility report in 1989. The table provided a summary of seismic intensity, peak ground acceleration, mean return period, probability and qualitative assessment of earthquake induced damage.

| **Nurses Chapel, Christchurch Earthquake Resistant Performance[18]** | | | | | |
|---|---|---|---|---|---|
| **MM Seismic Intensity** | **Peak Ground Acceleration** | **Mean Return Period (years)** | **Probability of Equal or Greater Event Occurring Within:** | **Qualitative Assessment of Earthquake Induced Damage** | |
| | | | | **Un-strengthened Building** | **Strengthened Building** |
| 6 | 0.025 g | 14 | 50 years: 98%<br>100 years: 100% | No damage | No damage |
| 7 | 0.05 g | 48 | 50 years: 65%<br>100 years: 88% | Minor cracking | No damage |
| 8 | 0.10 g | 160 | 50 years: 27%<br>100 years: 47% | Cracking becoming more extensive, particularly along mortar joints. Ornamentation falling off. Minor Life Risk | No damage |
| 9 | 0.20 g | 600 | 50 years: 8%<br>100 years 15% | Severe damage with loss of gable ends and failure of bond beam/brickwork area with probable loss of brickwork. Life Risk | Significant damage in the form of cracking and loss of minor elements |
| 10 | 0.40 g | 4000 | 50 years: 1%<br>100 years: 2% | Near total collapse.<br>Life Risk | Severe damage with probable partial collapse of some building elements. Life Risk. |

[17] 'Complacency over quakes', *Christchurch Press*, 2 October 1973

[18] Adapted from Nurses Chapel, Christchurch, Earthquake Resistant Performance, Morrison Cooper Ltd, ' Nurses Chapel Christchurch Hospital Christchurch, Structural Strengthening Feasibility Report, July 1989, p 14

The Morrison and Cooper report for the Nurses Chapel highlighted the issue of vulnerability of ground shaking due to underlying soft soils as it was considered that 'mircozone areas of foundation soil/building response will markedly effect the damage generated at any given earthquake event.'[19] This issue became a defining matter for the assessment of earthquake-prone buildings in Christchurch over the 1990s and 2000s. In 1993, Holmes Consulting Group commented with regards to the Arts Centre:

> Over the preceding decade, successive reappraisals of Christchurch's seismicity have resulted in a steady increase in the perceived level of seismic hazard. This is partly as a consequence of further information being gathered on the various contributing faults and partly from a better understanding on the effect of the deep layers of alluvially deposited material which Christchurch stands on. The net effect of this is that Christchurch is now assessed as having as severe a seismic hazard as Wellington for earthquakes of medium intensity, which could have serious implication for the Arts Centre, despite the fact that this is not recognised in current loadings codes.[20]

Earthquakes overseas also influenced greater awareness in Christchurch. The Friends of the Catholic Cathedral of the Blessed Sacrament dedicated their October 2001 publication to the issue of earthquakes:

> **NOT IF, BUT WHEN**
>
> On 24th June 2001, an earthquake measuring 7.9 on the Richter scale struck the city of Arcquipa, Peru, famed for its colonial architecture and its beautiful cathedral. The quake, which lasted only one minute, left 70 people dead, 550 injured and the cathedral badly damaged.
>
> More than seventy-five years have passed since Canterbury last experienced an earthquake which gave rise to considerable damage, but voices now constantly raised are warning of a major earthquake to come; they say it is not a case of if, but when. Peter Kingsbury, hazard analyst for the Canterbury Regional Council, believes there is a 95 per cent chance of Canterbury experiencing a magnitude 6 earthquake within the next twenty years. Bob Park, Emeritus Professor of Civil Engineering at Canterbury University, says there is a 65 per cent chance that Christchurch will be hit by a major quake in the next fifty years. [21]

While awareness, such as the example of the Friends of the Catholic Cathedral newsletter illustrates, did result in strengthening work, such work was influenced by the developing understanding of the soil and ground structure of Christchurch which had a substantial impact on affordability. As indicated in this report with regard to the Catholic Cathedral of the Blessed Sacrament, it was discovered in 2002 that the seismic ground shaking at the site was 'likely to be about three times stronger than that implied by the current New Zealand Loadings Code' and this meant that full strengthening of the Cathedral was not feasible due to the ground conditions.[22]

John Wilson's book *Lost Christchurch* provides an insight into the impact of earthquake risk awareness and heritage buildings.[23] This impact involved demolition and substantial modification by the removal of parapets, cornices and chimneys and some strengthening work.

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[19] Morrison and Cooper Ltd, ' Nurses Chapel Christchurch Hospital Christchurch, Structural Strengthening Feasibility Report, July 1989, p 13

[20] Holmes Consulting Group Ltd, *The Arts Centre Stage Three Strengthening Report,* for the Arts Centre of Christchurch Trust, November 1993

[21] 'Newsletter Friends of the Cathedral', No.46, October 2001

[22] Holmes Consulting Group Ltd, 'Catholic Cathedral Seismic Securing Proposal', prepared for the Catholic Cathedral Trust, 12 February 2002

[23] John Wilson, *Lost Christchurch,* Te Waihora Press, Springston, NZ, 1984

Demolition, as a result of fears of earthquake risk, often involved large URM institutional buildings. Examples include Addington School, Supreme Court Building, Waltham School and Sunnyside Hospital.[24] Proposals for demolition also confronted the Normal School in Cranmer Square and Christ's College in the 1960s/1970s. Mr A.H. Johnston, former structural engineer with MWD was quoted in the *Christchurch Star* on the need to demolish the Normal School:

> Nearly all the features known from bitter experience in New Zealand, California, Chile, Japan, Peru and many other places to be bad weaknesses under earthquake exist in this one building [the Normal School] – no building frame, not even concrete bands, deteriorating mortar, heavy ornamental stonework, masonry parapets and no tie between floors and walls, or roof and walls.[25]

As in the case of the Normal School and Christ's College, the issue of earthquake risk often arose when URM buildings began to be designated for architectural or historic interest by Christchurch City Council and/or the NZHPT. The MWD frequently submitted in opposition to designation on the basis of earthquake-risk buildings.[26]

Also in the early 1970s, Christchurch City Council, began to develop a policy to reduce earthquake risk under the Municipal Corporations Act 1968. The Council estimated that about 'two-thirds of the buildings of the central business district of Christchurch were thought to be earthquake risks, needing to be strengthened or replaced to avoid unnecessary injury or loss of life in an earthquake.[27] Wilson notes that the Council conducted a 'block-by-block survey' in 1972 and this survey resulted in the removal of potential falling hazards such as removal of parapets, cornices and chimneys. According to Wilson, this resulted in the removal of parapets and other architectural details from buildings such as the Opera House on Tuam Street, Warners Hotel and the Press Building.[28]

As in the case of Wellington and Auckland, proposed demolition of significant heritage buildings was opposed by the public and organisations such as the Christchurch Civic Trust and the NZHPT during the 1980s. This opposition questioned Council's approach to heritage buildings at risk. Writing in 1984 Wilson summed up the tension between heritage preservation and public safety:

> The most hazardous buildings are the older two-and three –storey commercial buildings, usually built of brick, which were put up before the 1931 Napier earthquake prompted a rewriting of New Zealand's building codes. These are the very buildings which to a large extent still set the interesting and appealing character of downtown Christchurch. They are crucial to the City's character because of their scale and proportions and the variety of their detailing and must be retained in significant numbers if Christchurch is to retain a claim of being a city of historical and architectural character.
>
> No-one can fault the City Council for its concern for public safety. But the Council is in the anomalous position of endeavouring to protect some buildings out of a concern for the City's character but at the same time threatening that character by requiring the owners of old downtown buildings which are earthquake risks to strengthen them or tear them down. The response of most owners to the requirement that they either strengthen or demolish an old building is to knock the building down.[29]

For heritage buildings, Council did develop a flexible approach to meeting the requirements of the Municipal Corporations Act 1968 and later building legislation. In the case of large and significant

[24] ibid, pp 55-59
[25] 'Demolition answer for school', *Christchurch Star,* 24 October 1970
[26] 'College Earthquake Risk', *Christchurch Press,* 28 February 1970
[27] John Wilson, *Lost Christchurch,* Te Waihora Press, Springston, NZ, 1984 , p 51
[28] ibid, p 77
[29] John Wilson, *Lost Christchurch,* Te Waihora Press, Springston, NZ, 1984, p 51

heritage buildings such as the Canterbury Museum, Arts Centre and Christ's College, the Council developed a policy to find agreement with the owners on an affordable programme of strengthening over a considerable period of time and providing variations in achieving of standards established under the building code.[30] This approach, which appears to have also applied to major heritage building alterations/refurbishments, may have influenced a less regulatory tactic for heritage buildings which is indicated by the fact that very few copies of section 124 notices to demolish or fix heritage buildings issued under the Building Act 2004 (or earlier legislation) are located on the NZHPT's Christchurch file prior to September 2010.

**Earthquake strengthening and heritage planning processes**

Heritage planning emerged during the 1960s and 1970s in two primary ways. Firstly, the National Historic Places Trust (which was established in 1955 and became the NZHPT in 1980), led the research and classification of a large number of buildings deemed to be of historic interest. The NZHPT, as influenced by the work of the Classification of Historic Buildings Committee, was responsible for the identification and classification of some 3,414 historic buildings nationwide by 1984.[31] These buildings make up the original core of the NZHPT's Register under the Historic Places Act 1993 today.

Secondly, during the 1960s/1970s the involvement of local authorities in historic buildings developed under the Town and Country Planning Acts 1952 and 1977, when local authorities were empowered to regulate to achieve the preservation or conservation of historic buildings under district schemes.

The first district scheme for Christchurch became operative in 1962 and this was updated in 1972 by the second district scheme. The first historic buildings were listed in Appendix K of the district scheme in November 1968 as objects or places of historic interest. Despite this listing, there was some uncertainty at the time if historic buildings could be 'protected' under the Town and Country Planning Act 1952.

In 1974, the Christchurch City Council initiated Change 40 to its operative district scheme to extend the list of historic buildings and outlined three levels of protection: Group 1 protected; Group 2 deserves protection; Group 3 listed and recorded. While demolition became regulated for Group 1 and 2 items, the NZHPT's file suggests that the district scheme rules did not regulate earthquake strengthening work and often involved no consultation requirements with the NZHPT.

By 1982, the district scheme listed 190 historic buildings and objects. This list was reviewed and expanded during the late 1980s which coincided with the classification of historic buildings by the NZHPT under the Historic Places Act 1980.

District schemes were replaced with district plans under the Resource Management Act 1991 and Christchurch City Council notified the first proposed district plan in 1995. This plan contained 570 heritage building, places and objects in four categories: Groups 1-4.[32]

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[30] Holmes, Wood, Pool & Johnstone Ltd, 'The Arts Centre of Christchurch', Report of Strengthening of Buildings to Resist Earthquakes.', 25 March 1982

[31] Rebecca O'Brien, 'Registration under the Historic Places Act 1993' unpublished paper for the NZHPT Heritage Planning Summer School, January 2005, p 3

[32] The four groups of the Christchurch City Plan heritage schedule are: **Group 1** listed heritage items include buildings, places and objects of international or national significance, the protection of which is considered essential.
**Group 2** listed heritage items include buildings, places and objects which are of national or regional importance, the protection of which is seen as very important where this can be reasonably achieved.
**Group 3** listed heritage items include buildings, places and objects which are of regional or metropolitan significance, the protection of which is seen as important where this can be reasonably achieved.

Appendix 1 of this report provides an overview of earthquake-risk related regulation for New Zealand, including a summary of heritage rules under the Christchurch City Plan. In Christchurch, most types of earthquake strengthening of listed heritage buildings was essentially treated as an 'alteration' under the Central City Plan which meant that either a controlled activity (for Groups 3 & 4) or discretionary activity (for Groups 1 & 2) consent was required from Christchurch City Council. The NZHPT was usually consulted as an affected party for alterations and other activities involving buildings registered under the Historic Places Act 1993. This regulation reflected a growing concern with some types of earthquake strengthening work which was considered as having too severe impact on heritage fabric.

In addition to the RMA, the other regulatory requirements for earthquake strengthening involved building consent approval from the local authority under the Building Act 2004 and possibly an archaeological authority from the NZHPT under the Historic Places Act 1993 if the work involved changes to land and buildings relating to pre-1900 human activity in terms of the legislative definition of an archaeological site.

Research for this report does suggest that the regulatory requirements for earthquake strengthening did increase under the RMA and did result in the need for longer planning timeframes. This planning system aimed to ensure that the proposed work was appropriate in terms of the heritage value of the building and the author is unaware of any resource consent applications for earthquake strengthening work being declined by Christchurch City Council.

Following the Darfield earthquake of 4 September 2010, a national civil defence emergency was declared and Urban Search and Research (USAR) teams were deployed to carry out initial structural assessments and carry out emergency protective works. The Civil Defence National Controller was empowered to issue decisions regarding demolition, partial demolition, shoring and repair during the national civil defence emergency which lasted until 16 September 2010. During this period, the Christchurch City Council heritage team and NZHPT provided advice to the Civil Defence Controller with regard to demolition and other heritage-related decisions.

The Darfield earthquake resulted in the demolition of eight listed heritage buildings. Of the eight, four were registered under the Historic Places Act 1993. The most prominent of these were Homebush Homestead and Manchester Courts building. The proposed demolition of the Manchester Courts Building, in particular, was opposed by some members of the public, including a street protest. On the basis of the engineering advice, risk to public safety and the damage sustained to the building from the Darfield earthquake, the NZHPT did not oppose the demolition of the Homebush Homestead and the Manchester Courts Building.

Following the lifting of the national civil defence emergency after 16 September 2010, heritage regulation defaulted back to the Christchurch City Council with the NZHPT providing an advisory role. Despite some regulatory processes being fast-tracked and streamlined under Orders in Council (including the archaeological authority process under the Historic Places Act 1993), the heritage rules under the RMA continued including resource and building consenting requirements for earthquake strengthening, alterations and additions.

National Civil Defence authorities resumed control on 22 February 2011 and exercised authority until the lifting of the state of emergency on 30 April 2011. With the lifting of the Civil Defence emergency, powers were granted to the Canterbury Earthquake Recovery Authority (CERA) under the Canterbury Earthquake Recovery Act 2011. Section 38 empowers CERA to carry out any

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**Group 4** listed heritage items include buildings, places and objects which are of metropolitan significance and/or involve a contribution to the heritage of the city, the protection of which is seen as desirable by the Council.

demolition, reconstruction, alteration or extension to any part of any building. Under CERA, the advisory role of NZHPT and Christchurch City Council was limited to listed Group 1 & 2 in the Christchurch City Plan heritage schedule and historic places, historic areas, wāhi tapu and wāhi tapu areas registered under the Historic Places Act 1993. Under the CERA regime, however, Christchurch City Council still regulates alterations and additions to listed heritage places under the RMA, including earthquake strengthening.

As required by the Canterbury Earthquake Recovery Act 2011, Christchurch City Council introduced the new draft Central City Recovery Plan in 2010 (the draft recovery plan). The draft recovery plan proposed to amend the heritage rules of the Central City Plan for the central area. As a result of public submissions, the finalised draft recovery proposes that earthquake strengthening of Group 1 and 2 listed heritage buildings is a controlled activity and earthquake strengthening of Group 3 and 4 listed buildings is a permitted activity. This draft plan is currently awaiting approval of the Minister.

The following table provides a summary of heritage-related regulation for earthquake-risk and strengthening in Christchurch since the 1960s.

| Summary Heritage and Earthquake-Related Regulation, Christchurch, 1950s-2012 | | | |
|---|---|---|---|
| **Date** | Legislation | Agency | Details |
| **1950s-1970s** | Historic Places Act 1954 | NZHPT | Established the National Historic Places Trust (which was renamed in 1963 as the NZHPT) |
| | Local Municipal Corporations Act 1968<br>Local Government Act 1974 | Christchurch City Council | Introduction of local authority earthquake-prone building powers |
| | Town & Country Planning Act 1952/ 1977 | Christchurch City Council | Beginning of regulation of demolition of listed heritage buildings. No apparent regulation of earthquake strengthening of listed heritage buildings |
| **1980** | Historic Places Act 1980 (continued by the current 1993 Act) | | Note, archaeological authority requirements for pre-1900 archaeological sites was introduced in 1975 |
| **1991** | Building Act 1991 | Christchurch City Council | Building consent requirements for alterations and demolition. Earthquake-prone building powers |
| **1995** | RMA | Christchurch City Council | Regulation of earthquake strengthening of listed heritage buildings as alteration (controlled or discretionary activity). Consultation required with NZHPT as affected party for registered historic places |
| **2004** | Building Act 2004 | Christchurch City Council | Building consent requirements for alterations and demolition. Earthquake-prone building powers and policy |
| **4-16 September 2010** | Civil Defence and Emergency Management Act 2002 | Civil Defence Controller | Authority over demolition and other works during civil defence emergency |
| **16 September 2010-22 February 2011** | RMA | Christchurch City Council | Regulation of earthquake strengthening of listed heritage buildings as alteration (controlled or discretionary activity). Consultation required with NZHPT as affected party for registered historic places |
| **22 February – 30 April 2011** | Civil Defence and Emergency Management Act 2002 | Civil Defence Controller | Authority over demolition and other works during civil defence emergency |
| **After 30 April 2011** | Canterbury Earthquake Recovery Act 2011 | CERA | Authority over demolition and other works |
| | RMA | Christchurch City Council | Regulation of alterations (including earthquake strengthening) of listed heritage buildings |

## Conservation plans

In addition to regulatory planning processes, many heritage places are part of non-regulatory conservation planning. Conservation planning is important to the on-going repair, maintenance and survival of heritage places.

Internationally, conservation planning is undertaken by owners and heritage agencies with the assistance of a conservation plan. A conservation plan is a non-statutory document prepared for the management and conservation of a specific historic place. A conservation plan sets out a general strategy for the long term management of a heritage place. It should guide day to day maintenance, longer term development proposals and specific initiatives to adequately protect the item's heritage fabric. It is a document containing all the reasonably accessible information that can be found about a heritage place.

A conservation plan would normally include (where appropriate) title information about the land, maps, sketches and plans, recent and historical photographs and information about the people connected to the place. From this information basis, the conservation plan outlines the significance of the place and outlines policies for the preservation of the essential qualities of the place, and for the future development that define the limits of acceptable change, can then be established. Conservation plans can also make provision for aspects of 'intangible heritage' such as recording of traditional stories and the development of new methods of interpretation. Guidance for preparing conservation plans is outlined in the NZ ICOMOS Charter 2010 and available from the NZHPT.[33]

For the purposes of this research, 18 conservation plans held by the NZHPT were reviewed as indicated in the report references. It was found that the conservation plans do not take a uniform approach to earthquake-risk related issues. Generally, the older conservation plans (dating from the 1990s) gave substantial attention to earthquake-risk issues and often included structural assessments as appendices. Examples of these plans include the *Canterbury Provincial Council Buildings Conservation Plan* 1991, the *Canterbury Museum Conservation Plan*, 1992, the *Arts Centre Christchurch Conservation Plan*, 1991, and the *Government Buildings Conservation Plan*, 1993. A number of conservation plans also contain explicit policies for earthquake strengthening such as those plans prepared for the Excelsior Hotel (1998), Jubilee Clocktower (2000), and Provincial Council Building (revised plan, 2009).

A number of conservation plans, however, give less explicit attention to earthquake-risk related issues. As examples, the conservation plans for Timeball Station (2000), Cranmer Centre (2002), Municipal Chambers (2000), Former Convent and Chapel (Music Centre of Christchurch, 2006) and St Luke's the Evangelist (2006) contain no explicit earthquake risk or strengthening policies. The Municipal Chambers conservation plan of 2000 is identified, in particular, because the plan did note that the structural integrity of the building was doubtful with regard to the chimneys, toilet block and cracks in walls and yet the plan itself contained no policies or timeframes for strengthening work. Meanwhile, the conservation plan for St Luke's the Evangelist (2006), while not having explicit strengthening policies, still included a schedule of works which included the need for a structural assessment and this did result in some strengthening works being undertaken.

On the basis of this research, further work appears to be necessary to develop guidance for conservation plans with regard to earthquake-risk issues and heritage buildings.

[33] Greg Bowron and Jan Harris, *Preparing Conservation Plans*, NZHPT, 2000

# Overview of research findings

## Damage Assessment, September 2010 – June 2011

The damage classification system adopted by the NZHPT uses the categories of minimal or no damage, moderate damage, severe damage, major damage and collapse. This system aligns to the general damage classification system set out by the Applied Technology Council (ATC)[34] as follows:

| NZHPT's damage assessment categories | ATC General Damage Classification (ATC, 1985) | Associated damage value % |
|---|---|---|
| **Minimal damage** | Insignificant or none | 0-10% |
| **Moderate** | Moderate | 10-30% |
| **Severe damage** | Heavy | 30-60% |
| **Major damage** | Major | 60-100% |
| **Collapse** | Destroyed | 100% |

The NZHPT assessed the observed level of damage arising from the earthquakes from 4 September 2010 to 26 December 2010. A further re-assessment was undertaken following the earthquakes of January-June 2011. This report has also noted additional damage arising from the July 2011-January 2012 earthquakes.

As indicated in Figure 1 and the table below, the level of damage was largely either minimal or no damage or moderate damage by the end of 2010. Only one building of the 100 heritage buildings was severely damaged and demolished being the Manchester Courts building. Some 52 buildings had only minimal damage and another 44 sustaining moderate damage.

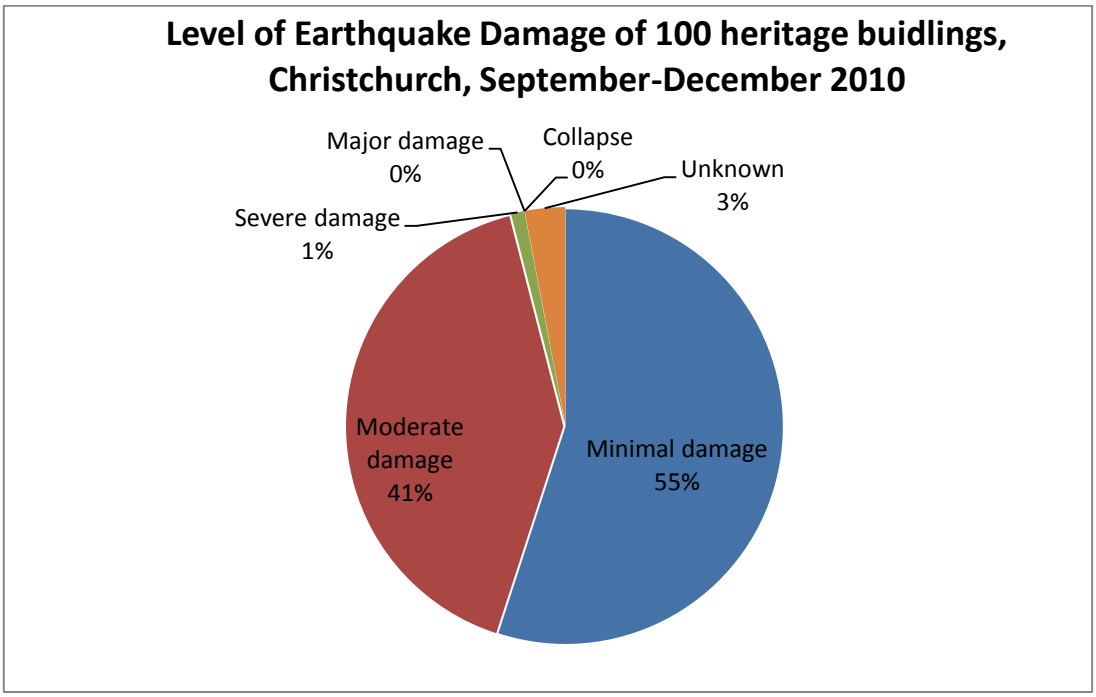



**Figure 1**

[34] Applied Technology Council (ATC), 1985, *Earthquake Damage Evaluation Data for California*, Redwood City, CA, ATC-13

This situation changed dramatically with much greater damage occurring following the January-June 2011 earthquakes. The damage resulted in the collapse of 3 buildings with major and severe damage to 51 buildings with only minimal damage to 11 buildings of the 100 sample list (Figure 2). Nearly all of the severe and major damaged buildings have been demolished.

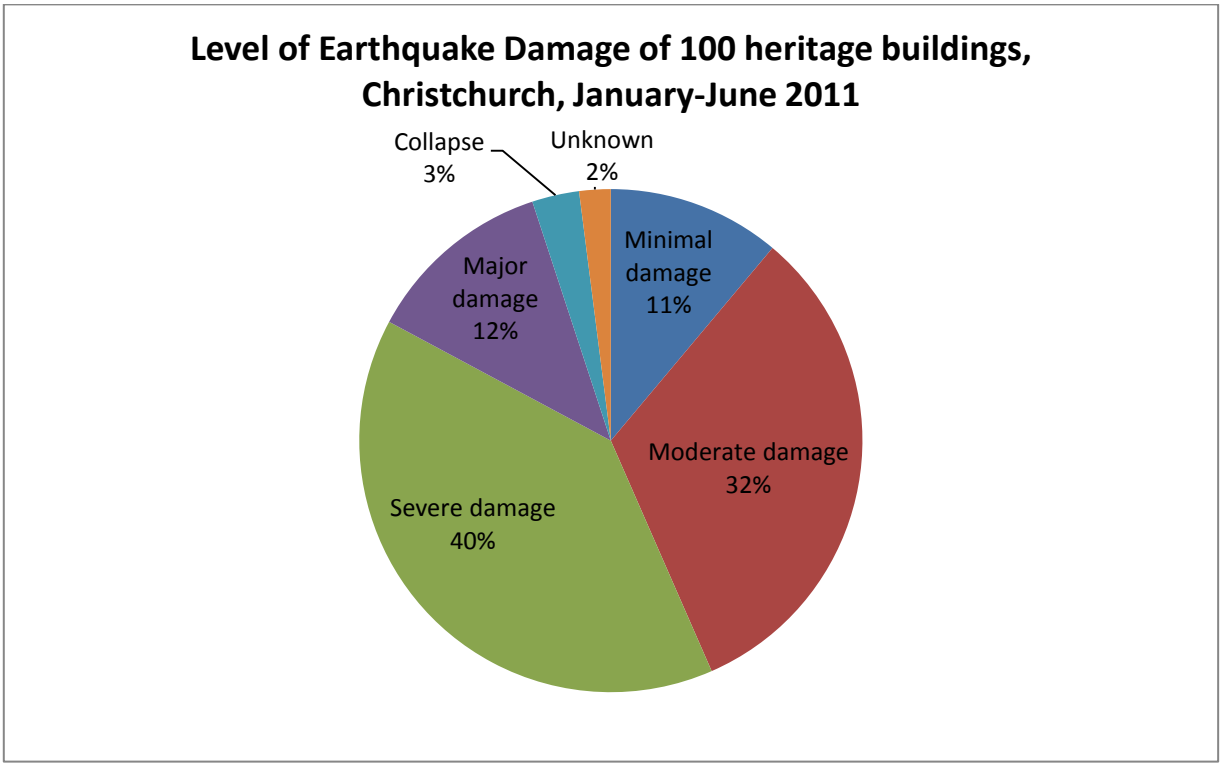



**Figure 2**

| Damage Assessment of 100 Heritage Buildings, Christchurch, September 2010-June 2011 | | | | | | |
|---|---|---|---|---|---|---|
| | **Minimal damage** | **Moderate damage** | **Severe damage** | **Major damage** | **Collapse** | **Unknown** |
| **September-December 2010** | 55 | 41 | 1 | 0 | 0 | 3 |
| **January-June 2011** | 11 | 32 | 39[35] | 12 | 3 | 2 |

[35] Excludes Manchester Courts building

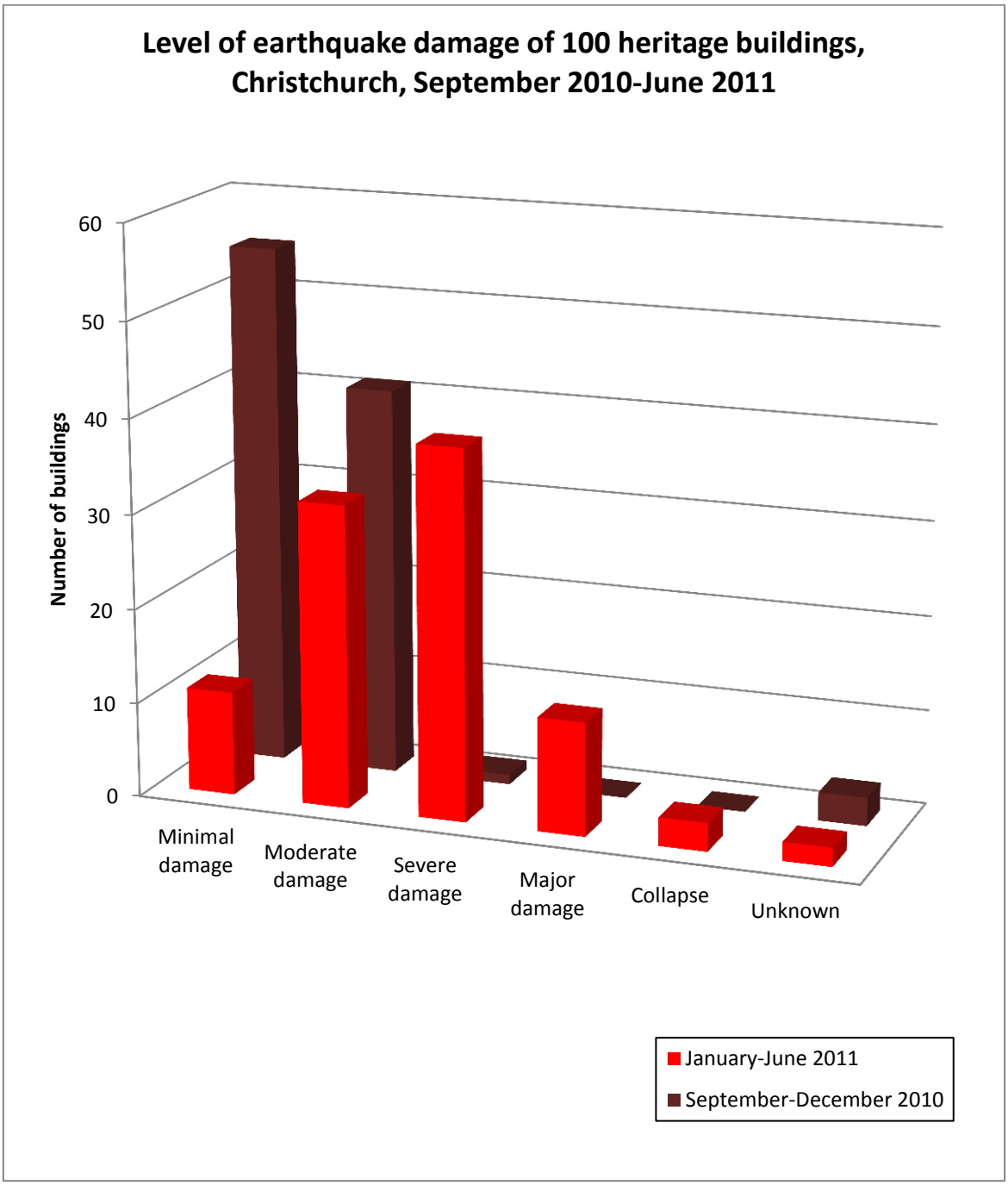



**Figure 3**

## Ownership status and funding assistance

Three main types of ownership status are indicated in this report: private; private as community or heritage trust; and public. These terms are defined as follows for the purpose of this report:

- Private land – land held by any person with the exception of Crown land, land held by Crown entities, local government or other community trust land. Private land includes land held churches organisations.

- Private Trust (community or heritage trust) – land held by community or heritage trusts for the purpose of heritage conservation or other public/community function.

- Public land – Crown land, land held by Crown entities and local government.

One of the most prominent community heritage trusts is the Christchurch Heritage Trust (CHT). CHT was established in 1996 for the purpose of the retention and protection of heritage and character buildings, places and objects in the Christchurch metropolitan area. Since its establishment, the most notable work of the CHT has been in the acquisition, strengthening and sale of heritage buildings. Four buildings related to the CHT are included in this research report: Lyttelton Times Building, Star Times Building, Smith's Bookshop and the Excelsior Hotel.

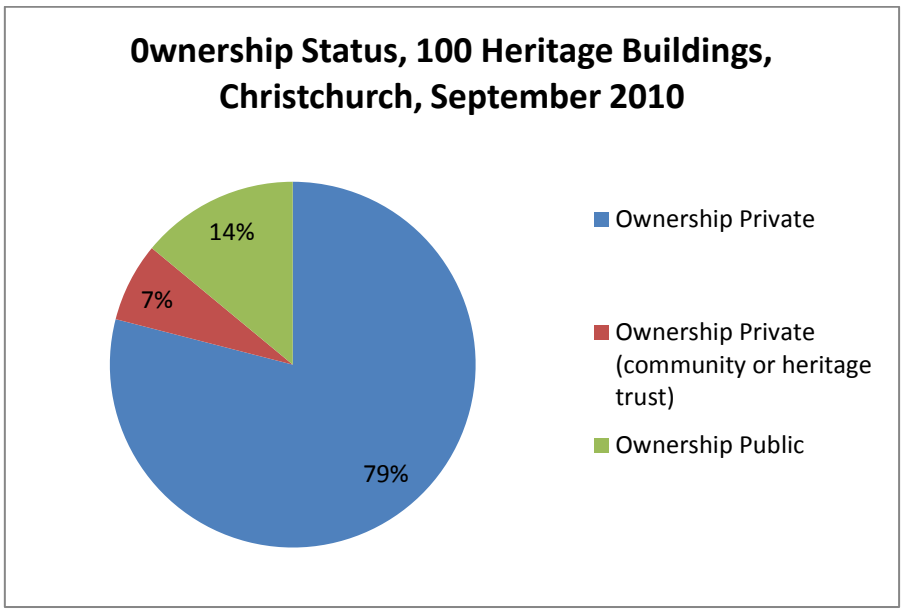
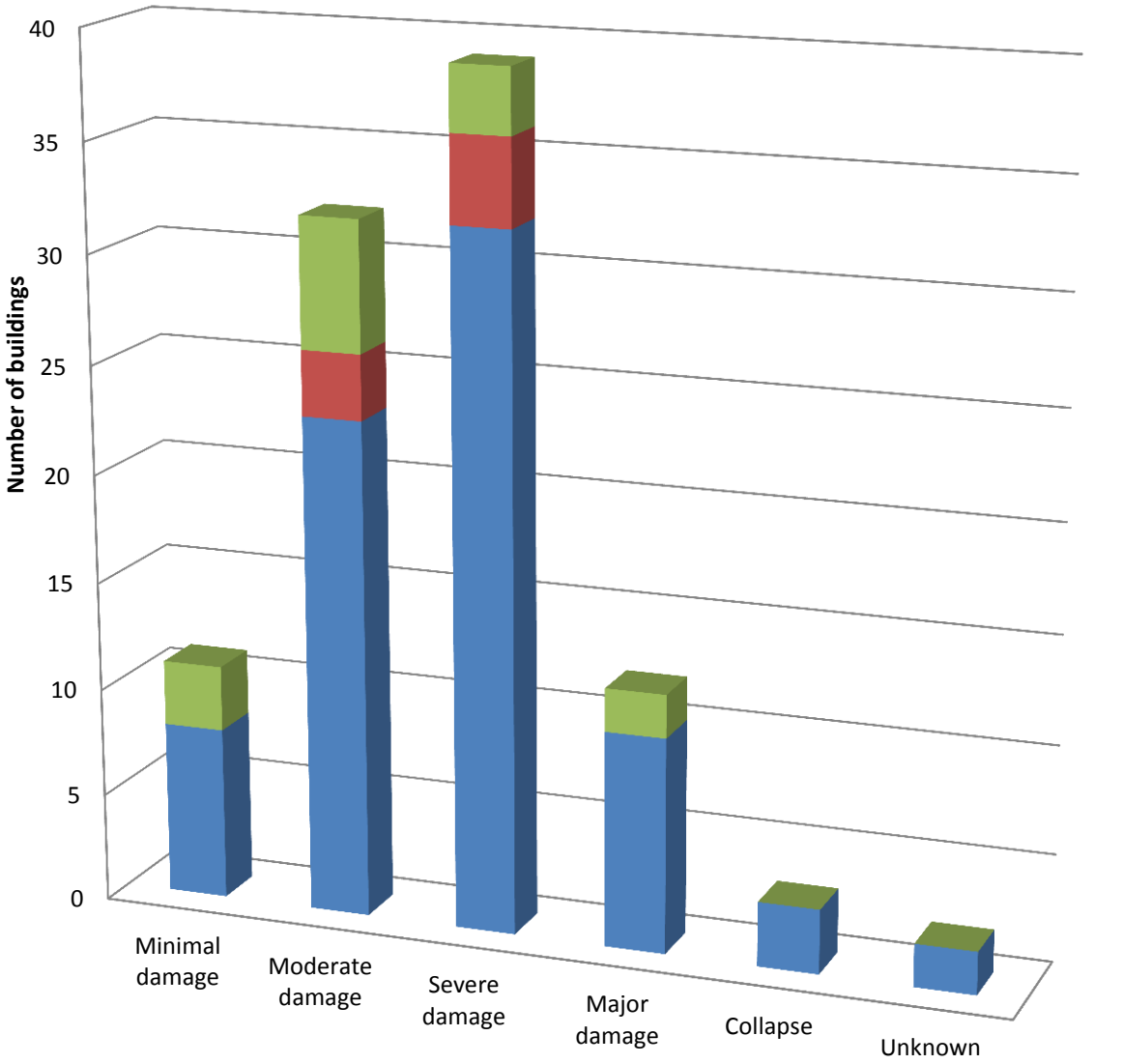



**Figure 4**

As indicated in Figures 4 & 5, the majority of buildings in all damage classes are in private ownership with public and community or heritage trust buildings lying within the minimal-major damage classes. Building damage resulting from earthquakes may be influenced by land ownership since, generally, public or community organisations may have access to funds from Crown or other sources for earthquake strengthening. As an example, New Zealand Lotteries Board funding support is not available to private landowners. Further, buildings such as Canterbury Museum and the Arts Centre have historically received direct funding from the Christchurch City Council as part of its regular annual planning budget.




| | Minimal damage | Moderate damage | Severe damage | Major damage | Collapse | Unknown |
|---|---|---|---|---|---|---|
| Public | 3 | 6 | 3 | 2 | 0 | 0 |
| Private (community or heritage trust) | 0 | 3 | 4 | 0 | 0 | 0 |
| Private | 8 | 23 | 32 | 10 | 3 | 2 |

**Figure 5**

Funding assistance for private landowners of heritage buildings has been limited to the Christchurch City Council's Heritage Incentive Grants Fund (formerly called the Historic Retention Incentive Fund) and the NZHPT's National Heritage Preservation Incentive Fund (NHPIF). The NHPIF is

restricted to registered Category I historic places, historic areas, wāhi tapu of national significance under the Historic Places Act 1993.

It appears from the research for this report that nearly all the major earthquake strengthening works undertaken on heritage buildings has been, to some degree, assisted by funding from the Christchurch City Council or the New Zealand Lotteries Board. Other sources of funding has been the NZHPT, Crown agencies and public donations. A summary of the primary funding assistance sources is outlined in the following table:

| **Sources of Public Funding Assistance for Strengthened Heritage Buildings (of 100 heritage buildings)** | |
|---|---|
| **Strengthened Heritage Buildings** | **Primary funding assistance sources for strengthening** |
| **Lyttelton Times Building** | Christchurch City Council |
| **Music Centre of Christchurch** | Christchurch City Council |
| **Fisher's Building, Cnr High/Hereford Streets** | Unknown |
| **Star Times Building, Gloucester Street** | Christchurch City Council |
| **Crown Hotel** | Christchurch City Council |
| **Arts Centre** | Christchurch City Council, NZ Lotteries Board, other sources |
| **Former Canterbury Provincial Government Buildings** | Christchurch City Council, NZ Lotteries Board, other sources |
| **Christ Church Cathedral** | Christchurch City Council, NZ Lotteries Board, other sources |
| **Former Trinity Congregational Church** | Unknown |
| **Cathedral of the Blessed Sacrament (Roman Catholic)** | Christchurch City Council, NZ Lotteries Board, other sources |
| **Excelsior Hotel, 120 Manchester Street** | Christchurch City Council |
| **Houses (semi-detached), 86-100 Chester Street East** | Unknown |
| **Wards Brewery Historic Area** | NZ Lotteries Board |
| **Former Magistrates Court (Family Court)** | Ministry of Justice |
| **Christ's College** | Christchurch City Council, NZ Lotteries Board, other sources |
| **Former Chief Post Office, Cathedral Square** | Telecom Ltd |
| **St Michael and All Angels Church** | Christchurch City Council, NZ Lotteries Board, other sources |
| **Victoria Street Clock Tower** | Christchurch City Council |
| **Theatre Royal, 145 Gloucester Street** | Christchurch City Council |
| **Former Teacher's College, Peterborough Centre** | Unknown |
| **St Mary's Convent Chapel (Rose Chapel), 866 Colombo Street** | Unknown |
| **Cashfields, 154 Cashel Street** | Unknown |
| **Cashel Chambers, Former Farmers Department Store, 214-234 Cashel Street (façade only)** | Unknown |
| **Canterbury Museum, 9 Rolleston Ave** | Christchurch City Council, NZ Lotteries Board, other sources |

| | |
|---|---|
| **Former Canterbury Society of Arts Building, Environment Court** | Ministry of Justice |
| **Old Government Buildings, Heritage Hotel** | Christchurch City Council, NZHPT |
| **Antigua Boat Sheds** | Christchurch City Council, NZHPT |
| **Nurses' Memorial Chapel** | Christchurch City Council, NZ Lotteries Board, other sources |
| **Canterbury Club** | Unknown |
| **Fleming and McKellar Houses, 138 Park Terrace** | Unknown |

## Construction

As-built construction types are generalised in this report as either unreinforced masonry (URM), timber-framed or other type such as reinforced block-work or steel.

The construction-type has been generalised to account for large or complex heritage places which may have a variety of construction types. For example, the Canterbury Provincial Council Building has distinctive URM stone and timber-framed sections. The table below provides a summary of the as-built construction for multi-type buildings. The generalised construction type has been selected on the basis of the most predominant building material for the purposes of this research report.

**As-built construction type summary for multi-type buildings**

| Name | As-built construction type | Generalised construction type for the purposes of this research report |
|---|---|---|
| **Canterbury Provincial Council Building** | URM and timber-framed | URM |
| **Christ's College** | URM, timber-framed plus reinforced concrete | URM |
| **St Michael's of All Angels** | Timber-framed, URM (stone school building) | Timber-framed |
| **Community of the Sacred Name** | URM, timber-framed | URM |
| **Cranmer Bridge Club** | URM, timber-framed | URM |
| **Old Theatre Royal** | URM, timber-framed | URM |
| **Cathedral of the Blessed Sacrament** | URM, concrete | URM |
| **NZ Express Co. Building (MLC Building or Manchester Courts)** | Reinforced concrete foundations, ground and first floor. URM above first floor with steel ties and standards | URM |

The research indicates that the dominant construction type of the list of 100 heritage buildings is URM (72%) with smaller numbers of timber-framed and other types of construction.

| As-built construction type, 100 heritage buildings, Christchurch | | |
|---|---|---|
| **URM** | **Timber-framed** | **Other (i.e. reinforced concrete)** |
| **72** | **15** | **13** |

The majority of the URM buildings are one or two levels in private ownership (80%) and dominated by commercial (especially retailing) use.

Jason Ingham and Michael Griffith have demonstrated the performance of URM in the Christchurch CBD in the Christchurch earthquake of 22 February 2011.[36] Ingham and Griffith's research, using a sample of 370 buildings, found a high proportion of building damage involving collapse (destroyed), major and heavy (severe).

This research report finds similar levels of damage for URM heritage buildings. By the end of June, 48 URM buildings of the 100 heritage buildings had collapsed or had major and severe damage. This compares with only 6 timber-framed or other types of buildings that had severe or major damage (Figures 6 & 7).

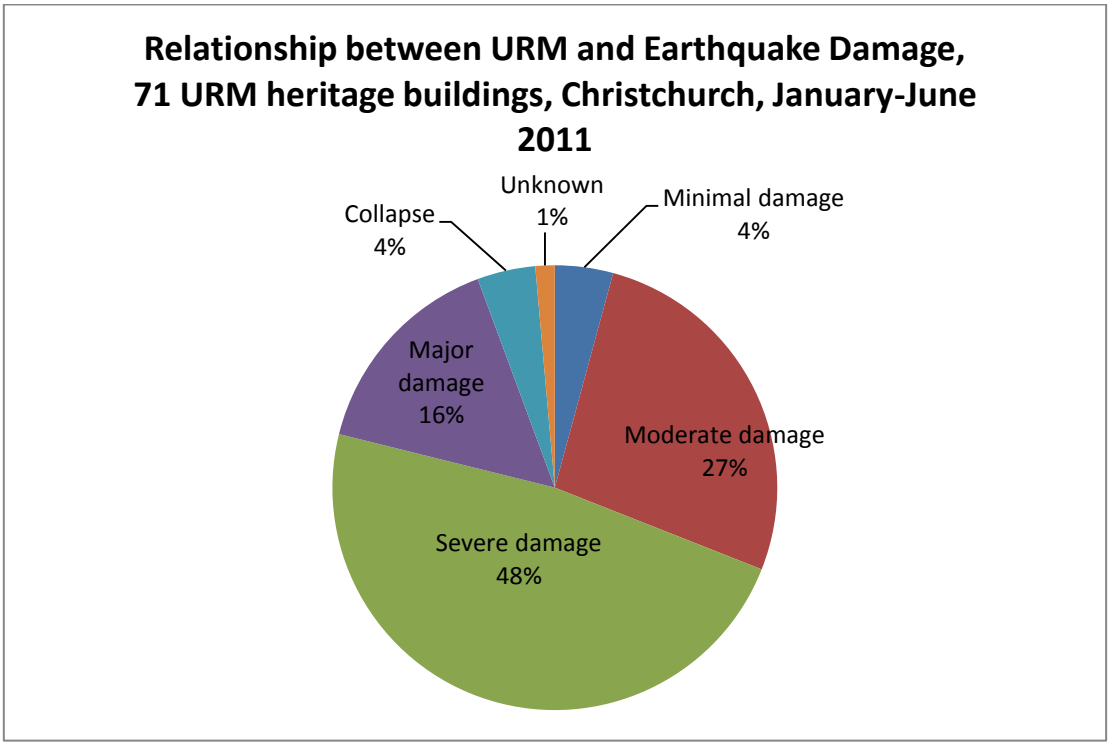
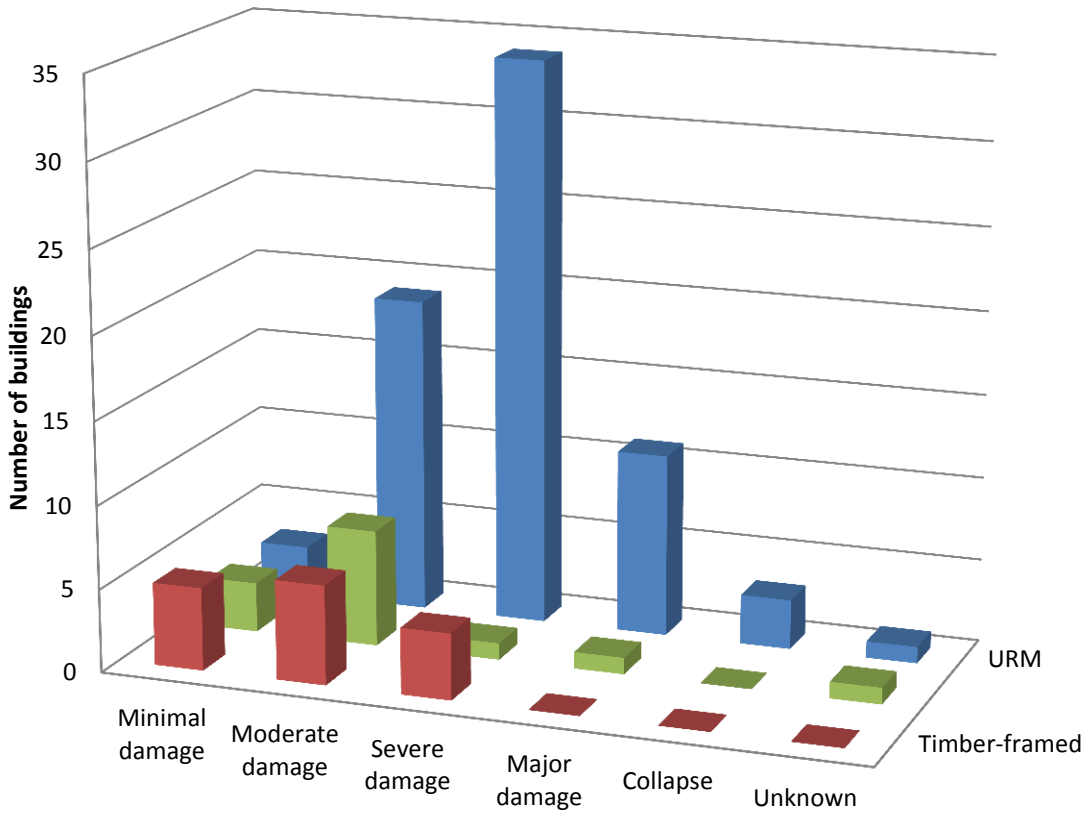



**Figure 6**

[36] Jason Ingham and Michael C. Griffith, *The Performance of Earthquake Strengthened URM Buildings in the Christchurch CBD in the 22 February 2011 Earthquake*, Report to the Royal Commission of Inquiry, October 2011




| | Minimal damage | Moderate damage | Severe damage | Major damage | Collapse | Unknown |
|---|---|---|---|---|---|---|
| Timber-framed | 5 | 6 | 4 | 0 | 0 | 0 |
| Other | 3 | 7 | 1 | 1 | 0 | 1 |
| URM | 3 | 19 | 34 | 11 | 3 | 1 |

**Figure 7**

## Potentially Earthquake-Prone Status

Christchurch City Council maintains a list of potentially earthquake-prone buildings (EQP) for the purposes of the Earthquake-Prone Buildings Policy under the Building Act 2004. A copy of this list of potentially earthquake-prone buildings was accessed for the purpose of this research from the Holmes Consulting Group report of June 2009 – 'Heritage Earthquake Prone Buildings Strengthening Cost Study'.

As indicated in the table, 83 of the 100 buildings were identified as potentially earthquake-prone by the Christchurch City Council as at 2009. Of the 12 of unknown status, 4 were possibly not listed as EQP because they were structures – Edmonds Clock, Band Rotunda and the Worcester, Colombo and Gloucester Street bridges.

| **EQP status, 100 heritage buildings, Christchurch June 2009** | | |
|---|---|---|
| **Potentially EQ prone** | **Not EQ prone** | **Unknown/residential** |
| **83** | **4** | **12** |

With regards to earthquake damage after June 2011, of the 83 potentially EQP buildings (excluding Manchester Courts building):

- 7 survived with minimal damage.
- 27 had moderate damage.
- 34 had severe damage.
- 11 had major damage.
- 3 collapsed.
- 1 building with unknown damage.

These results mean, that for those heritage buildings identified as potentially earthquake-prone by Christchurch City Council in 2009, 58% had severe damage, major damage or collapse by the end of June 2011.

The research for this report, however, indicates that the potentially EQP status indicated by Christchurch City Council was based on an initial desk-top assessment with limited knowledge of building strengthening history. For example, strengthened buildings which experienced minimal damage during the earthquakes (such as the Canterbury Museum, St Mary's Convent Chapel, Former Canterbury Society of Arts Building (Environment Court) and the Antigua Boat Sheds, were identified as having EQP status in 2009.

Conversely, strengthened buildings identified as having EQP status which experienced severe damage and collapse included the Lyttelton Times Building, the Music Centre of Christchurch, Fisher's Building and the Crown Hotel.

## Earthquake strengthening

Earthquake strengthening aims to improve the structural performance of a building. There are a range of methods to improve the structural performance of existing buildings, including heritage buildings. The NZ Society of Earthquake Engineering provides a summary of methods in the guide *Assessment and Improvement of the Structural Performance of Buildings in Earthquakes,* June 2006.[37] For URM and unreinforced concrete buildings, these methods include:

- In-plane strengthening – i.e. concrete shear walls and wall facings, concrete frames, braced steel frames, infilling wall openings, plywood faced shear walls.
- Face-load strengthening – i.e. Floor, roof and ceiling level ties, rosehead washers, mullion supports, parapet bracing, cantilever columns, composite fibre flexural strips, buttressing or propping, helical steel through ties, concrete overlay walls.
- Combined face-load and in-plane strengthening – i.e. Vertical and/or horizontial post tensioning, deep drilling and reinforcing of walls, grouting rubble filled walls, concrete overlay walls.
- Diaphragm strengthening – i.e. plywood overlay diaphragms, boundary connections, chords, drag ties, steel flat overlays, concrete topping overlays, roof and ceiling diaphragms.
- Chimney, towers and appendages – i.e. securing chimney and towers to diaphragms and/or walls, wire tying.[38]

In addition, unnecessary seismic mass can be removed such as roof mounted concrete tanks, chimneys and parapets.

As indicated in this report, earthquake strengthening of heritage buildings in Christchurch occurred over a time, beginning in the early 1970s. The research indicates five general categories of strengthening-related work:

- Type 1. No strengthening work.
- Type 2. Removal of Potential Hazards. This work involves the removal of chimneys and parapets. As stated above, this work was promoted by Christchurch City Council which conducted a 'block-by-block survey' of the CBD in 1972 and this survey resulted in the removal of potential falling hazards such as removal of parapets, cornices and chimneys.
- Type 3. Bracing and ties. Bracing has involved securing chimneys and towers and also parapet and gable bracing with floor, roof and ceiling ties.
- Type 4. Partial strengthening work involving incomplete strengthening or the strengthening of only one part of the building.
- Type 5. Strengthening by concrete shear walls, frames, infilling wall openings, post-tensioning, grouting rubble filled walls (in-plan and face-load strengthening). Most of this type of strengthening work began in the early 1980s.

Excluding work involving the removal of potential hazards, research for this report suggests that about 27% of the 100 heritage buildings had no strengthening work undertaken to the knowledge of the NZHPT.

Partially strengthened buildings (or where strengthening work was in progress at September 2010) account for 16% of the 100 heritage buildings. Some of these buildings had been in a process of substantial planning for strengthening work over a period of time and this work was being undertaken when the first earthquake struck on 4 September 2010. The Provincial Hotel is an

[37] NZSEE, *Assessment and Improvement of the Structural Performance of Buildings in Earthquakes,* June 2006
[38] ibid, pp 13-14-13-20

example where the owners acquired the building in 2007, obtained consents in 2009 and started strengthening work in 2010.

Strengthened buildings account for 30% of the 100 buildings. As indicated in this report, strengthening involved a wide range of techniques and stages of work with the most common methods involving bracing, post-tensioning, steel frames, concrete shear walls, floor diaphragms and grouting rubble filled walls. This figure includes some large and complex heritage places which comprise of a number of buildings constructed and strengthened over periods of time, especially the Arts Centre of Christchurch (26 primary heritage buildings/additions), Christ's College (12 primary heritage buildings) and St Michael and All Angels (3 primary heritage buildings).

Recent earthquake strengthening work has adopted new materials and techniques which can avoid the potential impacts of large concrete shear walls and steel framing. New techniques involves the use of Carbon Fire Reinforced Polymers (FRP) which can be applied to walls forming a new 6mm layer and the use of stainless steel rods to reinforce masonry walls (i.e. Helibar and Heli bond brand rods). This type of '2nd generation' strengthening system has been undertaken in the strengthening of the former 1878 Christchurch Girl's High School (School of Art) building at the Arts Centre of Christchurch which performed with minimal or no damage during the earthquakes.

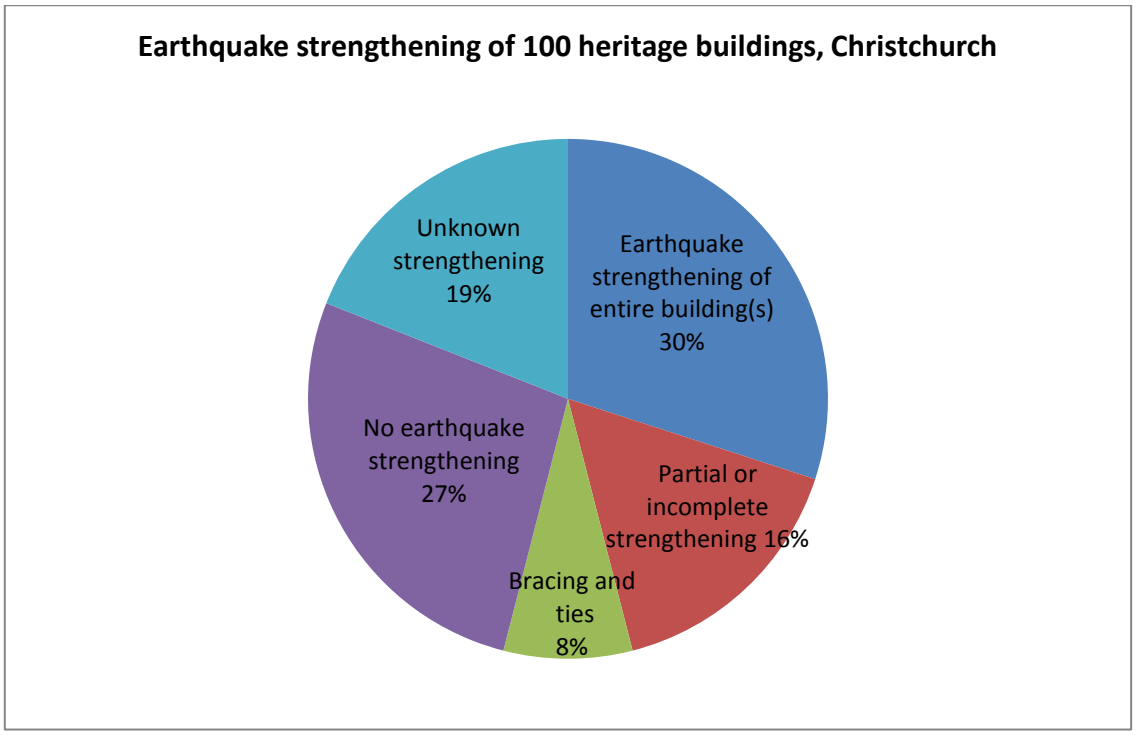



**Figure 8**

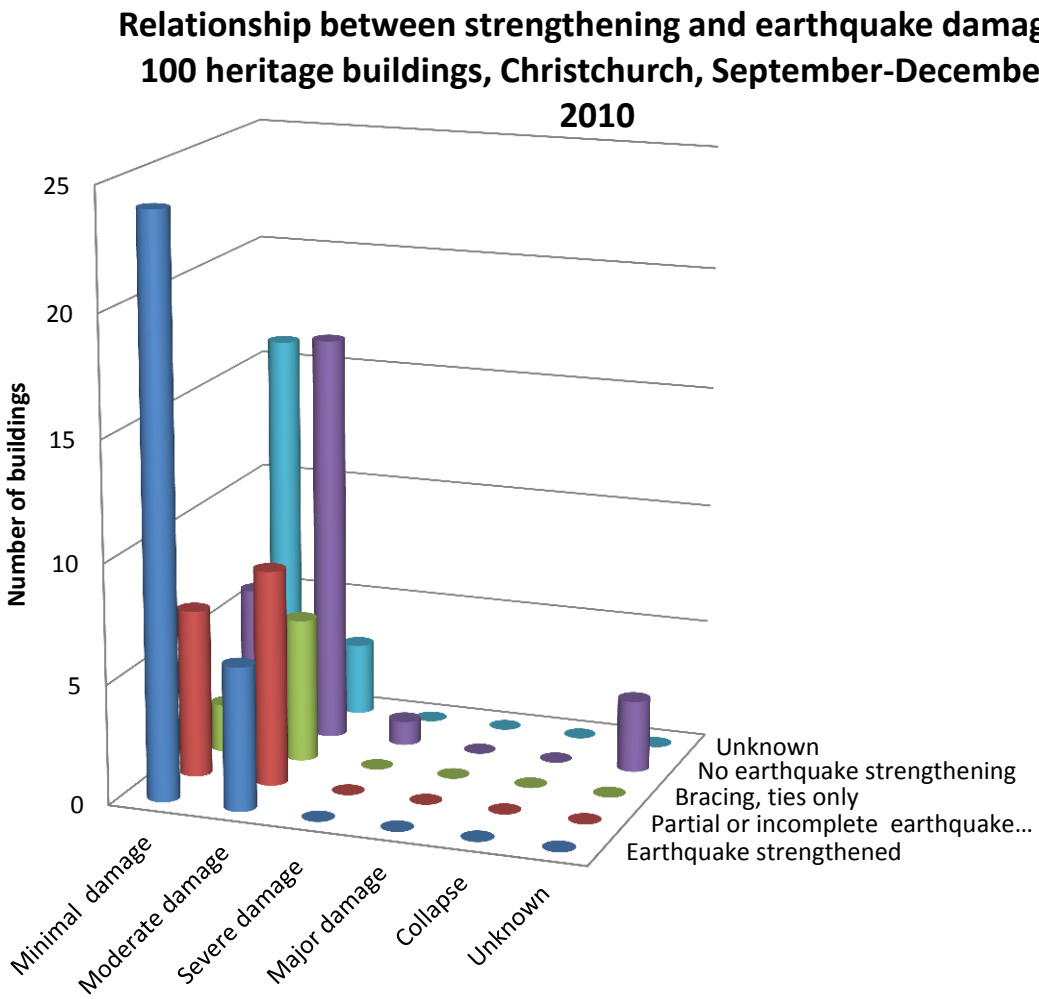
**Earthquake strengthening and earthquake damage**

As would be expected, strengthened buildings performed well during the September-December 2010 earthquakes as indicated in Figure 9. None of the strengthened buildings were severely damaged. The seven strengthened buildings that experienced moderate damage were the Lyttelton and Star Times buildings, Music Centre of Christchurch, Crown Hotel, Canterbury Provincial Council Chambers Building, Trinity Congregational Church and Ward's Brewery. For all of these buildings, damage involved falling chimneys, damaged parapets and masonry wall cracking with, in some cases, damage caused by liquefaction.

The large proportion of heritage buildings that were not strengthened (or only partial strengthening and bracing) sustained moderate damage. This damage was also dominated by falling chimneys, damaged parapets, cracking and from liquefaction. As indicated above, Manchester Courts was the only heritage building (of the sample of 100 buildings) in the Central City that was severely damaged as a result of the Darfield earthquake and was demolished in October 2010. It is worth noting that the severe damage was largely limited to the upper URM levels of the Manchester Courts building.

The Christchurch earthquake of 22 February 2011 and related aftershocks resulted in severe and major damage or collapse for the majority of the 100 heritage buildings (Figure 10). This time, 10 of the severely and major damaged URM buildings had been strengthened. As indicated in the table below the majority of the severe/major damage to strengthened URM buildings involved damage to parapets, towers and spires, gables and masonry wall cracking. It is also noted that five of the severely/major damaged strengthened buildings had been moderately damaged in the Darfield earthquake. Also the greater proportion of the 100 buildings that sustained minimal damaged had been strengthened to some degree and none of the strengthened buildings collapsed.

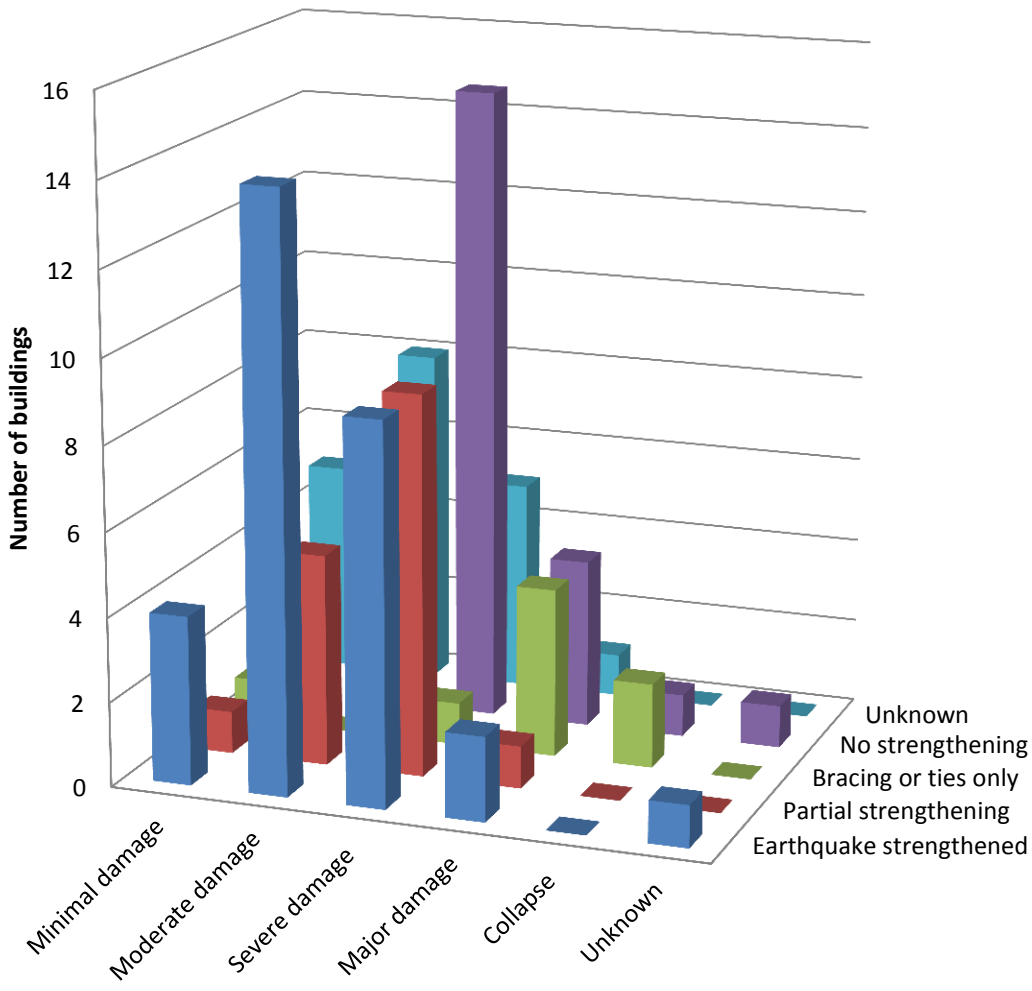
In contrast to strengthened buildings, the majority of URM buildings without strengthening (or only partial strengthening and bracing) collapsed or sustained severe or major damage.




| | Minimal damage | Moderate damage | Severe damage | Major damage | Collapse | Unknown |
|---|---|---|---|---|---|---|
| Earthquake strengthened | 24 | 6 | 0 | 0 | 0 | 0 |
| Partial or incomplete earthquake strengthening | 7 | 9 | 0 | 0 | 0 | 0 |
| Bracing, ties only | 2 | 6 | 0 | 0 | 0 | 0 |
| No earthquake strengthening | 6 | 17 | 1 | 0 | 0 | 3 |
| Unknown | 16 | 3 | 0 | 0 | 0 | 0 |

**Figure 9**

| Severely and Major Damaged Strengthened URM Heritage Buildings (January-June 2011) | | |
|---|---|---|
| **Strengthened Building** | **Damage (January-June 2011)** | **Comment** |
| **Lyttelton Times Building** | Severe - Parapet collapse and cracking | Was moderately damaged in September 2010 and damage repaired, building reopened |
| **Music Centre of Christchurch** | Severe - Collapse of gables and parapets with major cracking | Was already moderately damaged in September 2010 |
| **Fisher's Building** | Severe - Partial collapse of upper level and extensive cracking | |
| **Arts Centre** | Severe damage limited to partial collapse of Observatory Tower, some gables and chimneys, cracking in buildings not recently strengthened | Recently strengthened parts of the Arts Centre performed well with minimal damage |
| **Canterbury Provincial Government Buildings** | Major damage - Collapse of Stone Chamber and Tower, gables and buttresses collapse, partial collapse of Bellamy's | Was already moderately damaged in September 2010. Moderate damage to timber-framed parts of the building. |
| **Christ Church Cathedral** | Severe damage - The top of the tower (the spire) collapsed and the rest of the church was severely damaged. The north wall of the tower was demolished for urban search & rescue | |
| **Trinity Congregational Church** | Severe damage - Tower collapsed and the rest of the church was severely damaged | Was already moderately damaged in September 2010 |
| **Cathedral of the Blessed Sacrament** | Major damage - Partial collapse of twin bell towers, main dome rotated and leaning, key stones and arches badly damaged, severe cracking | |
| **Excelsior Hotel** | Severe damage - Interior damage and cracking | |
| **Ward's Brewery Historic Area** | Severe damage -Partial wall collapse, parapet collapse, cracking | Was already moderately damaged in September 2010 |




| | Minimal damage | Moderate damage | Severe damage | Major damage | Collapse | Unknown |
|---|---|---|---|---|---|---|
| Earthquake strengthened | 4 | 14 | 9 | 2 | 0 | 1 |
| Partial strengthening | 1 | 5 | 9 | 1 | 0 | 0 |
| Bracing or ties only | 1 | 0 | 1 | 4 | 2 | 0 |
| No strengthening | 0 | 5 | 15 | 4 | 1 | 1 |
| Unknown | 5 | 8 | 5 | 1 | 0 | 0 |

**Figure 10**

## Earthquake strengthening targets

While general information about earthquake strengthening is available to the NZHPT, less information is obtainable that indicates the actual level of earthquake strengthening in terms of percentage of New Building Standard (NBS). This is because the bulk of the strengthening-related information within the NZHPT's building files is limited to 'concept plans' for consultative purposes only and does not often include detailed engineering drawings. Despite this limitation, some information about targets was obtained from the NZHPT archive and with the assistance of Jason Ingham, Lisa Moon and Michael Griffith.

| Earthquake Strengthening Targets/Level, 100 heritage buildings, Christchurch | | | |
|---|---|---|---|
| **Above 67%NBS** | **33-67% NBS** | **Less than 33%NBS** | **Unknown** |
| **8** | **11** | 7 | **74** |

As indicated in the table, for 74 of the 100 heritage buildings the level of earthquake strengthening is largely unknown. The NZHPT however suspects, on the basis of research for this report, a large number of the severely damaged 'unknown' buildings would be likely to have a strengthening level of below 33%NBS.

The eleven buildings considered to have a strength of 33-67% NBS include the Theatre Royal (Isaac Theatre Royal), Christ's College, Arts Centre of Christchurch, Old Government Buildings (Heritage Hotel), Nurses Memorial Chapel and the Antigua Boatsheds. It is worth noting that nearly all of these buildings have received some financial assistance for strengthening work from bodies such as the Christchurch City Council, NZHPT or NZ Lotteries Grant Board.

Eight buildings have been identified in the research as being above 67% NBS prior to September 2010. These buildings are:

- Lyttelton Times Building
- Canterbury Times & Star Building.
- Regent Theatre.
- Whitcoulls Building.
- Christchurch Cathedral.
- Former Magistrates Court (Family Court).
- Cashfields.
- Former Canterbury Society of Arts (Environment Court).

In addition, the research for this report suggests that recently strengthened buildings of Christ's College, Arts Centre and parts of Canterbury Museum (including McDougall Art Gallery) would potentially be in excess of 67%NBS. Further, other potential buildings above 67% NBS would include St Luke's Vicarage, the Canterbury Club, St Luke's Chapel and the Fleming and McKellar Houses.

It would be expected that buildings strengthened above 67% NBS would have a greater chance of survival. But of the eight identified, only 1 building survived with minimal damage (the Former

Canterbury Society of Arts, Environment Court building). This statistic, however, should be viewed with caution due to the high number of buildings with unknown strengthening targets.

**Building condition**

Generally, it has been considered that well-maintained buildings have a better chance of surviving an earthquake than poorly maintained buildings. In 1987, Bernard Feilden commented that 'observation shows that well-maintained buildings survive much better than those that are poorly maintained. Indeed it has been estimated that some 50 percent of the damage that occurs in an earthquake may be attributed to lack of proper maintenance'.[39] However, in the context of Feilden's observation, 'maintenance' means taking action on structural decay and weaknesses (for example repairs to foundations) rather than simply painting a building.

Maintenance in New Zealand generally means repair work involving comparable materials or replacement with a comparable component excluding any structural work. The most common types of maintenance work includes:

- Cleaning.
- Painting.
- Repair and replacement of decayed or damaged fabric.
- Re-pointing, patching and sealing exterior masonry and timber.
- Roof repairs.
- Repairs to spouting, internal gutters, downpipes and wastewater.

As part of the research for this report, the status of building condition has been identified prior to the September 2010 earthquake. The condition of the buildings have been assessed using four categories:

1. Poor condition – Buildings known to the NZHPT that have physically deteriorated as a result of lack of maintenance and repair.
2. Fair condition – Buildings known to the NZHPT in variable condition with some evidence of irregular maintenance and repair work.
3. Good condition – Buildings known to the NZHPT in good condition having evidence of regular maintenance and repair work.
4. Insufficient information. Buildings where the condition is not known by the NZHPT.

As indicated in the Figure 11, the research indicates that the majority of heritage buildings (71%) were subject to regular repair and maintenance and were in good condition.

[39] Sir Bernard M.Feilden, *Between Two Earthquakes, Cultural Property in Seismic Zones*, ICCROM and the Getty Conservation Institute, 1987, p 32

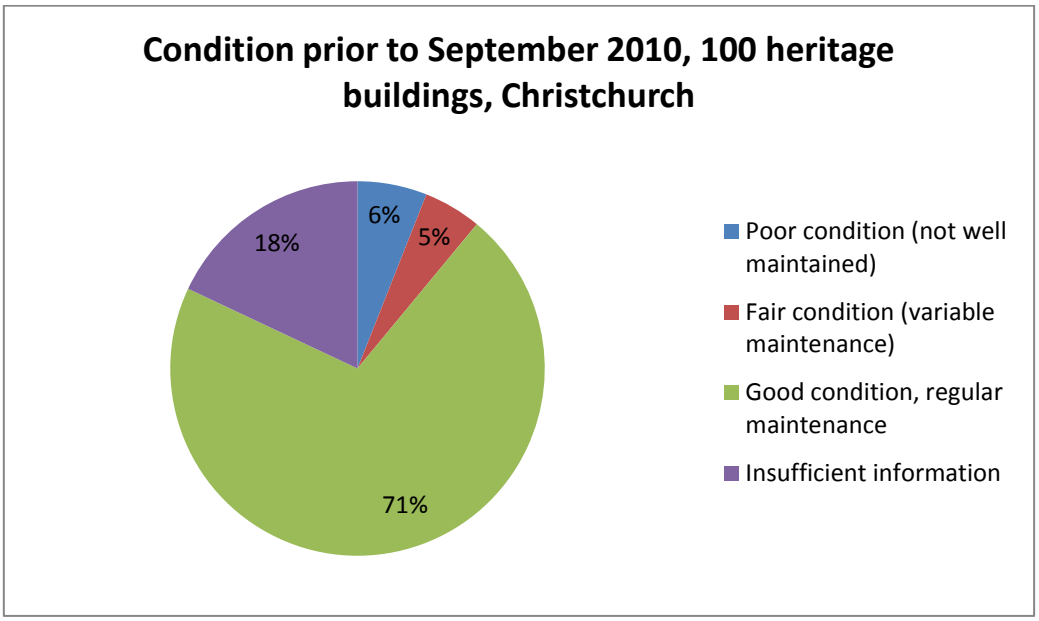
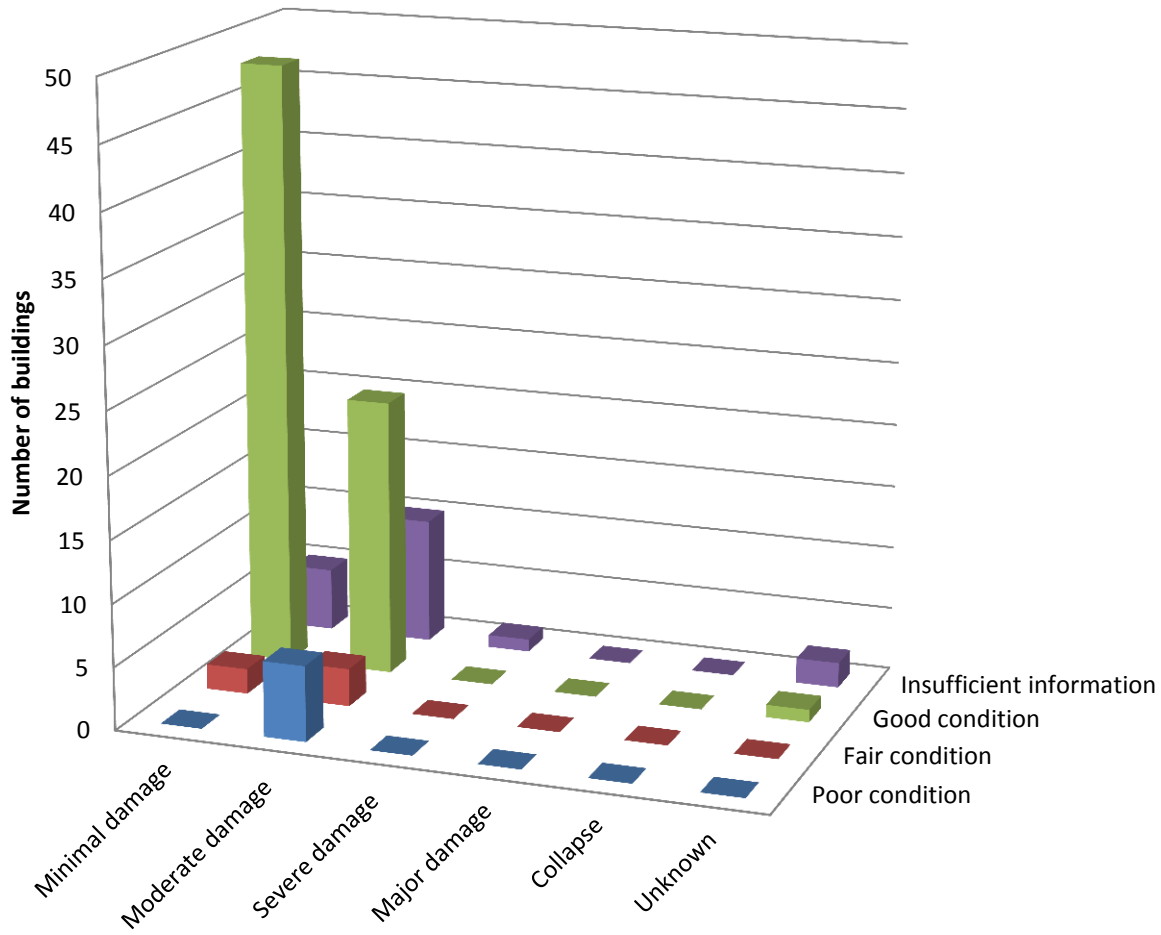



**Figure 11**

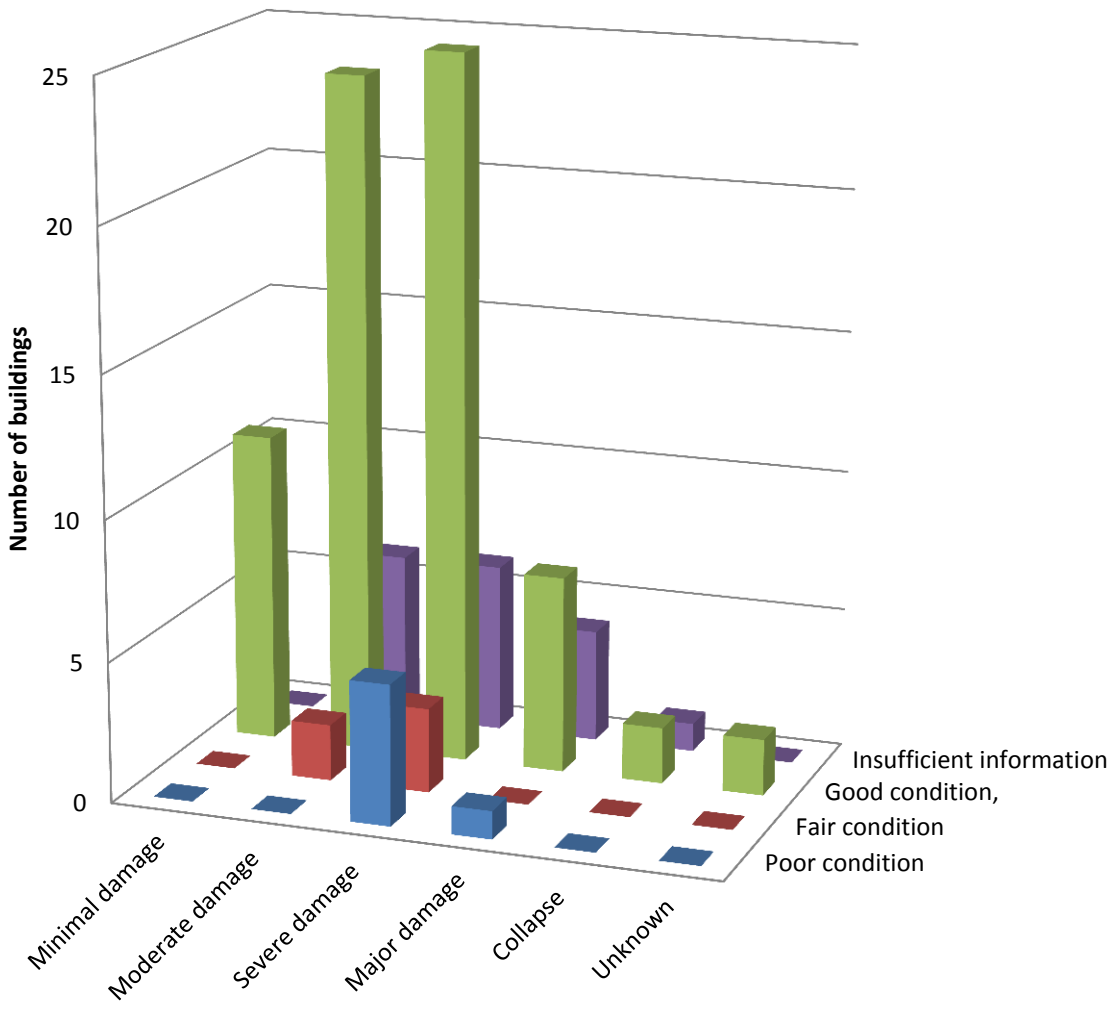
Figure 12 indicates that many of the heritage buildings which were in good condition sustained only minimal or moderate damage in the Darfield earthquake and associated aftershocks. This outcome changed dramatically after 22 February 2011 with major/severe damage and collapse of buildings that were in good condition (Figure 13).

Clearly condition, while an influencing survival factor, cannot be viewed in isolation. Figure 14 examines the relationship between condition, earthquake strengthening and damage from the January-June 2011 earthquakes. As indicated in Figure 14 even a number of buildings that were strengthened and were in good condition still sustained moderate and severe damage. However, the highest number of buildings that suffered only minimal damage were in good condition and were strengthened.




| | Minimal damage | Moderate damage | Severe damage | Major damage | Collapse | Unknown |
|---|---|---|---|---|---|---|
| Poor condition | 0 | 6 | 0 | 0 | 0 | 0 |
| Fair condition | 2 | 3 | 0 | 0 | 0 | 0 |
| Good condition | 48 | 22 | 0 | 0 | 0 | 1 |
| Insufficient information | 5 | 10 | 1 | 0 | 0 | 2 |

**Figure 12**




| | Minimal damage | Moderate damage | Severe damage | Major damage | Collapse | Unknown |
|---|---|---|---|---|---|---|
| Poor condition | 0 | 0 | 5 | 1 | 0 | 0 |
| Fair condition | 0 | 2 | 3 | 0 | 0 | 0 |
| Good condition, | 11 | 24 | 25 | 7 | 2 | 2 |
| Insufficient information | 0 | 6 | 6 | 4 | 1 | 0 |

**Figure 13**

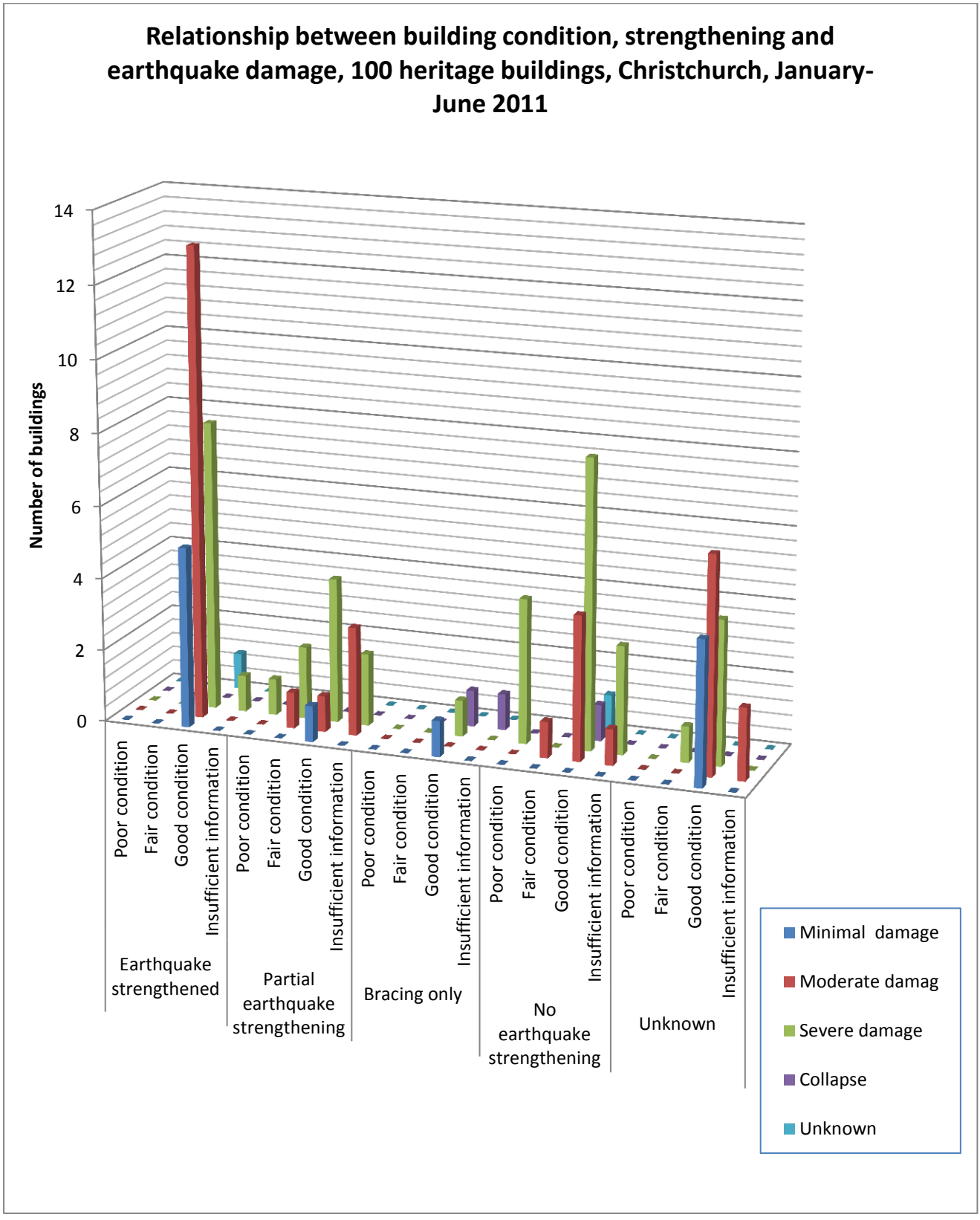

Relationship between building condition, strengthening and earthquake damage, 100 heritage buildings, Christchurch, January-June 2011
Number of buildings
0
2
4
6
8
10
12
14
Poor condition
Fair condition
Good condition
Insufficient information
Earthquake strengthened
Partial earthquake strengthening
Bracing only
No earthquake strengthening
Unknown
Minimal damage
Moderate damag
Severe damage
Collapse
Unknown

**Figure 14**

# Heritage Buildings Summary Information

## Methodist Church

Corner Durham Street & Chester Street West
1864
Crouch & Wilson Architects
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** The Durham Street Methodist Church opened on Christmas Day 1864. Built of stone it was the first church to be erected in permanent materials on the Canterbury Plains and was Gothic Revival in style. It was designed by the Melbourne architectural firm, Crouch and Wilson, who won the 1863 competition for the design of the new church. The church was a significant example of early ecclesiastical architecture in Christchurch.

**Construction:** Stone (URM)

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Good

**Strengthening history:** While historical bracing and ties of walls, floor and roofs was observed following earthquake damage,[40] there is no record of strengthening works on the NZHPT's file. Alterations occurred in 1986 and 1994, including fire safety work.

**Level of Damage**: September-December 2010: Moderate-severe damage.

January-June 2011: Collapse.

**NZHPT post-earthquake response:** On 28 September 2010, the NZHPT supported Engineer's recommendations that the site be made safe by removing gable stonework, strapping of towers and construction of supporting frame with recording of deconstruction. Later on 15 February 2011, the NZHPT recommended to Christchurch City Council that all risks of collapse should be addressed. After the 22 February 2011 earthquake, the NZHPT did not oppose demolition as the building had collapsed.

**Current status:** Demolished

[40] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Press Building**

32 Cathedral Square
1903
Armson, Collins and Harman Architects
Registered Category I historic place
Listed Group 1
Private ownership


**Significance:** The Press Building (1903) was a distinctive feature of Cathedral Square and, in conjunction with the Lyttelton Times building, illustrates the history of the two main Canterbury newspapers. The Press Building was a noted example of the work of Armson, Collins and Harman in the 'Perpendicular Gothic style' and was technically important as one of the earliest reinforced concrete buildings in Christchurch.

**Construction:** Reinforced concrete

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone.

**Condition prior to September 2010:** Unknown

**Strengthening history:** A conservation plan was prepared for the Press Building in October 2009 by Heritage Management Services and Fulton Ross Team Architecture.[41] The conservation plan states that the first internal alterations were carried out in 1929 with further interior fit-outs and alterations through the 1970s to the late 1990s. The conservation plan further says that 'in the interests of earthquake safety', the top of the parapet detail and finials were removed in the late 1960 noting that 'this was a fate that befell many of the inner-City buildings of the late Victorian early Edwardian period.'[42]

No major earthquake strengthening work was undertaken on the building is indicated in the conservation plan or to the knowledge of the NZHPT.

**Level of Damage**: September-December 2010: Moderate damage (damage to corner tower).

January-June 2011: Major damage (collapse of top floor, damage to façade).

**NZHPT post-earthquake response:** The NZHPT did not oppose the demolition of the building following the 22 February 2011 earthquake based on engineer reports.

**Current status:** Demolished

[41] Heritage Management Services and Fulton Ross Team Architecture, *Conservation Plan The Press Building, 32 Cathedral Square Christchurch*, October 2009
[42] ibid, p 34

**St Paul's-Trinity-Pacific Church**

(Presbyterian) Corner Cashel & Madras Streets
1877
Samuel Farr Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** St Paul's-Trinity-Pacific Presbyterian Church was significant as a church particularly well suited to the Presbyterian way of worship, with excellent acoustics. Built of brick and then plastered to resemble stone, the church was designed by Samuel Charles Farr. It was a distinctive example of ecclesiastical architecture in a city renown for its Gothic Revival buildings.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone
**Condition prior to September 2010:** Poor with fire damage (but repairs and conservation work under action)

**Strengthening history:** A condition report was prepared in December 2006 which noted that the church has 'remained relatively unchanged since it was constructed.'[43] However, the condition report did state that the building had suffered from lack of maintenance over the years with defects to roof and walls. Also that the 'swampy nature of the land and the high water table combined with the weight of the building has caused some slumping and cracking has appeared – notably on the western façade.'[44] Further, the condition report found that the building has been identified as earthquake-prone under section 122 of the Building Act 2004 and a structural assessment had been prepared by Holmes Consulting Ltd.

In 2008, the NZHPT supported a NZ Lotteries Board application for funding assistance to undertake structural strengthening and conservation work in five stages. This work had yet to begin when a fire damaged the building in August 2009. Structural strengthening work and fire/earthquake damage repairs were in progress before and after the September 2010 earthquake. The building, however, was severely damaged by the February 2011 earthquake and was demolished.

**Level of Damage**: September-December 2010: Moderate-severe damage.
January-June 2011: Major damage (dome, roof and wall collapse).
**NZHPT post-earthquake response:** The NZHPT did not oppose the demolition of the building following the 22 February 2011 earthquake due to severity of damage.
**Current status:** Demolished

[43] Dave Pearson, *St Paul's Trinity Pacific Church, Christchurch, A Condition Report and Assessment of Cultural Heritage Values*, December 2006, p 12
[44] ibid, p 14

**Church of St Luke the Evangelist**

Corner Manchester and Kilmore Streets
1909
Mountfort Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** The Church of St Luke the Evangelist was situated on one of the original five church reserves set aside in the plans of the Canterbury Association for the town of Christchurch. The church was designed by Julian Cyril Mountfort (1852- 1920) and completed in 1909. It was a competent example of early English Gothic Revival church of substantial scale. The construction method of a brick lining and stone facing was of note, which was complimented by an extensive use of Oamaru stone dressings and a high roof structure.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 2001, the NZHPT supported a NZ Lotteries Board application for funding assistance for the preparation of a conservation and structural report. The NZ Lotteries Board application stated that the structural report was 'suggested by one of the architects quoting for the conservation report. St Luke's is a large building and may well require strengthening to ensure that it is earthquake-proof, particularly because of its similarity to the earlier Napier Cathedral. Further, it is important for us to know that it is structurally sound or what is required to make it so.'

Powell Fenwick Consultants Ltd prepared a seismic assessment report in January 2003. The consultant's considered that the church had a 'resistance of about 25% of the current loading code's elastic response. But it would still suffer significant damage in a major earthquake. The risk to life would be mitigated because of the short time that the church is occupied. It would be a major undertaking and cost to strengthen this building to resist a major earthquake.'[45] The consultant recommended:

1. The church is not deemed to be earthquake-prone under the current legislation and therefore does not legally need to be strengthened.
2. The legal requirements for strengthening may increase in the future.

[45] Powell, Fenwick Consultants Ltd, 'St Lukes Church, Corner Kilmore & Manchester Streets, Christchurch', 20 January 2003

3. It is your decision whether you proceed with any significant strengthening work, to mitigate seismic building damage and the risk to people.
4. As the church has a low occupancy, the risk to people is less than normal similar buildings.

No strengthening work was carried out following the 2003 seismic assessment report.

The seismic assessment report was revised by the consultants in September 2008 following the preparation of a conservation plan in 2003 (which was revised in 2006).[46] In the 2008 report, it was stated that 'the building in its current state has a global strength in the longitudinal (E/W) direction of 43%NBS. The global strength in the transverse (N/S) direction is 25%NBS.' The consultant recommended short term work be undertaken to tie the gables back to the main structure to prevent any further damage to the building. In the medium term, the consultants suggested two options – strengthening to the legal requirement of 34%NBS and another to strengthen the building to 67%NBS.

In 2008-2009, planning for some repair and strengthening work was in progress in association with roof conservation works. This work focused on repairs to the cracked gables, involving reconstruction of stone work and the installation of new M16 threaded tie rods to brace the gables (Dave Pearson Architects Ltd, Nov 2008 drawings). This work was consented and completed by mid-2009.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Major damage (partial collapse, cracking and liquefaction).

**NZHPT post-earthquake response:** On 5 May 2011, the NZHPT did not oppose demolition following an assessment by the NZHPT's engineer and due to severity of damage.

**Current status:** Demolished

[46] Dave Pearson Architects Ltd, *St Luke the Evangelist Christchurch, A Conservation Plan & Condition Assessment*, Revised 2006

**Church of St John the Baptist**

Corner Latimer Square and Madras Street (234 Hereford Street)
1864-5
Bury Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** St John the Baptist Church was the first stone church to be built for the Anglican community in Christchurch. The church was designed by Maxwell Bury (1825-1912), an architect who arrived in Lyttelton in 1854 and who was also responsible the Nelson Provincial Council Chambers. The church was gothic revival in style and built of stone and was distinguished by a squat Norman tower and polygonal chancel. The Church stood as a reminder of the detailed planning of the Canterbury Association and of their desire to establish a wholly Anglican settlement in NZ.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** No record of earthquake strengthening work to the knowledge of the NZHPT.

**Level of Damage**: September-December 2010: Moderate-severe damage.

January-June 2011: Major damage (collapse of bell tower, partial wall collapse, cracking).

**NZHPT post-earthquake response:** Following September-December 2010 earthquakes, the NZHPT recommended the site be made safe to allow time for a comprehensive engineering review to be undertaken and future options for the building to be considered. Later in April 2011, the NZHPT did not oppose demolition on engineering advice.

**Current status:** Demolished

**Cranmer Centre (Former Christchurch Girls' High School)**

40 Armagh Street
1881 Original School Building (Armson Architect)
1908 Armagh Street wing (Collins and Harman Architects)
1913 Montreal Street wing (JG Collins Architects)
1962 Assembly Hall (Collins and Harman Architects)
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** Known today as the Cranmer Centre, the two-storey brick building on the corner of Armagh Street and Montreal, was built to house Christchurch Girls' High School. Architecturally the Cranmer Centre was significant as an example of the work of notable architect W.B. Armson and as a fine example of Victorian school architecture in a Venetian Gothic style. Historically the building is identified with the development of women's education in New Zealand. It housed, for over one hundred years, the first public girls' school in Christchurch. Since the 2000s, Cranmer Centre has been part of Christ's College.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Good

**Strengthening history:** The school was vacated in 1986 and was leased for a period by the Arts Centre Trust. In 2001 ownership passed to Ngai Tahu Property Group and then later Quadrangle Holdings Ltd. At this time a structural report was prepared by Holmes Consulting Group which recommended strengthening including the installation of steel angle braces within the roof spaces, the timber plywood diaphragms over tongue and groove floors to provide shear elements, the replacement of lath and plaster ceilings with plywood and the construction of concrete shear walls to a number of internal walls and the inside face of various exterior walls.[47]

The conservation plan of 2002 also highlighted the need for strengthening by noting a number of cracks to the exterior and interior of the building. However, the conservation plan commented about the design of the proposed strengthening and the potential impact of earthquake strengthening on the historic fabric of the building, especially the installation of concrete shear walls and concealment of the floors. The conservation plan did not include specific policies relating to earthquake strengthening. Despite the structural report, no earthquake strengthening work was undertaken on the building to the knowledge of the NZHPT.

[47] Dave Pearson Architects Ltd, *The Cranmer Centre (Formerly Christchurch Girl's High School Christchurch), A Conservation Plan*, October 2002

The building was damaged in the September 2010 earthquake. Repairs and strengthening were proposed in November 2010 to improve structural performance to 67%NBS. Severe damage occurred following the February 2011 earthquake while earthquake strengthening work was underway.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage (partial collapse, major cracking).

**NZHPT post-earthquake response:** In April 2011, the NZHPT did not oppose demolition of the building after an assessment by NZHPT's engineer due to severity of damage. Architectural and historical features retrieved.

**Current status:** Demolished

**A. J. White's Department Store, McKenzie and Willis Ltd (Former)**

236 Tuam Street
1879
Simpson Architect
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** This store was built for A. J. White who arrived in Canterbury in 1861 and established a prosperous business as a furniture and furnishing retailer. Built in 1879, this red brick building was designed by the architect Alfred William Simpson, who also designed a number of other commercial buildings in Christchurch. The building continued to be used as a furniture shop and was owned by McKenzie and Willis. It was significant because of its unusually fine Venetian Gothic façade with facings of Oamaru stone and Bluestone. Alongside White's other former stores it formed a noteworthy part of the cityscape.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** In 1998 rear alterations and an addition to extend the furniture showroom were built. There were further alterations to the building during mid- 2000. No record of earthquake strengthening work to the knowledge of the NZHPT.

The building was damaged in September 2010, but was considered to be repairable (staff were still operating within the building after the September 2010 earthquake). Severe damage occurred following February 2011 earthquakes.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Major damage (partial collapse).

**NZHPT post-earthquake response:** The NZHPT did not provide comment since the building was demolished after the 22 February 2011 earthquake under emergency provisions.

**Current status:** Demolished

**Lyttelton Times Building**

Cathedral Square
1902
Luttrell Brothers Architects
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** The Lyttelton Times building formed part of a significant group of heritage buildings fronting Christchurch's Cathedral Square, which were built around the turn of the nineteenth century at a time of economic growth. Its primary significance was its architectural merit, as the first building to introduce elements of the Chicago skyscraper style to New Zealand. The newspaper began in Lyttelton in 1851 and moved to Christchurch in 1863 where it first occupied a small cottage on Gloucester Street and then a two-storey timber building that fronted onto Cathedral Square. Internally, the building was substantially modified in the 1930s to accommodate new rotary presses and some strengthening work occurred at this time.[48]

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone
**Condition prior to September 2010:** Good

**Strengthening history:** The building was threatened by demolition in 1994 and was registered by the NZHPT at this time (interim registration issued by the NZHPT to stop demolition of the Lyttelton Times Building and the Savoy Theatre in September 1994). A revised proposal for demolition was put forward in 1996 involving the Lyttelton Times Building, Warners Hotel and the Old Star Building. The proposed demolition was contested at the Council hearing and Environment Court in 1999. The Environment Court received expert engineering evidence about the structural performance and feasibility of strengthening of the buildings.[49] The Court commented that 'in Christchurch the risk of a major earthquake is real and if the Council wishes to impose seismic strengthening on a building owner it needs to offer it the alternative of demolition' (page 14). The Court allowed the demolition of the Lyttelton Times, Old Star Building and Warners Hotel six months from the date of the decision. Only the Gloucester façade of the Old Star building was to be retained. Despite the Environment Court decision, the Lyttelton Times building and Old Star Building were saved as a result of a purchase by the Christchurch Heritage Trust for $1.35 million in 2001. The Council made a contribution of $250,000 towards the purchase. The Warner's façade was also preserved as a consequence of negotiations following the Environment Court decision. Following purchase, the Christchurch Heritage Trust undertook to convert the building into backpacker's accommodation and applied to the NZ Lotteries Board for financial assistance to undertake earthquake strengthening with work involving steel bracing to external and internal

[48] Heritage Team, City Solutions, Christchurch City Council, *Lyttelton Times/Star, A Conservation Report*, 2001
[49] AA McFarlane Family Trust v Christchurch City Council, C46/99

walls, upper floor diaphragm strengthening and parapet strengthening. Specific strengthening targets were not identified in the NZHPT file.[50] Following successful restoration and change of use, the buildings were sold by the Christchurch Heritage Trust in 2003.

**Level of Damage**: September-December 2010: Moderate damage involved loss of parapet and chimneys. Following the September 2010 earthquake, repair work was undertaken and the backpacker accommodation reopened in October 2010.

January-June 2011: Severe damage (parapet collapse and cracking).

**NZHPT post-earthquake response:** While initial NZHPT comment promoted repair and making safe, by June 2011, damage had become severe and the NZHPT did not oppose demolition.

**Current status:** Demolished

[50] Research following the earthquakes, estimates that the building was strengthened to >67%NBS Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Guthrey Centre (former Bell's Arcade)**

126 Cashel Street
1881
Armson Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** This building was originally erected to house shops and offices for John Anderson (1820-1897), whose iron foundry was situated at the rear. Anderson arrived on one of the first four ships, served as the city's mayor and his foundry firm constructed many bridges in the 1870s. The three storey façade of this building by architect WB Armson was a fine example of the Venetian Renaissance style.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** Strengthening of ground floor was observed following earthquake damage.

**Level of Damage**: September-December 2010: Moderate damage (chimney damage and parapets removed)
January-June 2011: Severe damage (partial collapse to parapets upper level and rear wall, cracking).

**NZHPT post-earthquake response:** The NZHPT recommended façade retention and funding was approved from the Canterbury Earthquake Heritage Building Fund. However, the owner was concerned about liability issues and the building was demolished with no retrieval of heritage features.

**Current status:** Demolished

**Music Centre of Christchurch**
(Sisters of our Lady of the Missions Chapel and Convent)

Barbadoes Street
1877-1907
Petre and Munnings Architects
Registered Category I (chapel) and Category II (former convent) historic place
Listed Group 1
Private ownership

**Significance:** The chapel was believed to the only fully realised Byzantine Revival church in New Zealand and therefore had considerable architectural significance. Its design also launched Munnings' successful international career as an architect. The Convent and Chapel along with the Cathedral of the Blessed Sacrament formed an important element of the streetscape. This complex was an important as part of the history of the Roman Catholic Church in New Zealand and served as a reminder of the role the church played in education. The chapel and convent were converted to a music centre which was a success.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Good

**Strengthening history:** The former chapel and convent was proposed for demolition in 1991 by the Sisters of our Lady of the Missions due to the financial cost of maintaining the building, including cost of earthquake strengthening. The cost of earthquake strengthening at the time was estimated at $461,300. Council intervened with a heritage order to save the building and an agreement was reached between the Council and the Mission Sisters to convert the building into a community music centre. By 1994, the upgrade and earthquake strengthening was completed at a cost of $930,000. The strengthening work involved nailing 18mm plywood to the stairs and floors and the screwing of metal ties to the plywood and bolted to the brick walls to tie the structure

together. The chapel was strengthened by the pouring concrete between the inner and outer brick walls.[51]

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage (collapse of gables and parapets with major cracking).

July 2011-January 2012: Severe damage (further partial collapse).

**NZHPT post-earthquake response:** The NZHPT did not oppose demolition based on engineering advice.

**Current status**: Demolished, January 2012.

[51] Robyn Burgess, *Conservation Plan Former Convent and Chapel Buildings*, Opus International Consultants Ltd , 2006

**Oxford Terrace Baptist Church**

288 Oxford Terrace
1882
Saunders Architect
Registered Category II historic place
Listed Group 1
Private ownership

**Significance:** The Oxford Terrace Baptist Church had historical and social significance as Christchurch's main Baptist church and a centre of Baptist community life in the city since its construction in 1882. The Church was one of the best remaining examples of neo-classical architecture in the city, by little-known Christchurch architect Edward Saunders.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Good

**Strengthening history:** No earthquake strengthening undertaken on the building to the knowledge of the NZHPT.

The building was damaged by the September-December 2010 earthquakes and was in the process of being secured. The building suffered severe damage and collapse following the February 2011 earthquake and was demolished.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Collapse.

**NZHPT post-earthquake response:** As the building had collapsed there was no opportunity for NZHPT input.

**Current status:** Demolished

**ANZ Bank (former)**

188 High Street
1908-12
Clarkson & Ballantyne Architects
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** The former ANZ Bank building was significant as an Edwardian commercial building designed by well-known Christchurch architects Clarkson and Ballantyne. The building became an instant landmark within the city due to the domed tower which dominated the corner site. The former ANZ Bank building, with its decorative classical facades, reflected the economic optimism of the city in the early 20th century.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** The former ANZ Bank building had been converted into apartments during the early 2000s and had a high degree of interior modification. The extent of earthquake strengthening undertaken on the building is not known by the NZHPT.

Historical bracing and ties of walls, floor and roofs was observed following earthquake damage.[52]

**Level of Damage**: September-December 2010: Moderate damage (parapet damage).

January-June 2011: Collapse.

**NZHPT post-earthquake response:** The front section partially collapsed on 22 February 2011 and was demolished without NZHPT input. The NZHPT did not oppose demolition of rear section after assessment by NZHPT engineer due to severity of damage.

**Current status:** Demolished

[52] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Sevicke-Jones Building**
53 Cathedral Square
1913-14
Collins and Harman Architects
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** The Sevicke-Jones building was a fine example of a building in the Italianate revival style and was a good example of a design by well-known Christchurch architects, Collins and Harman. It had townscape value, and represented the small manufacturing concerns which developed in inner-city suburbs between the wars.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Poor

**Strengthening history:** In 1995, the building was purchased by an overseas developer who planned to undertake earthquake strengthening and refurbishing. There is no record of earthquake strengthening work, however, being undertaken on the building to the knowledge of the NZHPT.

Since 1995 the building has been largely vacant and has been suffering neglect for some time. On 3 August 2009, the Council issued a 'dangerous building' notice under section 124 of the Building Act 2004 requiring work be carried out to reduce or remove the danger due to broken window glass falling onto the pedestrian route at Chancery Lane. The Council required the owner to secure all windows, secure the building, ensure regular inspections are undertaken and attach a notice to warn people not to approach or enter the building. The building was damaged in the September-December 2010 earthquakes, but was considered to be repairable. Severe damage occurred following February 2011 earthquakes.

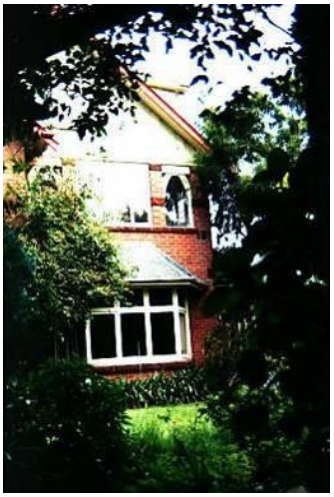
**Level of Damage**: September-December 2010: Moderate damage (cracking in main façade). January-June 2011: Severe damage.

**NZHPT post-earthquake response:** In June 2011, the NZHPT did not oppose demolition due to severity of damage.

**Current status:** Demolished

**The Deanery**

80 Bealey Avenue
1920
England Bros Architects
Registered Category II historic place
Listed Group 2
Private ownership



**Significance:** The Deanery was built in 1920 as a residence for senior clergy of the Anglican Church in Canterbury, initially as the home of the Dean of Christchurch Cathedral. Designed by Christchurch architectural firm the England Brothers, the Deanery was a significant example of the Arts and Crafts style**.**

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** Alterations and fire safety works took place in 2002. There is no record of earthquake strengthening work to the knowledge of the NZHPT.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage.

**NZHPT post-earthquake response:** The NZHPT was not provided with an opportunity for input with regards to the demolition of the building but supported initial propping and securing.

**Current status:** Demolished

**City Council Civic Offices (Former)**

194-198 Manchester Street
1899
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** This former Christchurch City Council Offices was constructed in 1899-1900 as the exhibition hall to house Canterbury's jubilee exhibition in 1900. In 1917 the hall had been leased to Fuller's Vaudeville Company, and soon after there was a fire which destroyed the majority of the building leaving the façade intact. This structure was then rebuilt in 1920-22 as offices for the Christchurch City Council. It was of architectural and aesthetic significance to the city and region as evidencing the work of local architects, and as an example of a highly decorative Edwardian Baroque style façade.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Good

**Strengthening history:** The rebuilding of the former Christchurch City Council Offices in 1920-22 and various alterations resulted in a URM façade and a reinforced concrete structure. A report by William Fulton of Stewart Ross Team Architecture Ltd in 2002 identified some deterioration of the main façade and some spalling concrete on the northern elevation which had exposed rusting reinforcing. Cracking to the concrete parapets on the south side was also identified. William Fulton recommended the preparation of a structural report to investigate these issues. While repairs of exterior stonework were undertaken in March 2003, there is no record on the NZHPT's file of substantial earthquake strengthening works.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Major damage (front façade removed by USAR).

**NZHPT post-earthquake response:** The NZHPT was not provided with an opportunity for input with regards to the demolition of the building.

**Current status:** Demolished

**Cathedral Grammar School Main Block**

8 Chester Street West
1928
Trengrove Architect
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** The Cathedral Grammar School opened in 1881 as a school primarily for the choristers of Christ Church Cathedral. In 1928 a new building was designed for the school by W. H. Trengrove. Trengrove designed a brick neo-Georgian building, which contained an assembly hall and gymnasium on the ground floor and classrooms on the next floor. The top floor was intended as dormitories, but was altered to contain a chapel, library, and matron's quarters and eventually re-converted to classrooms. The building was designed to provide as much fresh air and light as possible.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Good

**Strengthening history:** No record of earthquake strengthening undertaken on the building to the knowledge of the NZHPT.

Damaged in the September 2010 earthquake and further severe damage in February 2011.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage (partial collapse).

**NZHPT post-earthquake response:** The NZHPT was not opposed to demolition of the building due to severity of damage.

**Current status:** Demolished

**Fisher's Building (Former)**

Corner High and Hereford Streets
1880
Armson Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** Fisher's Building was a fine example of Venetian Gothic architecture which occupied a prominent site. Of the more than ten William Armson-designed buildings erected in Hereford Street between 1870 and 1883, Fisher's Building was the only one remaining.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** Strengthening work was undertaken in 2003. The work involved reinforcing to columns and construction of new concrete walls and strengthening of floors. The work was designed without alterations to the exterior and minimal visibility within the interior. The NZHPT's file does not indicate the target level of strengthening that was achieved.

The building suffered minor damage in the September and December 2010 earthquakes. Major damage occurred in the February 2011 earthquake and the building was demolished.

**Level of Damage**: September-December 2010: Minimal damage.

January-June 2011: Severe damage (partial collapse of upper level and extensive cracking)

**NZHPT post-earthquake response:** In April 2011, NZHPT recommended retention of ground and first floor as a partial demolition, however, demolition was approved by CERA as requested by building owner.

**Current status:** Demolished

**Regent Theatre**

(former Royal Exchange), Cathedral Square
1905
Luttrell Brothers Architects
Registered Category I historic place
Listed Group 1 (main façades & dome are listed only)
Private ownership

**Significance:** The first Edwardian Baroque commercial building in Cathedral Square and was a significant part of the townscape, this Luttrell brothers building was completed in 1905 as a commercial premises and was converted in 1930 into one of the grandest theatres in the city and continued to operate as a cinema.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** The NZHPT was aware that internal alterations and strengthening was carried out for the twin cinema (date of strengthening unknown) with work involving a braced steel frame to support the tower and floor ties to walls. Historical bracing and ties of walls, floor and roofs was also observed following earthquake damage.[53]

The building suffered moderate damage in the September and December 2010 earthquakes. Major damage occurred in the February 2011 earthquake and the building was demolished in July 2011.

**Level of Damage**: September-December 2010: Moderate damage (parapet damage).

January-June 2011: Moderate damage (parapet damage, cracking, dome roof collapse).

**NZHPT post-earthquake response:** In June 2011, the NZHPT recommended that the building be secured to allow time for a comprehensive engineering review to be undertaken and future options for the building to be considered. Demolition, however, was approved by CERA as requested by the owner.

**Current status:** Demolished

[53] Research following the earthquakes, estimates that the building was strengthened to >67%NBS. Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Harald's Building**

80 Lichfield Street
1881
Armson Architect
Registered Category I historic place
Listed Group 1
Private ownership


**Significance:** Harald's Building was an important example of Victorian commercial buildings in Christchurch and was a fine example of the work of W. B. Armson. It formed part of the cluster of Victorian and Edwardian commercial buildings in the Lichfield Street/High Street area. Built in 1881 for the Butterworth brothers' wholesale drapery business, the building was designed in the Italian palazzo style which was popular for commercial premises during the nineteenth century. As is characteristic of this style, the three floors of Harald's Building were distinguished on the exterior by the differing treatment of the windows.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** While, there is no record of earthquake strengthening work, the NZHPT's file records that the interior of the building was substantially altered and rebuilt in 1980.

**Level of Damage**: September-December 2010: Moderate damage (parapet and chimney damage).

January-June 2011: Severe damage to upper level.

**NZHPT post-earthquake response:** In June 2011, the NZHPT recommended removal of 2nd floor only and building to be made safe. Demolition, however, was approved by CERA as requested by the owner.

**Current status:** Demolished

**Strange's Building**

Corner 219-223 High and 83 Lichfield Streets
1900
Armson, Collins and Harman Architects
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** Strange's Building, was the first department store in Christchurch to develop out of the drapery trade. In 1899, at the height of firm Strange and Co.'s success, Armson, Collins and Harman designed the four-storey, Oamaru stone-faced building that wrapped around the corner site. The design continued the Italianate style employed in the 1893 building, commonly used in Victorian times for mercantile buildings. It was an excellent example of this style and was also significant for its association with a highly successful business.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** The building was refurbished in 1987 with some earthquake strengthening work undertaken.[54] No details of the work have been identified on the NZHPT file. Historical bracing and ties of walls, floor and roofs was observed following earthquake damage.[55]

**Level of Damage**: September-December 2010: Moderate damage.
January-June 2011: Severe damage.

**NZHPT post-earthquake response:** The NZHPT recommended that the building be made safe work to allow time for a comprehensive engineering assessment to be undertaken.

**Current status:** Demolished

[54] Research following the earthquakes, estimates that the building was strengthened to ~30%NBS. Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)
[55] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Weston House**

62 Park Terrace
1923-24
Cecil Wood Architect
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** Weston House was significant as a fine example of a Neo-Georgian house designed c.1923 by well-known NZ architect, Cecil Wood, built for George T Weston, a Christchurch solicitor. The west facade of this substantial two-storied brick house exhibited the complete range of Neo-Georgian elements, including a centralised porch, brick walls, symmetrically arranged windows, a deep cornice and a hipped roof with dormer windows.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** No record of EQP assessment prior to September 2010.

**Condition prior to September 2010:** Good

**Strengthening history:** No record of earthquake strengthening to the knowledge of the NZHPT.

Damaged in September 2010 and repairs were proposed by the owners. The building was further damaged following the February 2011 earthquakes and deteriorated over time.

**Level of Damage**: September-December 2010: Moderate damage (three chimneys were damaged).

January-June 2011: Severe damage (partial collapse and cracking)

**NZHPT post-earthquake response:** The NZHPT recommended repair but noted that these repairs were likely to be expensive. Following further deterioration of the building, demolition was approved by CERA in June 2011.

**Current status:** Demolished

**Former Canterbury Public Library, Children's Library and Librarian's house Corner**

Hereford Street and Cambridge Terrace.
1870s – Original Canterbury Public Library (William Armson architect)
1894 Librarian's house
1902 and 1924 – Children's Library and addition
Armson, Collins and Harman Architects

Registered Category I (1875 Canterbury Public Library) and II (Librarian's House and Children's Library and addition) historic place
Registered wahi tapu (Puari Pa Urupa)
Listed Groups 1 and 2
Private ownership

**Significance:** Located on the urupa for Puari Pa, a registered wahi tapu site, the library was commissioned by Canterbury University College. The complex of library buildings on the site onf the corner of Cambridge Terrace and Hereford Street in Christchurch including the original 1875 brick Venetian Gothic-style library building designed by William Armson (Category I historic place, Register No.297), the adjoining 1900s and 1920s section that fronted Hereford Street (Category II historic place, Register No.4910) and the stand alone libraran's house (Category II historic place, Register No.3704). The Venetian Gothic brick building by Armson received a National Award from the NZ Institute of Architects in 1983 and was the oldest of a complex of former public library buildings. The Children's Library was in built in brick in two stages by Collins and Harman, the architectural firm founded by William Armson responsible for the original 1874 library.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** To the NZHPT's knowledge, some minor strengthening was carried out to the 1902 building during mid- 2000s.

**Level of Damage**: September-December 2010: Moderate damage.
January-June 2011: Severe damage (parapet damage, liquefaction, cracking).

**NZHPT post-earthquake response:** On the basis of engineering advice, the NZHPT advocated for retention of original library Armson building but noted that these repairs were likely to be expensive. Demolition was approved by CERA as requested by building owner.

**Current status:** Demolished with significant amount of building fabric retrieval.

**Canterbury Times and Star Building**

Gloucester Street
1884
Armson, Collins and Harman Architects
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** The Lyttelton Times newspaper's growth during the 1880s led to a new building being erected on the Gloucester Street frontage in 1883 - 1884. This landmark brick building became the Star Building which interconnected to the Lyttelton Times building on Cathedral Square.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** (see entry for the Lyttelton Times Building which was integrated into this building and also strengthened).

**Level of Damage**: September-December 2010: Minimal damage.

January-June 2011: Moderate damage (parapet and corner damage)

**NZHPT post-earthquake response:** While initial NZHPT comment promoted repair and making safe, by June 2011, damage had become severe to the attached Lyttelton Times Building and the NZHPT did not oppose demolition.

**Current status:** Demolished

**Repertory Theatre**

144-148 Kilmore Street West
1929
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** The Repertory Theatre was built by the Radiant Health Club, as both a hall and a theatre for operetta productions. Most of the finance was contributed by one of its members, prominent city businessman and philanthropist, Thomas Edmonds, founder of the iconic New Zealand baking powder brand. The theatre was hired by the Canterbury Repertory Theatre Society from the time of its construction.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Good

**Strengthening history:** Major interior changes were undertaken in 1967 when J.A. Hendry remodelled the theatre which involved altering the foyer and closing in the gallery. During the 1980s, further changes involved refurbishment of the façade and canopy and lowering of the orchestra pit.[56]

In 2007, a conservation report was prepared for the theatre which stated that a major problem was the inability of the building to meet the Council's Earthquake-Prone, Dangerous and Insanitary Buildings Policy adopted in 2006.[57] It noted that R.D. Sullivan, Consulting Engineer, has been engaged to examine the building and 'has advised that the building is a Category A building which means that it has a highest priority for upgrading and the overall strengthening programme should be carried out within fifteen years. This figure is not confirmed but is anticipated that the street frontage should be stabilised within two to three years.'[58]

The NZHPT supported an application by the Canterbury Repertory Theatre Society to the NZ Lotteries Board for funding assistance to undertake earthquake strengthening work in April 2009. Work had not yet started in September 2010 and earthquake repairs were planned in early 2011. The building was severely damaged after February 2011.

Historical bracing and ties of walls, floor and roofs was observed following earthquake damage.[59]

[56] Heritage Management Services, *Conservation Report for the Repertory Theatre, Kilmore Street, Christchurch*, 2007
[57] ibid, p 5
[58] ibid
[59] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Major damage.

**NZHPT post-earthquake response:** The NZHPT did not oppose demolition as building had partially collapsed.

**Current status:** Demolished

**Coachman Inn**

144 Gloucester Street
1902
Maddison Architect
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** The Coachman Inn was significant as one of the oldest hospitality locations in the city that was still in use for that purpose and as one of the most successful designs of prominent turn-of-the-century hotel architect Joseph Maddison.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially Earthquake Prone

**Condition prior to September 2010:** Fair

**Strengthening history:** No record of earthquake strengthening works to the knowledge of the NZHPT.

The building experienced damaged parapets in the September-December 2010 earthquakes and repairs were being planned. Further damage followed the February 2011 earthquake and the building was demolished in July 2011.

**Level of Damage**: September-December 2010: Moderate damage (parapet damage).

January-June 2011: Moderate damage (rear wall partial collapse, damage to parapets, cracking).

**NZHPT post-earthquake response:** In June 2011, the NZHPT recommended that the building be secured and a strengthening scheme developed.

**Current status:** Demolished

**Houses (semi-detached)**

90-92 and 94-96 Chester Street East
1892
Widdowson Architect
Registered Category II historic place
Listed Group 3
Private ownership

**Significance:** Located between 86 to 100 Chester Street East, the four sets of semi-detached townhouses were designed by William Widdowson. They were unusual in their design as two storey grouped townhouses were uncommon in Christchurch during the late colonial era. Their near identical form, materials and design added to the architectural significance of the townhouses, along with the scale and streetscape value.

**Construction:** Timber-framed, brick party walls.

**EQP assessment prior to September 2010 (CCC, 2009):** Not listed as earthquake-prone (residential building).

**Condition prior to September 2010:** Good

**Strengthening history:** The NZHPT is aware that some structural weakening occurred by alterations to make ground floor open plan (also see entry for houses 86-88/98-100 Chester Street East).

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage.

**NZHPT post-earthquake response:** The NZHPT did not oppose demolition of the two middle buildings based on engineering advice.

**Current status:** Demolished (the corner and end houses remain).

**Old Theatre Royal**

148-154 Gloucester Street
1876
Simpson Architect
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** The Former Theatre Royal had architectural and aesthetic significance primarily for its flush-boarded timber facade, designed to resemble masonry. At the time of its construction by little-known Christchurch architect, Alfred Simpson, and builders Allen and Son, the theatre would have been one of the largest and most impressive of the city's buildings. The building represented the final phase of the timber-built city before masonry construction became derigeur in the inner city in the 1880s. This was the last timber classical facade and was the most significant of the city's remaining timber commercial building facades to remain extant.

**Construction:** URM/Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Poor

**Strengthening history:** The interior of the building was substantially modified since its purchase by the Christchurch Press Company in 1910 for retail purposes. In particular, substantial alterations were carried out in 1940 with the demolition of the auditorium and construction of a new building to the rear.[60] By the late 2000s, the building was in a poor state of repair and was acquired by an Australian developer who proposed the construction of three tower blocks on the site and the partial demolition of the former theatre. There is no record of earthquake strengthening works undertaken on the building to the knowledge of the NZHPT.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage (damage behind the façade).

**NZHPT post-earthquake response:** The NZHPT was not provided with an opportunity to comment as this building was demolished as part of the Press Building.

**Current status:** Demolished

[60] Heritage Management Services, Fulton Ross Architects, 'Heritage Assessment Report Former Theatre Royal & Kings Theatre, Gloucester Street, Christchurch', March 2008, p 8

**Whitcoulls Building**

111 Cashel Street
c.1914
Collins and Harman Architects
Not registered by NZHPT
Listed Group 2
Private ownership


**Significance:** The firm of Whitcombe and Tombs (now Whitcoulls) was established on this site in a small two storey building built in 1883. The building was erected on the same site c.1914, built primarily for retail, professional and commercial office use. It was designed by Collins and Harman, architects of the adjacent Press and Weekly Press Building. The building was an outstanding example of a classical inspired commercial Edwardian building.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** NZHPT file indicates an interior central wall was removed in 2003 with associated structural work. Further, the file indicates that the owners at the time intended to remove the upper floor to remove the heavy load on the ground floor. The NZHPT considered that the integrity of the upper floor was largely intact and this integrity would be compromised by the removal of the upper floor. The NZHPT recommended that structural engineering consultants should investigate the retention and strengthening of the upper floors. It is unknown if this work progressed and no further details are recorded by the NZHPT file. The NZHPT is, however, aware that selective strengthening was carried out to the central book arcade.[61] Historical bracing and ties of walls, floor and roofs was observed following earthquake damage.[62]

**Level of Damage**: September-December 2010: Moderate damage.
January-June 2011: Severe damage.

**NZHPT post-earthquake response:** The NZHPT advocated for façade retention, but demolition was approved by CERA.

**Current status:** Demolished

[61] Research following the earthquakes, estimates that the building was strengthened to >67%NBS. Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)
[62] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Former Press and Weekly Press Building**

109 Cashel Street
1879-96
Collins and Harman Architects
Not registered by the NZHPT
Listed Group 2
Private ownership


**Significance:** This building was erected to accommodate the expansion of the Press and Weekly Press newspapers that were printed at this location in timber premises from the 1860s. The building was an example of the work of noted Christchurch architects Collins and Harman and was built in stages from 1879 to 1896. The Cashel Street façade was brick with stone facings with Gothic stylistic elements in the Corinthian columns and arched windows on the first floor.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Fair

**Strengthening history:** Unknown

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage (partial collapse of upper levels and partial demolition by USAR).

**NZHPT post-earthquake response:** The NZHPT provided post-February 2011 on-site advice to USAR about the extent of any demolition needed to carry out a search of the building.

**Current status:** Demolished

**Provincial Hotel**

274 Cashel Street
1902-03
Clarkson and Ballantyne Architects
Not registered by NZHPT
Listed Group 2
Private ownership

**Significance:** The Provincial Hotel was significant as the only Edwardian Baroque/Free-style hotel in Christchurch, the best example of this style in the city, and the only hotel designed by Christchurch architectural partnership, Clarkson and Ballantyne. The Hotel was an exemplar of Edwardian masonry construction and exterior plasterwork.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** No record of EQP assessment prior to September 2010.

**Condition prior to September 2010:** Good (conservation work under action)

**Strengthening history:** The current owners acquired the building in 2007 with a view towards restoration and strengthening in order to open a new boutique hotel and bistro. Consents were granted for the work in 2009 and strengthening works had started in September 2010, but were incomplete. The building suffered severe damage from the February/June earthquakes.

Historical bracing and ties of walls, floor and roofs was observed following earthquake damage.[63]

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Major damage.

**NZHPT post-earthquake response:** The NZHPT was not opposed to demolition based on engineering advice.

**Current status:** Demolished

[63] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Bain's Building**

84 Lichfield Street
1890
Architect unknown
Not registered by NZHPT
Listed Group 2
Private ownership

**Significance:** One of commercial premises established in this block which subsequently became known as the "golden mile", during the period 1881 to 1920. Increasing numbers of successful and wealthy international firms established themselves in Christchurch to serve the growing city. Built for Ross & Glendining Ltd, importers, warehousemen and manufacturers, and proprietors of the Roslyn Worsted and Woollen Mills, the building was subsequently occupied by D.M. Bain & Sons Ltd. The design was based on Renaissance palazzo, but the detailing was more restrained than the neighbouring Harald's building.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** Unknown

Historical bracing and ties of walls, floor and roofs was observed following earthquake damage.[64]

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Major damage (top floors collapse).

**NZHPT post-earthquake response:** The NZHPT did not provide input to the demolition assessment as the building was not registered under the Historic Places Act 1993 and due to the severity of earthquake damage.

**Current status:** Demolished

[64] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Crown Hotel**

192 Moorhouse Ave
1906
Architect unknown
Not registered by NZHPT
Listed Group 2
Private ownership

Photo: Google maps online

**Significance:** The site's first hotel was in business around 1864 and has continued to be used as a licensed premises. The hotel, built between 1905 and 1906, was one of a number of hotels designed by architect Joseph Clarkson Maddison and completed for the 1906-1907 International Exhibition held in Christchurch. The connection between the Crown Hotel, Maddison, and the Exhibition is of high significance as Maddison not only designed other hotels for the Exhibition visitors, but he also designed the imposing international exhibition buildings that were temporarily erected in North Hagley Park.[65]

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good (conservation works under action)

**Strengthening history:** While strengthening work was proposed in 1987, it was not until 1996 that a structural assessment was prepared, with structural drawings in 2007. The NZHPT supported strengthening and consents were granted by Council and work was carried out to 67% NBS. As a result of the September 2010 earthquake, there was minor damage to the building (mainly parapet damage) and repairs and strengthening followed. The building suffered further damage in February 2011.

**Level of Damage**: September-December 2010: Moderate damage.
January-June 2011: Moderate damage (cracking of brickwork and damage to parapets)

**NZHPT post-earthquake response:** In May 2011, the NZHPT supported making safe, stabilisation and an engineering assessment to guide repairs. The building, however, was demolished without further input from the NZHPT.
**Current status:** Demolished

[65] Statement of significance from Christchurch City Council, Heritage Grants Agenda, 2009

**Colombo Road Wesleyan Church (Sydenham Methodist Church)**

343 Colombo Street
1878
Crouch and Wilson Architects
Registered Category II historic place
Listed Group 2
Private ownership (Sydenham Heritage Trust)

**Significance:** The growth of a Wesleyan congregation in the largely working class suburb of Sydenham (then known as New Town) in the 1870s necessitated the establishment of a place of worship. The by-then redundant St James Wesleyan Church was relocated from Montreal Street in the central city to a new site in Harper Street (Orbell Street), Sydenham in 1875, and was reopened the following year. Later in 1876 however, the decision was made to constitute Christchurch South as a separate circuit. St James was thought both too small and poorly placed to service the intended circuit, so a new, more centrally located site suitable for the erection of a larger building was sought. Initially a section on Colombo Road (Colombo Street) was purchased. However in October 1876, £200 was spent exchanging this section for a half-acre site further south on Colombo Road, at the Pound Road (Brougham Street) corner.

Construction of the Colombo Road Wesleyan Church by builder James Goss commenced in 1877, under Thomas Lambert's supervision. Due to budgetary constraints, Lambert was forced to modify the original design for the large 400 seat stone church. Two large transept vestries, an orchestra loft and spire above were left out of the building contract. The building opened in February 1878 at a cost of £2,650.

With the gradual industrialisation of Sydenham and a general decline in church-going during the 1960s, the congregation of the Sydenham Methodist Church began to dwindle. The church finally closed in 1971, and the property was leased to the Seventh Day Adventists. In 1986 the building was purchased by the Samoan Congregationalists, who used it until 1997 when they built a new church in Linwood. In 2001, Council purchased the church on behalf of the Sydenham Heritage Trust.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 1997, the Samoan Congregational Church applied for consent to demolish the church on the basis that the building was in a poor state of repair and an earthquake-risk. The costs of maintenance and strengthening were estimated at the time at $500,000. The Spreydon-Heathcote Community Board and NZHPT led a campaign (including a petition that attracted 3,400 signatures) to save the building. This advocacy resulted in an agreement in 2001 for the Council to purchase the church on behalf of the newly established Sydenham Heritage Trust.

Following the successful acquisition, the Sydenham Heritage Trust raised funds for a conservation plan, maintenance work and earthquake strengthening. A preliminary seismic strengthening report was prepared by Alan Reay Consultants Ltd in November 2001. The proposed work included:

- Construction of reinforced concrete buttresses to support face-loading of the west wall.
- Securing of stonework to the roof and ceiling diaphragm.
- Securing parapet capping stones.
- Installation of intermediate beams in the lower roof.
- Installation of diagonal roof bracing.
- Post-tensioning and repointing of mortar joints.

The strengthening measures aimed to increase the structural performance of the building to at least 66%NBS. It was noted in the documentation from Alan Reay Consultants that the 66%NBS level should ensure that the 'building should not collapse during a severe earthquake, thereby protecting human life, but may still be extensively damaged and require demolition.' (Alan Reay Consultants to Sydenham Heritage Trust, 14 September 2001). It was further noted that 'experts in seismic geology are currently predicting that a severe seismic event has a greater than 50% chance of occurring in Christchurch in the next 50 years. The consultants also recommended soils investigation, including checking whether liquefaction may be a potential hazard in an earthquake.

The proposed strengthening work had not taken place by September 2010 and the building was demolished following the February 2011 earthquake.

**Level of Damage**: September-December 2010: Minimal damage (dislodged capping stones and steel cross).

January-June 2011: Severe damage.

**NZHPT post-earthquake response:** The NZHPT was not provided an opportunity to comment on the demolition.

**Current status:** Demolished immediately after February 2011 earthquake without consultation or adequate assessment.

**Windsor Private Hotel**

52 Armagh Street
1904
Registered Category II historic place
Listed Group 3
Private ownership

**Significance:** Windsor Private Hotel was originally owned and operated by Duncan Rutherford as a private hotel. The hotel had a high reputation and was popular for country residents coming into Christchurch for Cup Week. The hotel continued in operation up to the September 2010 earthquake. The hotel was the base accommodation for the NZ Antarctic Expedition and the US Antarctic Programme.[66]

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** No record of EQP assessment prior to September 2010.

**Condition prior to September 2010:** Good

**Strengthening history:** While there is no record of earthquake strengthening to the knowledge of the NZHPT, historical bracing and ties of walls, floor and roofs was observed following earthquake damage.[67]

**Level of Damage**: September-December 2010: Minimal damage (chimneys down, hotel continued to operate).

January-June 2011: Severe damage.

**NZHPT post-earthquake response:** In April 2011, the NZHPT commented that it was not opposed to demolition of the building based on the engineering report.

**Current status:** Demolished

[66] Adapted from 'Windsor Hotel', Christchurch City Council Libraries – www.christchurchcitylibraries.com
[67] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Carlton Hotel**

21 Bealey Ave
1906
J.C. Maddison
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** A hotel has stood on this site since 1865, initially catering for travellers to Christchurch from the north. The Carlton was traditionally associated with a number of 'firsts' in New Zealand's brewing history, including the serving of the first beer on tap in 1939-1940, the opening of the first beer garden in 1947 and the first drive-through bottle store in 1954. While part of the building was used as a bar, the bulk of the ground floor was occupied by Burger King.

The Carlton Hotel was significant as an example of Maddison's hotel architecture, as a prominent local landmark and as part of the history of the New Zealand brewing industry. Its link with the 1906-1907 International Exhibition and the other hotels in Christchurch built at that time is also important.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone.

**Condition prior to September 2010:** Good

**Strengthening history:** Renovations were undertaken in 1994 with four chimneys being removed. The removal of the chimneys was opposed by the NZHPT Canterbury Branch Committee. In 1997 a new Burger King was proposed for the site involving significant alterations and additions. After a notified consent application process, the consents were granted by Council in 2000. There is no record of earthquake strengthening in the NZHPT file.

**Level of Damage**: September-December 2010: Moderate damage (parapet damage, external walls separated from roof).

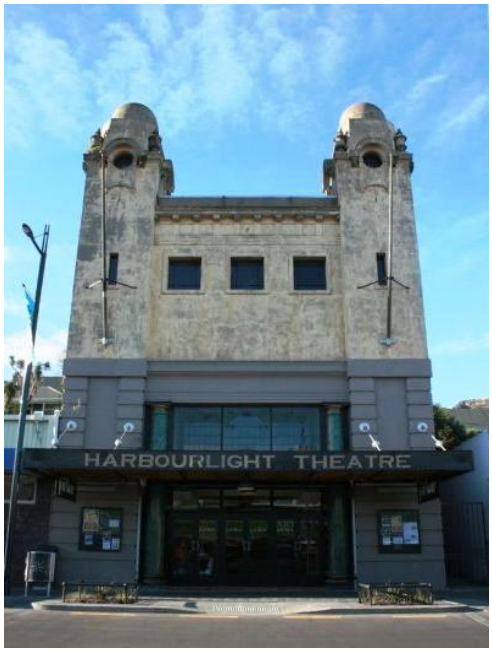
January-June 2011: Severe damage (south-west corner collapse, north parapet collapsed).

**NZHPT post-earthquake response:** The NZHPT recommended make safe and a further engineering assessment to guide repair works.

**Current status:** Demolished.

**Harbour Light Theatre**

24 London Street, Lyttelton
1916-1917
J.S. & M.J.Guthrie
Registered historic area
Listed, Banks Peninsula District Plan, Schedule V – Notable Buildings
Private ownership




**Significance:** The Harbour Light Theatre was a landmark building in the town and reflected the significant social role that cinemas played for most of the 20th century in New Zealand. Buildings existed on the site prior to 1862 but presumably these were destroyed by the 1870 fire. In 1916 the land was bought by Lyttelton Pictures Ltd for the creation of a local variant of the overseas 'picture palace'. Harbour Light Theatre was designed by J.S. & M.J. Guthrie as a purpose-built picture house and theatre. It was built for the Lyttelton Picture Company and opened on 20 March 1917.[68] Lyttelton residents and visitors had enjoyed films since the late 19th century (notably at the Salvation Army building at 36 London Street and Oddfellows Hall). The increasing popularity and technological advances in cinematography led to the Guthrie brothers, architects, designing the picture house for the Lyttelton Picture Company. At the time of its opening in March 1917, *The Press* described the Harbour Light Cinema as having 550 seats and being the most up to date in the dominion. The theatre remained in use until the mid-1970s when it fell into disrepair. Some renovation work was carried out in the 1980s and the theatre was used as a licensed night club and apartment

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone.

**Condition prior to September 2010:** Unknown.

[68] Skews Hey Ussher Architects, *Harbour Light Theatre Lyttelton Conservation Plan*, 24 June 1998

**Strengthening history:** In March 1995, Holmes Consulting Group carried out a preliminary assessment of the theatre in association with a proposal for apartment conversion.[69] The assessment proposed strengthening to 67%NBS for the purposes of providing for new apartments. This proposed strengthening work and the apartment's conversion was not progressed at the time. The need for earthquake strengthening was acknowledged in the conservation plan prepared in 1998.[70]

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage (rear wall collapse, parapet collapse, extensive cracking, towers damaged and unstable).

**NZHPT post-earthquake response:** In April 2011, the NZHPT stated that it was not opposed to the demolition based on engineering report.

**Current status:** Demolished.

[69] *John Hare, Holmes Consulting Group Ltd to The Crater Company*, 14 March 1995. Included in Skews Hey Ussher Architects, *Harbour Light Theatre Lyttelton Conservation Plan*, 24 June 1998
[70] Skews Hey Ussher Architects, *Harbour Light Theatre Lyttelton Conservation Plan*, 24 June 1998

**Zetland Hotel**

88-92 Cashel Street
1903
Joseph Maddison Architect
Registered Category II historic place
Listed Group 3
Private ownership

**Significance:** The first Zetland Lodge was an early wooden hotel built that was originally created as an eating house, and then later converted to a hotel. This building was condemned by the Licensing Committee in 1902 and plans for a new hotel were approved in March 1902. The hotel operated until 1990 when the Zetland Arms Hotel was substantially renovated and transformed into a restaurant, bar, and nightspot - Cafe Bleu.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** Some earthquake strengthening work was undertaken on the building in 1990 when the building was converted into Café Bleu. Further alterations were carried out in 1999 and 2008. Details of this earthquake strengthening work are not known to the NZHPT.

**Level of Damage**: September-December 2010: Minimal damage (chimney damage from adjoining building).

January-June 2011: Moderate damage (parapet collapse, partial stair collapse, wall cracking, water ingress).

**NZHPT post-earthquake response:** The NZHPT recommended that the building could be made safe, repaired and strengthened based on engineering report.

**Current status:** Demolished.

**Smith's Bookshop**

133-139 Manchester Street
1905
Not registered by NZHPT
Listed Group 3
Private ownership (Christchurch Heritage Trust)

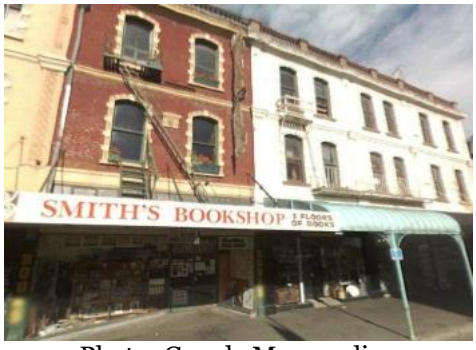


Photo: Google Maps online

**Significance:** The buildings at 133-139 Manchester Street include Smith's Bookshop, an iconic Christchurch institution. Smith's Bookshop first opened in 1894 and originally sold popular fiction and stationary. After Norman Oberg took over the business in 1967, Smith's Bookshop expanded the shop and filled all three floors of the building with floor to ceiling shelves full of books, maps, sheet music, old photographs and postcards.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Poor (conservation work in progress)

**Strengthening history:** Strengthening work was proposed by the Christchurch Heritage Trust in 2009. This work was not completed prior to September 2010. The building was damaged in the September 2010 and February 2011 earthquakes.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage.

**NZHPT post-earthquake response:** NZHPT did not provide comment as the building was not registered under the Historic Places Act 1993.

**Current status:** Unknown (possibly demolished).

**Duncan's Buildings**

135-165 High Street
1905
Luttrell Brothers
Registered Category II historic place
Listed Group 3
Multi-private ownership


**Significance:** High Street contained a significant complex of late 19th century Victorian and early 20th century Edwardian retail buildings. The Duncan Buildings of 1905, built for E.R. Duncan, were designed in Italianate Palazzo style and consisted of some 16 separate small retail units. The shops have included confectioners, fruiterers, butchers, furniture dealers, restaurants and hairdressers. Office and residential apartments occupied the floor above the shops.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** Strengthening work began in 2008 in association with internal alterations with the owners intending to undertake progressive strengthening to 100%NBS. Further repair and strengthening work was undertaken prior to 23 July 2011-January 2012 earthquake.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Severe damage: The façade of No.135 High Street was partially demolished by USAR to enable access to the McKenzie Willis building.

July 2011-January 2012: Severe damage: The façade of No.165 High Street collapsed and the rest of the façade is unstable.

**NZHPT post-earthquake response:** The NZHPT advocated retention of the building and an engineering assessment to guide make safe and repair works.

**Current status:** Partial demolition of the collapsed end of the building, repair and strengthening work undertaken to the remaining part of the building, but now future is uncertain as in February 2012 CERA has issued a section 38 demolition notice.

**NZ Express Co Building (MLC Building or Manchester Courts)**

160 Manchester Street
1906
Luttrell Brothers Architects
Listed Category I historic place
Listed Group 2
Private ownership

**Significance:** This building was built for the New Zealand Express Company in 1905-1906 and at the time of its construction it was the tallest commercial building in Christchurch. The New Zealand Express Company was a Dunedin-based firm established in 1867, with offices throughout New Zealand. They acted as carriers, and customs, shipping and express forwarding agents, and by the beginning of the twentieth century were a major New Zealand employer. Their Christchurch building was designed by Alfred and Sidney Luttrell, who arrived in New Zealand in 1902, and whose principal contribution to the history of New Zealand architecture was the introduction of the Chicago 'skyscraper'. They were also noted for their use of concrete. The foundation and first two storeys of the New Zealand Express building are reinforced concrete. This was probably, according to Geoffrey Thornton, the first use of reinforced concrete in a commercial building in Christchurch. Stylistically, this building is a compromise between British Edwardian architecture and the Chicago skyscraper style of the 1880s and 1890s. One example of this eclecticism can be seen in the corner tourelle, which was unusual in contemporary American architecture, but common within the English tradition. Technically the use of steel ties and standards, combined with the traditional brick masonry of the top five floors showed the same mix of sources. With the New Zealand Express Company building the Luttrells moved one step closer towards a true 'skyscraper' construction method, which they finally achieved with their design for the same company's head office in Bond Street, Dunedin, two years later.

**Construction:** Reinforced concrete foundations, ground and first floor. URM above first floor with steel ties and standards.

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** While it appears that some strengthening work was undertaken on the building around 1970, details of this strengthening work are not recorded on the NZHPT file. In 2006 the owner (Richard Peebles) indicated to the NZHPT that earthquake strengthening was the most obvious and expensive upgrade that will have to be undertaken sometime in the future. At the time, the cost of the strengthening work was estimated $1,000,000.00. Earthquake strengthening work had not taken place by September 2010.

Manchester Courts was moderately damaged in the September 2010 earthquake and the proposed demolition of the building sparked a major public debate. On 6 October, the Council voted 10-2 to demolish the building. Despite some media reporting at the time (*The Press*, 6 October 2010), the NZHPT did not oppose the demolition of the building in the interests of public safety on the basis of professional engineering advice.

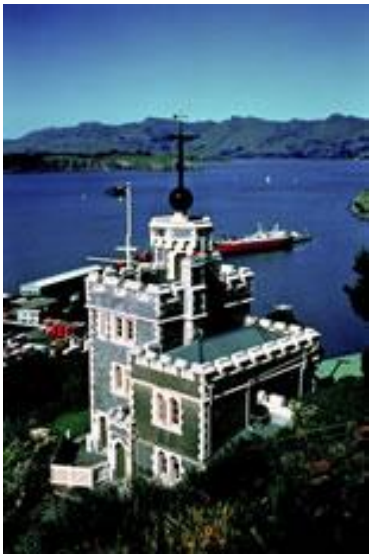
**Level of Damage**: September-December 2010: Severe damage.

**NZHPT post-earthquake response:** The NZHPT did not oppose demolition of the building based on engineering advice and risk to public safety.

**Current status:** Demolished (October 2010, Christchurch City Council decision)

**Timeball Station**

2 Reserve Terrace, Lyttelton
1876
Thomas Cane Architect
Registered Category I historic place and registered historic area
Listed, Schedule IV, Protected Buildings
Public ownership (NZHPT)



**Significance:** The Lyttelton Timeball Station (1876) was one of a handful of timeball stations that have survived throughout the world, and was the only original one that was standing in New Zealand. It illustrated the role of the timeball stations within the history of Western navigation and shipping, and its connection to the accurate calculation of longitude is of particular significance. The construction of the timeball station reflects the positive economic state, and the associated pre-eminent role within New Zealand that Canterbury, along with Otago, enjoyed in the last years of the provincial government system. It was a major landmark for Lyttelton and was an important part of the town's historic identity. Timeball Station was constructed in three principal stages: the original 3-storey stone building and tower (1876), stone kitchen (1878) and a large 2-storey brick addition (1912).

**Construction:** URM.

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:**

In association with the preparation of a conservation plan, the NZHPT engaged Holmes Consulting Group to prepare a structural survey of Timeball Station in 2000. The survey was a preliminary assessment in order to scope the need for strengthening and other works. The survey found that the building was earthquake-prone under section 66 of the Building Act 1991 being less than 10% (0.05g) of the full building code level (NBS).[71]

The structural survey recommended a number of methods for improving the structural performance to at least the minimum Building Act 1991 strengthening levels:

[71] Holmes Consulting Group, 'Timeball Station – Lyttelton Structural Survey' prepared for NZHPT, December 2000

- Ground Floor Roof Level - New grouted connections between the roof and walls and new plywood overlay under the roofing or new structural diaphragm ceiling.
- First Floor Roof Level – New grouted connections between walls and roof and new plywood overlay under the roofing or new structural diaphragm ceiling.
- Second Floor Roof Level - New grouted connections between walls and roof and new plywood overlay under the roofing or new structural diaphragm ceiling.
- South Wall – Grouted connections and a diaphragm.
- Tower Walls – Heavy steelwork and grouted connections extending along the walls of the main building to tie the tower into the rest of the building.
- Parapets – All parapets require securing using steel rods and pins.
- Securing of two chimneys by concrete filling, grouted steel rods and ties.
- Timeball and Mast – Upgrade connections, in particular at the base of mast stay wires.[72]

It was also noted that 'if a decision were made to strengthen the Timeball Station to higher load levels the required work would be of a similar nature to that described above but would be heavier in nature.'[73]

Further strengthening planning followed and in 2002 the NZHPT commissioned Hadley & Robinson Ltd to prepare a more detailed structural assessment.[74] In contrast with the earlier Holmes Consulting Group survey, the Hadley & Robinson structural assessment considered that the building had an earthquake resistant capacity 'equivalent to about 15% the required capacity for a new building' as an initial evaluation.[75] Consequently, Hadley & Robinson stated that 'the building was found not to be earthquake prone in terms of the present provisions of the Building Act.' However, the building would be earthquake-prone under the forthcoming new building legislation (Building Act 2004).

The Hadley & Robinson structural assessment focused on improving the connections between floors, roofs and walls. It was commented:

> It is known that improvement of interconnection among floors, roofs and walls is the most direct means of improving structural performance in earthquakes. We have therefore examined the likely performance of the building when the roofs and the floors are connected to the walls.
>
> The detailed evaluation of the building shows that the out-of-place capacity of the most critical walls can reach up to 150% what would apply to a new building. For the assessment of the in-plane response, the in-plane shear capacity, rather than the flexural capacity, governs, but the walls are strong enough to resist 112% of the earthquake actions that would be generated under earthquake intensity assumed for the design of new buildings.
>
> Bear in mind that this assessment (for both in-plane and out-of-plane response) is conducted on the basis that there are adequate connections between the stone walls and

[72] ibid, pp 4-5
[73] ibid, p 5
[74] Hadley & Robinson Ltd, 'The Timeball Station, Lyttelton Report on Earthquake Resistance', September 2002
[75] ibid, p 6

the floors and roofs to maintain the structural integrity of the whole building during the earthquake.[76]

To improve the strength of the building to at least 67%NBS, the structural assessment recommended improving the connection between the walls and roof using steel brackets and bolts. This work would involve removal of the roof adjoining the brick parapet, drilling through the existing timber trusses and inserting new steel holding down bolts between the timber trusses and masonry walls. No work was recommended to strengthen the chimneys, parapets or tie the tower into the rest of the building as had been earlier identified by Holmes Consulting Group.

The work involving connecting the roof to the walls using steel brackets and bolts, as guided by Hadley & Robinson, was completed in January 2006.

As a result of the 4 September 2010 earthquake, Timeball Station sustained moderate damage with loss of a chimney, widespread cracking of masonry walls and damage to parapets. Following the earthquake, Ruamoko Solutions Ltd were engaged to prepare options for the repair and strengthening of Timeball Station. Ruamoko estimated that the building had a strength of approximately 50%NBS in East/West direction and around 26-36%NBS in the other N/S direction. Ruamoko recommended strengthening work involving installation of stainless steel pins to the rubble-filled masonry walls, use of new 'Helifix' veneer ties to brick walls, new concrete walls and floor diaphragms, new ply ceiling diaphragm, parapet ties and rebuilding of chimneys in reinforced concrete.

As the NZHPT prepared to repair the building, severe damage resulted from the 22 February 2011 earthquake with parapet collapse and major cracking. The damage involved:

- 2-storey building 1912: Partial collapse and extensive cracking. The Tower: Extensive damage, wide cracking, unstable and could collapse at any time.
- 3-storey building 1876: Brick and stone sections on North wall are relatively undamaged; East wall - parapet and upper two level collapsed outwards; South wall – parapet collapsed, large cracks in wall; West wall – parapet and upper level have collapsed, extensive cracking in remaining walls.
- 1-storey building 1878: minor cracking of brick sections.

Structural inspections after the 22 February 2011 earthquake recommended careful deconstruction which began in April 2011. The building, however, partially collapsed in June 2011 while dismantling was underway.

**Level of Damage**: September-December 2010: Moderate damage.

January-June 2011: Major damage.

**NZHPT post-earthquake response:** NZHPT undertook controlled dismantling on the basis of engineering advice. Some of this dismantling work was compromised by partial collapse during the earthquake of 13 June 2011.

**Current status:** Demolished.

[76] ibid, p 8

**London Street Cafe (former Chemist, United Friendly Societies Building, former Noko's Restaurant)**

Corner Oxford & London Streets (No.2 London Street), Lyttelton
1912
Registered historic area
Listed Schedule V, Notable Buildings
Private ownership

Photo: Google maps online

**Significance:** No.2 London Street is part of the Lyttelton Township Historic Area and is the main commercial area of Lyttelton. It has a wide variety of commercial and public buildings. London Street, named after the Bishopric of London, was part of the commercial area of Lyttelton which included Norwich Quay and the connecting lower parts of Oxford Street and Canterbury Street. The majority of its original buildings (dating from c1850) were destroyed by fire on 24 October 1870, the worst urban fire to that date in New Zealand. The spread of fire along London Street could not be contained due to a lack of adequate water supply, even though the west end of London Street had a pump which tapped water from a spring discovered when the railway tunnel was constructed. Only a few buildings survived, so most buildings on London Street post-date 1870. Some of these new buildings contain more brickwork due to Lyttelton Borough Council requirements in an effort to prevent such spread of fire in the future. No. 2 London Street dates from 1912 and is a plastered brick two-storeyed semi-classical corner shop, formerly chemist's dispensary. The building was built on the site of the original Queen's Hotel and a 1875 dispensary.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** In 2002 alterations involving removal of internal partitions, internal staircase, and alterations to existing entrance, creation of a new main entrance and extension of the veranda were proposed. The NZHPT file contains no information about structural strengthening of the building at the time. The NZHPT opposed the proposal due to impact on the heritage integrity of the building. As a result, the owner redesigned the proposed alterations to reduce loss of heritage fabric and NZHPT's support and resource consents were obtained.

**Level of Damage:** September-December 2010: Unknown.
January-June 2011: Severe damage and demolished prior to the 13 June 2011 earthquake.

**NZHPT post-earthquake response:** The NZHPT did not oppose demolition based on engineering report.
**Current status:** Demolished

**Arts Centre of Christchurch**

Hereford, Montreal, Worcester & Rolleston Streets (including Dux le Lux)

From 1876
Various incl. Mountfort, Cane & Seager
Registered Category I and Category II historic places
Listed Groups 1 and 2
Public ownership (Arts Centre Trust)

**Significance:** This splendid collection of Gothic Revival buildings housed Canterbury University, one of the earliest of New Zealand's university colleges, from 1876 to 1975. Its clock tower was the first building designed specifically for a university in New Zealand. Renowned New Zealanders such as Ernest Rutherford and Apirana Ngata were amongst those educated here.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:**

The Arts Centre comprises of a large number of buildings constructed in a unified Gothic-revival style. The table provides a summary of the primary buildings constructed prior to 1923[77]:

[77] Adapted from Robyn Burgess, *Architectural History of the Buildings of Canterbury College, 1876-1923,* 1988, pp 46-47

| Date of construction | Arts Centre of Christchurch buildings |
|---|---|
| 1876-7 | Chemical Laboratory |
| 1876-7 | Clock Tower |
| 1876-8 | Christchurch Girl's High School (School of Art from 1882) |
| 1878-9 | Eastern Wing adjacent to Clock Tower |
| 1879-81 | Boy's High School |
| 1881-2 | College Hall and Staircase Turret (often called the Great Hall) |
| 1883 | Student Union (acquired by the University in 1929) |
| 1887-8 | Classics Lecture Block (Hight Block) |
| 1890-1 | Mechanical Engineering |
| 1893 | School of Art additions to north |
| 1895-6 | Biological Laboratory and Observatory Tower (includes Zoology) |
| 1895-6 | Boy's High School additions |
| 1901-2 | Electrical Laboratory |
| 1901-2 | School of Art |
| 1905-10 | Hydraulics Laboratory (former Court Theatre) |
| 1908 | Boy's High School Gymnasium |
| 1908-10 | Chemical Laboratory (Chemistry) |
| 1912-13 | Boy's High School, additions to south west |
| 1913-14 | Hydraulics Laboratory additions |
| 1914-15 | College Library |
| 1915-16 | School of Art additions |
| 1915-17 | Lecture Room and West Arcade (Maths), Lavatory Block, remainder of arcades, Registry |
| 1917 | School of Art stone facing |
| 1917 | Physics |
| 1917-18 | Biological Laboratory additions (Botany) |
| 1921-3 | School of Engineering extension |

All of the Arts Centre buildings were built of unreinforced masonry (largely stone) with the exception of the Student Union building which was built in 1883 as a private house being a mixture of brick (ground floor) and timber-framing (upper floor). This house was acquired by the former Canterbury University in 1929.

In 1966, the University of Canterbury shifted to Ilam and the buildings were vacated with the eventual adaptation of the site for a range of arts, commercial and community purposes under the ownership and management of the Arts Centre of Christchurch Trust Board. This Board was established in 1978.

As part of the planning for the new Arts Centre, the Community Arts Centre Steering Committee reviewed earthquake strengthening issues associated with the former University buildings in July 1974. The Steering Committee established the following strengthening priorities:

1. Brace all chimneys, pinnacles by securing to roofs and walls.

2. Strengthening by tying the walls together through roof and roof planes and by supplementary bracing in some areas. This work would begin in the Clock Tower and Great Hall.

3. Build new structures (shear walls, steel frames) within the former Chemistry, Biological, Engineering and Observatory Tower buildings.[78]

In order to carry out this work, it was recommended that the future arts centre would have a full time team of maintenance staff who could carry out strengthening work on a progressive basis.

Following the establishment of the Arts Centre of Christchurch Trust Board in 1978, stage one strengthening work began by Mr Jim Loper, building contractor and engineer Brian Wood. In 1982 Holmes Wood Poole & Johnstone Ltd reported that about 50% of the buildings on the site had been strengthening under stage one by tying all the principal elements together and the bracing of parapets and chimneys (including the removal of a few chimneys).[79] The report commented that stage two will involve the bracing of stone mullions of windows and tying to walls (this had already been done in the Great Hall) and installing a greater density of ties between the major elements. It was considered that the strengthening work of stages one and two would ensure that the buildings could withstand a MM VIII earthquake which was expected to occur in 1-200 years.[80] In short, the early strengthening work was not designed to prevent major damage or collapse, but to prevent partial collapse of critical elements in a moderate earthquake of MM VII-VIII intensity.[81]

In 1991 a further engineering report was prepared by Holmes Consulting Group. This report provided an overview of strengthening work completed and recommendations for further work as summarised below:

[78] Community Arts Centre Steering Committee, *Old University Precinct Future Use Feasibility Study*, July 1974, p 13
[79] Holmes Wood Poole & Johnstone Ltd, 'The Arts Centre of Christchurch Report on strengthening to resist earthquakes', 25 March 1982
[80] ibid, p 16
[81] Chris Cochran and Rod Cook, *Arts Centre Christchurch Conservation Plan*, NZHPT, June 1991, p 125

**Arts Centre of Christchurch Overview of Strengthening Work 1991**

| Building | Earthquake strengthening work completed | Recommended for further work |
|---|---|---|
| **Arts School** | Cross bracing installed in skylights to reinstate roof diaphragm | Steel frame be installed under stone roof of south entry |
| **Hight Block (Classics)** | Securing largely complete | West wall and chimney requires securing. Archway over entrance requires steel transoms to improve face-load stability |
| **Great Hall** | West wall has been vertically post-tensioned and fully grouted with extra foundations to provide independent stability. East wall secured by steel beam spanning from south wall to Old Math Block walls. North and south walls strengthened for face loads, south wall has in-plane steel truss added. Window mullions added | Chimney in the east wall requires strengthening and finial on north wall requires tying. Steeple on stair shaft on Rolleston Ave boundary requires strengthening. Gable end wall of entry vestibule on east face needs to be tied to roof |
| **Lecture Room and West Arcade (Maths)** | General integration completed, but limited ability of flooring to provide diaphragm | Two steel transoms to be added to east and west walls of entry stairwell |
| **Clock Tower** | General securing complete, including steel braced frame within clock tower, tied between 1st floor and roof installed | Steel transom required at 1st floor level, south wall and main stair. Window replacement to involve steel mullion straighteners |
| **Electrical Engineering (Theatre)** | General securing complete | |
| **Mechanical Engineering (Scott Block)** | General securing complete | |
| **Centre Gallery (Library)** | General securing complete | Chimney on west gable end requires strengthening. Bay windows in the north wall may require stone mullions |
| **Cloisters** | Steel angle connections between roof slabs and stone piers/walls have been fixed | Further work required to add extra angles to steel connections |
| **Men's Common Room (Collins Block)** | General securing complete | Extra cleats to secure roof trusses principals to inside faces of north and south walls |
| **Physics** | General securing complete including steel trusses at centre east-west walls and on east and west walls, on inside faces | |
| **Botany** | General securing complete | |
| **Biology (incl' Zoology), Observatory Tower** | No securing work done | Floors and roof to be tied to walls and observatory to be assessed. Chimney on west wall in very poor condition and requires urgent assessment |
| **Chemistry** | Securing, post-tensioning of north and south walls and parapet bracing complete | |
| **Boiler House** | No strengthening required | |
| **Hydraulics Laboratory (former Court Theatre)** | Work complete, general securing and horizontal post-tensioning at 1st floor and roof levels to provide spandrel frame capacity | |
| **Old Boys High School** | General securing complete | Gable ties required on south brickwork wall. Stone steeple and parapets require securing |
| **Craftshops (Old** | No work required | |

| | | |
|---|---|---|
| **Boys High School additions)** | | |
| **Gymnasium (Academy Cinema)** | Strengthening work completed prior to acquisition by Trust Board | |
| **Old Registry Building** | General securing complete, including leaning chimneys | New steel frame required at first floor level in the entry stair area |
| **New Registry addition** | No work required | |
| **Student Union Building (Dux de Lux)** | Minor work required only | |

As earthquake strengthening progress on the buildings and as the new Arts Centre developed, some level of concern emerged about the potential impact of strengthening work on heritage values. This issue and other matters influenced the preparation of a conservation plan by the NZHPT in June 1991.

The conservation plan established the need for a careful planned approach to earthquake strengthening by proposing two stages:

> The first stage would establish the basic seismic and geological data specific to the site and define in some detail the expected building response to earthquakes of varying intensity. The second stage would investigate the structural characteristics of each building using the above data and identify those at greatest risk, those at lesser risk and those at least risk. The second stage would also develop a programme for working through the buildings in a systematic manner indicating in broad terms, methods of strengthening, sequence of work, relocation of users and budget costs.[82]

With regard to costs of strengthening, the conservation plan commented that 'the cost of strengthening the buildings to preserve them will depend to a large extent on the intensity of the earthquake they are designed to resist.' This choice was 'essentially a social choice: the more precious the object the greater the effort we are prepared to make to protect it.'[83]

As recommended by the conservation plan, the Holmes Consulting Group prepared a comprehensive strengthening report in 1993.[84] The report provided detailed information about the site soil profile of the Arts Centre, a detailed and computerised evaluation of the Clock Tower, strengthening alternatives, costs and recommendations. By reviewing existing strengthening works and the detailed analysis of the Clock Tower, the report estimated that the Arts Centre buildings had an existing capacity of between .15g and .25g or approximately 50%NBS.[85] The proposed third stage strengthening work was recommended to involve a system of new concrete walls within the cells of the buildings with strengthened diaphragms and grouting to exterior walls with an estimated total cost of $8.5 million.[86]

Concerns in the community remained about the impact of strengthening work. As described by Glyn Strange in her discussion above conservation issues – '…a full programme of strengthening may

[82] Chris Cochran and Rod Cook, *Arts Centre Christchurch Conservation Plan*, NZHPT, June 1991, p 126
[83] ibid, p 127
[84] Holmes Consulting Group Ltd, *The Arts Centre Stage Three Strengthening Report*, Draft, November, 1993
[85] ibid, p iii
[86] ibid, p iv

intrude further upon the historic fabric of the buildings and alter their appearance to such an extent that it might obscure some of the reasons for their preservation.'[87]

Since the mid-1990s, earthquake strengthening work slowed (in comparison to the earlier period from 1980-1990) with the preparation of individual conservation plans for the Art Centre buildings. While earlier in 1993 it was considered that the structural performance of the buildings was estimated at around 50%NBS, this estimate has been reduced during the 2000s to around 36%NBS. In 2008, the Trust Board set a target of strengthening of 67%NBS at a cost in order of $28 to $30 million.

The most recent (pre-September 2010) strengthening project has involved an upgrade to the 1878 Christchurch Girl's High School (School of Art from 1882). Designed by Holmes Consulting Group, the work involved the use of advanced Carbon Fibre Reinforced Polymers (FRP) wrap to the walls. This technique removes the need for heavy 150mm concrete walls with instead heavy gluing of fibreglass sheets to form a 6mm layer over key bracing walls. This approach means that internal linings can be reinstated over the FRP strengthened walls without visible impacts on the fabric of the building. In addition, the level 1 floors of the building were overlaid with plywood to provide a diaphragm bracing element for tying to the walls and the roof was tied to the gables with extra bracing installed within the roof. The NZHPT understands that there has been no or minimal damage to the 1878 Christchurch Girl's High School building.

**Level of Damage:** September-December 2010: Mostly minimal damage except for Great Hall as a result of a falling chimney.

January-June 2011: Some severe damage with partial collapse (Observatory Tower). Recently strengthened parts of the complex have minimal damage.

July 2011-January 2012: Mostly minimal damage with some areas of moderate damage.

**NZHPT post-earthquake response:** The NZHPT is working with the Arts Centre of Christchurch Trust and Christchurch City Council to make safe, repair and strengthen, including some partial deconstruction and demolition. Resource consents have been obtained, and work has begun, for repair and strengthening (to 67%NBS) of the Clock Tower and Great Hall. Consenting for the repair and strengthening of the Registry building is being processed.

**Current status:** Some partial deconstruction and demolition repair and strengthening work is underway, but currently about 75% of the site has been 'mothballed' due to insurance and funding issues.

[87] Glyn Strange, *The Arts Centre of Christchurch Then and Now*, Clerestory Press, 1994, p 126

**Former Canterbury Provincial Government Buildings**

Corner Durham and Armagh Streets From
1858
Mountfort Architect
Registered Category I historic place
Listed Group 1
Public ownership (Department of Conservation and Christchurch City Council)

**Significance:** The only surviving purpose-built provincial government buildings in New Zealand, these superb Gothic Revival buildings were built in three stages by Mountfort to house one of the original six councils that governed the country's provinces between 1852 and 1876 and in 1928 became the first buildings in New Zealand to be protected for heritage reasons by legislation.

**Construction:** Timber-framed, URM

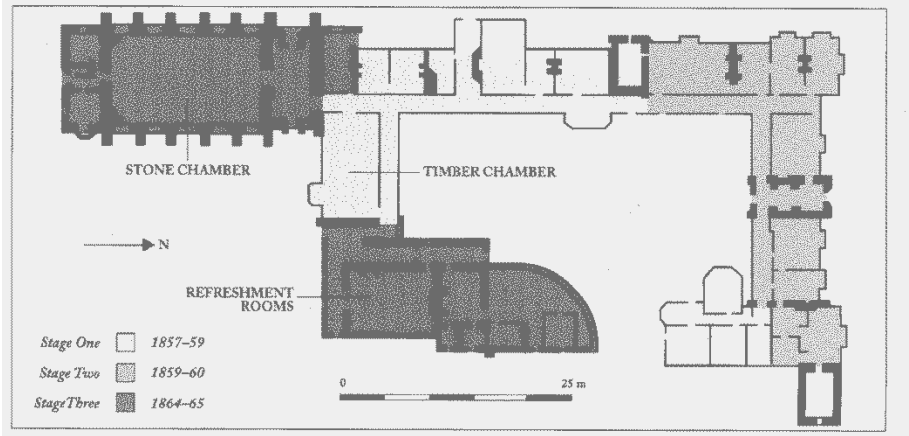
**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:**

The Former Canterbury Provincial Government Buildings has four main parts:

1. The largely-timber part of the building dating from 1857-60 including the Council Chamber (timber).
2. The stone towers within the timber-part of the building also dating from 1857-60.
3. The stone Council Chamber of 1864-1865.
4. The masonry refreshment rooms (known as Bellamy's) of 1864-1865.




Canterbury Provincial Government Buildings. Plan showing stages of construction.
Source, Ian Lochhead, *A Dream of Spires, Benjamin Mountfort and the Gothic Revival,* Canterbury University Press, 1999, p 117

Earthquake strengthening proposals for the Former Canterbury Provincial Government Buildings dates from 1986 as a result of advice from the Architectural Division of the Ministry of Works and Development (MWD). The MWD had assessed the timber-part of the building in February 1986 and recommended a programme of strengthening to 67% NBS. This assessment and the need to carry out strengthening on the stone sections of the building, resulted in the Canterbury Provincial Buildings Board to submit an application for funding assistance to the NZHPT in April 1986. The 1st stage of this work was proposed for the stone Council Chambers and the Durham Street tower. At the time, the Board considered that:

1. That earthquake was the most likely cause of destruction of the Provincial Buildings.
2. That in the event of that there would be little likelihood of reconstruction.
3. That it would therefore be more appropriate to invest in earthquake protection rather than insurance.
4. That fully indemnity cover be maintained on the basis of full cost less deprecation.
5. That damage rather than total destruction is the most likely outcome of a disaster and that the amount of insurance cover should be adequate to cover that damage.

The MWD prepared a structural report on the stone Council Chamber, Bellamy's and the stone towers in February 1987. The stone Council Chamber was found to have no effective roof tie or diaphragm bracing and therefore the stone gables were not considered capable of 'sustaining a 'moderate' earthquake without failing.'[88] Strengthening to 2/3 of the current building code was recommended using of staged system involving options of:

1. Test and investigation.
2. Tying the three gables into the roof and bracing/strengthening of chimneys.
3. Strengthening of walls using chemical foam to fill rubble cavity where it occurs between the skins of stone work.
4. Installing post-tensioned reinforcing rods fixed to the walls and tying the existing roof sarking to these walls.

[88] MWD Engineering Services Division, 'Canterbury Provincial Buildings Structural Report on Existing Buildings, Old Stone Council Chamber, Bellamy's Block, Stone Towers, February 1987, p 14

5. Isolation by installing a line of small diameter micro piles around the outside perimeter of the building and constructing post tensioned continuous concrete beams below ground level over the piles and against the foundation wall (this option was considered to be ambitious and novel at the time).[89]

Bellamy's was used by the Justice Department and included two Court rooms and Judge's Chambers. As for the stone Council Chamber, it was found that the floors and roofs were not tied laterally to the walls and so the building had limited diaphragm capability. This meant that the upper storey walls, supporting the roof, and the chimneys and gables would fail in a 'moderate' earthquake. A similar staged scheme was proposed for Bellamy's as outlined for the stone Council Chamber. However, this scheme also proposed spray coating critical internal walls with a 150mm reinforced concrete layer.

The gables of the Durham Street tower were also assessed to fail in the 'moderate' earthquake and strengthening proposals involved tying of gables and walls at roof level, installing and fixing roof, floor and ceiling in-plane bracing, and spraying of the inner face of existing walls of reinforced concrete. Comparable strengthening work was also proposed for the Armagh Street tower.

Following the disestablishment of the Canterbury Provincial Buildings Board, the buildings were vested in the Canterbury Regional Council and the Department of Conservation in the late 1988. Five years later, responsibility was transferred from the Canterbury Regional Council to the Christchurch City Council. The Canterbury Regional Council implemented the first stages of strengthening work involving tying and the installation of post-tensioning reinforcing rods fixed to the interior of the stone Council Chamber and Durham Street tower in 1990. The completed stone Council Chamber strengthening work involved:

- Strengthening work on 2 chimneys on south gable, imitation chimney using lightweight materials on north gable and strengthened chimney on north stairwell.
- Tying using steel rods with cast iron rose head washers on the north and south gables and Durham Street entrance gable. Steel bracing installed within roof space over north and south ends of the Chamber.
- Concrete beam installed along the top of the east and west walls along the full length of the Chamber.
- Steel bracing installed over parapet above the speaker's room and clerk's room, south end.
- Steel bracing installed beneath the floor of the strangers (public) gallery.
- Stone window mullions on east and west walls braced by steel mullions with ties to stonework.[90]

Sometime after this work, exposed steel cross ties were also installed within the ceiling of the stairwell and it appears some strengthening of the Durham Street tower was also carried out at this time.[91]

In 1991, the Regional Council also prepared a conservation plan which contained structural reports and a commitment to research and implement 'sympathetic securing and strengthening of the at-risk areas of the Canterbury Provincial Government Buildings against earthquakes.'[92]

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[89] ibid, p 24
[90] Shews Hey Ussher Architects, *Canterbury Provincial Council Buildings Conservation Plan*, October 1991
[91] Opus International Consultants, *Canterbury Provincial Council Buildings, Christchurch, Revised Conservation Plan*, December 2009, p 52
[92] Shews Hey Ussher Architects, *Canterbury Provincial Council Buildings Conservation Plan*, October 1991, p 141

Following the conservation plan and NZHPT concerns about the potential impact of earthquake strengthening on the heritage values of the building, the Christchurch City Council commissioned Holmes Consulting Group Ltd to prepare a strengthening report for Bellamy's in September 1994.[93] The report considered that the building had an estimated strength of .16g or approximately 30% of the current loading code design earthquake. The proposed strengthening programme tried to find a balance between strengthening and retention of heritage fabric especially regarding the application of sprayed reinforced concrete to the walls:

> The proposed strengthening system involves application of new concrete facings to some or all of the walls, full strengthening of the floor diaphragms and tying together of the various elements of the building. The analyses revealed that the whole building could be fully strengthened, but only by application of large areas of concrete, much of which would be hopelessly intrusive. A more acceptable alternative is proposed, by which the main areas of the building are fully strengthened, while the areas which cannot be unintrusively strengthened will be allowed to fail in the event of a moderate to large earthquake.[94]

This partial-strengthening approach, however, still involved substantial changes to the building including the removal of the existing floor, new foundations and new concrete beams with some reroofing required.

After some negotiations between NZHPT, DOC and the Christchurch City Council, a programme of partial-strengthening work was agreed upon in June 1996 involving new foundation alongside the existing and ceiling beam and new sprayed 150 mm reinforced concrete walls designed to minimise impacts on heritage fabric. This work was finished in 1999.

After the strengthening of Bellamy's, Holmes Consulting Group also designed strengthening proposals for the towers in 1998 and three chimneys with proposals for post tensioned steel cables, new base foundations and a concrete ring beam. This level of strengthening was aimed to achieve 40% of the current code.[95] After some further discussions between Council, DOC and NZHPT, the strengthening work was completed in 2001.

A revised conservation plan was prepared by Opus International Consultants in 2009. The conservation plan provided an overview of historical strengthening work and other alterations and conservation work. It stated that there was a need Christchurch City Council to 'develop a clear policy for any future earthquake strengthening that may be required for the Canterbury Provincial Council Buildings.'[96] The conservation plan also included an intervention policy that recommended detailed strengthening proposals that follow the recommendations of the NZHPT guidelines. It noted that 'some securing has already been carried out in the stone portions of the building, but further analysis is required to determine current and future strengthening requirements.'[97]

**Level of Damage:** September-December 2010: Moderate damage to Stone Chamber and Corridor and Tower (chimney damage and cracking to stone walls). Minimal damage to timber-framed parts of the building.

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[93] Holmes Consulting Group Ltd, 'Canterbury Provincial Buildings Bellamy's Strengthening Report', for Christchurch City Council, September 1994
[94] ibid, p ii
[95] Holmes Consulting Group Ltd, ' Structural strengthening of Armagh St Tower, Durham Street Tower and three chimneys adjacent to the Armagh/Durham Street corner', March 1998
[96] Opus International Consultants, *Canterbury Provincial Council Buildings, Christchurch, Revised Conservation Plan*, December 2009, p 80
[97] ibid, p 93

January-June 2011: Major damage and collapse of Stone Chamber and Tower, gables and buttresses collapse, partial collapse of Bellamy's (moderate damage to timber-framed parts of the building).

July 2011-January 2012: Further severe damage to Durham Street Tower and Bellamy's.

**NZHPT post-earthquake response:** NZHPT supports make safe and partial deconstruction. NZHPT successfully nominated for inclusion on World Monument Fund Watch 2012 List.

**Current status:** Collapse of Stone Chamber, Bellamy's and Towers. The rest of the building is being secured and made safe.

**Christ Church Cathedral**

Cathedral Square
1864-1904
Benjamin and Cyril Mountfort, and Scott Architects
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** Built on land set aside for the purpose by the Canterbury Association, the Cathedral is the only church designed by distinguished British Gothic Revival architect George Gilbert Scott in New Zealand and is one of the most important landmarks and symbol of Christchurch.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:**

The history of the Christ Church Cathedral has been well documented and an authoritative account of the construction of the Cathedral is provided by Ian Lochhead in his account of Benjamin Mountfort and the Gothic Revival.[98] This account records that George Gilbert Scott originally advocated for a 'hybrid timber and stone structure' which could be fabricated in Britain and be earthquake resistant.[99] While the hybrid structure was rejected in favour of a stone building, Lochhead's account includes a description of the earthquakes of the 1880s which resulted in damage to the spire and the 'final solution' of 1901 to reconstruct the spire in timber sheathed with copper. Lochhead noted that the 'distinctive cupreous green of the spire's apex acts as a conspicuous record of the cathedral's vulnerability to seismic events and also serves as a reminder of the protracted debates over its structure.'[100]

[98] Ian Lochhead, *A Dream of Spires, Benjamin Mountfort and the Gothic Revival*, Canterbury University Press, 1999
[99] ibid, p 130
[100] ibid, p 147

The NZHPT's record of earthquake strengthening of the Cathedral is limited to the February 1998 Seismic Evaluation by Holmes Consulting Group Ltd.[101] The seismic evaluation considered that the Cathedral presented a severe life safety risk with failure 'likely under a 50 year return period earthquake, which has a 64% probability of occurring within any 50 year period. The failure mode is collapse at the West face of the buttresses which resist all lateral loads generated by the upper nave walls and roof.'[102] The proposed strengthening measures was to 'add roof bracing to transfer earthquake loads from the upper Nave walls to the North and South exterior walls. Addition of this bracing reduces the probability of failure in a 50 year period from 64% to 22%, a significant decrease in life safety hazard.'[103] It was also suggested to add concrete skin walls in selected locations to further reduce seismic risk. Caution was provided, however, that even with the proposed strengthening, risk of failure was a possibility:

> Even with the roof bracing and the added concrete walls, the probability of failure in a 50 year design life is higher than recommended by the NZNSEE (14% versus 11%). However, there are twin constraints of working with a structural form which is unsuitable for earthquake resistance and a building of an historic nature to which substantial changes cannot be made. Within these constraints, it is inevitable that some compromise must be made to the level of earthquake resistance which can be achieved.[104]

By December 1998, further design work had been completed for the resource consent application involving the steel roof bracing and the addition of concrete skin walls to the west walls of the nave aisles and transept. The visual impact of the roof bracing was minimised by utilising the steel rods as the main bracing members and shaping exposed steel cleats and brackets to match in with the form of the existing structure. This work was supported by the NZHPT and was undertaken in 1999-2000.[105]

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Severely damaged – The top of the tower (the spire) collapsed and the rest of the church was moderately to severely damaged. The north wall of the tower was demolished.

Further severe damage occurred on 23 July 2011-January 2012 with the collapse of the west end of the nave, including the rose window.

**NZHPT post-earthquake response:** Prior to January 2012, the NZHPT worked with owners and CERA to develop a make-safe plan for the Cathedral. Following a reassessment of the options by the owners following 15 January 2012, the NZHPT provided advice to CERA on 27 February 2012 supporting reinstatement of the Cathedral in a strengthened form.

**Current status:** A decision to deconstruct the Cathedral was announced on 2 March 2012.

[101] Holmes Consulting Group Ltd, 'Christchurch Cathedral Seismic Evaluation', 4 February 1998
[102] ibid, p 2
[103] ibid, p 3
[104] ibid, p 3
[105] Research following the earthquakes, estimates that the building was strengthened to >67%NBS Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Former Trinity Congregational Church**

Corner Worcester and Manchester Streets
1873
Mountfort Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** The first Mountfort church built in stone, this church was designed for the Congregationalists, who reject state religion in favour of a democratic community and a 'simple and individual faith in Jesus'. It is Gothic Revival in style and its central, octagonal space required by the Congregationalists features a double-barrel vault panelled in timber described as 'one of Mountfort's most impressive and original inventions'. In more recent times used as a restaurant.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** The church was proposed for sale and/or demolition in 1973 which sparked a public outcry to save the building. At the time, the Ministry of Works and Development considered that the church was an earthquake risk and was 'unsuitable for strengthening.' Negotiations between NZHPT, Council and the church owners failed to secure the building and the building was proposed for a change of use as a restaurant in 1974. This change of use was supported by the NZHPT. As part of the change of use for a restaurant, the nave internal walls were substantially strengthened with concrete reinforced skin.

**Level of Damage:** September-December 2010: Moderate damage.

January-June 2011: Severely damaged and partial collapse - tower collapsed and the rest of the church was severely damaged.

July 2011-January 2012: Further moderate damage.

**NZHPT post-earthquake response:** The NZHPT is working with the owner to retain the octagonal hall part of the building..

**Current status:** Hall demolished. Church made safe with partial demolition.

**Christchurch Club**

Corner Worcester St and Latimer Square
1859
Mountfort Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** Built for the Christchurch Club that was founded in 1856 by a group of wealthy landholders, this Italian villa style timber building is an unusual example of Mountfort's work and was the centre of social and political life for the Canterbury elite in the 19th century.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** No earthquake strengthening undertaken to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Severely damaged: Latimer Wing collapsed and the rest of the building was moderately damaged. 50% of the building was demolished by USAR during the emergency response.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** In May 2011, the NZHPT recommended retention of the existing buildings and their interim propping and weatherproofing.

**Current status:** Secured/made safe.

**Cathedral of the Blessed Sacrament**

1901
Frank Petre Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** A superb example of work by well-known church architect Francis William Petre, the neo-classical Cathedral was built in Oamaru stone involved new, significant methods of construction and has been described as one of the finest examples of church architecture in Australasia and was admired by playwright George Bernard Shaw. It has been the centre of the Catholic diocese in Canterbury since its completion in 1905.

**Construction:** URM and concrete

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** While a gothic revival design was originally favoured by the Catholic Bishop of Christchurch in the early planning stages of 1899, Petre considered that a neo-classical design would be more resistant to earthquake shaking. The design and the use of concrete influenced a belief that it was 'long presumed that the Cathedral of the Blessed Sacrament is a much stronger building than others of its age.'[106] This belief, however, was tempered by the early problems after the construction of the Cathedral with ground subsidence which affected the two eastern piers carrying arches, drum and dome.

Alterations and restoration between 1970-1975 did not address earthquake strengthening issues and it was in 2001 that the parish started to address the issue. Following the Arcquipa earthquake in Peru of 24 June 2001, the Catholic Cathedral Trustees began a fundraising campaign. The Newsletter of October 2001 stated:

> Happily the Cathedral is of fairly massive construction and its form is symmetrical, with walls and piers capable of resisting directional tremors. While a detailed computer analysis has not been carried out, the engineers consulted believe that the basic building will remain stable at well above the minimum seismic load presently required for buildings deemed to be 'earthquake prone'.
>
> However, as was to be expected, certain features of the building are significantly more vulnerable than others. These have been identified and recommendations have been made with a view to securing or strengthening these to reduce their vulnerability to

[106] Newsletter, Friends of the Cathedral, No.46, October 2001

damage and collapse. With little or no visible alteration to the Cathedral, the engineers believe that it can be brought up to 60% of code strength.[107]

Further investigations by Holmes Consulting Group (with Soils & Foundations Ltd and input from Dr Berrill and Dr Davis of the University of Canterbury) were reported to the Trustees in February 2002 and found that the site was at risk as a result of the soft fine grained alluvial sediments over dense sands which would give rise to earthquake induced liquefaction. This meant that 'seismic ground shaking at the Cathedral site is likely to be about three times stronger than that implied by the current New Zealand Loadings Code.'[108]

As a consequence, the report stated that 'strengthening the building as a whole was, therefore, not considered practical' and 'it was accepted that it would be very difficult to execute a full and proper job of strengthening the building on a cost effective basis. Instead, it was decided to focus on dealing with the more obviously vulnerable building elements.'[109]

The focus on securing vulnerable building elements resulted in a strengthening proposal involving a mixture of bracing, concrete wall skins, steel rods and frames. The work, as consented and undertaken in 2002-2003 is summarised below:

| Area of work | Cathedral of the Blessed Sacrament Strengthening summary 2002-2003 |
|---|---|
| **Bell Towers** | New cross bracing added internally on four walls each. |
| **Handrails and Balustrades** | Tensioned stainless steel wire and rods. |
| **Barbadoes Street Pediments** | 150mm thick concrete overlay over the portico area.<br>Four braced steel frames tied into the overlay, parapet and gable wall.<br>100mm concrete wall overlay to the high-level slab between the parapet wall and gable wall.<br>89mm square steel sections shaped and fixed to back of each angel.<br>Height of cross shifted down to plinth level and secured by stainless steel rod.<br>Stainless steel wires from top of braced steel frames to the back of each capital |
| **North and South Gables** | Removal and rebuilding of cross<br>Steel frames to the back of each gable with anchors.<br>Steel flats along the floor at each side.<br>65mm square steel sections from the steel frames angled onto the floor with grouted fixings. |
| **Main Dome** | 200mm thick concrete skin wall to the inside of the dome wall.<br>Five stainless steel wires crossing the dome below the existing timber roof structure level fixed to cast in steel brackets. |
| **Dozy Stonework** | Stone replacement (16 stones) and installation of thirty stainless steel threaded rods 600 long pinning vulnerable stonework. |
| **Mezzanine Floor Overlay** | 100 thick concrete overlay. |
| **Main Ceiling Bracing** | 100 thick concrete overlay over the existing concrete ceiling to the mezzanine area.<br>Two stainless steel cables from the west gable wall anchored back to the existing concrete beams over the mezzanine columns. |
| **Ceiling Domes** | 36 connections from three ceiling domes to the surrounding timberwork. |

[107] ibid
[108] Holmes Consulting Group, 'Catholic Cathedral Seismic Securing Proposal' Prepared for Catholic Cathedral Trust, 12 February 2002, p 1
[109] ibid

Following the September earthquake, repairs and additional earthquake strengthening was in the planning stages when the building suffered severe damage on the 22 February 2011.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Major damage and partial collapse of twin bell towers, main dome rotated and leaning, key stones and arches badly damaged, severe cracking.

July 2011-January 2012: Severe damage with cracking to the front façade and walls of the nave.

**NZHPT post-earthquake response:** NZHPT is working with owners and consultants to make safe to retain nave. NZHPT's engineer has proposed an alternative option for minimum demolition.

**Current status:** Made safe/partial deconstruction. Future uncertain at time of writing.

**Former Municipal Chambers (Our City O'tautahi)**

Corner Worcester & Oxford Terrace
1886-1887
Seager Architect
Registered Category I historic place
Listed Group1
Public ownership (Christchurch City Council)

**Significance:** A significant and controversial departure from the Gothic Revival style favoured in Christchurch, this brick building constructed for the City Council was the first Queen Anne style building in New Zealand and one of Samuel Hurst Seagar's major works.

**Construction:** URM, tile roof

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** The Christchurch City Council prepared a building survey in 1988 which provided estimates for two options – 'to secure and restore' and to 'strengthen and restore.'[110] The 2000 conservation plan states that the option to 'secure and restore' was chosen as an interim measure and restoration works began in 1989 as guided by Don Donnithorne Architects.

As part of these works, the Christchurch City Council engineer designed a strengthening system with three tie rods across the Council Chambers vaulted ceiling in 1990. The work also involved the installation of a lift which added strength, new concrete shear walls in the southwest corner office and the chimneys were lined with concrete with steel angles alongside the chimney on the west elevation. This work was undertaken by the Council without consultation with NZHPT. At the time, the NZHPT indicated to the Council in writing that we wished to have an opportunity to discuss the strengthening work with the council.

The conservation plan of 2000 noted that 'concerns remain, however, regarding the structural integrity of the building in the following areas:

> **Chimneys**
> The chimneys constitute a substantial mass above roof level and their collapse in the event of an earthquake cannot be discounted. The chimney in the north corner has a pronounced lean towards the south.

[110] Dave Pearson Architects, *Municipal Chambers 159 Oxford Terrace Christchurch, A Conservation Plan,* March 2000, p 26

**Toilet Block**
The toilet block on the northwest face appears to have settled differently with respect to the remainder of the building. This has resulted in cracks in the brickwork and voussoirs to the arch above the window dropping.

**Cracks in Walls**
Cracks are apparent in a number of locations. In particular, cracks are evident within the Council Chamber, within the walls, ceilings and beams. Cracks have also occurred in the stairwell on the northwest face.'

Despite these findings, it is somewhat surprising that the conservation plan did not include conservation policies for earthquake strengthening of the building and the NZHPT is not aware of any strengthening work undertaken on the building after 1990.

**Level of Damage:** September-December 2010: Moderate damage.

January-June 2011: Severe damage.

July 2011-January 2012: Severe damage.

**NZHPT post-earthquake response:** The NZHPT has not provided a response and is waiting for Council's assets team proposal.

**Current status:** Secured/made safe with extensive propping. Further securing work is underway at time of writing (February 2012).

**McLean's Mansion**

387 Manchester St
1899
England Brothers Architects
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** One of the largest timber houses in New Zealand, this grand Jacobean style mansion was built from the proceeds of a government-forced sale of a large sheep station for Allan McLean by the England Brothers in 1899. Bequeathed for use as a retirement home on McLean's death it was later used for dental services and is now a training centre.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** No record of earthquake strengthening work to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Severe damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** The NZHPT is working with owner to retain.

**Current status:** Secured/made safe, with internal wall linings being replaced.

**Excelsior Hotel**

Corner 120 Manchester and High Streets
1881-1882
Armson Architects
Registered Category I historic place
Listed Group 1
Private ownership (Christchurch Heritage Trust)

**Significance:** An important landmark on a site that has housed a hotel since 1865. Designed by Armson for publican John Barrett as the Barrett's Family Hotel, in the style of an Italian palazzo, an architectural form made famous by Sir Charles Barry's designs for two London clubs, the Travellers' (1829-1830) and the Reform Club (1837-1838). Features of this style can be seen in the block-like plan, the rusticated lower storey, the differing window treatments on the 3 floors, and the elaborate cornice. The building was the first acquisition by the Christchurch Heritage Trust in 1997.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 1987, an initial structural assessment was prepared by Halliday, O'Loughlin & Taylor Consulting Engineers Ltd. The building was considered to be an earthquake risk and substantial strengthening was proposed involving providing ties to the cornices, ties at each floor level from the exterior walls to wooden floor diaphragms and removal of parapets and chimneys. Following purchase by the Christchurch Heritage Trust in 1997, a conservation plan was prepared by George W Lucking which included a specific conservation policy for the security of the building and its occupants from seismic forces and from fire and smoke.[111] As guided by the conservation plan, the Excelsior Hotel was strengthened with works involving internal floor to wall steel ties, steel beams, parapet bracing and roof to wall ties.[112] The Christchurch City Council Historic Retention Incentive Grant contributed $33,750 towards this strengthening work.

Following restoration, the building was sold by Christchurch Heritage Trust in 2010. It was re-purchased by the Christchurch Heritage Trust following the January-June 2011 earthquakes.

**Level of Damage:** September-December 2010: Minimal damage.

[111] George W Lucking, *Excelsior Hotel Conservation Plan*, Christchurch Heritage Trust Ltd, January 1998
[112] Research following the earthquakes, estimates that the building was strengthened to >33% but <67%NBS. Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

January-June 2011: Severe damage.

July 2011-January 2012: Minimal or no damage.

**NZHPT post-earthquake response:** In June 2011, the NZHPT advised retention of west Manchester Street façade.

**Current status:** Manchester Street façade retained.

**Odeon Theatre**

214 Tuam Street
1883
Lambert Architect
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** The Odeon Theatre, erected in 1883, is the oldest, masonry theatre in New Zealand and one of only three intact, purpose-designed theatres that were built in the nineteenth century. First known as the Tuam Street Hall or Theatre it was a popular venue for all types of public meetings, entertainment and exhibitions. Designed by prominent Christchurch architect T.S Lambert (1840-1915), of brick construction with a majestic stone façade of Italianate design with Venetian Gothic elements. The Luttrell Brothers, also notable architects, modified the interior in 1927, providing the theatre with superior comfort, acoustics and viewing qualities.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Poor

**Strengthening history:** Major interior changes were undertaken in 1927 with new ticket offices, staircase and mezzanine and new proscenium.[113] This interior format survived until 1960 when the theatre was converted into a cinema by Kerridge-Odeon Ltd. Following sale to the Sydenham Assembly of God Church, a structural report was prepared by W.Lewis.[114] The heritage assessment of 2006, noted that the structural report highlighted:

> The grave need for earthquake proofing. In 1960, the rear section of the theatre was enlarged to accommodate the seventy-millimetre screen. Essentially an unsupported brick shell, this back stage area is a significant earthquake risk. The front façade also needs tying back to the internal walls. Complete renovation was quoted at $790,000 in 1985.[115]

The cost of the earthquake strengthening and other retrofit work was prohibitive for the Sydenham Assembly of God Church and the building was sold to 3H Property Development Group in 2003. 3H Property Development Group lodged consents to demolish the building and this action resulted in community interest to save the building. In 2004, the theatre was suggested for a multi-purpose

[113] Ian Bowman, *Odeon Theatre, Christchurch, Heritage Assessment,* June 2006, p 8
[114] W. Lewis, 'Structural Report of the Assembly of God Building at 214 Tuam Street', 1985
[115] Ian Bowman, *Odeon Theatre, Christchurch, Heritage Assessment,* June 2006, p 10

community arts facility by the Odeon Theatre Trust. As part of the proposal, consultants were commissioned to prepare a structural assessment. This assessment found that the building was earthquake-prone (generally considered to be about 5%NBS) with critical weaknesses being:

- Lack of ties between the top of the masonry walls and the roof structure.
- The large height to thickness ratio of the auditorium and stage walls.
- The significant lack of in plane shear strength of the proscenium wall.
- Lack of roof bracing in the Auditorium and Fly Tower.

Despite substantial advocacy by the Odeon Theatre Trust, Christchurch Heritage Trust and the NZHPT, no progress was achieved on the restoration and strengthening of the theatre and by 2008 the building was in a state of neglect. Various ideas were being discussed at the time of the September 2010 earthquake when the building suffered substantial damage.

**Level of Damage:** September-December 2010: Moderate damage.

January-June 2011: Severe damage to theatre, roof and fly tower. Moderate damage to facade.

July 2011-January 2012: Severe damage.

**NZHPT post-earthquake response:** In July 2011, the NZHPT advised partial deconstruction and retention. Further comments in January 2012 by the NZHPT recommended façade and front of house retention, demolition of the fly tower and auditorium based on engineering advice.

**Current status:** Future uncertain at time of writing.

**Former Normal School**

(Cranmer Court), Cranmer Square
1873
Farr Architect
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** This Gothic Revival school was the first Normal School in Canterbury and one of the earliest in New Zealand. 'Normal Schools' allowed student teachers to learn through exposure to a normal school environment. The school closed in 1970 and has more recently been converted to apartments.

**Construction:** URM (stone façade) apartments behind the façade dating from 1981-1985.

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 1969, the Former Normal School was vacated by the Christchurch Teachers College and the Department of Education proposed to demolish the school and use the site for an extension to the Christchurch Technical Institute.[116] This proposal sparked a major public debate and a campaign to save the building.

Prior to the departure of the school and from the early 1960s, the structural integrity of the school was a concern to the Government. In October 1963, the Director of Education commissioned the Ministry of Works (which later became the Ministry of Works and Development) to prepare a structural report. This report, which remained confidential for some years, considered that the building was an earthquake-risk and in very poor condition. The report recommended that the building be demolished and a new replacement built within three years.[117]

The structural report of the Ministry of Works and Development was not released to the Christchurch Civic Trust and the wider public until 1978 but in 1970 media reports were circulating about the contents of the report[118] A former structural engineer of the Ministry for Works and Development was reported in the media as saying that strengthening of the building 'could not be done at a reasonable cost'.[119]

[116] *Christchurch Press*, 16 September 1969
[117] Christchurch City Council, Town Planning Division, *The Architectural Heritage of Christchurch, The Normal School*, 3rd Edition, October 1986, p 11
[118] *Christchurch Star*, 24 October 1970
[119] ibid

After substantial advocacy, the Minister of Lands confirmed the earlier government decision to demolish the school. This proposal was halted by intense public interest and a proposal by a private company (Paynter and Hamilton Ltd) to purchase the property for apartments. This purchase was successful subject to an agreed conservation covenant and in 1981 the former school was converted into 22 apartments and 15 town houses resulting in partial demolition and façade retention. After some financial difficulties, the project was completed by Fletcher Development and Construction Ltd in 1985. There is no record on the NZHPT's file of earthquake strengthening in association with the conversion of the building into apartments.

**Level of Damage:** September-December 2010: Moderate damage.

January-June 2011: Severe damage and partial collapse - Octagonal Room collapsed and severe damage to the rest of the building.

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** Between May-September 2011, the NHZPT worked with owners to make safe.

**Current status:** Building is secured and made safe. Further securing work is required following the 2-15 January 2012 earthquakes.

**Dorset Street Flats**

12 Dorset Street
1956
Miles Warren Architect
Registered Category I historic place
Listed Group 3
Private ownership

**Significance:** The Dorset Street Flats are one of Sir Miles Warren's earliest architectural projects. The flats set new architectural, social and aesthetic standards for domestic buildings in New Zealand and are recognised as one of the most important Modern Movement buildings constructed in this country.

**Construction:** Reinforced block-work

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** No record of earthquake strengthening to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** In October 2011, the NZHPT recommended retention with support from owners and Sir Miles Warren and is working with owners on retention proposal.

**Current status:** The stables apartment building has been demolished and the future is uncertain for the flats at time of writing.

**Houses (semi-detached)**

86-88 and 98-100 Chester Street East
1892
Widdowson Architect
Registered Category II historic place
Listed Groups 2 & 3
Private ownership

**Significance:** The remaining two sets of semi-detached townhouses located between 86 to 100 Chester Street East were built by William Widdowson. They are unusual in their design as two storey grouped townhouses were uncommon in Christchurch during the late colonial era. Their near identical form, materials and design add to the architectural significance of the townhouses, along with the scale and streetscape value. (note: two sets were demolished following the earthquakes).

**Construction:** Timber-framed, brick party walls

**EQP assessment prior to September 2010 (CCC, 2009):** Not listed as potentially earthquake-prone (residential building).

**Condition prior to September 2010:** Good

**Strengthening history:** Each pair of the four sets of semi-detached townhouses on Chester Street East were connected by 225 mm brick party wall. During the early 1990s, cracks appeared in the party wall at No. 86/88 Chester Street East as a result of ground settlement. The owner applied to the NZHPT for financial assistance to repair and strengthen the party wall using steel tie rods. While financial assistance from the NZHPT was not forthcoming, the work was completed in January 1994.

In 2007, substantial alterations were made to No.88 Chester Street East involving wall and chimney removal. Further work was proposed for No.86 in July 2010 involving sub-floor stabilisation and piling to prevent further ground settlement. This work was completed following the 4 September 2010 earthquake.

**Level of Damage:** September-December 2010: Minimal damage.
January-June 2011: Severe damage.
July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** NZHPT supports retention and is working with owners to achieve retention.

**Current status:** Yet to be secured and made safe.

**Knox Church (Presbyterian)**

28 Bealey Avenue
1902
R.W. England Architect
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** Knox Church and its setting make an important contribution to the identity, sense of place and history of the Christchurch metropolitan area. In June 1901 the foundation stone for the present church was laid and the completed church was dedicated on 1 May 1902. It is an important example of the Church designs of prominent local architect R. W. England.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** While there is no record of earthquake strengthening to the knowledge of the NZHPT, the church gables had been tied to the roof as a result of historic strengthening work.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Severe damage.

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** The NZHPT is working with owners on a redevelopment proposal.

**Current status:** Secured, made safe and a proposal to rebuild to 100% NBS subject to resolution of insurance issues.

**McKenzie & Willis Building**

Corner 179 High and 238 Tuam Street
1910
England Brothers Architects
Registered Category II historic place
Listed Group 2
Private ownership


**Significance:** This Edwardian building, erected as an addition to the earlier A.J. White Store (demolished following the February 2011 earthquake), was designed by the England Brothers. The England Brothers were one of the foremost architectural practices in Christchurch during the early twentieth century. The building was built for the business of A J White. In connection with adjacent buildings, this store forms a noteworthy part of the cityscape and provides a continuous link to the history of furniture retailing in Christchurch.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** No record of earthquake strengthening to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Severe damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** The NZHPT supports facade retention and funding support has been approved by the Canterbury Earthquake Heritage Buildings Fund (with financial assistance from Fletcher Construction Ltd).

**Current status:** Façade secured and made safe. Strengthening work to begin and the north façade has been propped as part of retention works.

**Millers Department Store (Former)**

163-173 Tuam Street
1938
Hart Architect
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** Of significance to the Canterbury region for its long term use as the Miller's Department Store and secondly by the Christchurch City Council as Civic Offices. Associated with philosophies related to worker's wellbeing and with provision in the building for staff recreation in a central city location, Miller's was considered a leading firm nationally with the building in this respect. The building is of architectural and aesthetic significance as an early example of the International Style of architecture in Canterbury and New Zealand. It is notable as the foremost work of Christchurch architect G.A.J. Hart, and for its successful design both functionally and aesthetically. It has technological significance as an example of the early use in Christchurch of modernist construction techniques using steel and concrete, and is of particular note for the use of waffle slabs, cantilevering, and hexagonal columns.

**Construction:** Steel and reinforced concrete

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone.

**Condition prior to September 2010:** Unknown

**Strengthening history:** No record of earthquake strengthening to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.
July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** The NZHPT has been waiting for CCC assets team proposal for this building.

**Current status:** Engineering assessment currently underway and securing work commenced late in 2011.

## Edmonds Clock, Edmonds Band Rotunda, Poplar Crescent Building and Balustrades

Corner Chester Street East and Madras Street, 230 Cambridge Terrace
1929
Hean and Willis Architects
Registered Category II historic place
Listed Group 2
Public ownership (Christchurch City Council)

**Significance:** In 1929 Christchurch businessman Thomas Edmonds donated £5,000 towards the River Bank Improvement Scheme, financing the erection of the rotunda and shelter on the Cambridge Terrace riverbank and a clock tower and telephone cabinet/drinking fountain to commemorate 50 years of Edmonds' business in Christchurch. These structures were designed by local architects Victor Hean and H. Francis Willis with sculpture by sculptor William Trethewey. Together with their setting the structures make an important contribution to the Avon River landscape in central Christchurch.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** No record of EQP assessment prior to September 2010.

**Condition prior to September 2010:** Good

**Strengthening works:** No record of earthquake strengthening to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Severe damage.

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response**: NZHPT has commented on proposals for repair and strengthening work as part of a resource consent application for clock tower.

**Current status**: Christchurch City Council have prepared a resource consent proposal for repair and strengthening of clock tower. The future of the rotunda is uncertain at time of writing.

**Wards Brewery Historic Area**

Corner Fitzgerald Ave, Kilmore and Chester Streets.
1860s
Registered historic area
Listed Group 2
Private ownership

**Significance:** Ward's Brewery, the first established in Christchurch, opened in 1854. It moved to its current site in 1860 and has been a significant landmark on the eastern side of the city for well over a hundred years. Constructed of brick and stone, the interesting range and form of the buildings attract attention to the site adjacent to the Avon River. The buildings are notable amongst other industrial structures of the era for their attractive detailing featuring Oamaru stone. The kilns in particular are superb examples of industrial architecture, their design and ornamentation transcending their functionality. Together with the malt-house, brewing tower and other related structures they comprise the largest and most important group of industrial buildings in Christchurch dating from this era.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** In 2003, the Crichton Cobbers Youth Club applied to the NZ Lotteries Board for financial assistance to undertake earthquake strengthening work to the former Malthouse. At the time the building had an estimated resistance of about 25% of the NBS as detailed in a building condition report.[120] The work involved the erection of a SHS horizontal truss in the ceiling plane, spanning the full length of the hall to portals with 5 columns at each end of the hall.

**Level of Damage:** September-December 2010: Moderate damage.
January-June 2011: Severe damage.

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** Between May 2011 and February 2012, the NZHPT has provided various reports and recommended partial demolition and make safe works.

**Current status:** Malt House, South Drying Kiln, Some Barrel Storage Halls – demolished; Brewing Tower - partly demolished.

[120] John W. Warren, *Building Condition Report and Application for Funding for Earthquake Strengthening,* October 2003

**Christchurch Town Hall**

100 Kilmore Street
1965-1972
Warren & Mahoney Architects
Not registered by the NZHPT
Listed Group 1
Public ownership (Christchurch City Council)

**Significance:** Designed in 1965 by Sir Miles Warren and Maurice Mahoney of the architectural firm Warren and Mahoney, the Christchurch Town Hall was the result of the largest and most significant design competition seen in New Zealand to that date. Warren and Mahoney's design is the pinnacle of a local response to Brutalist principles in modern architecture, a development spearheaded by the firm. The Town Hall was built using significant financial contributions from the public and the commissioning of a civic venue of this nature was perceived as a sign of the city's coming of age. Initially a joint project by the six former metropolitan territorial local authorities, the Christchurch Town Hall is now vested in the City Council (managed by V Base).

**Construction:** Reinforced concrete

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** No record of earthquake strengthening to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Severe damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** No input by the NZHPT at time of writing.

**Current status:** Secure, has been assessed as repairable, loss adjusters and consultants preparing reports. The future of the town hall is uncertain at time of writing.

**Former Magistrates Court (Family Court)**

Armagh Street
1880
Mountfort Architect
Registered Category I historic place
Listed Group 1
Public ownership (Ministry of Justice)

**Significance:** The earlier, unpretentious portion (1880-1881) is the work of Mountfort, New Zealand's pre-eminent Gothic Revival architect. It is a simple but refined example of his prodigious design talents. The later portion (1908-1909) was designed in sympathy with Mountfort's original design, and is a rare example of Public Works Department gothic architecture. Together, the two portions of the building constitute an important contribution to a precinct of exceptional Gothic buildings.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** The former Magistrates Court was substantially upgraded in 1997 for the purpose of a Family Court. The work involved changes to the interior of the building including demolition of original cells, removal of internal walls and division of the large courtroom into smaller spaces. As part of this work, earthquake strengthening involved the stripping of brick walls and replacement of the interior brick layer with reinforced concrete. Also floors were completely replaced and mezzanines were installed within the double-height court room ceilings.[121] Chimneys were removed and replaced with lightweight replica structures.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** The NZHPT supported make safe and repair work.

**Current status:** Secured and made safe, repair works are proceeding.

[121] Research following the earthquakes, estimates that the building was strengthened to >67%NBS Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**Christ's College**

(including: Big School, Chapel, Hare Memorial Library, Jacobs House, School house, Open air classrooms, Classrooms 1915-21), Rolleston Ave
From 1863
Various architects
Registered Category I and II historic places
Listed Groups 1 and 2
Private ownership

**Significance:** Planned by the Canterbury Association in Gothic Revival style by some of New Zealand's most renowned architects as a replica of the 'great Grammar Schools of England', Christ's College is now the oldest and one of the most prestigious private boys' schools in New Zealand.

**Construction:** Pre-1931 buildings are predominantly URM with the exception of the timber-framed Condell's House.

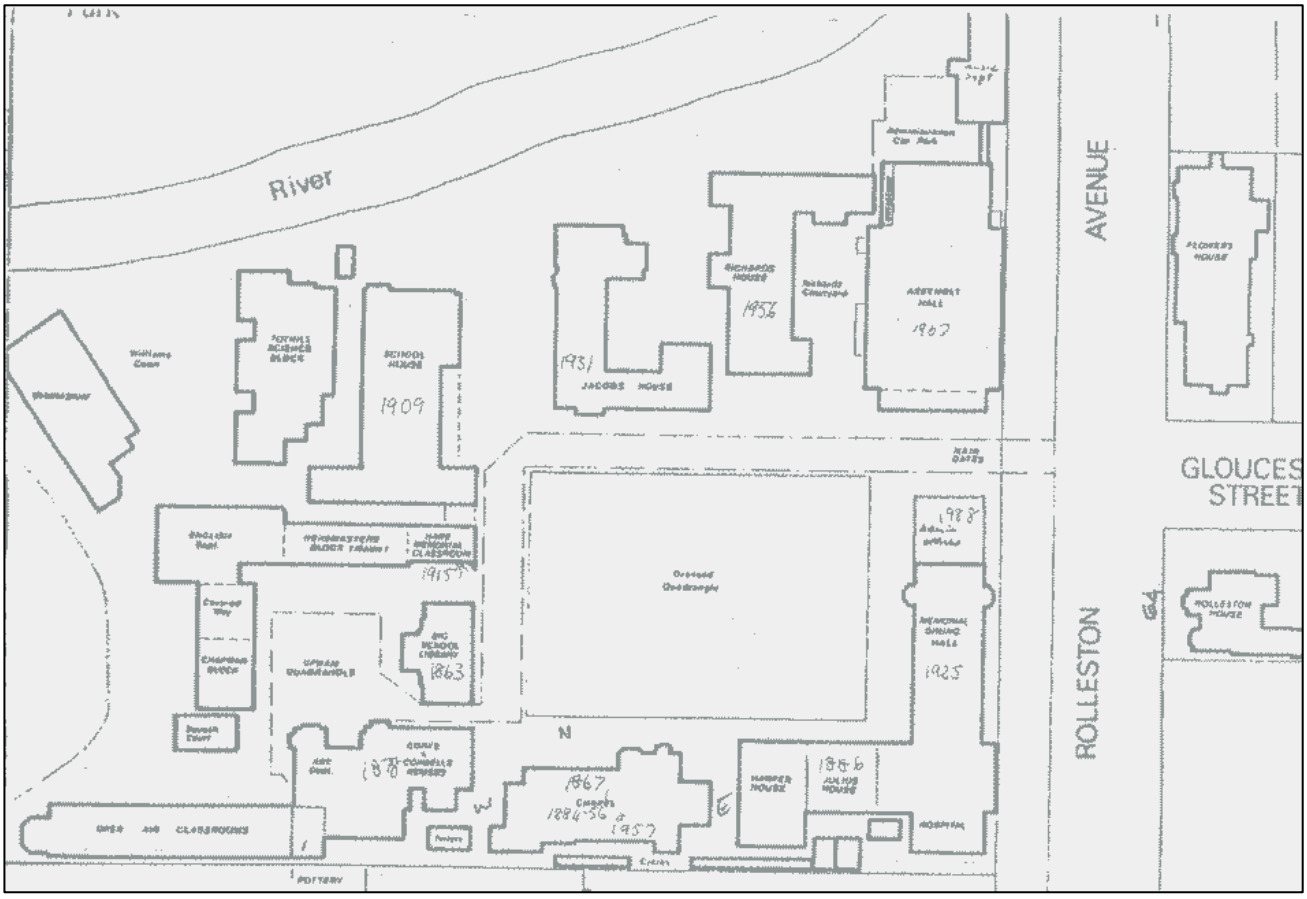
**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:**

Christ's College was built from 1857 with new buildings and additions taking place up to the present day. The primary historic buildings are as follows:

| | |
|---|---|
| Big School Library | 1863 |
| Chapel | 1867 and 1884/1888 (rebuilt in the 1950s) |
| Condell's House | 1878 (incl' Corfe House and often named 'Condells Corfe') |
| New Classrooms | 1886 (Harper-Julius House) |
| School House | 1909 |
| Hare Memorial Block | 1915 |
| Open Air Classrooms | 1915-21 |
| Memorial Dinning Hall | 1925 |
| Jacob's House | 1931 |
| Richard's House | 1956 |
| Chapman Block | 1960 |
| Assembly Hall | 1967 |




Plan of Christ's College, Christchurch

The primary construction method of all the existing buildings prior to 1931 was unreinforced masonry (stone), predominantly in the gothic revival style. An exception is Condell's House which is timber-framed with brick chimneys.

The risk of earthquake damage to Christ's College was first raised during the 1970s and the College undertook a number of strengthening projects during the late 1970s and early 1980s with the design work guided by Warren & Mahoney Architects. The first strengthening work involved the School House and Harper-Julius House in 1983-1984 and involved:

- Installation of a stiff core of reinforced concrete within the centre of the building.
- New concrete shear walls attached to the main cross beams and timber trusses.
- New internal steel frames as extensions of trusses.
- Tying of roof frame with steel braces.
- Tying of floor, roof and walls.
- Infilling of chimneys with concrete.[122]

An addition to the Memorial Dining Hall in 1988 for administration offices provided the opportunity to insert a rigid reinforced concrete block which is tied to the Memorial Dinning Hall using steel bracing which was inserted into the roof, inside walls and columns of the Hall with minimal visual impact.

[122] 'Christ's College takes steps to preserve its architectural heritage', *The Press*, 9 April 1981

Further strengthening work was undertaken on the Big School in 1989 in association with a substantial addition designed by Warren & Mahoney Architects and Holmes Consulting Group. The work involved removal of two tall chimneys which were considered an earthquake hazard and the construction of new foundations and reconstruction of the west wall using reinforced concrete columns. These columns were tied to the original building by additional roof bracing. This work involved the demolition of the west wall and west wall buttresses.

Following a new addition and strengthening of Richard's House in 1998, Christ's College tackled Condells Corfe Houses dating from 1878 (with interior changes having taken place in 1918, 1940, 1960 and 1977). This project involved removal of the rear west wing of the building and the restoration and strengthening of the twin-gabled east block. The twin-gabled east block included large windows, bell tower and two tall chimneys. This project was associated with a new Art and Technology Block which wraps around three sides of Condells Corfe Houses. Resource consent was granted for Condells Corfe House partial demolition and restoration in December 2000.

In 2003, Christ's College upgraded School House which had been previously strengthened in 1983. The upgrade works involve a substantial improvement in the structural performance of the building with new plywood structural floor diaphragms, exterior steel ties, five new concrete shear walls and the replacement of large and visible brackets dating from 1983 with more compatible smaller ones. In the same year, Jacob's House was also strengthened using new reinforced concrete shear walls, new plywood structural floor diaphragms and new steel ties to the exterior. Both the School and Jacob's House were strengthened to 67% NBS.

**Christ's College, Christchurch – Summary of Earthquake Strengthening**

| Date | **Building** | **Works summary** |
|---|---|---|
| **1983** | School House | Shear walls, steel frames, steel braces, infilling of chimneys |
| **1984** | Harper-Julius House | Shear walls, steel frames, steel braces, infilling of chimneys |
| **1988** | Memorial Dining Hall | Rigid concrete block, steel frame bracing |
| **1989** | Big School | Removal of two chimneys, new concrete foundations and wall, roof bracing |
| **1989** | Flower's House | Bracing to parapets (the building was demolished in 2004) |
| **1998** | Richard's House | Steel frames and shear walls |
| **2000** | Condells Corfe | Strengthening of bell tower, gabled east block, two tall chimneys |
| **2003** | School House | Upgrade of 1983 works with new shear walls, floor diaphragms, bracket replacement and new steel ties to exterior (to 67%NBS) |
| **2003** | Jacob's House | Shear walls, floor diaphragms, steel ties to exterior (to 67%NBS) |

Following the September 2010-February 2011 earthquakes, the school suffered generally minor damage except for some damage to Harper-Julius House, School House and the Memorial Dinning Hall. Repairs are in progress and the school was one of the first within the Central City area to reopen.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate and minimal damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** The NZHPT is working with owners to make safe and repair, consent received for Harper-Julius House for earthquake strengthening.

**Current status:** Made safe and repair for the majority of the site, with demolition of Maths block (registered Category II historic place).

**Former Chief Post Office (facade only)**

Cathedral Square
1877
Clayton Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** Designed by New Zealand's first and only Colonial Architect William Clayton, the Italianate style building combined classical and Venetian Gothic elements and was one of the early major post offices and the home of the first telephone exchange in New Zealand. The 7 story addition built to house Telecom was completed in 1991.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone.

**Condition prior to September 2010:** Good

**Strengthening history:** In 1974, the Post Office Department proposed partial-demolition of the building with façade retention. This proposal sparked public debate and pressure to 'save' the building. The NZHPT engaged Smith Leuchars Consultants in 1980 to undertake a structural assessment. The consultants considered that earthquake strengthening of the Post Office was possible for a cost of the order of 90% of that required to construct a new replacement building. After some negotiation, Telecom Property Services (replacing the Post Office Department) agreed to façade retention and the structural upgrading of the Clock Tower in 1985. As work progressed during the early 1990s, a greater proportion of the interior was preserved than originally planned and demolition was limited to the rear third of the east facing part of the building. Details of the earthquake strengthening work undertaken by Telecom Property Services are not recorded in the NZHPT file.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** In June 2011, the NZHPT recommended make safe works.

**Current status:** Secured and made safe - future uncertain at time of writing with the owner wanting to demolish the building.

**Bishopspark Main Building and Chapel**

100 Park Terrace
1927
Cecil Wood Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** Bishopspark (formerly Bishopscourt) was designed in 1926. The Main Building is built in the Colonial Georgian style and shows the influence of American architecture on domestic design in New Zealand in the 1920s and 30s. It is a large house with over twenty rooms contained in its three storeys. It remains as an excellent example of the work of Cecil Wood and one of the finest Colonial Georgian houses in NZ. A small Georgian chapel is joined to the house by a covered way and is probably the only Georgian styled building of its type in NZ. The house and chapel have historical significance as the traditional residence of the Bishops of Christchurch, an influential body of men in a city founded as an Anglican settlement.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone.

**Condition prior to September 2010:** Good

**Strengthening history:** No record of earthquake-strengthening to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** The NZHPT supported make safe and repairs.

**Current status:** The NZHPT is discussing options with owners and the future of the building is uncertain at time of writing.

**Saint Michael and All Angels Church**

(Anglican) (incl. belfry, hall and School)
1861: Belfry – Mountfort
1870-72: Church – Strouts and Crisp Architects
1877: Stone school building – Thomas Cane
Registered Category I historic place
Listed Groups 1 & 2
Private ownership

**Significance:** One of the largest timber Gothic Revival churches in the Southern Hemisphere, this renowned as a 'High' Anglican church was opened in 1872 and is one of the few remaining major works by Anglican church architect William Crisp.

The stone school building was originally St Michael's Parish Hall and was designed by Thomas Cane in 1877. In 1883, the parish hall was converted as the main schoolroom of St Michael's School and was also used for Sunday School.[123] In 1912 the stone school building was relocated on the site to make space for a new classroom block designed by Cecil Wood.

**Construction:** Church and belfry – timber-framed; school stone building - URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening works:** In 2001, the stone school building was altered and strengthened with the NZHPT's support (no details of this work were recorded on the NZHPT's file). Regular maintenance has also occurred on the church and in 2007, the NZHPT supported restoration works including external timber conservation and some earthquake strengthening.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage to school stone building with gables having fallen out.
July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** The NZHPT supported make safe and repair.

**Current status:** The church is intact with little damage and is open to the public. The stone school building has been secured and made safe.

[123] Tony Ussher Architect and Conservation Consultant, *St Michael and All Angels Anglican Church Day School Stone Classroom Block, Christchurch, Conservation Plan*, 2nd Draft, September 2001

**Wellington Woollen Manufacturing Company Building (Former)**

96-98 Lichfield Street
1919
W.H. Gummer Architect
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** A significant example of William Henry Gummer's commercial architecture, this building gave the Wellington Woollen Manufacturing Company a progressive and distinctive image, as well as a facility that met practical requirements. Its use of large glazed areas and the paring back of decoration foreshadows the introduction of architecture of the Modern Movement to New Zealand. The NZHPT's registration report also noted the use of reinforced concrete floors, beams and columns. The building forms an important part of the commercial townscape. It was recently converted into Living Space apartments.

**Construction:** URM and Reinforced concrete

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** The building was upgraded in association with the conversion to Living Space apartments. Specific strengthening work, however, undertaken on the building in association with the alterations is not recorded by the NZHPT.

No earthquake strengthening work has been undertaken on the building to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Minimal damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** No NZHPT input as yet.

**Current status:** Secured but future uncertain at time of writing.

**Shand's Emporium**

88 Hereford Street
1860
Architect unknown
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** Built in 1860, this simple timber office building is one of the oldest and now a very rare remaining example of an early commercial building in central Christchurch. The neighbouring brick Olympia building on the right of Shand's has been demolished.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** In 1979, the owners (Hereford Holdings Ltd) were informed by the Council that the building was 'unsafe' and did not meet current building codes in terms of fire ratings, earthquake strengthening and egress requirements. There is no record of earthquake strengthening work being undertaken on the building to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** In June 2011, the NZHPT has recommended retention and weatherproofing works.

**Current status:** Secured and made safe. Currently (February 2012) there is a proposal to relocate the building on a temporary basis while the adjacent Gough House (former offices of the NZHPT Canterbury/West Coast office) is demolished.

**Cranmer Bridge Club**

Corner Cranmer Square and Armagh Street (25 Armagh Street)
1864
Hurst Seager Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** Built in 1864, this is one of the earliest brick residences in Christchurch and was later home to significant architect Samuel Hurst Seagar whose 1899 timber addition reflects his importance as one of the first architects who sought to design houses with a New Zealand character.

**Construction:** Timber-framed addition (1899), URM residence (1864, brick)

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** The Cranmer Bridge Club informed the NZHPT in 1990 that the brick section of the building was an earthquake hazard as a consequence of cracks in the brickwork. These cracks were investigated by Jim Espie (Conservation Architect) in 1993 who considered they were caused by ground settlement (possibly as a result of adjacent new construction or by changes in ground water conditions). In addition to repair works, Jim Espie recommended that the cracks be monitored and that a structural engineer be engaged to design a strapping system and/or a bond-beam at coping level. The brick repair works were carried in 1994 out with the financial support of the NZ Lotteries Board. No specific earthquake strengthening work or structural repairs were undertaken to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Severe damage to brick residence, moderate damage to timber-framed addition.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** NZHPT recommended retention of the timber addition and is currently working with owners for redevelopment options.

**Current status:** Brick residence demolished, timber addition retained, plans to redevelop site.

**Community of the Sacred Name**

181 Barbadoes Street
1895-1912
B & CJ Mountfort (timber-framed building) & J.G. Collins (brick buildings)
Registered Category I historic place
Listed Group 1
Private ownership

(Collins Building)

**Significance:** The only Anglican convent in New Zealand, the Community of the Sacred Name founded by Sister Edith Mary Mellish (1861-1922) and has been associated with the Christchurch diocese for over 100 years. The Community has also played an important role in Canterbury women's history and in the history of non-governmental welfare assistance. The complex has three buildings. The first timber-framed building was designed by Benjamin Woolfield Mountfort in 1895. The second building (also timber-framed) was designed by C.J. Mountfort (son of Benjamin Woolfield Mountfort) in 1900 and the final building, built of brick, two and a half storeys high, was designed by J.G. Collins.

**Construction:** URM and timber framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Fair

**Strengthening history:** In 1998, a preliminary structural assessment was undertaken in association with proposed upgrade, new lift and restoration works. This assessment resulted in the construction of two new exterior structural buttresses to the rear of the building.[124] It is unknown what other strengthening work was undertaken at this time.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Severe damage to brick buildings, moderate damage to timber-framed building.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** The NZHPT recommended retention of the Collins building but demolition was approved.

**Current status:** B.W Mountfort and C.J. Mountfort buildings secured, J. G Collins building demolished

[124] Research following the earthquakes, estimates that the building was strengthened to >33% but <67%NBS. Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**New Regent Street**

1930
Willis Architect
Registered Category I historic place and historic area
Listed Group 2
Private ownership

**Significance:** Designed by Christchurch architect Mr H.F. Willis, this set of two-storey Spanish Mission style shops was one of the only substantial building projects undertaken in the South Island during the Depression. The street was closed to traffic in the 1990s.

**Construction:** URM (solid interlocked brick walls with two layers of steel reinforcing mesh).

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Fair (conservation works under action)

**Strengthening history:** In 1990, the NZHPT was informed by Paul Dunlop, Optometrist of New Regent Street, that the walls of his shop were found to be very difficult and costly to demolish for alterations. This was because of the solid interlocked brick walls with two layers of steel reinforcing mesh. Further, the walls on each ends of the shop rows have reinforced concrete beams.

In 2009, Council facilitated a significant structural upgrade and retrofit project for New Regent Street. The strengthening work involved cavity wall tie renewal using the Helifix system. Both Council and NZHPT provided financial assistance for the project. This work was partially completed in September 2010.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Minimal and moderate damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** The NZHPT supported the owners financially (via the National Heritage Preservation Incentive Fund) to undertake strengthening work.

**Current status:** Secured.

**Victoria Street Clock Tower (Jubilee Clocktower)**

Victoria Street
1860
Mountfort Architect
Registered Category I historic place
Listed Group 1
Public ownership (Christchurch City Council)

**Significance:** The Victoria Street Clock Tower was too heavy to ornament the Canterbury Provincial Council Chambers for which it was designed. The iron structure, imported from England, was finally set in place in 1897 on the corner of Manchester and High Streets to commemorate Queen Victoria's Diamond Jubilee and is a landmark in Christchurch. The tower was relocated and re-erected on its present position in 1930.

**Construction:** URM with cast iron frame

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** The clock tower was restored in 1978 and by the late 1990s was in a poor state of repair. A conservation plan was prepared by George W Lucking in November 2000 which highlighted the need for earthquake strengthening. In particular, the conservation plan outlined the need for strengthening of the stone base, reinforcing of the cast iron framed middle section, the attachment of the spire to the middle section and the attachment of the three different sections of the structure.[125] The conservation plan ensured that earthquake strengthening was one of priority actions for the conservation of the structure and part of the schedule of the proposed conservation works.

**Level of Damage:** September-December 2010: Minimal damage.
January-June 2011: Moderate damage.
July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** NZHPT recommended retention.

**Current status:** Secured and made safe.

[125] George Lucking Consultant, *Conservation Plan for Structure, The Jubilee Clocktower*, November 2000, p 16

**Theatre Royal (Isaac Theatre Royal)**

145 Gloucester Street
1906
Luttrell Brothers Architects
Registered Category I historic place
Listed Group 1
Private ownership (Theatre Royal Charitable Trust)

**Significance:** One of the oldest theatres in Christchurch still in use as a theatre, the ornate structure was built for the syndicate headed by American-born J.C. Williamson and initially used for live theatre before being refitted as a cinema in 1928.

**Construction:** URM (reinforced)

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 1975, the Friends of the Christchurch Theatre Royal were established to 'save' the building from demolition as it was considered to be an earthquake-risk. A report from Holmes, Wood, Poole & Johnstone Consultants from 1978 stated that the building was very prone to earthquakes and 'clearly must be strengthened'. Eventually, the Theatre Royal Charitable Trust purchased the building with community support and by the mid-1990s was in a position to seek NZ Lotteries Board financial backing for earthquake strengthening. A structural assessment was prepared by the Holmes Consulting Group in 1997, as a result of a Council Heritage Grant, which proposed work involving mostly steel trusses, mullions and braces attached within the roof spaces, the fly tower and the workshop.[126] This strengthening work, costing about $1 million, was designed to resist an earthquake with an equivalent ground acceleration coefficient of C=0.24 (0.24g) and was completed in December 2000. In the draft conservation plan of May 2010, it was noted that Holmes Consulting Group considered that the strengthening work to the façade would have achieved approximately 33% NBS.'[127][128]

**Level of Damage:** September-December 2010: Minimal damage.

[126] Holmes Consulting Group, 'Report on Seismic Strengthening the Theatre Royal for a C=0.24 Earthquake, 15 August 1997
[127] Tony Ussher, *Isaac Theatre Royal Gloucester Street Principal Façade, Conservation Plan,* First Draft, May 2010, p49
[128] Research following the earthquakes, estimates that the building was strengthened to ~50%NBS Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

January-June 2011: Moderate damage.

July 2011-January 2012: Severe damage.

**NZHPT post-earthquake response:** The NZHPT is working with owners to make safe, repair and strengthen.

**Current status:** Make safe and repair works ongoing, structural upgrade. Future uncertain at time of writing.

**State Insurance Building (Former)**

Worcester Street
1933-1935
Cecil Wood Architect
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** Architect Cecil Wood's traditional approach to design is seen in his large commercial buildings, beginning with the Public Trust Office, Christchurch (1922–25). Although constructing it of reinforced concrete, he employed a stripped classical idiom. Wood gradually refined and abstracted the classical language in subsequent buildings. In the State Insurance Building the concrete piers became flat strips and art deco and Maori motifs were introduced.

**Construction:** Reinforced concrete

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** Unknown

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** No NZHPT input as yet.

**Current status:** Secured, future unknown.

**Former Teachers' College (Peterborough Centre)**

Corner of Peterborough Street and Montreal Street
1924-1930
Penlington Architects
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** Designed by Canterbury Education Board Architect George Penlington, on its completion, Board Chairman Ernest Andrews defended it against criticism that the College didn't really need a castle by stating that all the other local educational institutions were grey stone piles so why not his. This former Teachers' College has been converted into apartments and won an NZIA Heritage and Conservation Award.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** The building was vacated in 1978 by the Christchurch Teachers College and was unoccupied during the 1980s and early 1990s. During the early 1980s, the Arts Centre Trust investigated strengthening and retrofit of the buildings for community purposes. A preliminary report of April 1980 noted the need for strengthening work involving ties from the walls to the floors, roof, gable and tower bracing and horizontal pre-stressing at roof and first floor levels in the external walls.[129]

The former Teacher's College was purchased in 1996 by Peterborough Centre Ltd who planned to strengthen the buildings for apartments/hotel use. Consent was issued for the work in 1998. While the work involved substantial internal alterations, details about the earthquake strengthening work was not identified on the NZHPT's file.

Historical bracing and ties of walls, floor and roofs was observed following earthquake damage.[130]

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

[129] Arts Centre of Christchurch Trust, 'The Former Christchurch Teachers College – A Preliminary Report on the Use of the Buildings', April 1980
[130] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** NZHPT is working with owners on a retention plan. Issues with on-going damage, multiple ownership and liquefaction.

**Current status**: Secured with owners awaiting geotechnical survey to inform future decisions for the property.

**Worcester Street Bridge**

Worcester Street
1885
Walkden Architect
Registered Category II historic place
Listed Group 2
Public ownership (Christchurch City Council)

**Significance:** At only 52 ft in width, the Worcester St bridge is one of only two nineteenth century bridges in the city not to have been widened to accommodate modern traffic (the other being the Armagh St Hagley Park Bridge). Today the tourist tram route crosses the bridge, though trams did not pass this way when part of the transport system. With its fine cast iron railings, The bridge contributes much to the townscape and character of Christchurch.

**Construction:** Cast iron, brick and stone.

**EQP assessment prior to September 2010 (CCC, 2009):** No record of EQP assessment prior to September 2010.

**Condition prior to September 2010:** Good

**Strengthening history:** Unknown

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** NZHPT has been in discussions with Council's consultants.

**Current status:** Unknown.

**Colombo Street Bridge**

Colombo Street
1902
Dobson
Registered Category II historic place
Listed Group 2
Public ownership (Christchurch City Council)

**Significance:** The first bridge across the Avon on Colombo Street was made of timber and erected in 1858. This survived until 1902, when it in turn was replaced - this time with a 44ft. 9 in. wide steel and concrete structure. This was probably designed by City Surveyor Arthur Dudley Dobson. With its fine cast iron railings, Colombo Street Bridge contributes much to the townscape and character of Christchurch.

**Construction:** Reinforced concrete and steel

**EQP assessment prior to September 2010 (CCC, 2009):** No record of EQP assessment prior to September 2010.

**Condition prior to September 2010:** Good

**Strengthening history:** Unknown

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** NZHPT has been in discussions with Council's consultants.

**Current status:** Unknown.

**Gloucester Street Bridge**

Gloucester Street
1886
Walkden Architect
Registered Category II historic place
Listed Group 2
Public ownership (Christchurch City Council)

**Significance:** A suspension footbridge was erected at the Gloucester Street crossing of the Avon in 1862. Gothic in style to match the adjacent Provincial Government Buildings, the bridge may also have been designed by B.W. Mountfort. In 1886-7 it was replaced with a new iron road bridge. This bridge was designed by City Surveyor Charles Walkden. With its fine cast iron railings, Gloucester Street Bridge contributes much to the townscape and character of Christchurch.

**Construction:** Cast iron, reinforced concrete.

**EQP assessment prior to September 2010 (CCC, 2009):** No record of EQP assessment prior to September 2010.

**Condition prior to September 2010:** Good

**Strengthening history:** Unknown

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** NZHPT has been in discussions with Council's consultants.

**Current status:** Secured.

**St Saviours Anglican Church (Former)**

26 Park Terrace
1885
Cyril Mountfort Architect
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** Erected in West Lyttelton in 1885 as the result of an endowment to assist with the provision of a minister specifically for the people of West Lyttelton and visiting seamen. In 1975 St Saviour's parishioners gave the church to the Christchurch Diocese. It was acquired by the Cathedral Grammar School and dismantled and rebuilt on a site on the corner of Park Terrace and Chester Street West. The church serves the school community, as its chapel.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 2009 the building was refurbished including some structural strengthening works (details of strengthening works are not recorded in the NZHPT's file).

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** NZHPT is working with owners – consents may be required for various options.

**Current status:** Building is intact, but there are ground movement issues. Secured/made safe/proposal to extend or relocate church to another site.

**Girl Guide Headquarters**

217- 223 Armagh Street
1865
Speechly Architect
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** This dwelling has historical significance for its associations with prominent early settler surveyor Cyrus Davie and prominent lawyer Henry Andrews. It is a rare example of a colonial gothic revival dwelling - a style particularly characteristic of domestic architecture in Canterbury in the 1850s and 1860s, and as an example of the work of early Canterbury architect Robert Speechly.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** Unknown

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Moderate damage

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** The NZHPT is involved in discussions with the owners about potential options.

**Current status:** Secured and made safe, but future uncertain at time of writing.

**Theosophical Society Building**

267 Cambridge Terrace
1927
Cecil Wood Architect
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** The Theosophical Society building was constructed in 1927 for the Christchurch branch of the non-sectarian, non-political, and non-dogmatic society founded in 1894. Thomas Edmonds, local businessman and philanthropist, contributed funds and a loan to assist with the cost of the new building. The Neo-Georgian building is a good example of the work of local architect Cecil Wood.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** Unknown

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Moderate damage

July 2011-January 2012: Severe damage.

**NZHPT post-earthquake response:** The NZHPT supported retention but the building has suffered severe damage from the 2-15 January 2012 earthquakes.

**Current status:** Due to be demolished due to severity of damage at time of writing.

**St Mary's Convent Chapel (Rose Chapel)**

866 Colombo Street
1910
Luttrell Brothers Architects
Registered Category II historic place
Listed Group 2
Private ownership (Community Trust)

**Significance:** The chapel, a remnant of the St Mary's Convent, is representative of the endeavours of an order of Roman Catholic nuns, the Sisters of Mercy, who for more than 75 years ran a teaching establishment on the site. The St Mary's Convent Chapel was the first of six churches designed by the Luttrell brothers for the Catholic church. The chapel is a model example of the application of the precepts of the Ecclesiologists to church architecture, and is designed in Early English 13th Century Gothic. It is constructed of Oamaru stone and Hoon Hay basalt.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 1998, strengthening work was undertaken on the building designed by Skews Hey Ussher and Holmes Consulting Group. The works involved:

- Repair of damaged walls and buttresses
- New steel tie rods and buttress ties.
- Grout filling of existing wall cavity.
- New steel ties from rafter to under-purlins.

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** No NZHPT input as yet.

**Current status:** Secured and made safe.

**Cashfields (Southern Star Apartments, former DIC Cashfields Arcade)**

154 Cashel Street
1908
Registered Category II historic place
Listed Group 3
Private ownership

**Significance:** Cashfields was originally built for the Christchurch branch of the Drapery and General Importing Company of New Zealand (D.I.C.). Bendix Hallenstein founded the D.I.C. in Dunedin in 1884, believing that there was room for a less formal type of drapery business. The D.I.C had a co-operative element and was one of the first to place goods out on display so customers could view them. As with similar stores in Australia and elsewhere, the D.I.C. catered for the growing middle classes, providing them with everything 'from furniture to haberdashery, from bicycles to crockery', at a reasonable price, all available in one building. By 1885 the D.I.C. had expanded to Christchurch and by 1900 it was doing so well that it was able to build a three-storey building on Cashel Street. This building was, however, destroyed in 1908 by a fire, which also destroyed two other stores and the White Hart Hotel. The fire was the largest Christchurch had yet experienced and cost the various insurance companies over £300,000 in claims.

The replacement building following the fire was designed by the England Brothers, a well-known Christchurch architectural firm. The Cashel Street facade of the new D.I.C. building was constructed of red and white stone, a feature now disguised by paint. Inside the appointments included counters of polished walnut, and marble floors in the vestibules. It was described at the time of its opening as 'a wonderfully spacious and thoroughly up-to-date emporium'.

This building was used by the D.I.C. until 1978 when the company merged with Beath's and shifted to Beath's premises at the corner of Cashel and Colombo streets. The building was eventually sold to the developers Paynter and Hamilton, who built a three-level shopping arcade, which they named the Cashfields Centre, as it linked Cashel and Lichfield streets.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 2006 the building was strengthened and extended (a new third floor addition) with the NZHPT's support.[131] Historical bracing and ties of walls, floor and roofs was observed following earthquake damage.[132]

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Moderate damage

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** The NZHPT supported removal of the parapet and supported retention of the building in February 2012.

**Current status:** Building is intact, with some parapet damage – made safe. But future uncertain at time of writing.

[131] Research following the earthquakes, estimates that the building was strengthened to >67%NBS Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)
[132] Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

**National Bank (former Cook and Ross Building)**

779 Colombo Street 1926
Helmore and Cotterill architects
Registered Category II historic place
Listed Group 3
Private ownership

**Significance:** The Victoria Square Branch of the National Bank occupies a site long known as the Cook & Ross Comer after the pharmacists who occupied the site from last century and who built the present building in 1926 to replace an earlier wooden structure. The site, on the corner of Colombo and Victoria streets, is considered more important than the building. It is understood to have housed the first temporary court house for the Canterbury province, but is better known for its very long association with Cook and Ross. They ran the leading pharmacy in the city and built the 1926 building now occupied by the National Bank as Victoria Chambers, using the ground floor for their pharmacy business and leasing the three upper floors for office space. The site use history typifies the attraction of corner sites to banks and to retailers. The National Bank building was built in 1926 and was designed by Helmore and Cotterill.

**Construction:** Reinforced concrete frame (English-bond brickwork)

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** No earthquake strengthening work to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Unknown.

January-June 2011: Unknown.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** No NZHPT input as yet.

**Current status:** The building appears to be intact. Further information is required.

**Cashel Chambers (Former Farmers Department Store) Façade only**

214-234 Cashel Street
1882-1919
T.S. Lambert (1882 part of the building)
Not registered by NZHPT
Listed Group 4
Private ownership

Photo of the former Cashel Chambers
prior to fire damage and partial demolition in 2005

**Significance:** The Manchester-Cashel streets area was associated with farming trade-related businesses for the Canterbury region, especially wool and grain merchants. The largest local firm was the New Zealand Farmer Cooperative which was established by a group of Canterbury farmers at Christchurch's Commercial Hotel on 23 July 1881. The first building on the site was designed by TS Lambert in 1882 with subsequent additions and different buildings connected together extending through to Bedford Row in 1919. Farmers Department Store became an important New Zealand institution and a place for rural clients to shop, rest and socialise while in the city.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** No record of EQP assessment prior to September 2010.

**Condition prior to September 2010:** Unknown

**Strengthening history:** Demolition of the Cashel Chambers complex of buildings was proposed in 2004. The proposed demolition involved 15 buildings, with 13 of the buildings listed as Group 4 in the City Plan. The proposed demolition was opposed by the NZHPT and a number of community groups and individuals. The application included an engineering assessment by Dr A. Reay, which included a detailed geotechnical survey which indicated susceptibility of the soils in the area to liquefaction. Consents were granted by the Council and the NZHPT filed an appeal to the Environment Court to secure the façade of the Cashel Chambers, including the Cashel Madras and Bedford Row facades. A fire damaged the building in January 2005 and the NZHPT's appeal was withdrawn. The final result was the retention of the earliest façade which was strengthened and 85% of the site was demolished in 2005.

**Level of Damage**: September-December 2010: Minimal damage (façade only).
January-June 2011:Unknown.
July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** None required.
**Current status:** The bulk of the building was demolished in 2005 and was replaced by the IRD building. The retained historic façade is still surviving.

**Canterbury Museum**

9 Rolleston Ave
From 1870 onwards
B. W. Mountfort and others
Registered Category I historic place
Listed Group 1
Public ownership (Christchurch City Council)

**Significance:** Canterbury Museum is the oldest purpose-built museum building still in use in New Zealand. It is an excellent example of Mountfort's Gothic Revival architecture and a landmark in the city. Mountfort was one of the foremost architects in Victorian New Zealand.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:**

The Canterbury Museum consists of the original 1870 building and a number of additions constructed in 1872, 1877, 1882, 1958 and 1977. The buildings dating from 1870-1882 are known as the Haastian building associated with the Museum's founding director, Julius Haast. All the Haastian buildings were constructed of unreinforced masonry in the gothic revival style. The conservation plan of 1992 noted that a 1869 earthquake prompted the architect, Mountfort to speculate:

> That there might be others [earthquakes] in the future, and to suggest that the incorporation of some iron bolts and ties would be of great advantage to the building and could be done more economically then than in any future time. The suggestion was not followed.[133]

Earthquake strengthening of the Canterbury Museum began with the appointment of Michael Trotter as museum director in 1983. In 1989, Trotter recalled that just two days after he took office as director, a 'large lump of stone broke off from the front the building and fell onto a car parked below. Luckily no-one was hurt – we received a claim for damage to the car – but it did emphasise a fact that some of us had been aware of for some time: the Museum was in dire need of strengthening and maintenance.'[134] Following this incident, the Works and Planning Department of the

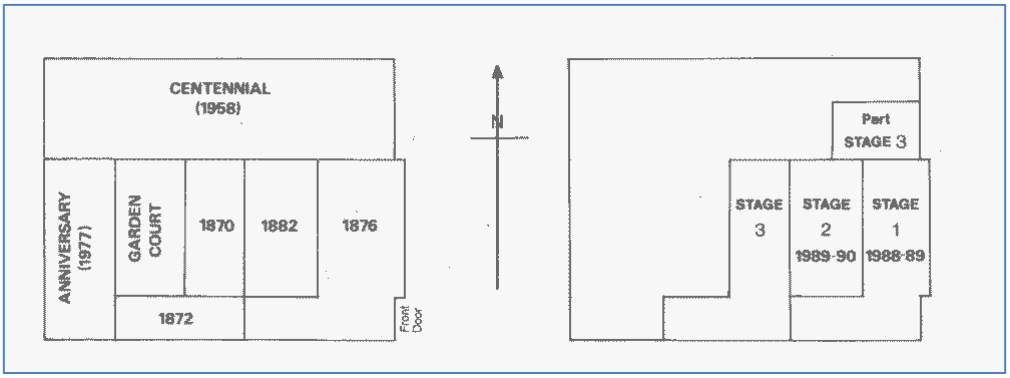
[133] Michael Trotter, *Canterbury Museum Conservation Plan*, Canterbury Museum, Christchurch, November 1992, p 3
[134] Michael Trotter, 'Refurbishing Canterbury Museum', *AGMANZ Journal*, Vol 20, 4, 1989

Christchurch City Council undertook a detailed condition report of the building for the Museum Board. This report (dated August 1984) guided repair and strengthening works during the late 1980s.

The condition report found that the Haastian buildings were in urgent need for maintenance and strengthening and one option suggested was the complete demolition of the buildings because of the high cost of strengthening and the modern access, display and storage requirements for the museum.[135] Demolition, however, was never 'considered seriously by the Museum authorities.'[136]

Following the condition report of August 1984, Council required the Museum Board to strengthen or demolish the Haastian buildings within a 10 year period under the Municipal Corporations Act 1968. At the time, the Council decreed that if securing work was carried out within the 10 year period, then timeframes for strengthening may be extended by another 10 years – 2004.[137] The selected strengthening work involved a combination of reinforced concrete against the walls and diaphragm improvement. This option involved 'replacing ground and first floors with concrete, installing ceiling and roof diaphragms and casting new reinforced concrete walls against, and tied to, the old stone walls.'[138] At the time, the cost of strengthening was estimated at $4.2 million.

With the NZHPT's support, stage 1 strengthening of the 1876 extension began in 1988. This involved the pouring of 150mm thick reinforced concrete against the sides of the inside walls, new reinforced concrete foundations and installing new concrete floors with pryotyenax heating.[139] The walls were further supported by horizontal steel trusses and plywood diaphragms and complete roof restoration.




Stages of construction (left) and reconstruction (right), Canterbury Museum.[140]

Stage 2 strengthening work began in 1989 involving the 1882 extension. Stage 2 strengthening work was progressed with the assistance of an NZHPT grant fund of $15,000 despite the NZHPT's concerns about the loss of original timber flooring and the insertion of a new floor within the ceiling of the hall.

Stage 3 strengthening of the originally 1870/1872 buildings was to begin in 1991 and was associated with a proposal to construct a new four-storey block in the Garden Court. Consultation with the NZHPT resulted in the preparation of a draft conservation plan in July 1992 by the museum director, Michael Trotter.[141] The conservation plan had a major focus on earthquake strengthening issues and provided an overview of strengthening undertaken on the building since 1988. With

[135] ibid, p 26
[136] ibid
[137] ibid, p 25
[138] ibid, p 26
[139] Michael Trotter, 'Refurbishing Canterbury Museum', *AGMANZ Journal*, Vol 20, 4, 1989
[140] Michael Trotter, 'Refurbishing Canterbury Museum', *AGMANZ Journal*, Vol 20, 4, 1989
[141] Michael Trotter, *Canterbury Museum Conservation Plan*, Canterbury Museum, Christchurch, November 1992

regard to the 1870/1872 buildings, the conservation plan established a policy to 'retain the original appearance of the 1870 Wing as close to original as possible', but to strengthen to full code standards. It was commented that this will require replacement of the wooden ground floor of the 1870/1872 buildings with a new concrete floor. It was commented that:

> There is no way this work [earthquake strengthening] can be undertaken without some effect on the historical integrity of the elements concerned – the object must be to effect a compromise that protects the most important features as much as possible...it is not possible to save every desirable feature; preference should be given to the interior of the 1870 Wing and the exterior southern wall of the 1872 Wing.[142]

Following the draft conservation plan, the NZHPT sought advice on the proposed strengthening from Hadley & Robinson Ltd Consulting Engineers of Dunedin in June 1992. Hadley & Robinson questioned the need for both the application of a new concrete skin to the walls and removal of the original timber floors. Instead, Hadley & Robinson suggested the use of new structural steel stiffener columns to support the existing walls and new cross-beams under the existing foundations.[143]

On the basis of the Hadley & Robinson report, the NZHPT refused to support a NZ Lottery Grants Board application for funding assistance to carry out the strengthening work. The NZHPT's position was that the proposed strengthening work was 'excessive' and recommended a lesser strengthening target to preserve heritage fabric. This position influenced a controversial decision by the NZ Lottery Grants Board to refuse a museum funding application of 2.2 million in 1994.

Despite NZHPT's concerns and loss of NZ Lottery Grant Board funding, the Museum Board went ahead with the strengthening of the 1870/1872 buildings involving 150mm thick concrete facing to the interior of the existing stone walls and a new suspended concrete floor with a new plywood diaphragm at the roof level with new A-frame trusses.[144] This work was completed in June 1995.

Since the earthquakes of September 2010-June 2011, the Museum has been undertaking repair and strengthening works and the Museum had the distinction of being one of the first public buildings to reopen within the Central City area on 2 September 2011.

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Minimal damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** The NZHPT supported consent for repair and strengthening works following the 22 February 2011 earthquake.

**Current status:** Made safe and repaired, open to the public.

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[142] ibid, p 40
[143] Hadley & Robinson Consulting Engineers Ltd, 'Structural Report on the Canterbury Museum Building Christchurch for the Historic Places Trust', 3 August 1992
[144] Holmes Consulting Group Ltd, 'Canterbury Museum Stage 3 Alterations, Interim Structural Review', 10 September 1993

**McDougall Art Gallery**

9 Rolleston Ave
From 1932
Edward Armstrong
Registered Category I historic place
Listed Group 1
Public ownership (Christchurch City Council)

**Significance:** The McDougall Art Gallery is a significant civic landmark built in the classical style during the Depression, funded by Robert McDougall, the Manager of Aulesbrooks (the largest biscuit company in Australasia), to house a significant art collection that had been donated to the City. It is an important part of the townscape around the Botanic Gardens, in conjunction with the Canterbury Museum.

**Construction:** Reinforced concrete, stone and brick

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** The McDougall Art Gallery was constructed of reinforced stone, brick and concrete in the classical design in 1932. It appears no strengthening has taken place on the building with the exception of parapet and chimney bracing in September 1995.

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Minimal damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** No input by NZHPT as yet.

**Current status:** Unknown.

**Former Canterbury Society of Arts Building (Environment Court)**

Corner Durham and Armagh Streets
1890
Mountfort Architect
Registered Category I historic place.
Listed Group 1
Public ownership

**Significance:** The first art gallery in Canterbury, this notable example of work by Mountfort and renowned local architect, RD Harman, was built for the Canterbury Society of Fine Arts. It served as the centre of development in fine arts between 1890 and 1968 and was closely associated with 'The Group', a circle of artists who developed a uniquely Canterbury style of painting in the 1930s. It has since been renovated to serve the Department of Justice.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** The building was vacated by the Canterbury Society of Fine Arts in 1967 and was purchased by the Justice Department for courtrooms. During the early 1970s, the building was renovated for court purposes with substantial interior alterations. At this time, exterior strapping was installed to the Durham Street façade as a strengthening measure. In 1990, the Justice Department considered demolishing the building as it was considered to be an earthquake risk. However, following an investigation by Malcolm Jones (retired engineer at the time), the building was found to be reasonably sound and secure. During this period, the NZHPT considered the exterior strapping along Durham Street to be architecturally insensitive, but was fulfilling the desired function and could be replaced by more discreet strengthening work in the future. In April 1991, the Justice Department decided not to progress demolition and commissioned reports on the structural integrity of the gallery and the cost of strengthening.[145] Further details of strengthening works undertaken on the building are not known to the NZHPT.

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Minimal damage.

[145] Research following the earthquakes, estimates that the building was strengthened to >67%NBS Pers. comm. Jason Ingram (University of Auckland), Lisa Moon and Michael C. Griffith (University of Adelaide)

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** In June 2011, the NZHPT recommended make safe work and weatherproofing. Following further damage on 23 July 2011-January 2012, demolition is currently proposed and the NZHPT has recommended façade retention.

**Current status:** Secured/made safe, but future is uncertain at time of writing.

**Old Government Buildings**

(Heritage Hotel) Cathedral Square
1909-1913
J.C. Maddison Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** One of noted Christchurch architect J.C. Maddison's most impressive works, this Italian High Renaissance palazzo style building opened in 1913. It provided a central location for government services in Christchurch for over 70 years before being purchased by the Christchurch City Council to prevent its demolition in the 1990s. It has since been meticulously restored and is now part of Heritage Hotel.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Not listed as potentially earthquake-prone.

**Condition prior to September 2010:** Good

**Strengthening works:** During the mid-1980s, the building was vacated by the government and was proposed for demolition by Government Property Services Ltd on the basis of structural assessment report by the Ministry for Works and Development. Demolition was opposed by the NZHPT who issued a heritage order to save the building. After intensive negotiations, the Christchurch City Council purchased the building in 1992 and prepared a conservation plan. The conservation plan provided explicit guidance for earthquake strengthening with a statement that the 'building shall be strengthened to meet the full NZS4203 (revised draft) code loadings. Methods of strengthening shall as far as possible be non-intrusive. The impact of intrusive strengthening elements shall be minimised.'[146] Following the preparation of the conservation plan, the Council on-sold the building to the Symphony Group in 1995.

The sale of the building was conditional that the Symphony Group strengthens the building with the financial support of the Council who would contribute up to 60% of the cost of strengthening work (up to a max' of $1,580,000). Restoration and strengthening work was undertaken in 1995. The strengthening work involved:

- Partial demolition of some interior fabric (toilet and vault areas).

[146] Environmental Policy & Planning Unit, Christchurch City Council, *Conservation Plan Government Buildings, 28-30 Cathedral Square, Christchurch*, 1993

- New stiff elements to take load with minimal new skin walls.
- Construction of new concrete shear walls anchored to the building.
- New skin wall elements added to the exterior at each end of the building.

Following the restoration work and the opening of the new apartments and Heritage Hotel, the Symphony Group Ltd published a history of the building, including strengthening works in 1997.[147] Further restoration works were undertaken on the building in 2005 with the financial assistance of the NZHPT.

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Minimal damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** The NZHPT is working with owner to repair and consents have been granted by Council (September 2011).

**Current status:** No major damage. Made safe and repaired. Currently assessed at 67%NBS

[147] Melanie Yonge, *Government Buildings Christchurch, 1909-1996*, Everbest Printing Ltd, 1997

**Bridge of Remembrance**

Cashel Street
1923
Grummer Architect
Registered Category I historic place
Listed Group 1
Public ownership (Christchurch City Council)

**Significance:** Built to commemorate Canterbury soldiers of WWI and later wars, the substantial triple-arched concrete bridge is a distinguished memorial by Gummer (architect of the National War Memorial) and features carvings by noted Canterbury carver Frederick Gurnsey representing the British Empire.

**Construction:** Concrete

**EQP assessment prior to September 2010 (CCC, 2009):** Unknown

**Condition prior to September 2010:** Good

**Strengthening history:** Unknown

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Moderate damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** Support securing, methodology to be agreed with Christchurch City Council.

**Current status:** An engineering assessment is underway and the bridge has been secured at time writing.

**St Luke's Vicarage**

185 Kilmore St
1867
Speechly Architect
Registered Category I historic place
Listed Group 1
Private ownership

**Significance:** St Luke's Vicarage was designed by the British architect Robert Speechly (1840-84), who had been appointed to supervise the building of Christchurch Cathedral in 1864. The vicarage is a large timber house, with distinctive hoods over the ground floor windows and entrance. It is significant architecturally as one of the best preserved examples of Speechly's domestic work, and as a NZ vicarage inspired by the nineteenth-century Ecclesiological movement. In conjunction with St Luke's Church (now demolished) it forms an important part of the local townscape.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 1992, the NZHPT financially supported ($5,000) the repair of the chimneys and re-roofing.

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Minimal damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** No NZHPT input as yet.

**Current status:** Secure/made safe, chimneys removed, future uncertain at time of writing.

**Antigua Boat Sheds**

1882
Shaw and Tidd Architects
Registered Category I historic place
Listed Group 2
Private ownership

**Significance:** A Christchurch institution and quintessentially English component of the city, the sheds are thought to be the only surviving example of 19th century river boat sheds built for commercial boat hire purposes in New Zealand and are still used for their original purpose.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** In 2008 the building was strengthened and restored with the Council's and NZHPT's financial assistance.

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Minimal or no damage.

July 2011-January 2012: Minimal or no damage.

**NZHPT post-earthquake response:** Not required.

**Current status:** Building is intact and open for public use.

**Nurses' Memorial Chapel**
1927
Collins Architect
Registered Category I historic place
Listed Group 2
Private ownership (Community Trust)

**Significance:** The only war memorial in NZ dedicated solely to women and the first hospital chapel in the country, this building commemorates 3 Christchurch Hospital nurses killed in 1915 when their troopship was torpedoed and 2 who succumbed to the 1918 influenza epidemic. Strong public opposition to its demolition saved this interdenominational Chapel from demolition proposals in the 1970s and 1980s.

**Construction:** URM – cavity brick walls, brick buttresses, timber-framed roof, slate

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** Strengthening work was proposed in 1989 in association with the campaign to save the building.[148] The strengthening work was designed following a detailed examination of the building, earthquake resistant performance and including an economic assessment of strengthening. The proposed work involved:

- Clean out the cavity between the two layers of brickwork to all masonry walls and fill with a cement based grout that will bond the two layers together to form a homogenious wall...
- Dowel base of masonry walls to concrete slab by drilling diagonally down from the outside, through the cavity and grouting in D16 steel bars at 300mm centres.
- Add timber blocking between rafters, over top bond beam of masonry walls, and dowel fix blocking to bond beam. Fix blocking to timber roof sarking.
- Lift roof edge slates over gable and walls and dowel fix diagonal sarking to top edge of masonry walls.

[148] Morrison Cooper Ltd, 'Nurses Chapel Christchurch Hospital Christchurch, Structural Strengthening Feasibility Report', July 1989

- Arch between nave and Chancel to be tied by fixing a horizontal steel strap to the face of the brickwork above the arch line of the Chancel side, from Vestry pier to Vestry pier.
- Fix gable end roof ornamentation by doweling down into the gable end brickwork.
- Clean out bony areas in the basement concrete work around reinforcing steel and patch with epoxy mortar.
- Apply a water proofing glaze to the exterior surface of all brickwork.[149]

Restoration work was undertaken in 1992, including earthquake strengthening works.

**Level of Damage:** September-December 2010: Minimal or no damage.

January-June 2011: Moderate damage (cracking of brick work, west and east walls, damage to north wall and internal arch).

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** Christchurch City Council is working with engineers on make safe works. The NZHPT supported consent to secure.

**Current status:** Moderate damage, building secured and made safe.

[149] ibid, pp 10-11

**Canterbury Club**

(incl. Gas lights and hitching post), Corner Worcester and Cambridge Streets.
1873
Strouts Architect
Registered Category II historic place
Listed Group 2 (Gas lights and hitching post are listed Group 4)
Private ownership

**Significance:** Established in 1872 by the 'newer' gentlemen of the province, professionals and businessmen, whose backgrounds and interests differed from the gentry membership of the established Christchurch Club, (1856), this 1873 Italianate style building still houses the Club.

**Construction:** Timber-framed on stone foundations

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good

**Strengthening history:** Major alterations and additions were proposed in 2006. In December 2007, these plans were amended to insert two structural steel frames within the new lowered ceiling space of the main Functions Room 1 space as part of general earthquake strengthening works. The December 'Boxing Day' 2010 earthquake resulted in damage to chimneys. These were proposed for reinstatement in materials and form consistent with the original chimneys in January 2011.

**Level of Damage:** September-December 2010: Minimal damage (damage limited to chimneys, internal cracking, sinking foundations).

January-June 2011: Moderate damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** The NZHPT supported the owner to repair and strengthen the building.

**Current status:** Repair and strengthening work underway.

**St Luke's Chapel (Christchurch City Mission)**

275 Hereford Street
1888
R. England Architect
Registered Category II historic place
Listed Group 2
Private ownership

**Significance:** St Luke's Chapel was originally erected as the funerary chapel for the Heathcote Cemetery. It was relocated to the Jubilee Home in Woolston in 1947 and relocated again to its current location in 1991. The chapel has architectural significance as an early design by Robert England who later formed the partnership, England Bros.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Not listed as potentially earthquake-prone.

**Condition prior to September 2010:** Good

**Strengthening history:** No record of earthquake strengthening to the knowledge of the NZHPT.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Minimal damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** No NZHPT input as yet.

**Current status:** Secure, future uncertain at time of writing.

**Former Majestic Theatre/New Life Centre**

122-126 Manchester Street
c.1930
Luttrell Brothers Architects
Not registered by NZHPT
Listed Group 2
Private ownership

**Significance:** The former Majestic Theatre is one of a number of cinemas and theatres in the central city in the first half of the 20th century. The building is an example of the 'atmospheric' style of interior decoration popular in the 1920s and 30s. The Theatre was designed in the Art Deco/ Moderne style, by successful local architects the Luttrell Brothers. The building is four storied with an auditorium and backstage area. It is of technical significance for its method of steel construction which was innovative at the time.

**Construction:** Reinforced masonry

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Good – under renovation

**Strengthening history:** The building had been renovated on a number of occasions with a number of interior alterations particularly in 1946 and 1977 following fire damage. In 2009, consents were obtained to return the building to its original use as a theatre and earthquake strengthening work began on the roof, parapet walls and proscenium arch in June 2010. Renovation work was uncompleted at the time of the September earthquake.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Minimal damage.

July 2011-January 2012: Moderate damage.

**NZHPT post-earthquake response:** No NZHPT input as the building is not registered under the Historic Places Act 1993.

**Current status:** Future uncertain at time of writing, potential demolition following further damage from the 2-15 January 2012 earthquakes.

**Shop / Residence, 40 Cranmer Square**
c. 1870
Architect unknown
Not registered by NZHPT
Listed Group 2
Private ownership

**Significance:** The shop and residence at 40 Cranmer Square was built in the early 1870s by licensed victualler Charles Dann, probably to serve as a private billiard room. In 1883 the building was purchased by grocer Elias Gaudin, and the shop served as Gaudin's business premises. In the late 1880s, the shop was taken over by the Gardiner family, who ran it until the late 1940s. Because of its proximity to the Normal School, the shop served for many years as the pupils' tuckshop. It is one of the oldest retail buildings in the inner city.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Not listed as potentially earthquake-prone.

**Condition prior to September 2010:** Good

**Strengthening history:** Unknown

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Minimal damage.

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** No NZHPT input as yet.

**Current status:** Future uncertain at time of writing.

**Dwelling, 2-storey (Christ's College)**

4 Armagh Street (Corner Rolleston Ave)
1867
Architect unknown
Not registered by NZHPT
Listed Group 2
Private ownership

**Significance:** The dwelling has historical and social significance for its connection with a number of prominent individuals - particularly Leonard Harper, Samuel Bealey and Thomas Maling and its long association with Christ's College. The dwelling has architectural, aesthetic and craftsmanship significance as a well-preserved and prominently-positioned colonial villa. The dwelling has contextual significance within the western inner-city residential area, with Hagley Park and Christ's College, and as part of the city's precious fund of surviving colonial buildings.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):**

**Condition prior to September 2010:** Good

**Strengthening history:** Unknown

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Minimal damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** The NZHPT supported consent to repair the building.

**Current status:** Made safe and repaired.

**Fleming and McKellar Houses**

138 Park Terrace
1912 and 1926
Samuel Hurst Seager and Cecil Wood
Registered Category II historic place
Listed Group 3
Private ownership

**Significance:** McKellar House was designed by Samuel Hurst Seager in 1912 for A.A.McKellar. An innovative design, the house incorporates the influence of the English Arts and Crafts movement. McKellar House was originally named the Beach House because of a large beech tree on the property. Fleming House is situated next to McKellar House and was built in 1926, designed by Cecil Wood. The house was a retirement home for A.R. Fleming, a Port Levy run-holder and heavily influenced by English domestic architecture. It was constructed with extensive use of brick with a fine Rosemary tiled roof. Fleming and McKellar Houses make a major contribution to the historic residential character of the Park Terrace area.

**Construction:** URM

**EQP assessment prior to September 2010 (CCC, 2009):** Not listed as potentially earthquake-prone.

**Condition prior to September 2010:** Good

**Strengthening history:** Flemming and McKellar Houses were acquired by the Methodist Church in the 1960s. In 1997, the Church filed an application to demolish the buildings. One of reasons for the application was the cost of upgrade works, including earthquake strengthening. The NZHPT opposed the proposed demolition and the matter was heard by the Environment Court in 2001. The Environment Court decision[150] allowed the demolition stating that safety and economic matters outweighed heritage values.

Despite the Environment Court decision, the buildings were 'saved' by a sale to Park Terrace Apartments and an agreement between the Council and the new owners which allowed the construction of 20 new apartments on the site and financial support for earthquake strengthening and other works. The NZHPT also supported the new apartments and earthquake strengthening works in 2004.

**Level of Damage:** September-December 2010: Minimal damage.

[150] *New Zealand Historic Places Trust/Pouhere Taonga; Christchurch Central Methodist Mission v Christchurch City Council*, C173/01, 6 NZED 830

January-June 2011: Moderate damage.

July 2011-January 2012: Unknown.

**NZHPT post-earthquake response:** No NZHPT input as yet.

**Current status:** Some damage reported, waiting for engineering assessment.

**Commercial Building (Rat n' Roach Building, Changs Fruiterers, Chan's Cafe)**

47 London Street, Lyttelton
1880s
Registered historic area
Listed Schedule V, Notable Buildings
Private ownership

Photo: Google maps online

**Significance:**

No.47 London Street is part of the Lyttelton Township Historic Area and is the main commercial area of Lyttelton. It has a wide variety of commercial and public buildings. London Street, named after the Bishopric of London, was part of the commercial area of Lyttelton which included Norwich Quay and the connecting lower parts of Oxford Street and Canterbury Street. The majority of its original buildings (dating from c1850) were destroyed by fire on 24 October 1870, the worst urban fire to that date in New Zealand. The spread of fire along London Street could not be contained due to a lack of adequate water supply, even though the west end of London Street had a pump which tapped water from a spring discovered when the railway tunnel was constructed. Only a few buildings survived, so most buildings on London Street post-date 1870. Some of these new buildings contain more brickwork due to Lyttelton Borough Council requirements in an effort to prevent such spread of fire in the future. No. 47 London Street dates from 1880-1900 and was formerly Treddenick's shoe/chemist's shop and a former cobbler's workshop was still surviving at the rear of the building dating from a 1918 shoemakers/menders shop.

**Construction:** Timber-framed

**EQP assessment prior to September 2010 (CCC, 2009):** Potentially earthquake-prone

**Condition prior to September 2010:** Unknown

**Strengthening history:** In 2003 upper level alterations and an addition, incorporating some improved structural strengthening of the building, were undertaken. The NZHPT supported the proposal and consents were approved by Council.

**Level of Damage:** September-December 2010: Minimal damage.

January-June 2011: Moderate damage (parapet collapse and partial collapse of western masonry wall).

July 2011-January 2012: Minimal damage.

**NZHPT post-earthquake response:** The NZHPT supported repair and retention of the building based on engineering report.

**Current status:** Repair work carried out and the building is open and operating.

# Appendix 1. New Zealand's Earthquake-Risk Management and Cultural Heritage Legislation and Policy - Overview

There are five main aspects of New Zealand's earthquake-risk management and cultural heritage legislation and policy – environmental management, building regulation, heritage, civil defence and earthquake insurance. At the central government level, these aspects are managed by different government agencies: the Ministry for the Environment, Department of Building and Housing, Ministry for Culture and Heritage and the NZHPT, Ministry for Civil Defence and Emergency Management and the Earthquake Commission.

At the local government level, the Local Government Act 2002 provides the purpose and principles of local government. This purpose and principles includes providing a broad role in promoting social, economic and cultural well-being of their communities, taking a sustainable development approach'.[151] Section 11A of the Local Government Act 2002 lists a number of core services to be considered by local authorities in performing its role. These core services include avoidance and mitigation of natural hazards, libraries, museums, reserves, recreational facilities and other community infrastructure. Local authorities also have key roles under the RMA, Building Act 2004 and the Civil Defence and Emergency Management Act 2002.

**Resource Management Act 1991 (RMA)**

The RMA regulates the use of natural and physical resources to achieve sustainable management. For the purpose of sustainably managing natural and physical resources, the RMA outlines the functions of regional and territorial authorities in relation to environmental management. These functions include the avoidance or mitigation of natural hazards. This function is implemented by provisions in regional policy statements, regional plans and district plans. The natural hazards provisions tend to focus on the identification of hazards risk areas on the planning maps, such as an earthquake fault line, and rules that may restrict the construction of new houses or other activities within hazard areas. There is also an emergency-response provision in the RMA which enables local authorities to undertake immediate preventive and remedial measures in emergency situations.

Historic heritage is also provided for under the RMA. Under section 6(f) of the RMA the protection of historic heritage from inappropriate subdivision, use and development must be recognised and provided for as a matter of national importance. As with natural hazards, regional policy statements, regional plans and district plans contain provisions relating to the protection of historic heritage in the form of heritage schedules, policies and rules.

Local authorities are, therefore, empowered to regulate activities involving heritage places by rules under the RMA. These rules normally manage activities such as alterations and additions, relocation, demolition, subdivision and signage. Earthquake strengthening is often treated as an alteration under the RMA.

While decisions over listed heritage places are delegated to local authorities, the NZHPT manages any damage to pre-1900 archaeological sites as a separate centralised archaeological authority process.

The table below provides a summary of the heritage rules that apply to listed historic buildings, places and objects in the Christchurch City Plan prior to the introduction of the Central City Recovery Plan in 2012.

[151] Sections 3 and 14, Local Government Act 2002

| **Summary of Heritage Rules, Christchurch City Plan (prior to the introduction of the draft Central City Recovery Plan, 2012 and excluding cultural precinct rules)** | |
|---|---|
| **Consent status** | **Rule** |
| Controlled activity | 1.3.2 Group 3 and 4 Buildings, Places and Objects<br>Alteration[152] of a Group 4 heritage item, or the erection of any additional building(s) on a site containing a Group 3 or Group 4 heritage item. Council discretion is limited to matters concerning the heritage values of a protected item |
| Discretionary activity | 1.3.1 Group 1 and 2 Buildings, Places and Objects<br>Alteration or removal of any Group 1-2 heritage item, or the erection of any additional building(s) on a site containing the aforementioned heritage item. Council discretion is limited to matters concerning the heritage values of the protected item.<br><br>1.3.2 Group 3 and 4 Buildings, Places and Objects<br>Demolition of any Group 3-4 heritage item.<br><br>Any alteration or removal of a Group 3 heritage item,<br><br>Any removal of a Group 4 heritage item.<br><br>Council discretion is limited to matters concerning the heritage values of a protected item.<br><br>1.4.1 Assessment Matters – Demolition, Removal, or Alteration of any Protected Buildings, Places or Objects<br>Please see for extensive list of criteria that Council takes into consideration |
| Non-complying activity | 1.3.1 Group 1 and 2 Buildings, Places and Objects<br>Demolition of any Group 1-2 heritage item.<br><br>1.3.4 Requirement to Supply Heritage Records<br>In the case of any demolition of a listed building, place or object, the Council requires the supply of heritage records (photographs or plans) described in Clauses 1.3.5 and 1.3.6. The provisions of Clauses 1.3.5 (a) - (g) and 1.3.6 apply to all Group 1 and 2 heritage features; and the provisions of Clause 1.3.5(a) (b) and (c) to Group 3 and 4 features. Work shall not commence until any information required is supplied to the Council |

## Historic Places Act 1993

The Historic Places Act 1993 promotes for the promotion of the identification, protection, preservation and conservation of the historical and cultural heritage of New Zealand.[153] The Historic Places Act 1993 outlines the functions of the NZHPT, including the New Zealand Historic Places Trust Board and the Māori Heritage Council. These functions include the archaeological authority process and registration of historic places, historic areas, wāhi tapu and wāhi tapu areas.

[152] Alterations in the Central City Plan was defined as 'in relation to a protected building, place or object, means any work by way of construction, modification (including the fixing and installation of outdoor advertisements), or partial demolition which may have the effect of altering the heritage fabric of that protected building (both internally or externally), place or object; and maintenance using materials or techniques that are detrimental to the materials or finish of the heritage item; but excludes repainting existing painted surfaces and cleaning or washing with materials or techniques not detrimental to the heritage fabric. External alterations to buildings adjoining an important public open space means any work by way of construction or modification which may have the effect of altering the exterior fabric of the building, but excludes any maintenance, cleaning or repainting.'

[153] Section 4 Historic Places Act 1993

While registration provides recognition of heritage places, it does not provide statutory protection. Instead, regulatory protection is provided by the scheduling of heritage places since local authorities must have regard to the register when preparing regional and district plans under the RMA.[154]

While the Register provides no statutory protection, it has a number of implications including:

- The classification of 'sensitive land' in relation to the Overseas Investment Act 2005.
- The provision of Project Information Memorandum or building consent to the NZHPT under the Building Act 2004.
- The inclusion in Land Information Memorandum under the Local Government Official Information and Meetings Act 1987.
- The inclusion of the NZHPT as an affected party under the RMA in relation to consent procedures (at the discretion of the local authority).

A building constructed before 1900 may also be an archaeological site under the Historic Places Act 1993. Under section 2 of the Historic Places Act 1993, an archaeological site is defined as any place in New Zealand that either – was associated with human activity that occurred before 1900; or is the site of the wreck of any vessel where that wreck occurred before 1900; and – is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand. Under section 9(2) of the Historic Places Act 1993, the NZHPT may declare any post-1900 site to be covered by the archaeological site definition in section 2 by notice in the *Gazette*.[155]

Section 10 of the Historic Places Act 1993 directs that an authority is required from the New Zealand Historic Places Trust if there is 'reasonable cause' to suspect an archaeological site (recorded or unrecorded), may be modified, damaged or destroyed in the course of any activity. An authority is required for such work whether or not the land on which an archaeological site may be present is designated, or a resource or building consent has been granted.

**Building Act 2004**

All building work is regulated by the Building Act 2004 (the Building Act). As building work, earthquake strengthening will involve three basic categories:

- Modification of global behaviour, usually decreasing deformations (adding stiffness in the form of shear walls and braced frames).
- Modification of local behaviour, usually increasing deformation capacity by enhancing the existing shear or moment strength of an element.
- Connectivity to ensure individual elements do not become detached and fall.[156]

Generally, the majority of work associated with earthquake strengthening will constitute an 'alteration' under the Building Act. All alterations to existing buildings must comply as is reasonably practicable with the building code. Minor earthquake strengthening work may also be classified as exempt building work under the 1st Schedule of the Building Act. This work, therefore, does not require consent under the Building Act.

[154] Section 74(1)(2)(b)(iia) RMA
[155] In 2004, the NZHPT declared the Napier Prison Wall an archaeological site under section 9(2) of the Historic Places Act 1993.
[156] FEMA, *Designing for Earthquakes, A Manual for Architects*, 2006, FEMA 454, p 8-46

The Building Act also regulates changes to the use of buildings. A change of use may involve a range of conversions, especially the creation of new household units where there were none before.[157] It may also, for example, involve the conversion of a residential building into a public building.
In the case of the creation of new household units, the building, in its new use, is required to comply, as nearly as is reasonably practicable, with the building code in all respects.[158] For other changes of use, the building is required to comply, as nearly, as is reasonably practicable, and to the same extent as if it were a new building, with respect to fire safety, sanitary facilities, structural performance and disabled access provisions of the building code.[159]

Sections 112, 114 and 115 of the Building Act 2004 means that strengthening proposals involving alterations and change of use potentially triggers other building code requirements in relation to fire safety and accessibility. In order to safeguard historic heritage values, building consent authorities can exercise a degree of discretion and flexibility with regard to what is 'reasonably practicable'.

The Building Act provides special management provisions for certain categories of buildings which are considered to be dangerous, earthquake-prone or insanitary.[160] With regard to earthquake-prone buildings, these buildings are those which will have their 'ultimate capacity exceeded in a moderate earthquake.'[161] In simple terms, a building may be considered earthquake-prone if it is assessed to be less than one-third of the current standard for new buildings.[162]

If a territorial authority (local government) considers that a building is dangerous, earthquake-prone or insanitary, the territorial authority can take action to safeguard both life and property. These actions include putting up a hoarding or fence to prevent people approaching the building, attaching a public warning notice, or issuing a written notice to the owners requiring them to reduce or remove the danger or prevent the building from remaining insanitary.[163] A copy of any such notice must be provided to the NZHPT if the building is a heritage building.[164]

Discretion on taking action on earthquake-prone buildings is exercised by territorial authorities under the Building Act. In order to promote a strategic response to managing earthquake-prone, dangerous, and insanitary buildings, section 131 of the Building Act, contains requirements for territorial authorities to adopt policies on such buildings. The policies must state:

- The approach that the territorial authority will take in performing its functions under this Part; and
- The territorial authority's priorities in performing those functions; and
- How the policy will apply to heritage buildings.
- Policies for dangerous, earthquake-prone, and insanitary buildings are subject to public consultation processes with the opportunity for submissions and a public hearing.[165]

The earthquake-prone buildings policies with special provisions recognise that heritage buildings should be treated differently from other general buildings on the basis that preservation of heritage

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[157] Katharine Wheeler, 'Change of Use', *Build*, August/September 2008, pp 78-79
[158] Section 115, Building Act 2004
[159] ibid
[160] See definitions of dangerous, earthquake-prone, and insanitary buildings: sections 121-123 Building Act 2004
[161] Section 122(1)(a) Building Act 2004
[162] It is noted that the standard for new buildings includes for ductility which reduces the required design forces. Older buildings do not have much ductility so the forces required to meet current standards are much more than for a new building. This is why the definition refers to the ground shaking, not the response of the building. *Pers Comm* David Hopkins, Department of Building and Housing, Wellington
[163] Section 124 Building Act 2004
[164] Section 125(2)(f) Building Act 2004
[165] Section 83, Local Government Act 2002.

buildings is in the public interest and that heritage buildings raise special management issues. At a general level, the special provisions promote flexibility when dealing with heritage buildings and promote methods such as management plans, dialogue and other special requirements. Examples of common methods in earthquake-prone policies include:

- Initiation of discussions with the NZHPT.
- Seeking advice from NZHPT and/or heritage professionals.
- Consultation processes with all stakeholders.
- Extended timeframes for engineering assessments and structural upgrade works.
- Public consultation.
- Upgrading work to comply with ICOMOS NZ Charter or other standards.
- Use of waivers and modifications to the building code.
- Financial assistance.
- Risk and recovery management and pre-disaster planning assistance.
- Demolition as the last option (or avoiding demolition).[166]

While these provisions do assist in the management of procedures relating to identified earthquake-prone heritage buildings of the Building Act and sometimes indicate financial assistance, they do not generally provide detailed policies or guidance for the strengthening of earthquake-prone heritage buildings.

**Civil Defence and Emergency Management**

The Civil Defence and Emergency Management Act 2002 (the CDEM Act) is the primary legislation for the management of emergencies in New Zealand. Section 3 of the CDEM Act promotes the sustainable management of hazards; encouraging and enabling risk acceptance by communities; planning and preparation for emergencies, including response and recovery; local authority coordination; integrated national and local civil defence emergency management planning; and coordination across the wide range of agencies and organsiations.[167] In relation to sustainable management, the CDEM Act states 'to improve and promote the sustainable management of hazards…in a way that contributes to the social, economic, cultural and environmental well-being and safety of the public and also the protection of property.'[168]

The CDEM Act provides a range of powers to civil defence directors during an emergency. These powers include the 'removal or disposing of, or securing or otherwise making safe, dangerous structures and materials wherever they may be.'[169] These powers are supported by section 330 of the RMA which basically mean that in the event of a civil emergency, persons exercising emergency powers under the CDEM Act could demolish or remove severely damaged listed heritage buildings without resource consent in the interests of public safety. Section 59 of the CDEM Act is a general obligation for all government departments and others to undertake civil defence emergency management functions and responsibilities.

The CDEM Act establishes a strategic and policy framework involving the Civil Defence Emergency Management Regulations 2003 and three key plans:

[166] For an overview, see NZHPT, Towards Improving National and Local Action on Earthquake-Prone Buildings', NZHPT, 3 March 2009: http://www.historic.org.nz/en/ProtectingOurHeritage/AdvocatingForHeritage.aspx;
[167] Section 3, CDEM Act 2002
[168] Section 3(a), CDEM Act 2002
[169] Section 85, CDEM Act 2002

- The National CDEM Strategy.
- The National CDEM Plan (and associated guidelines).
- CDEM Group Plans.

The National CDEM Strategy 2008 promotes an integrated approach to CDEM based on the four R's: reduction, readiness, response and recovery. In this context, the CDEM Strategy sets out five principles, being:

- Individual and community responsibility and self-reliance.
- A transparent and systematic approach to managing the risks from hazards.
- Comprehensive and integrated hazard risk management.
- Addressing the consequences of hazards.
- Making best use of information, expertise and structures.

As part of principle one, the importance of Māori cultural heritage is highlighted which makes reference to the role of Māori as an important community stakeholder, especially for the role of marae in recovery, and the risk to wāhi tapu sites and other sites of significance.[170]

While the role of the NZHPT is noted in the National CDEM Plan guidelines, the CDEM group plans do not specifically provide processes or guidance for the management of historic heritage during a state of emergency.

**Earthquake Insurance and Funding**

As part of the civil defence framework, the role of the Earthquake Commission (EQC) is important with respect to the recovery for domestic or residential properties. The EQC provides nation-wide insurance from natural disasters.[171] Prior to September 2010, the EQC had over $5 Billion (NZD) created by a levy collected on all private household insurance policies. The money is held in cash, global equities and in government bonds. The EQC levy is 5 cents on every $100 NZD of insurance cover. In the 17 years since the establishment of the Earthquake Commission, the levy would equate to about $1200 paid by every homeowner who has held an insurance policy since 1993. Of the $5 Billion, $2.5 Billion NZD was held in international reinsurance which is activated when the EQC has paid the first $1.5 Billion in claims following a disaster.

Non-residential, public or commercial buildings (including churches) are not part of the insurance coverage provided by EQC. As a consequence, repair of these buildings is dependent on private sources of finance, private insurance and the quality of that insurance. This means there is often a gap between the amount of money an insurance company will pay for repairs to a building as opposed to what is actually required for full restoration, including structural improvements to NZ Building Code requirements. For many public buildings, such as churches, funding assistance is sourced from community fund raising, including donations and applications to the NZ Lottery Grants Board.

For private commercial buildings, the options are more limited since generally the public does not 'give' to benefit private commercial businesses and these businesses cannot apply to the NZ Lottery Grants Board unless they are a charitable trust or incorporation. However, local authority initiatives, such as the Christchurch City Council's heritage grant fund do provide some limited assistance for

[170] MCDEM, National CDEM Strategy, 2008, p 7
[171] Earthquake Commission Act 1993

private owners of heritage buildings with funding for conservation and earthquake strengthening works. Some funding assistance is also available from the NZHPT under the National Heritage Preservation Incentive Fund (NHPIF). The NHPIF is restricted to registered Category I historic places, historic areas, wāhi tapu of national significance under the Historic Places Act 1993.

| Summary of NZ's Disaster Management, Environmental and Heritage Regimes | | | |
|---|---|---|---|
| | **Disaster Management and Insurance** | **Environmental and Housing/Construction** | **Heritage Management** |
| **Law** | Civil Defence & Emergency Management Act 2002<br>Earthquake Commission Act 1993 | Building Act 2004, Resource Management Act 1991 (RMA) | Historic Places Act 1993, Resource Management Act 1991 (RMA) |
| **Primary Government agencies** | Ministry of Civil Defence and Emergency Management (MCDEM)<br>Earthquake Commission (EQC)<br>Local authorities<br>Emergency services | Ministry for the Environment (MFE)<br>Department of Housing & Construction<br>Local authorities | Ministry for Culture and Heritage (MCH)<br>NZ Historic Places Trust (NZHPT)<br>Local authorities |
| **Focus** | Civil Defence Emergency readiness and response'<br>Earthquake insurance | Environmental and building regulation | Heritage conservation |
| **Planning** | National CDEM Strategy<br>National CDEM Plan<br>CDEM Group Plans | RMA: National Policy Statements (NPS)<br>National Environmental Standards (NES)<br>Regional Policy Statements (RPS)<br>Regional Plans<br>District Plans<br>Earthquake-prone, dangerous and insanitary policy under Building Act 2004 | Regional Policy Statements<br>District Plans<br>Conservation Plans |
| **Risk focus** | Natural disasters, emergency management<br>Earthquake insurance | Natural hazards (RMA)<br>Building Standards<br>Earthquake-prone, dangerous and insanitary buildings (Building Act 2004) | Development (alterations, etc)<br>Subdivision<br>Earthworks<br>Signage<br>Archaeological sites |

To summarise New Zealand's framework, the management of earthquake-prone buildings is primarily managed by local authorities under the Building Act in the context of the environmental planning framework provided by the RMA. Since local authorities are also responsible for natural hazards avoidance and local civil defence, the legislative and regulatory framework for disaster management and cultural heritage has the potential to be well integrated. This framework, however, is very dependent on the capability and resources of local authorities and the cooperation between central and local authorities and associated agencies.

For heritage buildings listed in district plans under the RMA, earthquake strengthening will often require resource consent in addition to compliance with the Building Act. Earthquake strengthening may also trigger the need for an archaeological authority from the NZHPT if the site has evidence of (or the NZHPT has reasonable cause to suspect) pre-1900 human activity.

Also if an earthquake-prone heritage building is listed in a district plan under the RMA, resource consent will be required to demolish. This activity is usually classified as a discretionary or non-complying activity (and in some districts – prohibited).

Funding and incentives for earthquake strengthening are generally limited in New Zealand especially for privately owned heritage buildings.

In terms of post-disaster response, the NZHPT considers that there is a need for greater guidance for historic heritage within the National CDEM Strategy/Plan and the CDEM Group Plans.

# Appendix 2. Information Request, Canterbury Earthquakes Royal Commission

**Canterbury Earthquakes Royal Commission**
**Komihana a te Karauna hei Tirotiro i ngā Whare i Horo i ngā Rūwhenua o Waitaha**

28 September 2011

Robert McClean
Senior Heritage Policy Analyst
Historic Places Trust
PO Box 2629
WELLINGTON 6140

By email: rmcclean@historic.org.nz

Dear Mr McClean

**Heritage buildings in the Christchurch Central Business District**

The Royal Commission of Inquiry into Building Failure caused by the Canterbury Earthquakes is currently conducting an inquiry into the failure of a large number of buildings in the Christchurch Central Business District (CBD).

The Commission has asked the Christchurch City Council to provide a full list of buildings (by address) within the CBD which have heritage status.

The inquiry would be assisted by the Historic Places Trust providing the following information (if held) in relation to heritage buildings located within the Christchurch CBD:

1. Details of any seismic retrofitting that may have taken place;
2. Any information regarding the current condition of the building as a result of the Canterbury earthquakes.

The Commission believes that the Trust may be in a position to provide the information particularised above, on the basis of a recent media report that the Trust has assessed 176 buildings for the Canterbury Earthquake Recovery Authority (CERA) (*The Press*, 27 September 2011, page 1).

Would you please provide any relevant documentation or information in your possession, as soon as possible. Either hard copy or electronic format is suitable.

The information and documentation requested is required pursuant to the Royal Commission's powers of investigation set out in section 4C of the Commissions of Inquiry Act 1908.

15 Barry Hogan Place, Addington, Christchurch
PO Box 14053, Christchurch Mail Centre 8544

Freephone 0800 337 468 www.royalcommission.govt.nz

If you have any queries in relation to this request please contact **Sara Jamieson on (03) 741-3033** (sara.jamieson@royalcommission.govt.nz) or **David Hutt (03) 741 3006**

Yours faithfully

Sara Jamieson
Legal Analyst
Canterbury Earthquakes Royal Commission