

EARTHQUAKES – RECOVERY AND RECONSTRUCTION, NEW ZEALAND

by Dominic Atkinson

IN THE SPACE of the last three years the world has experienced several violent and damaging earthquakes. Each event was unique in terms of reasons, impacts and level of response. In Haiti, in 2010, we witnessed a great tragedy unfold. Some 13 months later, Christchurch in New Zealand experienced a massive earthquake, prompting large-scale responses. This unit explores the recovery and reconstruction following the Christchurch event. The recovery has people at its heart, enabling a new start for the city.

Causes of earthquakes

Earthquakes are one of the most damaging of natural phenomena. They are created by two tectonic plates on the Earth's surface moving past each other, creating friction. When this friction is released, powerful seismic waves are created causing vibrations in the ground. The amount of time the ground shakes, the location and depth of the earthquake and the power of the shaking (the magnitude of the earthquake) significantly affect the level of damage at the surface.

On 22 February 2011 the small city of Christchurch, home to approximately 400,000 people in South Island, New Zealand, was struck by its second powerful earthquake in a year, measuring 6.3 on the Richter scale (Figure 1). Because this earthquake was much closer to the city – the epicentre was less than 6 km away, in the suburb of Lyttelton – large areas of the city suffered damage. Impacts included the following:

- The old city centre core was made virtually unusable, with 40% of

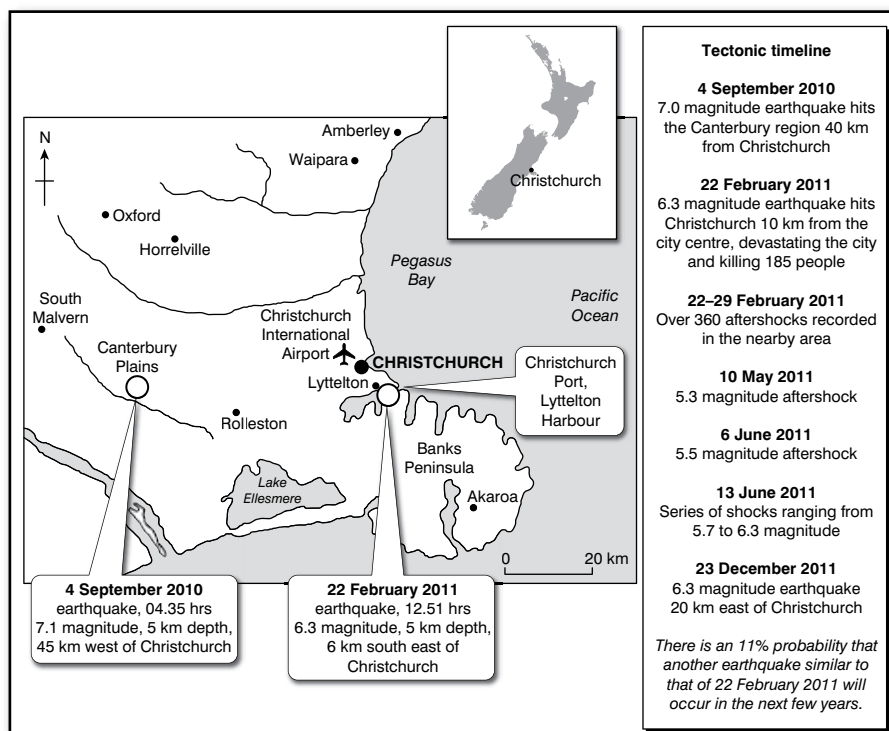


Figure 1: The Christchurch earthquake, February 2011

the buildings damaged beyond repair. Some of them, including the Canterbury TV building, collapsing completely.

- 185 people were killed and 6,000 injured.
- Economic damage was estimated to be over \$20 billion. An amount equal to half of this was set aside to completely redevelop the city.
- Secondary impacts – that is, those that happen as a result of the earthquake – included landslides, particularly around Lyttelton. Further away, a large chunk of the Tasman Glacier calved into the sea.
- The Rugby World Cup was moved to other locations, further affecting the future economic influence of the city.

Christchurch had been the gateway town to the South Island, popular with tourists and a hub for commerce and business. It is now a shadow of its former self:

its Cathedral, once standing tall, is now in a state of dereliction, evidence of New Zealand's darkest day.

Aftermath: recovery and reconstruction

Following any major natural disaster, recovery and reconstruction are essential to the vitality and health of the location for the future. It also involves decision-making through a number of individuals and organisations. Recovery for Christchurch has involved national and local government, individuals, finance companies, insurance and infrastructure providers, community groups, landowners, house builders, and the Iwi (Maori population).

Recovery and reconstruction of any area devastated by a hazard is subdivided into a sequence of different time periods (Figure 2).

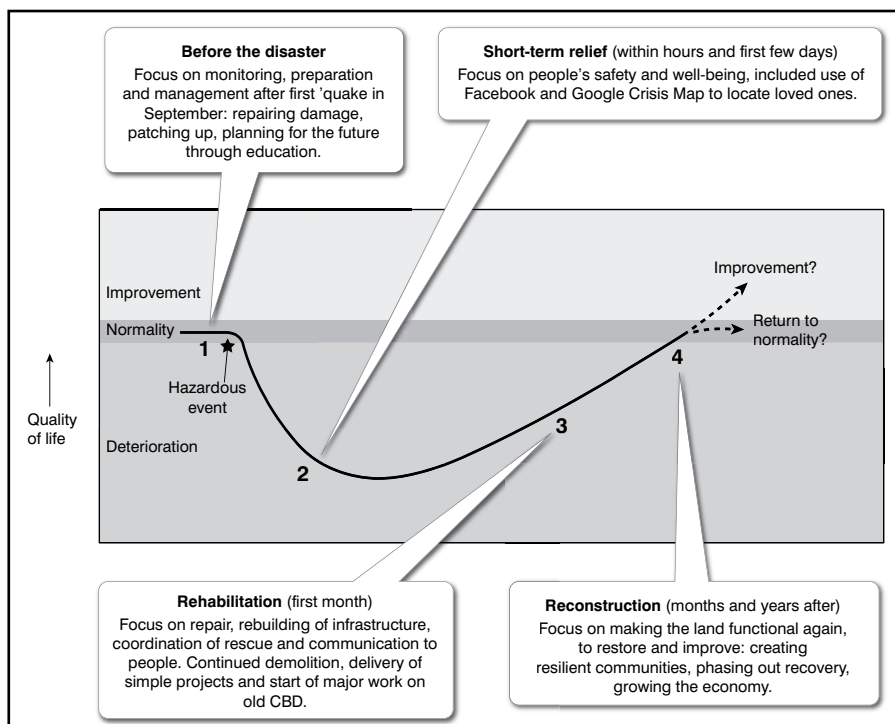


Figure 2: Park's Recovery Model applied to Christchurch, New Zealand

The first response of the authorities once the dust had settled was to meet the immediate needs of the local people and to start demolition of the old city core and other at-risk buildings. Two years later, in 2013, the focus is on investment, innovation, job creation and improving the well-being of the local inhabitants. The national government will provide \$8.8 billion of the funding, with local government providing the water, sewerage, road and transport networks. The private sector, local philanthropists and charities will provide the remainder. The process of recovery and reconstruction is set out in Figure 2.

Strengths, weaknesses, opportunities and threats

Part of the process of recovery and reconstruction is to analyse critically the current situation, to recognise the problems facing the city, and to identify the potential change and positive features created by a devastating event. Christchurch is a key city in New Zealand, so the threats and challenges are a major concern, but at the same time the earthquake provided a unique opportunity for redevelopment and reconstruction.

Strategy 1: Christchurch Recovery Strategy

The Christchurch Recovery Strategy is the main government initiative to improve and redevelop Christchurch. The 'Roadmap to Recovery' is aimed at revitalising Christchurch after the earthquake and helping the city to recover from the damage created, estimated at \$20 billion. The Strategy has six guiding principles which involve working together, having an integrated policy with all groups of people being aware of the strategy, looking to the future, being efficient, innovative and above all simple. Its priorities are the safety and well-being of the local population through repair and rebuild, creating an even better city through restoration and enhancement.

- 1 **Leadership** – ensuring the policy is carefully funded and coordinated, e.g. Christchurch Central Development Unit.
- 2 **Economic growth** – obtaining investment, e.g. Business Environment Programme.
- 3 **Social improvements** – ensuring education and health are key foci, e.g. Residential Red Zone Programme is aiding the redevelopment process by buying back damaged properties that have been insured and offering

support and guidance to local people and businesses. Currently over 7,000 buildings are included in the Red Zone.

- 4 **Cultural awareness** – development of arts, buildings and sport facilities, e.g. Heritage Buildings and Cultural Places programme.
- 5 **Built environment improvement** – careful monitoring of land use, housing and transport, e.g. Land and Land Use Programme.
- 6 **Natural environment management** – management and monitoring of coasts, land and rivers, e.g. Natural Environment Recovery Programme.

Strategy 2: Christchurch Central Development Plan

The Christchurch Central Development Plan is designed to redevelop and reconstruct the central part of the city. It is a subplan of the Recovery Strategy (Figure 3).

The Plan's vision is for a 'thriving heart of the city, drawing on heritage, skills and embracing change'. The aim is to have a new central core to the city with clear anchor points to show off the key strengths of the new city. The plan has been developed to follow a clear strategy – 'look around, listen, commit to a vision, produce a blueprint and bring the ideas to reality' – with the underlying themes of a 'green, prosperous, vibrant and accessible city' at the heart of the vision. Local people offered a total of 106,000 ideas, including requests for entertainment, shopping, cycling, learning, specialised retail, recreation, shopping, riverside development, lighting, green environments, clear and innovative architecture. As a result the plan



Figure 3: Redevelopment at Cathedral Square

Source: Licensed under Creative Commons; photo by Ross Becker

evolved into a new city centre focused on key aspirations to repair and make the city attractive again (Figure 4).

These anchor projects will be the first stage in attracting both people and businesses back to the city. The city centre is being redesigned to include both residential and commercial properties which will allow people to live close to where they work and use the facilities in the city centre. The aim is to underpin the area with local Maori culture, including a new cultural centre and areas of native vegetation. High-quality footpaths and access routes will be provided, and low-level buildings giving greater protection against seismic activity and the elements. The new

city centre is designed to be safe and sustainable, and will include large open areas to encourage social interaction.

Summary

Recovery and reconstruction following a serious earthquake is a difficult task, to ensure there is a fair balance of economic, environmental and social development. Any nation is unique in terms of its specific aid and development needs. New Zealand is wealthy enough to support its own people using advice and guidance from other nations. However, other countries, for example Haiti, may have workable plans for reconstruction, but rely significantly on outside nations,

charities and agencies to make them happen. Apart from its location in a tectonically unstable area, Christchurch is a relatively safe city.

Reconstruction is about learning the lessons from previous events but also ensuring that short-term aims are met and not forgotten about in the face of long-term projects. Improving the well-being of the local people is surely the most vital aspect to any recovery process, and maintaining the growth and development for future generations the essence of sustainable development.

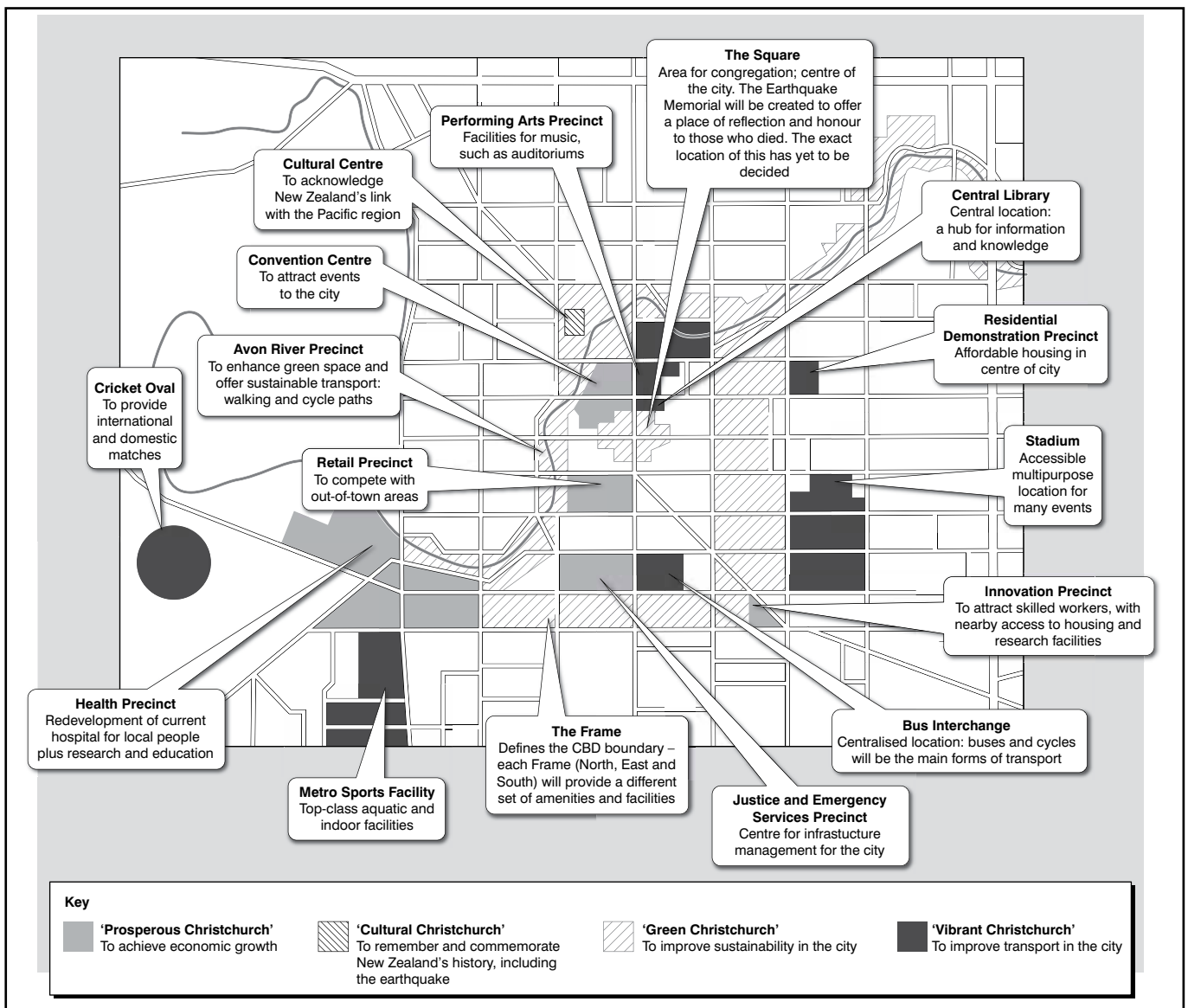


Figure 4: Redevelopment plans for central Christchurch

Source: <http://ccdu.govt.nz/the-plan>

Activities

1 Define the terms *earthquake* and *epicentre*.

2 Describe the location of Christchurch, within the world and in New Zealand.

3 (a) Using the data in Figure 5, create a line graph to show population change in Christchurch since 1981.

Figure 5: Population of Christchurch, 1981 to 2012

Year	Population
1981	281,721
1986	288,948
1991	296,061
1996	316,611
2001	323,956
2006	348,435
2011	392,500 (est.)
2012	376,000 (est.)

Source: Christchurch City Council

(b) From your graph, describe and suggest reasons for the population change.

4 (a) Describe some of the impacts of the February 2011 earthquake.

(b) Suggest why it was more devastating than the September 2010 earthquake.

5 Study Figure 6. Do you think the strengths and opportunities for Christchurch outweigh the threats and challenges?

6 Define the term *hazard response*.

7 What is the difference between earthquake *recovery* and *reconstruction*?

Threats (concerns faced in the task of rebuilding)

- Fear of aftershocks. For example, Christchurch suffered 360 aftershocks which delayed rescue procedures.
- Fear of future 'quakes at the unstable plate boundary between the Pacific and Australian plates.
- New developments cost significant amounts of money which might never be reclaimed.
- Out-migration of people: in 2012, over 10,000 people left the city.

Challenges (difficulties faced in rebuilding the city)

- Demolition of remaining buildings still deemed unsafe in the CBD Red Zone.
- Temporary housing in the districts still being used in 2013.
- Shared facilities for communities, such as schools.
- Attracting investment from new companies.
- Psychological impact on the local population of the earthquakes and aftershocks.

Opportunities (benefits that could come out of the rebuilding)

- A boom in the construction industry.
- Creation of a green city with sustainable architecture and transport.
- Establishing a new identity for the city.
- Creating a compact core in the centre, with new facilities.
- Improvements in accessibility and infrastructure.
- Cultural developments.
- New vision for the city through the Christchurch Recovery Plan.

Strengths (advantages the city has in the task of rebuilding)

- Major city of South Island, producing 12% of the nation's GNP and 70% of the nation's income.
- The port at Lyttelton attracted over \$5 billion a year worth of exports.
- The city had the largest hospital in South Island, two universities, research centres and an international airport.
- 1.8 million tourists a year visited Christchurch.

Figure 6: SWOT analysis for Christchurch two years after the event

8 (a) Make a large copy of Figure 7. The following is a list of decision-makers involved in the reconstruction of Christchurch. Place each of the decision-makers in the diamond according to how important they are in the reconstruction of Christchurch.

- National government
- Local government
- Individuals (philanthropists)
- Finance companies
- Insurance providers
- Infrastructure providers
- Community groups
- Landowners
- Iwi (Maori population)

(b) Write a 200-word explanation justifying your decisions.

9 Draw up a table listing the advantages and disadvantages of the redevelopment plans for Christchurch.

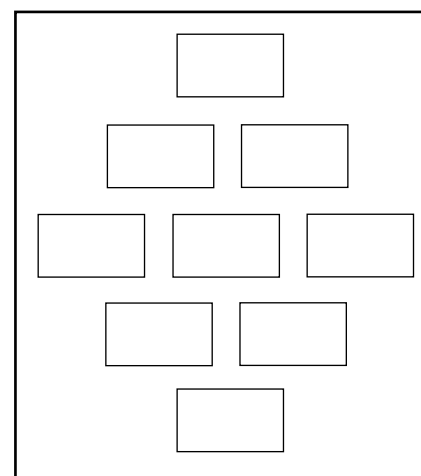


Figure 7: Template for Activity 8