Are we really prepared for disaster? Responding to the lessons from Christchurch

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Abstract

Disasters can be sudden and traumatic events, coming without warning. Understanding the exposure and vulnerability of heritage to the risks posed by natural and human hazards enables us to put in place suitable mitigation measures to minimise losses and protect our heritage for future generations. But are we really prepared for disaster? Large-scale disasters have their own dynamics, driven by health, safety, economic, social and political agendas that usually exclude heritage, resulting in its omission from the emergency response and recovery processes. In Christchurch, following the Canterbury Earthquakes of 2010 and 2011, almost 50 per cent of the city’s architectural heritage was lost as a result of this exclusion. The case highlighted how important it is for the heritage sector to engage with government and emergency responders prior to disaster to ensure the inclusion of cultural heritage in resilience, emergency and recovery planning post disaster.

In 2017, Australia ICOMOS and ICOMOS New Zealand established a joint working group to develop strategies for improving the disaster preparedness of heritage places, the capacity of heritage professionals, and promote the inclusion of heritage in Government emergency plans. With reference to events in Christchurch, this paper outlines the goals of the working group.

Introduction

Disasters, whether natural or human in origin, are often sudden and traumatic events, coming without warning and resulting in severe loss. From cyclones to torrential rains and floods, droughts, heatwaves and fires, to earthquakes and industrial disasters, Australia and New Zealand face large-scale disasters on an almost annual basis. Many have catastrophic consequences leaving a trail of destruction and trauma in their wake, with the loss of lives, homes and livelihoods. As a consequence, both Australia and New Zealand have developed broad ranging mitigation measures, sophisticated early warning and response systems, highly trained emergency personnel and very efficient approaches to emergency response, post disaster clean up and infrastructure recovery. The losses also include cultural heritage, much of which is irreplaceable and important to local cultural identity and community cohesion. However, although heritage is valued and protected under normal circumstances, in the broader New Zealand and Australia emergency management context, cultural heritage is rarely considered a high priority, if at all. Thus, unless substantive mitigation measures have been implemented by property owners and managers to protect significant places and collections, our cultural heritage remains vulnerable and a potential casualty of future disasters.
Background

Earthquake History

New Zealand experiences earthquakes on a regular basis. Of the sixteen earthquakes of magnitude seven or above recorded in New Zealand prior to 1991, three occurred within 100km of Christchurch with structural damage to buildings in Christchurch being recorded in 1881, 1888, 1895, 1901, 1922, 1929 and 1968 (Densem 1990; McClean et al. 2012). Between 1968 and 2010, however, the region remained quiet.

The Canterbury Earthquakes

From 2010 to 2012, Christchurch was affected by a sequence of large and devastating earthquakes, the most significant occurring on 4 September 2010 and 22 February, 13 June and 23 December 2011. These earthquakes, collectively referred to as the Canterbury Earthquakes, were interspersed and followed by thousands of aftershocks (Mclean et al. 2012).

The physical, humanitarian, economic and psychological impacts of the disaster on the city and its people were enormous. In addition to the 185 fatalities associated with the February 2011 earthquake, the city suffered widespread damage to land, buildings and infrastructure. Forty-four percent of heritage listed buildings in the city centre were destroyed (Ohs & Wykes 2019) – iconic landmarks, historic streetscapes, whole city blocks, public squares, government, commercial, religious, cultural, industrial and residential buildings, memorials and bridges (Heritage New Zealand 2019; McClean et al. 2012). These structures represented all phases of the city’s urban development and provided the backdrop to daily life. Their loss severely impacted Christchurch’s distinctive architectural character, identity and sense of place.

Structural vulnerability of heritage buildings

Building Vulnerability, Codes and Legislation

In 2012, the New Zealand Historic Places Trust (NZHPT) prepared a detailed submission for the Canterbury Earthquakes Royal Commission: Heritage Buildings, Earthquake Strengthening and Damage (Mclean et al. 2012). The report reviewed the seismic performance of one hundred heritage buildings affected by the earthquakes, eighty-four of which were located in the city centre. Some had been seismically strengthened prior to the earthquakes and others had not. The report found that of the buildings surveyed, almost all those destroyed were of unreinforced masonry (URM) construction with no or minimal strengthening (limited to ties and bracing). The majority of buildings that survived had been strengthened to 67% of the National Building Standard (NBS).

Although timber construction has always been popular in New Zealand, many older buildings in urban areas, built prior to the 1930s, were of URM construction (Mclean et al. 2012). It was only after the 1931 Hawke’s Bay (Napier) Earthquake, in which 256 people died (NZ History 2017), that the popularity of this type of construction waned (Rands n.d.). In 1965 legislation was introduced to prohibit URM construction for new buildings of more than one storey (New Zealand Standard 1900, Chapter 8, 1965). Building standards have since been developed for URM and other types of construction to mitigate seismic risk.

In 1972, Christchurch City Council conducted a block-by-block survey of the central business district identifying approximately two-thirds of the buildings as posing an earthquake risk (Mclean et al. 2012). In response, several heritage buildings were demolished, whilst others were made safe by removal of parapets, cornices, chimneys and other architectural features. By the 1980s, however, the public, Christchurch Civic Trust and NZHPT opposed these demolitions due to their impact on the character of downtown Christchurch. There was also concern over the impact of unregulated strengthening works on heritage fabric and values. Thus in 1995 the Christchurch District Plan regulated earthquake strengthening of heritage buildings, with the works to be assessed and approved by Council.

Under the Building Act 2004, all territorial authorities, including Christchurch City Council, are required to identify earthquake-prone buildings in their high seismic areas. These buildings fail
to meet 33% of the NBS requirements for new buildings. Buildings identified as an earthquake-risk meet 34% to 67% of the NBS. Many historic buildings fall into one of these two categories and are thus highly vulnerable to major earthquake events such as occurred in Christchurch.

**Failure to Strengthen Historic Buildings**

Since the 1980s, structural assessments of numerous heritage buildings have contributed to a better understanding of earthquake risks at individual property level and at city level (the city is built on layers of alluvial deposits and aquifers and is thus vulnerable to liquefaction). These studies have raised awareness of the risks to Christchurch’s architectural heritage, but also the immense and often unfeasible cost of strengthening heritage buildings (McClean et al. 2012, Henrich and McClure 2017). Thus, although property owners may have been notified of the risk associated with their buildings, many had not upgraded them prior to the earthquakes. It also appears some property owners failed to fully comprehend or take the risk to their buildings seriously. In 1973, Professor R. Park, of the University of Canterbury, stated:

... 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 (cited in McClean et al. 2012).

Despite Christchurch’s documented earthquake history, the expanding body of knowledge about the risks and the development of building codes and regulations to mitigate risks, this attitude still seemed to persist in 2010.

**Post disaster heritage impacts**

**Christchurch Case Study, 2016**

Although it is recognised that the inherent vulnerability of Christchurch’s historic URM buildings is substantially responsible for the loss of the city’s architectural heritage, other external factors also contributed to these losses.

In September 2016, a study was undertaken to assess the impacts of the emergency response to the earthquakes and recovery from the earthquakes on Christchurch’s architectural heritage (Forbes 2017). The purpose of the study was to better understand the dynamics of disaster response and recovery in large-scale urban disasters and the impacts that these have on the architectural heritage of cities such as Christchurch.

**Methodology**

The study was based on field observations and individual and focus group interviews with those working to save the city’s heritage, including: heritage officers with Christchurch City Council (Local Government has the regulatory responsibility for protecting heritage through its District Plans and heritage lists); heritage officers with Heritage New Zealand Pouhere Taonga (this national government body provides heritage advice to government and property owners and has regulatory responsibility over archaeological sites); members of ICOMOS New Zealand (International Council on Monuments and Sites, peak body for heritage professionals in New Zealand); architects and engineers with specialist expertise in architectural heritage conservation; and the Mayor of Christchurch, Lianne Dalziel (who was involved in the city’s post disaster recovery planning and development of the city’s resilience plan) (Forbes 2017).

The report produced was reviewed by those interviewed, as well as members of ICOMOS-ICORP (ICOMOS’s International Scientific Committee on Risk Preparedness), Australia ICOMOS, ICOMOS New Zealand and Blue Shield Australia.

**Study Findings**

The study found that in large scale urban disasters many of the major decisions made and actions implemented lie outside the control of property owners, experts or even local government. It identified issues experienced by property owners, council heritage officers and
heritage experts in the emergency response and post disaster recovery phases that made the protection and salvage of the city’s heritage buildings extremely difficult, and it highlighted the disconnect between the heritage sector, the emergency management sector, property owners and government policy makers, which resulted in heritage being undervalued and left unprotected.

The following are the key issues identified as affecting heritage in the aftermath of the disaster.

1. **Built heritage was not included in emergency planning for the city, Civil Defence charters, operating procedures or training scenarios.**

   Although places of cultural heritage significance are identified on heritage inventories and heritage maps and are protected under resource management legislation (District Plans), no discussions had taken place between heritage authorities, the National Government and Civil Defence prior to the disaster to ensure that it was protected in times of crisis. The importance of cultural heritage, particularly built heritage, to the identity of Christchurch and its importance to the recovery of the city and its people, failed to be understood or acknowledged by those outside the heritage agencies. Heritage places were not included in emergency plans, Civil Defence charters, operating procedures or training manuals or scenarios. Therefore, it was not on the agenda, let alone given priority or special consideration, in the emergency response to the disaster.

2. **Suspension of heritage legislation under the Canterbury Earthquake Recovery Act (CERA) left heritage buildings unprotected in the aftermath of the disaster.**

   Although many of the structures damaged in the first earthquake (4 September 2010) were older buildings, including notable landmarks such as Christchurch Anglican Cathedral and the Catholic Basilica of the Blessed Sacrament, heritage experts urged building owners not to demolish their buildings hastily. Demolition was not permitted without Council consent and penalties applied (Forbes 2017). A fund was launched to help repair historic buildings damaged by the earthquake and the New Zealand Government allocated NZ$10 million towards their restoration.

   However, in the wake of the second earthquake (22 February 2011), a state of emergency was declared by the New Zealand Government and Civil Defence took control of the city assisted by the military, police and search and rescue teams from other parts of New Zealand and abroad. The city was evacuated, and the centre of the city was cordoned off to prevent access by everyone other than those authorised by Civil Defence and later the Canterbury Earthquake Recovery Authority (CERA). The cordon around the Central City Red Zone was only fully removed on 30 June 2013, more than two years after the second earthquake (DPMC 2017).

   Under section 85 of the Civil Defence and Emergency Management Act 2002 (CDEM 2002), Civil Defence directors have the power to facilitate the ‘removal or disposing of, or securing or otherwise making safe, dangerous structures and materials wherever they may be’ (McCLean et al. 2012). Consent is not required. This power transferred to CERA under section 38 of the Canterbury Earthquake Recovery Act 2011 (Anderson Lloyd Lawyers 2014).

   CERA was established by the national government on 29 March 2011 through the Canterbury Earthquake Recovery Act 2011. Under CERA normal planning legislation, including that relating to the protection of cultural heritage (Resource Management Act 1991, Christchurch District Plan 1995), was suspended for the purpose of facilitating the recovery. Only legislation protecting archaeology was maintained (Historic Places Act 1993, and later the Heritage New Zealand Pouhere Taonga Act 2014). CERA remained in control of Christchurch for more than five years (DPMC 2017).

3. **Decisions regarding the future of the city were made by outsiders who had no association with the place and limited understanding of its heritage values.**

   CERA’s powers facilitated demolition and replanning of the city, with much of this work being undertaken by outsiders (experts imported from Wellington, Auckland and Australia), most of whom were not familiar with the local context and had limited understanding or interest in the local built heritage.
4. **Heritage buildings were difficult to identify during the emergency response.**

As the Council offices were located in a section of the city that was seriously affected by the earthquakes, there was no access to heritage data in the immediate wake of the earthquake. Access to digital backup data was also limited due to a lack of power. When backup data did become available, it was found to be incomplete or inaccurate. In addition, heritage buildings were not readily identifiable from other buildings amongst the debris. Thus, identification of heritage buildings was dependent on the knowledge of the Christchurch City Council heritage team, who assisted Civil Defence as best they could, providing listing information as early as possible. All these factors constrained the capacity of local authorities to assess and monitor the damage to heritage places.

5. **Damage assessments were carried out by engineers with limited heritage expertise.**

Although most of the deaths occurred through the collapse of modern reinforced concrete buildings, there were also deaths resulting from the collapse of historic building facades into the street, crushing two buses. This highlighted the high level of risk associated with URM heritage buildings. Minimising risk was the highest priority and demolition orders were issued for many URM buildings. In addition, as the building damage was cumulative over the series of earthquakes, with small cracks later becoming major failures, a conservative approach was adopted to damage assessments (Ingham 2019).

As there was no register of experienced heritage professionals qualified to carry out post disaster damage assessments, assessments of heritage buildings were undertaken by engineers without specialist heritage expertise or experience. For many, conserving the city’s heritage was not their interest. With the assistance of ICOMOS NZ, Christchurch City Council engaged a small number of specialist heritage engineers to undertake peer reviews of the damage assessment reports submitted to CERA. These were used later to challenge the demolition orders in the courts.

By 3 March 2011, of the 3,000 buildings inspected within the central city area (defined by the four avenues), 45% were marked as unsafe with red or yellow tags, including many heritage buildings. By February 2015, 1,240 demolitions had occurred within this area (Gates 2015). Many buildings in the Red Zone were demolished without prior communication with their owners or relevant authorities because they were determined to be dangerous or considered uneconomic to repair. Timber structures (of which there were many in Christchurch) generally experienced far less earthquake damage than their masonry counterparts, but were not exempt from the demolition notifications.
6. **Time in which to assess buildings, challenge demolition orders or record buildings prior to demolition was extremely limited.**

From the time the state of emergency was declared until CERA was disestablished on 18 April 2016 (DPMC 2017), Christchurch City Council, which would normally have had responsibility for the protection of heritage within the region, had no authority. Despite this, council heritage officers sought to save the city’s heritage from demolition by recording damage, providing peer reviews of damage assessments and challenging demolition orders. Unfortunately, more often than not, their recommendations were not upheld by CERA or the court.

Heritage New Zealand, on the other hand, retained a statutory role in regard to archaeology, which included structures built before 1900. It used its powers to gain access to sites to record buildings prior to their demolition. Staff prepared reports for almost all heritage buildings that were demolished for consideration alongside the demolition reports prepared by the engineers. However, due to the higher weighting given to safety and the situation of individual property owners (personal and economic), many heritage buildings were demolished regardless. Even buildings known to have been seismically upgraded prior the earthquake (including works undertaken using Council grants), had demolition orders approved by CERA, despite heritage objections.

7. **Heritage listings were inadequate in their identification of the heritage values and attributes to challenge demolition orders in court.**

Even though many Government and Council owned heritage buildings were stabilized, retained and repaired, or secured and made weather-tight for future repair and seismic upgrade, much of Christchurch’s built heritage was privately owned. It was this heritage that suffered most from the forced demolitions that took place following the earthquake.

The courts determined that unless heritage attributes were fully and clearly described in the heritage listings, they could not be regarded as significant and worthy of protection. Thus, where inventory listings were not sufficiently detailed, the Council had difficulty defending heritage items and protecting them from demolition.
8. **Historic interiors have been delisted making them vulnerable, not only during the recovery, but into the future.**

With the review of Christchurch’s District Plan in 2016, and under the aegis of the Independent Hearings Panel, historic interiors have now been delisted. In the post disaster recovery it was considered unreasonable to force owners to them. As a result, internal alterations to heritage buildings, whether earthquake related or not, are permissible without consent (Henrich and McClure 2017).

9. **There can be potential conflict between the cultural heritage value attached to a place by the community and the value attached to it by its owner.**

Much of the city’s heritage was in private ownership. Unfortunately, there can be conflict between the cultural value attached to a place by the community (cultural) and the value attached to it by its owner (personal, monetary). Decisions regarding demolition or recovery of buildings were highly dependent on the will and/or financial resources of the owner. Some owners used the opportunity to demolish buildings that would otherwise have been protected (under the District Plan), some with the intention of redeveloping the land more profitably or selling it off unencumbered. Others, however, have fought to save their heritage buildings through the courts, challenging CERA’s demolition orders. Wharetiki House, a category 2 heritage item, was the first case to challenge CERA’s authority in the High Court. The case was unsuccessful and the building was demolished despite the owner’s commitment to repair and upgrade it (https://en.wikipedia.org/wiki/Wharetiki_House).

10. **Making insurance claims was extremely difficult for many property owners.**

Insurance companies also played a major role in determining what was demolished and what was saved. As a series of earthquakes are not considered to be a single ongoing event, but rather as numerous separate events, each requiring a separate claim form and assessment, for many property owners claiming on insurance was extremely onerous and stressful. In 2016, there were still many property owners who had not received insurance payouts, or had had long arguments with their insurance companies whilst trying to retain their heritage buildings. In addition, several insurance companies went into liquidation leaving people without recompense.

11. **Few materials and artefacts were saved from the demolition of historic buildings.**

Under standard demolition contract conditions, demolition materials are the property of the demolisher. Unless explicitly stated in a demolition contract, materials from collapsed or demolished heritage buildings could not be salvaged for reuse. With the trauma of the situation, combined with the urgency with which Civil Defence and CERA were authorizing or ordering demolitions, the lack of access to sites by property owners and the short notice given to owners of impending demolitions, negotiation of demolition contracts was not a priority for most people.

In addition, there was little monitoring of where materials or building artefacts went (including rare large dimensioned timbers, window and door joinery, stone and carved elements), whether to land fill or for sale on the open market. Where possible, Christchurch City Council stepped in to salvage materials, but found access to long-term storage facilities for the materials was an issue.

12. **Focus on large lot development and anchor projects lead to demolition of some heritage properties and some loss of the city’s historic development pattern and character.**

The extent of destruction within the city provided an opportunity to implement extensive new infrastructure projects and large-scale redevelopment of key precincts. Under CERA a new city plan was developed which included large ‘anchor projects’ that were considered key to Christchurch’s recovery. These projects were for new buildings and precincts (e.g. a new sports stadium, new Justice and Emergency Services Precinct), the location of which did not necessarily correspond with the historic layout of the city (CERA 2012).
In some areas, particularly around Cashel Mall, the retail hub of the city, the plan worked against small property owners and built heritage. As development approval required sites to be of a minimum size, the process encouraged the amalgamation of small allotments to form much larger development sites, forcing small property owners to sell their properties. In at least two cases heritage buildings that had survived were demolished to make way for the new developments.

13. The cost of reconstruction is extremely high

The cost of reconstruction in Christchurch is extremely high and most insurance payouts have not been sufficient to fund it. Many people whose buildings had been demolished could not afford to replace them. The extremely high demand for construction work in the city resulted in prices up to four times the original estimates.

The new building code requirements have also been exceptionally expensive to implement and for some heritage buildings, highly intrusive. In many cases only facades have been retained with new steel and concrete structures erected behind them, resulting in a loss of integrity and authenticity. Eight years after the initial disaster many blocks of land in Christchurch still remain vacant.

Discussion

The experience of Christchurch has been devastating for both the local community and the city’s architectural heritage. Despite the known vulnerability of the city and its historic buildings to earthquakes, it is clear that property owners, heritage practitioners, Council officers and the NZHPT were not prepared, particularly for a disaster of this scale. The city’s historic buildings suffered greatly, particularly those that had not been strengthened.

The 2016 study (Forbes 2017) showed that heritage also suffered greatly through the emergency response and recovery planning processes. Heritage was seen as a risk (human safety, cost of repair) by the emergency management sector and a large portion of the public, rather than as an asset to the city’s economy, identity and future well-being. Although the
city’s architectural heritage is normally protected under heritage and resource management legislation (*Heritage Places Act* 1993 and *Resource Management Act* 1991), it is not protected under civil defence and emergency management legislation (*CDEM Act* 2002). The latter overrides the former in large-scale disasters. Because of the lack of understanding and cooperation between the heritage and emergency management sectors pre-disaster, heritage was excluded from emergency, resilience and recovery plans for the city. Thus, it is clear that if heritage is to survive such disasters, there is a need for consultation and collaboration between the two sectors (Lochhead 2013).

The United Nations International Strategy for Disaster Reduction (UNISDR) Sendai Framework for Disaster Risk Reduction 2015-2030 (2015), to which the city of Christchurch is committed, recognises the importance of cultural assets to community life and the economy. It refers specifically to the need for protection of cultural heritage in disasters and its inclusion in disaster risk reduction and emergency management frameworks for cities (UNISDR, 2015, paragraphs 5, 17, and 19(c)). It also stresses the need for Government to engage with relevant stakeholders, including the community of practitioners (including heritage practitioners) in the design and implementation of policies, plans and standards for disaster risk reduction (UNISDR, paragraph 7). Priority for Action 4 emphasises the need for the response, recovery and reconstruction phases to be prepared for ahead of the disaster as this makes nations and communities more resilient (UNISDR, paragraph 32).

Heritage authorities must also be prepared for disaster. Heritage inventories need to be detailed, up to date and accessible (Forbes 2017; Lochhead 2013). Inventories that clearly identify significant heritage attributes and values, supported by accurate online mapping of heritage sites and possibly even tagging of buildings and monuments with a universally recognised marker (e.g. Blue Shield as defined by the 1954 Hague Convention) would greatly assist responders in identifying heritage buildings requiring special consideration in the disaster situation. It would highlight the need for damage assessment by specialist heritage engineers. To facilitate this, a national register of heritage experts with the required skills for working in a disaster situation is required (Forbes, 2017; Lochhead 2013). Detailed inventory data would also promote legal recognition and protection of heritage buildings as their significance and attributes could be clearly demonstrated in court.

Training of heritage professionals (architects and engineers) in disaster risk management for built cultural heritage is also needed. This would include training in risk assessment (for all types of hazard, natural and human), prevention, mitigation (including physical interventions at site or building level) and preparedness for disaster. Training in rapid assessment, stabilisation, salvage and detailed damage assessment, is required to support the emergency response and recovery of heritage.

**Conclusion – lessons from Christchurch**

Although the inherent seismic vulnerability of Christchurch’s URM buildings was identified by the NZHPT report as the primary reason for the failure of Christchurch’s historic buildings during the Canterbury Earthquakes, the failure of emergency response and post disaster recovery processes, as highlighted in the 2016 study, were also found to be major contributors to the city’s loss of architectural heritage. The study identified a broad range of issues that must be addressed in pre-disaster risk management planning if architectural heritage is to survive such large-scale urban disasters in future.

The experiences of Christchurch have highlighted not only the lack of capacity among heritage officers and heritage professionals to respond to large scale disaster, it has also demonstrated the disconnect that exists between emergency responders, heritage practitioners, government and the local community. Establishing cooperation and collaboration between these parties is essential to developing good practice in disaster risk reduction, response and recovery and to increase the resilience of heritage places, minimise losses and enable recovery (UNISDR, paragraph 24(g), p10).
Response to the Lessons from Christchurch

As New Zealand and Australia have similar approaches to disaster preparedness, response and recovery, and often support each other in such events, the lessons learned from the 2016 study are considered relevant to the future protection, resilience, and recovery of heritage in both countries.

In response to the study a joint Australia ICOMOS and ICOMOS New Zealand Working Group on Cultural Heritage Risk Preparedness was established to examine the impacts of disaster on cultural heritage in the two countries, to improve the capacity of heritage professionals in preparing for and responding to such events, and to develop effective strategies to improve the outcomes for heritage in times of disaster. The group comprises architects, engineers, archaeologists, conservators, museum specialists, heritage officers from national and local heritage authorities and emergency management specialists.

The purpose of the group as set out in its terms of reference (Australia ICOMOS and ICMOS New Zealand 2017) is:

- To promote the protection of cultural heritage in times of disaster (both natural or human made, fast and slow onset, including climate change);
- To promote cooperation between the heritage sector, government, emergency services and civil defence and the inclusion of cultural heritage in emergency plans at local, regional, state and national levels; and
- To build the capacity of heritage professionals in disaster risk management planning and emergency response for cultural heritage and to establish a network of professionals that can respond responsibly to emergencies as they arise.

Using the Christchurch case study as a starting point, the group has identified gaps in the ways in which heritage is managed in relation to disaster and is developing priorities for action that aim to bring about a better outcome for heritage in future disasters.

Acknowledgements

The 2016 Christchurch post disaster case study was made possible by contributions from the following people:

- Dave Margetts and Robyn Burgess, Heritage Officers with Heritage New Zealand Pouhere Taonga, southern regional office in Christchurch;
- Brendan Smyth, Fiona Wykes and Amanda Ohs, Heritage Officers with Christchurch City Council;
- Carole-Lynne Kerrigan, member of ICOMOS NZ and heritage consultant for the salvage and stabilization of the Catholic Basilica in Christchurch;
- Bryan Lintott, former curator of the Christchurch Arts Centre and member of ICOMOS-ICORP;
- Mary O’Keeffe, president of ICOMOS NZ at the time of the earthquakes and member of ICOMOS-ICORP; and
- Lianne Dalziel, Mayor of Christchurch.
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