A Commemorative Landscape in the Christchurch Residential Red Zone

Andrea Davis

ID: 1464947

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Abstract:

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The Canterbury Earthquake Sequence (CES) occurred between September 2010 and December 2011, with the Christchurch earthquake of February 22nd, 2011, killing 185 people and destroying much of the Central Business District (CBD). At the time of the first earthquake Christchurch was the second largest city in New Zealand. The Earthquake Commission received over 470,000 insurance claims, due to the reoccurring earthquakes and damage to the built environment. The collective sense of loss was felt heavily by the people of Christchurch, especially those families living in the eastern part of the city. With 15,000 families losing their homes and 7,350 of those families permanently displaced from their land, the earthquakes caused the largest internal displacement in New Zealand history. Through the 1900s the Christchurch suburbs sprawled east along the Avon River/Ōtākaro. This is now known as the Residential Red Zone (RRZ). This project looks at the abandoned landscapes of the RRZ, and how a commemoration of loss might be expressed honestly. This design uses broken elements of the abandoned neighborhoods to tell a story of place and loss. This design incorporates new elements that give back a sense of place, creating tūrangawaewae for all visitors, to the design site.
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This project is dedicated to the people of Christchurch who once called the RRZ their home.
## Contents

Abstract: i

Acknowledgments: ii

Acronymns: v

Māori to English: v

Chapter 1: Project Overview 1

Chapter 2: Background 5

  Historical Layer One: The Swamp Forests of Canterbury 5
  Historical Layer Two: First Human Arrivals 1240-1915 7
  Historical Layer Three: World Wars to Suburbia, 1915-2010 11
  Historical Layer Four: Earthquakes to Vacancy, 2010 onwards 14

Chapter 3: Review of Literature and Case Studies 19

  Review of Literature: 3 Theories 20

    Theory 1: Commemoration after a disaster 20
    Theory 2: The ephemeral nature of abandoned landscapes 21
    Theory 3: Resilience through psychological preparedness 23

  Summary 24

  Case Studies 25

  Summary on the Case Studies 32

Chapter 4: Methodology 33

  Connection 35

  Resilience 35

  Commemoration 35

Chapter 5: The Design 36

  Introduction 36

  Pre-Design: Perceptions and Investigations 37

    Site Analysis 39

    Site Visits informing the Design 41

    Conclusion Pre-Design 43
**Acronymns:**

CCC- Christchurch City Council


CERA- Canterbury Earthquake Recover Authority, established March 29th, 2011 and disestablished April 2016

CES- Canterbury Earthquake Sequence, four of the largest earthquakes Sept 4th, 2010 and Feb 22nd, June 13th and Dec. 23rd

CTV- Canterbury Television, the building that housed the station collapsed and killed 115 people

GCR- Greater Christchurch Recovery Act

LINZ- Land Information New Zealand

RRZ- Residential Red Zone, announced on June 23rd, 2011 by CERA, included 600 hectares, east of the city and areas on the Port Hills subject to rockfall.

**Māori to English:**

Kaitiakitanga- respect of nature

Mahinga kai- food gathering places

Manaatikanga- hospitality, kindness, generosity and support

Ngāti Māmoe- tribe who engaged the Waitaha in battle and absorbed the tribe of Waitaha

Ngāi Tahu- tribe who engaged the Ngāti Māmoe in battle and absorb the tribe

Ōtākaro- place of the game, the area known along the Avon River

Ōtautahi- place of Tautahi, son of Huikai from Port Levy, area known as Christchurch City

Pākehā- European not of Māori decent

Pounemu- greenstone

Puari Pā- Historical site for Waitaha Located in Victoria Square
Māori to English cont.

Pūtaringamotu- the place of the echo, or the severed ear, Riccarton Bush

Te Waipounamu- place of greenstone, the South Island of New Zealand

Tikanga- customs, culture, habit, rule, method

Tūrangawaewae- place where one has the right to stand

Waitaha- tribe that originally inhabited the South Island
Chapter 1: Project Overview

The CES consisted of four destructive earthquakes, occurring between September 2010 and December 2011. The most violent and traumatic was the Christchurch earthquake on February 22nd, 2011, which killed 185 people, and destroying much of the CBD (Murray & Rafferty, 2018).

The story of the Canterbury earthquakes and the Christchurch recovery is complicated in both a geophysical and sociopolitical way. The planning and rebuilding of post-disaster Christchurch has been stressful for everyone involved, from the local residents, to the people in public office (Stewart & O’Callaghan, 2013). Much of the stress relates to the uncertainty of the environment, and the trauma revisited with each violent aftershock. Questions like; “Are we safe?” “Is our home safe?” “Can we get insurance for our house and our belongings?” can erode a person’s sense of well-being. Research into the effects of trauma on people who live through a natural disaster suggests the initial trauma of the event is only the beginning of continued stress due to disrupted lives, loss of work, loss of homes, and displaced communities (Bland, O’Leary, Farinaro, Jossa & Trevisan, 1996). The following diagrams explain the call to action that sought the return to certainty after the first earthquake September 4th, 2010, and the three other major earthquakes that followed.

The New Zealand Government has spent 1.5 billion of taxpayers dollars buying damaged homes and land (NZ Government, 2017) in an attempt to regain certainty for the people of Christchurch. The unavoidable truth is that uncertainty is here to stay, and the landscape will continue to move and flood. However, if we accept uncertainty the outcome of resilience becomes a focus of disaster recovery (Prewitt Diaz & Dayal, 2008). After the earthquakes and the cleanup, there was an unprecedented collective loss of place, as 7,350 families were displaced from their homes. This displacement occurred over 5.0 years, and left 602 vacant hectares known as the RRZ (NZ Government, 2017).
(Project overview continued)

The Crown’s definition of the RRZ is “where the land has been so badly damaged that it’s unlikely it can be built on over the short to medium term” (LINZ, 2018). This landscape sends a clear message of “do not build here” to future town planners and developers. The broken landscape continues to reminds us about the inescapable forces of nature.

![Figure 1.3: Google Earth, n.d. (Labeled: Andrea Davis, 2018)](image)

**Figure 1.3:** Google Earth, n.d. (Labeled: Andrea Davis, 2018)

![Figure 1.4: Lateral Spread along The Avon River (Cosgrove, 2011)](image)

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![Figure 1.5: The remaining gardens illustrate the voids left by clearing the land (Authors own, 2017)](image)

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![Figure 1.6: Weeds encroach on roads and footpaths (Authors own, 2017)](image)

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At the time of publication, the Christchurch rebuild was in its 420th week since the first earthquake. This puts the city at the start of “Reconstruction Phase II” (see Appendix A) based on a time frame of 300-1000 weeks (5.0 to 19 years); a time when “betterment and commemoration” occurs (Kates, Colten, Laska & Leatherman, 2006). It was week 312, when the official opening of the Canterbury Earthquake National Memorial Wall took place, six years after the fatal and devastating earthquake. The memorial, named “Riverside Promenade”, holds the names of the 185 people who lost their lives on February 22nd, 2011. The Canterbury Earthquake National Memorial Wall was a joint project, overseen by Ōtākaro Ltd. (NZ Govt), with partners Christchurch City Council, Te Rūnanga o Ngāi Tahu, and the Ministry of Culture and Heritage. The design competition was won by Slovenian designer Grega Vezjak, with the final say on the design, made by the Minister for Earthquake Recovery, Hon. Gerry Brownlee (Canterbury Earthquake National Memorial, Otakaro Ltd, 2017).

The wall memorializes with permanent engraved marble, while the temporary commemoration ‘185 empty chairs’ is popular with tourists and is seeking a permanent home on the site of the Baptist Church (185 empty chairs, n.d.). The vacancy that remains in parts of the city remind us that there is a bigger story to tell about the earthquakes, a story that reaches east along the Avon River/Ōtākaro. This design project aims to tell the story of the human response to the “collective loss of place”, caused by the earthquakes. Our “sense of place” is the linked to our human instinct for safety. Shelter is second to our most basic psychological needs; food, water and sleep (Maslow, 1943)(see Appendix A). The Māori culture and language use “tūrāngawaewae” to explain this concept of sense of place, literally translated as “a place to stand”.

Figure 1.7: The Canterbury Earthquake Memorial Wall under construction (Authors own, 2017)  Figure 1.8: The Wall Memorial at Night (Authors own, 2017)
The Aim of a Commemorative Landscape

This design project aims to commemorate loss of home, and the sense of belonging, using the canvas of the abandoned neighborhoods in the RRZ. There are many layers of history under the landscape in the RRZ: this design aims to peel back the layers and resurface them as a commemoration. The untold story about displacement, has a space held for it in the RRZ.

The Objective of a Commemorative Landscape

The objective is to use commemoration as a vehicle for the story of the earthquakes, and the following displacement of 10,000 people (CERA, 2016). The objective of this design, is not to come up with a “master plan” that has a pretense of permanence. The “master plan” here accepts the landscape is ephemeral with uncontrollable forces, and the saturation of the land is expected due to sea level rise (see Appendix B.1).

Scope of Project

Although this project aims to commemorate a loss, it does not aim to design a memorial in the sense of a permanent structure. This project does not aim to solve fiscal issues related to the RRZ, although the soft material would be immediately accessible and affordable. Finally, land ownership and land claims are beyond the scope of this project.

Research Question

How can a post-disaster landscape commemorate the collective loss of place felt by communities after the Christchurch earthquakes?
Chapter 2: Background

The Layers of History

In order to better understand the history of the Christchurch RRZ site, it is necessary to research the events of the past, both naturally occurring and man-made. There are four layers related to important time frames in history. These layers are; prehistoric, the arrival of humans, suburban growth and lastly the earthquakes. Each time frame is a unique layer of geophysical or sociopolitical significance, which helps drive the direction of the design.

Historical Layer One: The Swamp Forests of Canterbury

Long before the arrival of humans, the landscape of Canterbury was covered by lowland forests consisting of kahikatea/Dracycarpus dracydioides, ribbonwood/Plagianthus regius, totara/Podocarpus totara and matai/Prumnopitys taxifolia (Symmes, 2018). In addition to forests, there is evidence of several earthquakes and tsunami before 1200 (Mcfagden, 2014) which helped to shift large deposits of gravel and sand to create both swamps and drylands on the Canterbury Plains (Adams, 1980).
There is evidence of kahikatea in the early Miocene sediments of New Zealand soil, which means Kahikatea were living here 20 million years ago (Pole, 2007) indicating they are clearly a survivor over time. The adaptability of the kahikatea over millions of years is important for future climate change. Reaching 60m at maturity, it is New Zealand’s tallest tree, with a life span of well over 500 years (Knight 2018). In Canterbury, stands of kahikatea would established and later become flooded by the Waimakariri River, creating an “ever-changing forested landscape across the plains” (Orwin, RNZ, 2015). The ecological success of the kahikatea over time makes it a highly resilient tree for the rising water table of Christchurch (Van Ballegooy et al., 2013). For successful colonisation the endemic frugivorous birds of the South Island are necessary. Adaptation in the form of reforestation is one way to meet the challenges of sea level rise in New Zealand (Parliamentary Commissioner for the Environment, 2015). The history of the design site reveals the ecological success of a wet plains forest. An example of an original kahikatea forest exists today at Riccarton Bush, 2 km from the Christchurch City Centre. Intervention by the Deans brothers and their conservationist attitudes, is the reason this forest survived the sawmills of Christchurch.

Totara was another species covering the Canterbury landscape in prehistoric times. Totara logs were found in recent excavations of Christchurch sewerage works (Garland, 2015) and this photo (Figure 2.10 below) shows a 1920s drainage board crew removing a log.

Figure 2.8: Hagley Park center, with Deans Bush, left, (Goodle Earth, 2018)  
Figure 2.9: Deans Bush in Riccarton, The Māori name is Pūtaringamotu, literally translates as “the place of the echo” or the “severed ear” (Google Earth, 2018)  
Figure 2.10: Christchurch Drainage Board Photo of Log being removed from Avonside, Retreat Rd. drain, 1920s (Christchurch City Libraries)
Historical Layer Two: First Human Arrivals 1240-1915

“We like to think of indigenous people as living in harmony with nature, but this is rarely the case. Humans everywhere will take what they need to survive. That’s how it works.”
Morten Allentoft, (Morrell, 2014, para 8)

Part 1: Polynesian Arrival to New Zealand, 1240-1848

The earliest known human settlement in New Zealand was at the mouth of the Wairau River in Marlborough, dating approximately 1280 CE (Lewis, 2016). The arrival of Eastern Polynesians coincides with the climate changing eruption of Salamas in Lombok, Indonesia (Stoffel et al., 2015) which perhaps caused food shortages in South East Asia, and according to oceanographic anthropologist, Athol Anderson, these fearless people were in a “process of exile from their homeland”. They spread across the Pacific in large seafaring canoes with double square-rigged spritsails, searching for food and new land. The archaeological sites of the Wairau Bar reveals moa bones at different life stages, including eggs (Morrel, 2014).

Using mitochondrial DNA, the dates of moa extinction is thought to be rapid, taking less than 100 years (Perry, Wheeler, Wood & Wilmshurst, 2014). Rapid extinction and rapid land clearing by burning, transformed the Canterbury landscape from wet plains forest to tree-less swamps of flax, fern and raupo (Lucas & Assoc., 2001).

Māori customs and culture are known as “tikanga.” This includes the practice of respect for the natural
environment, “kaitiakitanga”, and the custom of food gathering, “mahinga kai”. Historically, the land where Christchurch city sits was an excellent food gathering place for the Ngāi Tahu tribe. The Avon River catchment known as Ōtākaro, has great historical importance of mahinga kai. Much of the Avon River/Ōtākaro catchment is now labeled RRZ, making a return to Crown ownership, and a return to cleaner water with less overland water pollution. 

As part of the Canterbury land sale, known as the Kemp Deed of 1848, there was a condition for mahinga kai. Sites of mahinga kai requested by Ngāi Tahu were Puāri Pā (Victoria Square) and Ōtautahi (Madras and Kilmore Streets). Neither were granted (Tau, 2018). In the context of post-disaster Christchurch, “tūrangawaewae” means a place to stand, a place where we feel empowered, a place where we feel a sense of belonging (Māori Dictionary, 2018). Māori tikanga in this layer of history is a platter for the concepts for kaitiakitanga, mahinga kai and tūrangawaewae to rest on.

This concept of a sense of belonging, tūrangawaewae, is a basic human need for both Māori and Pākehā. This historical layer begins with the Polynesian arrival to Aotearoa, by seafaring waka. Both Māori and Pākehā set out from their homelands with the same thoughts of tūrangawaewae, and mahinga kai. The Māori tribes had a great sense of tūrangawaewae and kaitiakitanga/land guardianship.
Historical Layer Two: First Human Arrivals (cont.)

Part 2: British Arrival to New Zealand, 1848-1915

Following the 1848 “land sale” of 20 million acres in the Canterbury region known as the Kemp Deed, the mapping and written history of Christchurch began. Between 1850 and 1853 a total of 3549 British settlers arrived into the Port of Lyttelton (Te Ara Encyclopedia of New Zealand, 2018). Plans for a “model city” went beyond the space available in Lyttelton and Teddington, and took surveyors over the hill to the wet barren plains meeting in an estuary. The landscape was treeless with only two stands of forest visible from the bridal path.

The swamps of Christchurch were rich in mahinga kai, where local Māori made regular trips to the Avon River/Ōtākaro, known as “Place of the Game”, to gather native fauna. However, after 1850, when the boundary lines were drawn by British surveyors, the local Māori families struggled to continue their traditional food gathering practice of mahinga kai. Unfortunately, the waterways were soon polluted with sewage from the new settlement of Christchurch. The Avon River became particularly polluted, and by 1876 Christchurch had the highest incidence of typhoid, diphtheria and dysentery in New Zealand (Batcheler, 2002).
When the plan for Christchurch city was surveyed and drawn by assistant surveyor Edward Jollie in 1850, many small tributaries of the Avon River were included in the survey, along with a green belt surrounding the city centre. This green belt was rejected by chief surveyor Capt. J. Thomas as unnecessary. Jollie’s green spaces were designed to prevent the growth of urban slums, as were found in Europe of the mid-1800s. The site of Christchurch was not only on very wet land, needing extensive drainage, it was a floodplain of the Waimakariri River to the north of the city. The flood of 1868 came into the city centre from the Waimakariri, at a depth of 1 m, during a six day rain event (NIWA, 2018) (NZHistory, 2018).
There are written records about the unsuitability of the land for the new city, beginning as early as 1847 by Mr. Tuckett, The New Zealand Company’s Nelson surveyor, who found the plains near the sea swamped by the overflow of Lake Ellesmere, generally the ground was too wet (NZETC, 2018). The founders of Christchurch were proactive in drainage schemes for the city, however, they would have been unaware of the high liquefaction risk. However, there is a history of earthquakes and tsunami in the region. The seismic forces were making an impact on the built environment as early as 1881. Unlike the other new cities of the colony, wooden building materials were scarce in Canterbury. The stone of the Christchurch Cathedral spire was damaged by earthquakes in 1881, 1888, and 1901, after which the spire was rebuilt in hardwood (“The Christchurch Cathedral”, 2018).

Christchurch city was established in July 1856 by royal charter, making it officially the oldest city in New Zealand.

**Historical Layer Three: World Wars to Suburbia, 1915-2010**

**Part 1: World War I**

As a sovereign British colony the uptake to fight on the side of Great Britain was exceptional with 109,683 men willing to serve (“First World War NZ History, New Zealand history online”, 2018). It is after WWI when we started to see suburban changes to the landscape of Christchurch. Unfortunately, as the soldiers returned from Europe in October 1918, they carried the deadly strain of flu virus with them back home to New Zealand.

The illness took a toll on the population of Christchurch, killing 5%
of the residents (“1918 Influenza Pandemic” Christchurch City Libraries, 2018). The war took another 4,399 local Canterbury men (Canterbury and World War One, Live Lost Lives Changed, 2018). Although New Zealand lost 16,000 thousand young men, in World War I, there were thousands of men returning to settle down, including the 41,000 injured men, making the need for housing immediate (“Settlement Since 1912 – 1966 Encyclopedia of New Zealand – Te Ara”, 2018). Government re-settlement schemes created work and housing. Christchurch expanded well past the 1850 grid designed by Jollie, following the tram lines.

![Figure 2.23: Development of Christchurch along the tram lines, from 1896 -1926, (Wilson, n.d.) Overlay of the Residential Red Zone, by Author](image)

**Part 2: World War II**

Another call to war came 22 years after WWI. The uptake was large with 140,000 New Zealanders leaving Europe in 1940. Lessons from WWI saw government re-settlement schemes in place, for the return of troops in 1945 (“New Zealand and the Second World War/New Zealand history online”, 2018).

In 1941 a large piece of land in Avonside (Figure 2.25) was bought by the Crown from Mr. T. Robson, owner of the wool scour, to resettle returning servicemen from Europe. The houses shown in figure 2.25 were the 1910 villas and the 1920s bungalow style. However, the 1940s state house building boom soon began, and with it a new era of domestic growth.

![Figure 2.25: Avonside and Dallington 1940s Showing Robson’s Block (Christchurch City Libraries, n.d.)](image)

![Figure 2.24: The Tram at Dallington Bridge 1913 (Kete Christchurch added 2013)](image)
Part 3: Suburban Utopia

Housing in Canterbury and Christchurch has evolved with the landscape. The Māori huts had a fence of manuka brush and stakes (Figure 2.26). When the labouring colonists arrived in 1850 to work the land, the V huts (Figure 2.27) were built and used until the timber for a better house could be purchased. ‘

Figure 2.26: A Māori Village (Goodings, 1913)

Figure 2.27: V Huts in Riccarton, (Barker, 1864 )

Figure 2.29: State House circa 1910s (Godber n.d.)

Figure 2.30: First State House, 1940 (O’Brien, 2002)
Historical Layer Four: Earthquakes to Vacancy, 2010 onwards

Part 1: The Earthquakes

The days following the September Darfield Earthquake were grim for those in the eastern suburbs. Power was out for a few days, water and sewerage were out for much longer. Drinking water was delivered by large tankers to the schools where people were queuing up to fill their water containers. The city had a hard lesson to learn in post earthquake services. It was clear from that first seismic event many families lacked the basic knowledge of survival, with very few with the tools to get back to normal life. What would these families do if there was a much bigger disaster?

The February 22nd earthquake came in with an incredible force, violent, and deadly. This earthquake felt like a killer. From personal experience, it was much louder than September 4th and staying upright was almost impossible. The reason this earthquake was so violent and deadly has to do with the peak ground acceleration, combined with the poor construction of buildings and weakening of buildings by the September 4th event (Department of Building and Housing, 2018). In the end 185 people were killed by crushing, and most of these victims (115) died in two buildings, the Pyne Gould Guinness building and the CTV building. There were another 164 severe trauma patients with crushed limbs needing amputation. Christchurch Public Hospital was open and operating, while rocking and rolling continued throughout the day and night (NZ Herald, 2012). There were two large aftershocks on February 22nd, after the initial 12:51 earthquake. They were at 13:04 and 14:50 (“Christchurch Quake Map”, 2018).

The earthquakes of September 4th and February 22nd, caused natural phenomenon called liquefaction, and non-scientifically it is wet gray sludge bubbling up from the earth with some force (Christchurch City Council, 2011) (see Appendix B)
A prerequisite for liquefaction is a saturated layer of silty sand below the water table: the more violently wet land is shaken the more liquefaction is forced up. Christchurch was warned about the risk of liquefaction in a 1996 TV3 documentary. The developers of Pacific Park, in Bexley, sought a planning change in 1992 in order to develop the often saturated land near the Avon estuary. The developers of this land used concrete slabs foundations, which were easily shifted by the forces of liquefaction.

Liquefaction and Flooding

Before 2010, very few Cantabrians, or New Zealanders had heard the words liquefaction or lateral spread. Due to the silty soils east of the city, especially along the banks of the two rivers in Christchurch, the land moved laterally up to 3 m with vertical changes up to 1 m (Quigley et al, 2016). Land movement is certain to happen in an earthquake. Records show the 1931 Napier Earthquake lifted the sea floor 2.7 m and drained the lagoon next to the city. This uplift allowed Napier to expand onto land previously unsuitable for building (Annabell, 2012) (Earthquake 1931, Napier City Council). Much of Christchurch’s eastern suburbs are reclaimed wetlands, as was the area around the lagoon in Napier. However, the drop of land and lateral spreading puts Christchurch and the Red Zone land at risk of more regular flooding. Liquefaction came forth during five earthquakes over two years (Tonkin & Taylor 2013). While the Urban SAR groups searched through wreckage in the CBD, the residents in the eastern suburbs began digging out.
Government response

The cleanup of Christchurch was beyond the realm of the Christchurch City Council and NZ Civil Defense. Days after the Darfield earthquake the Canterbury Earthquake Recovery Act and Authority (CERA) were established. CERA acted as an arm of government between April 2011 and 2016. The Earthquake Minister, Gerry Brownlee, and CERA had a large presence, with far-reaching powers (NZ Law Society, 2010) to expedite the cleanup and recovery of New Zealand’s second largest city at the time (Goodyear, 2018). The rezoning of eight eastern suburbs was announced in June 2011, with thousands of families unable to stay in their homes past July 2013. However, an extension of six months was added (Christchurch City Council, 2014). The work of CERA and government continues to establish certainty amongst uncertainty.

Part 2: The Establishment of the Residential Red Zone

In June 2011, CERA announced the rezoning of the damaged eastern suburbs. The new zone was to be called the Residential Red Zone (RRZ), and by definition from CERA, the land was beyond repair and “uninhabitable in the short term”, meaning perhaps one day it could be built upon. The boundaries (Figure 2.38) followed the silty soils of the Avon River/Ōtakaro. Land movement in the RRZ was laterally up to 3 m (Cubrinovski, 2011) and vertically up to 1 m (Hughes et al, 2015) (see Appendix B). The amount of liquefaction surfacing during the February 22nd earthquake was 322,000 tonnes (Christchurch City Council, 2011). On June 23rd an announcement of zoning change meant 7350 families would need to leave their damaged homes, and start life somewhere else.
As the Technical Category Map of Christchurch shows, in retrospect the new subdivisions of Marshlands, Burwood and Bexley would not be allowed. The liquefaction and broken services did drive most residents to accept the Crown Offer, their 2007/2008 rateable property value. At the end of CERA’s term in April 2016, most of the 7350 homes were owned by the NZ Government. The demolitions took 5.0 years and the vacant land was quickly leveled and seeded with grass. The maintenance of the RRZ, falls to Land Information New Zealand (LINZ) with an annual budget of $960,000 for RRZ mowing (New Zealand Government, 2017).

Part 3: Living in the Residential Red Zone

The label of “Red Zone” had a stressful affect on residents lives. More than half of the respondents experienced stress “most of the time” or “always”. The stress is trauma related and known to continue long after the disaster (MacDonald & Carlton, 2016). The term “Red Zone” began as a zoning label, yet with most zoning came some shame and inequity. The research into post-disaster landscapes confirms that in the case of flooding it is often a case of inequity, because over time the families with more income move to higher ground. Those left living in the Red Zone were referred to as “Red Zoners”, (MacDonald & Carlton, 2016) The physiological affects of abandonment or de-settlement is based on the value we base on certainty and settlement. “Even when temporary, the act of abandonment disturbs deep psychic roots. If the settlement of a place is a sacred act requiring rituals that we still honor in groundbreakings, consecrations, and roof tree-raisings; de-settlement is an unsettling act” Grady Clay, “Ephemeral Places” (1989, p.8). There were 101 residents who turned down the Crown Offer, and have decided to stay in their homes.
Part 5: Canterbury Earthquake Recover Authority and Regenerate Christchurch

In April 2016 CERA was disestablished and Regenerate Christchurch was established to take over decisions about future land use in the Red Zone. The objectives of Regenerate Christchurch are (Regenerate Christchurch, 2018):

1. Enhance the connection between the central city and New Brighton, the estuary and the open coast
2. Improve the health of the Ōtākaro/Avon River
3. Avoid and mitigate natural hazards;
4. Reinforce the importance of New Brighton as a destination
5. Influence the future of eastern Christchurch
6. The use of powers under the GCR (Greater Christchurch Recovery) Act will enable an expedited planning process for the area

In November 2017, Regenerate Christchurch published this image (Figure 2.42) called “10 Land Use Proposals” for the RRZ. The public consultation received 1,800 responses which are publicly accessible on the Regenerate Christchurch website. The most popular was the ecological restoration proposal and least popular was the residential proposal (Regenerate Christchurch, 2018).

On April 10, 2018 Regenerate Christchurch announced that “The Green Spine”, a shortlisted land use option would go ahead. The main aim was to improve the water quality of the river and handle the storm-water from 15,000 properties (Regenerate Christchurch media release April 10, 2018).
Chapter 3: Review of Literature and Case Studies

This literature review focuses on the human psychological reaction to natural disasters and the resilience gained from the lessons following a disaster. The literature reviewed points to acts of commemoration as a cathartic process for any community suffering from collective loss (Brett, Bickford, Ševčenko & Rios, 2007). Therefore, the case studies focus on commemoration, ranging from traditional memorials to more modern “anti-memorials”. The design site has come to exist through a complex series of events, both natural and political, which fits the criteria for the “counter memorial” below. Commemoration is a form of story telling that informs resilience. The broad definition of resilience; the capacity to recover quickly from difficulties (O.E.D, n.d.) tells us we have the goal of quick recovery. Resilience research tells us; more adaptation to the natural environment creates more resilience in our times of disaster (Le Blanc, 2012) (Bonanno, Galea, Buccarelli & Vlahov, 2007). In the case of the RRZ, accepting the land is moving and flooding, forces adaptation on the physical landscape, and the human part in this is to remember the earthquake’s many lessons.

Definitions

To commemorate is to recall and show respect for someone or something (Oxford American College Dictionary, n.d.).

To memorialize is to preserve the memory of, by way of a memorial which is a statue or a structure established to remind people of a person or an event. (OACD, n.d.)

Anti-Memorials * aim not to console but to provoke, not to remain fixed but to change, not to be everlasting but to disappear, not to be ignored by passers-by but to demand interaction, not to remain pristine but to invite their own violation and not to accept graciously the burden of memory but to drop it at the public’s feet.’ (Young, 1997)

* For the purpose of this project the terms, Anti-Memorial, Counter-Monument, and Counter Memorial are synonymous.
Review of Literature: 3 Theories

Theory 1: Commemoration after a disaster

In the context of post earthquake Christchurch, the psychological effects of trauma related to the earthquakes have been well documented. The displacement of 7,350 RRZ families occurred in one political move, yet the individual experiences are what make up the collective loss. The Human Rights Commission reported 84% of the respondents disagree that they had been treated fairly in relation to the decision-making processes about leaving their homes (MacDonald & Carlton, 2016).

Memorials versus commemorative landscapes

There are many papers written about commemoration as a practice for recovery after disasters. A strong case of research findings agree the benefits are multi-faceted when a community is encouraged to tell their stories about a collective loss. A memorial for the loss of life is appropriate and often prescriptive for the visitors. However, it is the complex series of events following a natural disaster that takes longer to understand and commemorate appropriately. The following studies consider holding space for an act of commemoration:

- Anti-Memorials and the Art of Forgetting: Critical Reflections on a Memorial Design Practice (Ware, 2008)
- National Identity and Commemorative Space: Connections to the Nation through Time and Site (Sumartojo, 2015)
- The Effects of Public Memorials on Social Memory and Urban Identity (Gurler & Dozer, 2013)
- The discourse of counter-monument: semiotics of material commemoration in contemporary urban spaces
- Memorialization and Democracy: State Policy and Civil Action (Brett, Bickford, Ševčenko & Rios, 2007)
Theory 2: The ephemeral nature of abandoned landscapes

“Short-term vacancy speaks of transition, often normal in the course of business events. But long-term vacancy speaks overtly of failure: the inability to revitalize” (Lamme, Jakle & Wilson, 1993)

The topic of abandoned landscapes in urban centres has been examined by architects and landscape architects since the mid-1980s. The above research into collective loss carries into the political-social expectations of vacant land, especially when a disaster clears entire neighborhoods in one event.

There are 2 important studies about the dilemma of abandoned suburbs.

• Vacancy and Landscape, Cultural Context and Design Response (Corbin, 2003)
• Ephemeral Places, Here today and Gone Tomorrow, Design Quarterly 143 (Clay, 1989)

These 2 articles support the design move to not wipe the site clean, but allow visitors to see the remnant suburban elements. The need to clear building entirely and rebuild from scratch is based on our socio-political ideas of successful land use (Corbin, 2003).

“We finally cleaned up public housing in New Orleans. We couldn’t do it, but God did,” Rep. Richard H. Baker, a Republican from Baton Rouge, (Sasser, 2006)
Ephemerality (Cont.)

In the RRZ the landscape has been wiped clean because of the earthquake. If we accept the natural forces at play in New Zealand, we can prove this landscape is ephemeral; that there is nothing permanent about it. In just over 100 years, the land had changed from wetlands, to agriculture, to a thriving suburb. Economics and the swampy nature of the eastern suburbs saw the boundary of the RRZ including some of the most run down suburbs in the city. This land is now an abandoned suburban landscape with aspects of parkland and wetland. Examples of this change has been shown to us by the CES.

*Figure 3.1: River Rd., Avonside after Feb. 22, 2011, showing lateral movement along the river. (Cosgrove, 2011)*

*Figure 3.2: Liquefaction in Avonside Feb. 22, 2011, (Cosgrove, 2011)*

*Figure 3.3: Sink Holes in Avonside (Cosgrove, 2011)*
Theory 3: Resilience through psychological preparedness

The canvas of the RRZ is a visual reminder about disasters. The earthquakes in Christchurch have highlighted the need for adaptation. The RRZ landscape tells a story about risk and uncertainty and prepares future residents for adversity. The following six case study sites commemorate using either the post-disaster landscape or a built memorial on the landscape. By using the scars of the disaster, we are increasing the psychological preparedness of communities.

“Being better able to anticipate what they may encounter enhances people’s ability to predict, respond to and exercise control over challenging circumstances and to manage and recover from the associated stress” (GNS Science Report, 2013 (p.5-8) Community Resilience in Christchurch)

A stop bank works as a temporary measure until one event overspills the barrier. New Orleans suffered tremendous losses in human life, and property damage, when the city’s system for keeping water out, pumping stations and sea walls failed (Shelifstein, 2013). The effectiveness of 5.0 m seawalls and coastal forests have also been found to reduce damage from tsunamis in Japan, however, seawalls under 5.0 m have encouraged development in vulnerable areas (Nateghi, Bricker, Guikema & Bessho, 2016)

Figure 3.4: Flooding after the Feb 22nd Earthquake (RNZAF, 2011) Inset: Cleared of houses (Google Earth, n.d.)
Collective loss and psychological preparedness

The psychological effects of the Residential Red Zone displacement have been studied by the Human Rights Commission of New Zealand, and other researchers. The technique of interviewing residents before and after they left their homes gives a perspective on the importance of memories and remembrance even if the event is best left in the past. The following New Zealand research papers cite international studies about collective loss and the benefits of remembering the past to improve the future of others. The most valuable part of these New Zealand studies are the number of quotes, by Red Zone residents about their memories of the old neighborhoods and their feelings about displacement.

• Staying in the Red Zones, Monitoring human rights in the Canterbury earthquake recovery. (MacDonald & Carlton, 2016)

• Disaster impact and recovery: what children and young people can tell us. (Freeman, Nairn & Gollop, 2015)

• Mapping Memories in the Residential Red Zone (Quaid, Nguyen, Ellison & Ncube, 2018)

• Residential Red Zone Survey - of those who accepted the crown offer (Nielsen, 2016)

• Community Resilience in Christchurch - Adaptive responses and capacities during earthquake recovery (Paton, Selway & Mamula-Seadon, 2013)

“The psychological impact of the June earthquake was significant. It damaged morale and was the tipping point for some residents’ decision to move out of Christchurch. It was identified as confirm in that the earthquake was an ongoing event.” (Community Resilience in Christchurch - Adaptive responses and capacities during earthquake recovery, GNS, 2013, p.8)

Summary

By definition, resilience is the capacity to recover quickly from difficulties, to bounce back (O.E.D., n.d.). Does resilience weaken when a society has no memory of disasters? Commemoration, telling the story, is an important part of resilience. These stories help to psychologically prepare others for future disasters (GNS, 2013).
Case Studies

The case studies are about commemoration, expressed on post-disaster sites. The first three case studies are commemorations using the space created or emptied by a disaster. The next three case studies are anti-memorials, contributing to commemoration by pulling questions or opening discussion from the observers. Controversial elements that encourage public discussion, as seen in Case Study 5, (the inverted fountain in Kaasel, Germany) is untraditional method of the storytelling. These commemoration stories of the past inform us of the future and help build public physiological preparedness for ongoing disasters. The commemorations covered are a tangible way to build psychological preparedness and resilience. Modern sites of commemoration take on the role of a more multi-use public space. As mentioned earlier the anti-memorials of today involve movement and adaptive change in the design elements.

Figure 3.5: The Empty Streets of Avonside; an Ephemeral Landscape (Author, 2017)
Case Study 1: 9/11 Memorial Ground Zero, N.Y.C., U.S.A.

The 9/11 Memorial at Ground Zero, Lower Manhattan, was designed by Michael Arad aged 34 years. The design was accepted in 2004, with a budget of $700 million (9/11 Memorial, 2018). The two voids are finished with granite and the name are engraved in steel. Names are place by relationships rather than alphabetically.

“Very rarely is an architect entrusted with the responsibility to communicate emotions, the truth, the story of what happened.”

Michael Arad (Ōtākaro Ltd., 2017)

Completed in 2011, ten years after the attack on the twin towers, the memorial sit on Ground Zero. The two voids, are bottomless, not fillable. The voids commemorate the disaster and symbolise the loss of life, on a large scale. The 9/11 Memorial Organization budgets $2500 each year for the purchase of white roses to stick in the names on victim’s birthdays (NBC News, 2018).

The 400 strong white oak urban forest, surrounds the voids. The memorial park is open from 7:30am - 9pm, seven days a week. Admission is free to enter the park, admission is charged for the museum under the voids (9/11 Memorial, 2018)
Case Study 2: Yalova Earthquake Memorial, Turkey

The Yalova Earthquake Memorial designed by sculptor Umit Ozturk sits on top of an hill of reclaimed land known as “The 17th August Memorial Park”. The refrigerator-sized blocks of marble commemorate the loss of 18,000 people killed by the Izimit earthquake of 1999. The memorial is built on reclaimed land made usable after the demolition of 14,000 homes. This case study expresses loss and uses the disaster material to build a park. The park covers an area of 65,000m² on edge of the Sea of Marmara.

There are 3,000 names along the ‘hallway’. Beside each name is a hole for a flower.

There is a story of a boy who was trapped under a collapsed building, who waited for days while rescuers shouted out “Kimse Yok Mu?” (Is anyone there?). This phase became a cry for help for those in need after this devastation left 500,000 people homeless. (Izimit Earthquake of 1999, Turkey, Britanica.com, n.d.)
Case Study 3: Lochnagar Crater/Beaumont-Hamel, Somme, France

The landscape of war is tangible in a French village called Beaumont-Hamel. It is in the north of France in the “Hauts de France” region, famous for the battle of the Somme. The first trenches were dug in September 1914, totaling thousands of kilometres. The trench warfare of the Somme advancement took the lives of over 420,000 British and 200,000 French. On the first day of battle, July 1st 1916, the British and their allies lost over 60,000 men.

The Lochnagar crater exploded at 7:28am on July 1st 1916. This explosion opened the Battle of the Somme. British buried and detonated explosives killing German soldiers and leaving a 100 m wide crater. (“Lochnagar Crater, La Boisselle, Somme Battlefields”, 2018).

The Newfoundland Memorial at Beaumont-Hamel commemorates the 700 out of 800 Newfoundland troops who died in that first day of battle. Shortly after WWI the land was purchased by Newfoundland from over 250 French individual land owners (Veterans Affairs Canada, 2018).

This landscape is a meaningful commemoration of WWI, using scars of trench warfare and explosives.
Case Study 4: Final Act by Ian Strange, RRZ, Christchurch, N.Z.

Australian born visual artist Ian Strange manipulates abandoned homes for his work. His past exhibitions include ‘Home’, 2011, Sydney, followed by ‘Suburban’, 2013 at the NGV, Melbourne.

Later, in 2013, Ian Strange arrived in Christchurch and the RRZ to film ‘Final Act’. Strange’s method was to cut and reveal the skeleton of three homes. These were Government owned houses waiting for demolition in Avonside. The crew spent three nights lighting and filming ‘Final Act’ (IanStrange.com, 2018) Ian Strange comments on the making of ‘Final Act’, “Houses are meant to be permanent structures, but they are also permanent emotional structures that we take with us through our lives”.

These artistic investigations into the concepts of home and suburbia point to “the iconic role of the family home” (Hurlston & Smith, 2013). The film ‘Final Act’ exhibited at the Canterbury Museum from December 2013 until March 2014 (Photos: by permission I. Strange)
Case Study 5  Aschrott Fountain, Kassel, Germany

The Aschrott Fountain in Kassel, Germany, was designed by Horst Hoheisel in 1985 as a negative of the original fountain removed by Nazis. In 1939 the Third Reich demolished the fountain because the entrepreneur who gave it to the town, Sigmond Aschrott, was Jewish.

The inverted Aschrott Fountain serves society as anti-monuments which challenges historical memory and permanence of the historical event. Hoheisel’s quote about the public interaction with this anti-memorial is:

“The sunken fountain is not the memorial at all. It is only history turned into a pedestal, an invitation to passersby who stand upon it to search for the memorial in their own heads.
For only therein is the memorial to be found.”

Horst Hoheisel

In 1994 Horst Hoheisel submitted his idea for the Memorial for the Murdered Jews of Europe in Berlin. He proposed the destruction of the Brandenburg Gate, represented by dust and void served as the memorial of mass murder.

(Sketch and Photo: by permission H. Hoheisel)
Case Study 6: Memorial to the Murdered Jews of Europe, Berlin

Peter Eisenman designed the Berlin Memorial to the Murdered Jews of Europe in 1999. The opening was in May 2005, 60 years after the liberation of the Auschwitz concentration camp. When asked about the design, Eisenmen commented on the Holocaust, “We cannot comprehend what happened. It makes us helpless. And the monument lets one experience something of that helplessness” (Fulker, 2017). There are no names, or words anywhere on the site, only concrete blocks, called stele. The use of the stele is an ancient architectural tool to honor the dead, and this site holds 2,711 stele of different shapes and heights. The sizes range from 15 cm to 470 cm. There is no doubt that this is a memorial, yet it holds somewhat of an anti-memorial space. What make it an anti-memorial is its non-descriptive narrative. Visitors move through the site with no pattern. The stele are used for multiple activities or just sitting. The multi-use nature of the site is an expression of an anti-memorial, however, one vocal blogger has condemned those visitors who take selfies while doing yoga, parkour, or juggling. The site is completely non-directive, allowing a visitors to interpret the site in a personal way. The memorial is not without critics; German writer, Marin Walser, comments on the memorial as “The monumentalisation of our disgrace,” in a speech, October 1998 (Barton, 2011).
Summary on the Case Studies

These six case studies help clarify memorialization versus commemoration and leave an open door for the use of anti-memorials in our acts of commemoration. Since the 1980s we have seen a change in sites of commemoration. It was in 1982 when the wall memorial movement launched with Maya Lin’s Vietnam Veterans Memorial.

The ornate stone and bronze statues seem to have been left in the last century. Today we see more minimalistic walls, voids, and landscapes around the world, including in Christchurch with the Canterbury Earthquake Memorial Wall holding the 185 names remembered. There is a growing discourse as counter-monuments and commemoration in our urban spaces increase. Anti-memorials are successful at commemorating complex events, with diverse stakeholders and objective for commemoration. They can carry many different interpretations and well as forms (Krzyzanowska, 2015).
Chapter 4: Methodology

The methodology used for this project, is “Research by Design” because the context of the RRZ design site has uncertain geophysical and socio-political forces. Research by Design works well in this case because firstly “planning the future can no longer be based on the certainty of programs and conditions” and secondly “climate change, migration, even economics and social processes, can be characterized as problems with no final solution” (Roggema and Roggema, 2016).

The 3 Phases - Pre-Design, Design, and Post-Design

Figure 4.1: Combined Approach Diagram for Research by Design (Roggema & Roggema, 2016)
The first phase of the methodology is when the site visits inform the research, and the research informs the investigations on the site. After two general site visits of the entire RRZ, and six months spent investigating the site, I was able to choose a design site, and develop the “The Research Question”.

How can a post-disaster landscape commemorate the collective loss of place felt by communities after the Christchurch earthquakes?

The master plan for a Commemorative Landscape in the RRZ used the methodology of overlapping research and design to produce a design programme with an incremental process to reach the design proposals. The design proposals develop as the case studies and research have their input and are rationalised on the design site.
Post -Design

The move from the Design phase into the Post-Design phase uses communication as the arm that transfers the knowledge drawn out of the Design solutions. In many ways the Post-Design part of the method is the visual and written communication that is the Design Programme realized on a master plan. A sign of success for this design will be how well the information about resilience, connection and commemoration are expressed on the landscape in Avonside.

Resilience

Prepare for the uncertainty of our future

Connection

Physical and Emotional ways to connect people

Commemoration

Loss of Place on the Land, Tūrangawaewae
Chapter 5: The Design

Introduction

The aim of the design is to tell a story about the collective sense of loss from the Canterbury earthquakes. The earthquakes were devastating, especially for those who lost loved ones or their family home. Change is considered one of the largest triggers for stress and depression in humans, (Kubler-Ross, 1969) and the case of earthquakes, there is no warning and the shock of change is extreme. The psychological preparedness of people is part of adaptive resilience, helping communities to bounce back more quickly after disaster hits (Paton, Selway & Mamula-Seadon, 2013). We can prepare our future communities by using the abandoned neighborhood of the Avonside RRZ as a canvas for the commemoration. This design does not expect to be permanent and it can be created or removed with minimal capital. The methodology used is Research by Design which is ideal for complex sites, surrounded by uncertainty. After a year of pre-design work, the design programme was decided.

There are three themes to the four layers. The design proposals fall into these three design outcomes; resilience, connection and commemoration. The direction of the design is circular, starting and finishing with resilience. The resilience layers use forms of connection to enrich the commemoration on site.
Pre-Design: Perceptions and Investigations

The Pre-Design phase of this project took a year. It was a time when perhaps the widest scope of information is collected. The “Basic Perceptions” about the project informed the “Research Question” and directed the research literature. The visual investigations on site are a tangible part of the pre-design.

June 2016: The dilapidated roads have large muddy puddles. “No Entry” signs were posted in an attempt to keep people out. The RRZ has a wicked problem. Roggema calls a wicked problem any design problem with difficult or shifting parameters (Roggema, 2012). It is a huge amount of land. The river divides the areas in to smaller areas. I was aware that for this design project, a small part of the RRZ would be more meaningful.

December 2016: The weather was sunny and warm. The gardens of the RRZ were thriving despite having no gardeners to look after them. The contractors had been mowing the grass, and it smelled like suburbia. I ended up riding into the Avonside Loop by bike. It was very peaceful. The high terrace of Avonside pulled me into the centre of the site over the broken roads. There is an impressive collection of some of the old specimen trees. The other dominating landscape feature on this site is the stop bank between Avonside Drive and the river. It is very ugly and utilitarian, a quick fix of gravel dumped and shaped into a 1 m high by 1 m wide bund. The stop bank reminded me how insignificant the human act of trying to keep water out can be, when the future looks certainly wet.
Site Choice Avonside

The entire RRZ is over 600 hectares, and the design site in Avonside is 100 hectares, making it slightly smaller than Hyde Park in London. The location and river setting of Avonside is one of the strengths of the site. The centre of the city is 2.5 km from the design site. The site is bound by the river on three sides, it is almost an island with no bridges except for two vehicle bridges connecting Retreat Road with Dallington to the east and Richmond to the west. If not for the skeletons of roads and leaning power poles this site looks like an arboretum, with some old established trees, both native and exotic. Despite this the layout of the trees in garden-size units is unique, yet completely out of context for a park.

The site has importance for Māori as a site of mahinga kai. It also have importance for Pākehā as one of New Zealand’s earliest settlements. Avonside as a settlement began in 1857, following the consecration of the Holy Trinity Church. The land in Avonside was agricultural and pastoral, classified as Rural Section 87 under the city map of 1850 by Edward Jollie.

Later a wool scour was built and Avonside Bulk Stores operated on the site known as Robson Block. The Pioneer fruit preserving factory was on the high terrace in the centre of the main loop of the river. After the 1941 Crown purchase of Robson’s Block, the neighbourhood grew. New roads were named after the local founding families, and the “cul-de-sac” was introduced as a symbol of modern suburban life (Marshall, 2015). The earthquakes destroyed this idyllic suburban setting along the river. In Avonside many of the older residents had been living in the same house since the 1940s (Cosgrove, 2018). We hear about the displacement of families all over the world, however, this was happening in New Zealand, and on a grand scale. Ten thousand people were displaced between 2011 and 2016. Half of the homes in Avonside (334) homes were removed from the landscape.
Site analysis

Aerial imagery from Google Earth is an invaluable tool. Google Earth imagery along with the map generated by GIS (Figure 5.6) have been the two most useful tool in the design process. The elevations of the GIS map are consistent with the drying-off of the ground in summer, as seen in the aerial photo of the site (Figure 5.5). The 1.5 m stopbanks are visible in the GIS image (Figure 5.6) creating a swimming pool effect should floods overflow the stopbanks. A combination of elevation and the history of vegetation (Figure 5.7) is important for the adaptability of the site and the overall resilience of the design.

Figure 5.7: Photo of Avonside design site (LINZ, 2016)

Figure 5.8: GIS image of Avonside design site (GIS, n.d.)

Figure 5.9: Contours at 1m and information from the 1856 Black Map by Cass and Thompson (author’s own)
The Black Map for the greater Christchurch (Figure 2.18) confirms the design site of Avonside are natural wetlands, made habitable by the on going work of drainage schemes and stopbanks. Di Lucas Associates, rendered the original black map by surveyors Cass and Thomas, naming it The Ecosystem Map. It was this map that confirmed the plant choices for the design of the commemorative landscape.

The soils of Avonside are a mix of alluvial sand with silt overbank deposits. The silt deposits are what moved sideways in an earthquake (Canterbury Earthquake Royal Commission, 2011). There is a band of marine sand on the northern edge of the design site, as confirmed by the black map of 1856 (Figure 2.18).

**Summary of site analysis**

The map analysis and sea level rise projections for the Avonside design site were the most important factors behind the big design move of commemoration using only plant material and stories. The 2015 report by the Parliamentary Commissioner for the Environment “Preparing NZ for Rising Seas - Certainty and Uncertainty” confirmed the likelihood of a sea level rise of over 1 m in the next 50 years. After the Feb 2011 earthquake parts of the Avon River banks sank as much at 0.8 m (CCC report 2017). The current gravel stopbanks will buy some time for flooding, however the water table continues to rise (GNS, 2013)
Site Visits informing the Design

As described previously, the area along the river shifted sideways up to 3 m, perhaps this is why the majority of elms along the river have died. The need for an adaptive landscape on this site is important. Trees and grass grow well on the site, due to the access to the water table, estimated at 0.5 m in winter (Van Ballegooy et al., 2013).

Four site visits:

February 2017: The site is not very accessible. Connecting the site to the rest of the city would guarantee a successful public space. The stop banks are a poor solution to a big problem, why not let the water into the site? I also noticed on this visit how many people were meandering through the site, regardless of the fences and notices saying “no public access” I met an Armourguard security woman, who told me about an elderly resident who walks into the abandoned landscape every day to look at her old garden. The site is peaceful and we form a conscious bond with the landscape. The bond with the land is one reason why humans create gardens for the sake of viewing. The abandoned part of Avonside has become a place of peace for the local dog-walkers, drone-flyers and fruit-foragers.

August 2017: The access into the site from the City/ Richmond (west) side is by a very old Swann Rd. Bridge. Heavy vehicles would not be safe on this bridge. There is a rhododendron, maybe 100 years old.
October 2017: Direct investigation into finding appropriate site for three new footbridge piles. There is sufficient high ground through the center of the Avonside site. The elevation changes from 0.5 m to 5 m above sea level. I found four places with enough elevation that would serve as bridge entrances and exits as well as viewing platforms.

Figure 5.19: High ground on Dallington side of east bridge (Authors own, 2017)

Figure 5.20: High ground on Avonside side of the east bridge (Authors own, 2017)

February 2018: This was my last visit to the Avonside site. It revealed to me that the communities of Dallington and Richmond need to be better connected for foot and bike traffic. I found Community garden of Richmond and a public paddling pool and playground. These facilities are very close to the place where the high ground for the western bridge will end up.

Figure 5.21: High ground for Richmond side of the west bridge (Authors own, 2017)

Figure 5.22: Araucaria/Monkey Puzzle on the Richmond side of the river (Authors own, 2017)

Figure 5.23: Richmond Transitional Community Garden (Authors own, 2017)

Figure 5.24: Community paddling pool (Authors own, 2017)

Figure 5.25: Shade tree with tree-house (Authors own, 2017)
Conclusion of Site Visits

The fact there were no bridges directly into the site woke up the sense that an “arrival over the water” was an essential part of reaching this commemorative landscape. The four site visits during the Design phase also contributed important information about how the surrounding neighborhoods use the site. A vision of creating movement to an anchor point in the center of the site also came from walking/biking around the site. Once on the site our we can feel our human instinct of moving to higher ground, pull to the heart centre of the site.

Conclusion Pre-Design

The Pre-Design phase is an important time in the design process. The investigations included site visits to the entire RRZ as well as the design site. The scale of the Red Zone and problems associated with the often saturated land became very clear during site visits. Forming a design programme that includes the RRZ as the part of the design move drove the research of literature into post-disaster recovery. The Pre-Design also directed the Research Question; How can a post-disaster landscape commemorate the collective loss of place felt by communities after the Christchurch earthquakes?

The site investigations in parallel with the research welcomed the vacancy of the landscape and broken elements of the site. In conclusion, the Pre-Design directed me to the Design Program of Resilience, Connection and Commemoration.
The Design Programme

Resilience, Connection, Commemoration, Resilience

The RRZ landscape as it exists today sends a powerful visual and tangible message about the importance of adaptive resilience. As mentioned in the introduction, the aim of this design is to tell the story of the RRZ by using commemoration. The objective of the design is to add four layers on top of the remnants of abandoned gardens and broken streets, rather than wipe clean and start afresh.

The programme uses layers of resilience, connection and commemoration of what was lost from the design site. There are many stories about the RRZ landscape in Avonside; some of these stories are expressed in the design proposals and are empty space held for future stories. The design phase of the has six design proposals. The full expression of the design is all four layers, however, each layer is a design of its own, and can be added or removed at anytime.

![Diagram of Design Programme](image)

**Figure 5.26: Diagram of Design Programme (Authors own, 2018)**

![Full Master of Commemorative Landscape in Christchurch RRZ](image)

**Figure 5.27: Full Master of Commemorative Landscape in Christchurch RRZ (author, 2018)**

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<thead>
<tr>
<th>Resilience - Layer 1</th>
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<tbody>
<tr>
<td>1. Kahikatea Forest</td>
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<th>Connection - Layer 2</th>
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<td>2. Mihi Circle</td>
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<td>3. Bridges and Paths</td>
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<th>Commemoration - Layer 3</th>
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<td>4. House Sites</td>
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<td>5. Kōrero Story Circles</td>
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<th>Resilience - Layer 4</th>
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<td>6. Wall at the 2m Contour</td>
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Layer 1: Resilience

Proposal 1: The “Tiki Forest”

This layer is the beginning, it represents the landscape before humans existed. The ecology of the site during the last 10,000 years has gone from dense lowland ancient forests (Lucas Associates Ecology Map, 2018) to barren saturated land. The deforestation of Canterbury and the world in general is a practice we know is not serving our future as it did in the past. That is why re-forestation is now part of sustainability practices worldwide. Only 4 km from the design site is the last remnant of original lowland forest of kahikatea, totara, matai and ribbonwood. This the last stand because it was protected by the first settlers to Canterbury, the Deans brothers (“The Pioneering Deans Family”, 2018). This bush would have certainly been used to build the city as was Papanui Bush.

“The last tree of the Papanui Bush, a totara, stood for some years after its fellows were gone.” By all accounts the bush was all cut out after about five years.” (Grant, 2008)

The kahikatea forest in the shape of a tiki. On plan it is called the “Tiki Forest” and has several roles in the design. Firstly the forest will keep the land dry for as long as possible, acting as a giant sponge in the future of rising water tables and flooding. It is symbolises a return to the origins of the landscape of lowland kahikatea forest as seen in Dean’s Bush. It creates a large nest of protection for the main connection point in the center of the site, known as the “Mihi Circle”.

Figure 5.28: Resilience layer, Tiki Forest with Mihi Circle (Authors own, 2018)
Why kahikatea trees for the Tiki Forest?

The way to become more resilient as a community is to prepare for uncertainty by strengthening the ecosystems around us. This design uses re-forestation as a starting point for the first layer. There are thousands of trees already on the site, with hundreds of species represented. The reason why kahikatea is the tree of choice for this project has to do with its survival from archaic times and its preferred habit of growth. Below is a quote about the growth habits for kahikatea, by Dr. Catherine Knight. It reflects how the people in the RRZ supported each other with each new earthquake and outpouring of liquefaction, as well as the years of uncertainty living in the RRZ.

“Far from a solitary tree, the kahikatea groups closely with other kahikatea, intertwining its buttressed roots with its neighbours for support in the unstable swampy ground.” C.Knight, 2018).

Scale

The scale of the site has an unexpected response. Rather than feeling expansive and limitless we feel enclosed by a neighbourhood. The width of the site is 1 km the same size as a public park, yet we can never see one large vista it
Layer 2: Connection

There are three parts of the connection layer. As described earlier in the notes from the site visit on February 21st, 2017, the design site is isolated and bound by river on three sides. There is no direct access to the site across the river from the surrounding neighborhoods of Richmond or Dallington. Connecting the site to the rest of the city with three wide multi-use bridges and paths will bring public life back to the landscape. The elements of connection are both physical and emotional, with the physical elements being bridges and paths. Creating an element of emotional connection is important for the context of this site, considering the emotional energy spent while clearing the land. My experience of moving through the design site during the site visits I felt a natural pull to the center of the site. The Mihi Circle is in the centre. The emotional element is how visitors feel when they move through the commemoration of the old house sites and more importantly how they feel once in the Mihi Circle. The sense of belonging is one of our most basic human needs, we know Māori also have a emotional connection to their place on the land called, tūrangawaewae.

Figure 5.30: Connection layer with 1m flood (Author, 2018)
Connection (cont.)

Proposal 2: The “Mihi Circle” heart centre

The center of the site is the “Mihi Circle”, where all the paths connect. This is heart centre of the site, and acts as the emotional connector, as well as a physical connector to the landscape. The emotional connection to the landscape provides much needed stress relief and adds resilience to the city (Lee, Park, Tsunetsugu, Kagawa & Miyazaki, 2009) (FEMA, 2014). The study of 300 new entrant children found 80% showed symptoms of PTSD (Allen & Liberty, 2017). These fear based emotions need a safe place to dissolve and rest. The Mihi Circle is surrounded by kahikatea forest, rather than buildings, it creates a safe place to rest the nervous system. The aim of the circle is to give a sense of belonging back to those who have been displaced or feel unsettled by change.

The physical elements of the Mihi Circle relate to the position in the landscape and the materials which form the circle. The circle is 40 m diameter and approximately 1,250 m2. It sits at the large intersection of Keller Street and Morris Street. The circle uses 32 pouwhenua/land posts, as demarcation, which relates to the realm of Tāne; the god of forests (Manaaki Wilson, 2014). Pouwhenua are one way to express a story either through traditional carving or more modern treatment of written stories carved into the wood. This is an opportunity to invite the most notable carvers in New Zealand to tell their personal stories about internal displacement and loss of tūrangawaewae. The aim of a trip to the Mihi Circle is to leave the visitor with not just a visual memory, but a emotional memory.

Figure 5.31: The entrance from the east into through the Tiki Forest and into the Mihi Circle shown with 5mm flooding (Authors own, 2018)
Proposal 3: The Bridges and Paths

Part 1: Bridges

The bridges are big design features, both as investment and prediction into the future sea level rise. It is appropriate that these bridge assume the shape of boats, to prepare for the rising waters as well as to reflect the historical arrival of humans. The eastern bridge represents the courageous journey and arrival of Māori from Hawaii to Aotearoa. The western bridge represents the English arrival from Lyttelton Harbour. The northern bridge represents the exit of the families, both Māori and Pākehā, who left after being displaced by the earthquakes. The northern bridge has the same placement as the Medway St. footbridge (and aims to re-purpose the “Twisty Bridge”). This bridge is an amazing reminder of the power of the forces of nature.

The bridges exit onto wide multi-use paths that lead to the high ground of the Mihi Circle. The east and west bridge are about arrival of people over water and both are in the shape of vessels. The eastern bridge is in the shape of a single hull war waka and includes moving parts, such as paddles which move through the water. The western bridge is in the shape of a launch used by the English when landing in Lyttelton, also with moving parts such as oars. Both bridges are designed to allow water in and out of the vessel shape. The paddles and oars are symbols of moving forward, creating a pattern in the river of koru/a new beginning.
The northern bridge is a replica of the “Twisty” bridge, also known as the Medway footbridge. The only engineered structures on the design site are the three bridges. The choice of crossing points relates to the highest ground near the river, as well as a place where walkers and bike riders are safe from traffic. This public space is a place for the residents and visitors to travel to and through, day and night. The site will be well lit and patrolled as necessary.

**Part 2: Path Network**

The movement into the Avonside site is over water, and then onto newly formed paths. Rather than use the old broken roads made new again, the idea is to walk through the gardens and observe the streets of the neighborhood as the residents once did from their homes. Although the site has many elements similar to a large park like vast lawns, specimen trees and a natural water feature, it also has the constraints of a suburban neighborhood; 10 m wide roads with curbing and footpaths, power poles, and telephone network boxes in various states of disuse. The positions of paths are designed to take us to the centre as well as around the edges. Eventually, the landscape will flood and some paths will be submerged. This is an intention of the design. The reminder of the ephemeral nature of the landscape is more important than a polished new park-like setting.

*Figure 5.35: Mihi Circle at night (Authors own, 2018)*

*Figure 5.36: The 5m wide path from east bridge to Mihi Circle (Authors own, 2018)*

*Figure 5.37: Elevated path (Authors own, 2018)*
The construction of paths in wet areas has reached an art with many propriety systems on the market to allow flooding. The main boulevards at 5 m wide will require a capital investment, while the more affordable options for paths of 2.5 m wide, can be done as a single mower width. It should be noted that the annual budget for the mowing of the RRZ is paid for by taxes, at a cost of $950,000 annually (LINZ, 2018).

The mowing that occurs on the Avonside site would discontinue with the implementation of this design, apart from a small amount of mowing. This would be a single ride-on mower width. The mown paths measure approximately 2.6 kilometers through the back of the house sites. The idea is to pull the visitors into the world that was once a neighbourhood.
The view of someone’s back garden is normally available for viewing. The path network has us observing from the inside to the outside. The new paths will have new lighting and will also use old street lights on the broken roads. The future of connection is also digital, which is why the design site will have an element of free power and wireless connection stations. Having a large public space near to the city centre with free wi fi would be a strong incentive for people to use the site. It would help those people who cannot afford home connection, and assist travelers and youth who want to save money on data charges.

Layer 3: Commemoration

Commemoration by memorialization is a tangible human response to disaster, but in this case the design prefers to use an anti-memorialization approach. One of the aims of anti-memorials is to create an open and less directed form of rememberance. This proposal plants 334 houses back into their gardens. The design move of replacing the houses is an attempt to help heal some of the trauma associated with the clearing of the RRZ.

![Figure 5.39: Commemoration layer house sites (Authors own, 2018)](image)

Proposal 4: The Houses

For each house site, a shallow trench 0.5 m deep (to water table) represents the shape and size of the foundation. Native bracken is planted in the trenches. The decision to use native bracken, Pteridium
esculatum, came from a phone discussion with Di Lucas, and later an email, about which fern would work well in this situation (Di Lucas, April 11th, 2017). These house-size blocks of native bracken can compete with grass invasion, create homes for many invertebrates, thus attracting native birds, which assist in propagating more forests. The height of a block of Pteridium is 2 m, which could take two years to reach. The effect on the visitor is to feel the neighborhood, around them. There would be an addition of fences of kānuka to contain the fern. The brush fences will be lit at night by low lumen LED lighting for an effect that is uplifting, as found in the Ian Strange’s ‘Final Act’ case study.

Proposal 5: The Kōrero Story Circles

Kōrerorero translates as discussion, talk or chat in Māori. This element of commemoration aims to bring communities of people together by re-connecting with stories. The circular shape of this commemoration is important for the public perception of the space. The aim is to encourage open thinking rather than the directed thinking we achieve with walls with story boards. The circle is a well documented positive safe space for discussion.

“Traditionally, many Native American communities have used the talking circle as a way of bringing people of all ages together for the purposes of teaching, listening, and learning” (Mehl-Madrona & Mainguy, 2014).

There are 6 cul-de-sacs on the design site at different elevations. The highest in elevation are the two eyes of the “Tiki” at the end of Halley Place and Silverdale Place. It is in these two eyes where the space for the story of Māori arrival be held. It would be a sign of respect that the two Kōrero circles on high ground near the centre of the design site. This includes the history about the first tribes of Waitaha, Ngāti Māmoe and later Ngāi Tahu.
The Ngāi Tahu name for the area of Christchurch Ōtautahi, place of Tautahi, son of Huikai of Port Levy (Tau, 2018). The tradition of mahinga kai on the Avon River/Ōtākaro is well documented. The other four cul-de-sacs will also be held for communities to fill with their stories. Cul-de-sacs are circular dead ends, a suburban invention from the early 1900s. They were considered safer for playing children. In this design they serve as the ideal space for kōrero/storytelling.

Invitation for public engagement

These circles are an open invitation to the communities of neighbours who have stories to share with each other and with the public. University of Canterbury geography students carried out a research project called “Mapping Memories in the Residential Red Zone”. The primary objective of the project was to map the experiences and narratives of individuals who were displaced. One interviewees when asked “What would the desired outcome of sharing the memories of the Red Zone be?” She said, “Sharing what the community was like; Bexley was not a suburb, it was a home”. Another family when asked “How they think the memories should be recorded?” said they would like to put a plaque on their old totara tree that says their family name. (Quaid, Nguyen, Ellison & Ncube, 2018).

Figure 5.42: An example of a kōrero circle in a cul de sac (Author own, 2018)
Design Layer 4: Future Resilience

Proposal 6: The 2 m Contour Sitting Wall

The last layer is a return back to the first layer of resilience and the Tiki Forest. This layer of resilience drawn our senses to the future. The concept is a sitting wall following the entire 2 m elevation contour line in the design site. The wall defines the line of retreat. The potential to build that wall out of the design site and into the neighbourhood is possible, but out of the scope of this design. The 2m Contour sitting wall consist of thousands of large broken and rumbled concrete blocks, polished on the sitting areas only, and placed on the landscape as a dashed contour line. The sitting wall made of different lengths of cubed concrete. This permanent man laid element sets the limit on how much water can rise before there is more displacements from the area. The wall will remind us about the time in history when predicting sea level rise was an unknown. Resiliency should have the first word and the final word. Along the Retreat Road boundary the wall blocks prevent vehicles from entering the site. Currently there are fences and permanent road blocks at these road intersections.

Figure 5.43: The 2m Contour sitting wall (Authors own, 2018)
Reflection on the Design

This design is not proposing to be permanent. It is a temporary space that will change with the movement of time. The aim is to hold space for the people of Christchurch to tell their stories about the earthquake. There are fixed features like the three bridges, and the 2 m Contour Wall, while the rest of landscape is prepared for evolution in the form of water. At the start of this document, the diagram (Figure 1.0) of the realms of power, described a recovery process that was a very heavy on the socio-political realm; with very little of the human emotion heard. The Design for a “Commemorative Landscape” considers the three realms of power affecting the future land use of the RRZ. The importance of individual stories and a re-adjustment of the realms of power more towards the human realm allows post-disaster Christchurch to find a necessary balance.

It is the humanness of the design, in the Mihi Circle, the bracken houses and the Kōrero Circles, that enables the viewer to empathise and build human connection with what happened to the city and the site specifically. The connection layer is the more tangible layer. It connects the resilience layer to the commemoration layer. In the words of Grady Clay “Ephemeral Places; Here Today - Gone Tomorrow”, he suggests that the act of abandonment “disturbs deep psychic roots”. He goes on to say, “if the settlement of a place is a sacred act, then de-settlement is an unsettling act” (Clay, 1989).
Chapter 6: Conclusion

This design project uses remembrance as a design element, but it does not seek to compete with, or run parallel to, the Canterbury Earthquake National Memorial Wall or the 185 empty chairs in downtown Christchurch. This design project uses remembrance as a design method, aimed at preventing further trauma to families and communities, by revealing the entire history of the landscape and forming a collaborative agreement that this landscape is unsuitable for permanent structures. The hope is that this design of a commemorative landscape remains as a public green space making Christchurch a more resilient city in the face of climate uncertainty. This design also uses connection as a design element that brings people together in agreement. We can all agree that tūrangawaewae/having an place on the land is of paramount importance to everyone in New Zealand and worldwide. The future of successful master planning and landscape design accepts that we live in an uncertain world, where permanence is not guaranteed. It is important for every New Zealander, and other communities around the world, because it relates to land ownership, natural disasters, and commemoration after a disaster. Having a home is one of the basic necessities of wellbeing (Maslows, 1943). This is why losing a home and the loss of a safe place to stand is traumatic, in any culture.

“Owning a home remains a "long standing pre-occupation" and widely shared aspiration, and is seen as particularly important for New Zealanders’ sense of order and continuity in life.” (Mitchell, 2015)

The act of moving on is not to erase, but to commemorate, and pull an emotion from a visitor that will be remembered. This idea of creating a commemorative landscape in the RRZ is to hold space for the people of Christchurch and visitors from afar. The earthquakes have created a unique geophysical landscape, as well as a sociopolitical landscape. It contains broken roads, 7,000 individual gardens and 30,000 significant garden trees. The individual expressions of a garden relate directly to those people who lived on that quarter acre of land. The story in Christchurch is a story of collective loss of place. We have the opportunity to use the post-disaster landscape in the form of the RRZ to highlight the loss. The design of a commemorative landscape aims to hold the space in the post-disaster abandoned neighbourhoods and allow the people of Christchurch to become part of the story-telling on the site, or to simply visit the site and hold it as sacred and enjoy observing the stories of their neighbours.
The three design drivers surfaced from the research of literature, the site visits and the international case studies. They are resilience in layer one, connection in layer two and commemoration in layer three. The fourth layer of resilience completes the design. The research (Prewitt, 2013) says psychological preparedness is a key part of resilience. Through stories some predictions for the future surface, this is the start of adaptive resilience. Adaptation allows the land to flood rather than building higher stopbanks, and planting more trees is can reduce the risks to infrastructure caused by rising water tables. The most important thing about rebuilding with resilience is the story people have to tell. These stories are reminders of flawed development decisions based on short term gains. Wiping the slate clean and forgetting the disaster is common in human land-use practices. However, replacing with something new is not what compassion looks like. Compassion has the following definition: empathy, understanding, humaneness (O.E.D.,n.d.). Compassion is a sense that we hear your story and we are standing with you on this land. Remembrance can show our compassion with our fellow citizens if we allow their space for their stories of loss.

Figure 5.44: White bait net in the Avonside RRZ (Authors own, 2018)
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List of Figures

Figure 1.0. The Three Realms of Power after the Earthquakes (Authors own, 2018)
Figure 1.1. The Three Realms of Power with more balance in the Human Emotion Realm (Authors own, 2018)
Figure 1.2. The Three Realms of Power equal and balanced (Authors own, 2018)
Figure 1.3. Google Earth Residential Red Zone, labelling by Author (Google Earth, n.d.)
Figure 1.4. Lateral Spread along the Avon River (Cosgrove, 2011)
Figure 1.5. RRZ empty gardens (Authors own, 2018)
Figure 1.6. RRZ streets and footpaths disappearing (Authors own, 2018)
Figure 1.7. Canterbury Earthquake Memorial Wall under construction (Authors own, 2017)
Figure 1.8. Canterbury Earthquake Memorial Wall at night (Authors own, 2018)
Figure 2.0. Diagram of the Circular Movement of the design (Authors own, 2018)
Figure 2.1. The Wet Plains of Canterbury (Lucas Associates, 2001)
Figure 2.2. Illustration of the Kahikatea/Dracyporus dracyidioides (Strieby, 2007)
Figure 2.8. Google Earth Hagley Park and Riccarton Bush (Google Earth, n.d.)
Figure 2.9. Google Earth Riccarton Bush (Google Earth, n.d.)
Figure 2.10. Christchurch Drainage Board Photo of log being removed from Avonside, Retreat Rd. drain, 1920s (Christchurch City Libraries, n.d.) Retrieved from http://christchurch-cdrom.nzld.com/swamp_city1.html
Figure 2.11. Gilsemans, I., 1643 Tongatapu [Photolithograph]. From Abel Janszoon Tasman’s Journal (Alexander Turnbull Library, National Library of New Zealand)
Figure 2.12. Location of Wairau Bar, the first known Polynesian settlement in New Zealand (Lisa Matipoo-Smith, 2018)
Figure 2.15. Earle, A., (1827) Waka taua War Canoe [Painting]. (Alexander Turnbull Library) Retrieved from https://nzhistory.govt.nz/media/photo/nga-puhu-raiding-party-prepares
Figure 2.16. Holmes, W., (1851) Sketch of the View from St Andrews Hill [Lithograph]. (Alexander Turnbull Library) Retrieved from http://mp.natlib.govt.nz/detail/?id=8818&l=en
Figure 2.18. Christchurch Area showing Swamps and Vegetation based on The Original 1856 Black Map by J. Thomas and T. Cass (Christchurch City Libraries, n.d.)
Figure 2.21. Damage to the Christchurch Cathedral 1888, (Photographer unidentified, n.d.) (Alexander Turnbull Library) Retrieved from http://natlib.govt.nz/records/22720273
Figure 2.22. Troops watering horses in the Avon River near Carlton Bridge, Christchurch, 23 Sept. 1914 (Christchurch City Libraries, n.d.)

Figure 2.24. The Tram at the Dallington Bridge in 1913 (Kete Christchurch, added 2013) Retrieved from http://ketechristchurch.peoplesnetworknz.info/site/images/show/12445-tram-at-terminus-of-old-dallington-

Figure 2.25. Aerial view of Dallington 1940s (Kete Christchurch added in 2015) Retrieved from http://ketechristchurch.peoplesnetworknz.info/site/images/show/23407-aerial-view-of-dallington-in-the-1940s#.W7HhgmgzaUm

Figure 2.26. Māori Village (Gooding, 1913) Picturesque New Zealand. Retrieved from http://www.archive.org/details/picturesquenewze00gooduoft

Figure 2.27. V huts of Riccarton (Barker, 1864) (Christchurch City Libraries) Retrieved from http://christchurchcitylibraries.com/heritage/photos/disc4/img0082.asp

Figure 2.29. State House circa 1910 (Godber, n.d.) Retrieved from https://nzhistory.govt.nz/media/photo/first-state-house

Figure 2.30. The First State House 1940 (O’Brien, 2002) Retrieved from https://nzhistory.govt.nz/media/photo/first-state-house

Figure 2.31. Dust clouds above Christchurch (Needham, 2011) (Ministry for Culture and Heritage) Retrieved from https://nzhistory.govt.nz/media/photo/dust-clouds-above-christchurch

Figure 2.32. Pyne Gould Guinness Building Collapse Feb 22nd, 2011 (Credit: Wellington Emergency Management Office (WEMO) Emergency Response Team, February 2011)

Figure 2.33. Liquefaction in the Bexley Suburb on Feb 23, 2011 (Google Earth, 2011)

Figure 2.34. Cleared of houses, Bexley (Google Earth, 2018)

Figure 2.35. The Avon River Overflows on Feb. 22nd, 2011 (Cosgrove, 2011)

Figure 2.36. Damaged Red Zone House, 2011 (Opanowski, 2012)

Figure 2.37. Liquefaction and Flooding (Cowie, 2011) Retrieved from Stuff article “Can We Fix It?” with permission

Figure 2.38. Old drains in Christchurch filled with liquefaction, 2018 (Williams, 2018) Retrieved from http://blog.underoverarch.co.nz/tag/drains/


Figure 2.40. The Last House in Bexley, 2016 (Authors own, 2016)

Figure 2.41. Loved home in the RRZ (Staff/The Press, n.d.)

Figure 2.42. Productive Land Uses, 2018 (Source: https://engage.regeneratechristchurch.nz/productive-land-uses-residential-visitor-attraction-and-ecological-restoration)

Figure 2.43. The Green Spine in the Ōtākaro Corridor, 2018 (Permitted by Regenerate Christchurch)

Figure 3.0. View across Avonside to the City Centre and Beyond to Hagley Park (Google Earth, 2018)

Figure 3.1. River Rd., Avonside lateral movement along the river (Cosgrove, 2011)

Figure 3.2. Liquefaction in Avonside (Cosgrove, 2011)

Figure 3.3. Sink Holes in Avonside (Cosgrove, 2011)

Figure 3.4. Flooding after the Feb 22nd Earthquake (RNZAF, 2011) CC-BY-3.0

Figure 3.5. The Empty Street of Avonside; an Ephemeral Landscape (Author, 2017)

Figure 3.6. “Ground Zero” at the World Trade Center disaster (Peterson, 2001). Source: U.S. Navy photo by Photographer’s Mate 2nd Class Aaron Peterson (Released) CC-BY-3.0

Figure 3.7. Void with name (Davis, 2016)

Figure 3.8. The Oak Forest at night (Davis, 2017)

Figure 3.9. White Rose (Freitas, 2014) CC-BY-3.0
Figure 3.10. Building collapses; Izmit Earthquake, 1999 (Wikimedia Commons n.d.) CC-BY-3.0
Figure 3.11. The entrance “hallway” into the Yalova Earthquake Memorial Museum (Wikimedia Commons, n.d.) CC-BY-3.0
Figure 3.12. Mourning Woman at the 17th Anniversary of the Earthquake (Yeni Safak News, 2008)
Figure 3.13. Newfoundland Memorial of Beaumont-Hamel Battlefield, Somme France (Google Earth n.d.)
Figure 3.14. WWI Men in Trench (Wikimedia Commons, n.d.) CC-BY-3.0
Figure 3.15. Lochnagar Crater Memorial; Somme Battlefields (Wikimedia Commons, n.d.) CC-BY-3.0
Figure 3.16. ‘Number Twelve’ (Strange, 2013)
Figure 3.17. ‘Number Thirty-four’ (Strange, 2013)
Figure 3.18. Aschrott Fountain (EPA European Pressphoto Agency b.v. / Alamy Stock Photo n.d.) Germany
Figure 3.19. Sketch of Aschrott Fountain (Hoheisel, 1985)
Figure 3.20. Ashcrott Fountain Underground (Hoheisel, 1987)
Figure 3.21. The Berlin Memorial to the Murdered Jews of Europe at night (Torinberl, 2005)
Figure 3.22. Image of the site (Google Earth, n.d.)
Figure 3.23. Concrete stele of unique sizes (Metoc, 2006)
Figure 3.24. Vietnam Veteran Memorial Wall (US Geological Survey, 2002)
Figure 4.0 Combined Approach Diagram for Research by Design (Roggema & Roggema, 2016)
Figure 5.0. Master Plan for a Commemorative Landscape in the RRZ (Authors own, 2017)
Figure 5.1. The QEII Stadium vacant site (Authors own, 2016)
Figure 5.2. Dog-walkers on a stopbank (Authors own, 2016)
Figure 5.3. Gardens without a house (Authors own, 2017)
Figure 5.4. Terrace with specimen trees (Authors own, 2017)
Figure 5.5. Stopbank along Avonside Drive (Authors own, 2017)
Figure 5.6. The Holy Trinity Church of Avonside 1857 (Fooks, 1857 (Christchurch City Libraries n.d.) Retrieved from http://christchurchcitylibraries.com/heritage/photos/collection22/02336.asp
Figure 5.7. Photo of Avonside design site (LINZ, 2016)
Figure 5.8 GIS image of Avonside design site (GIS, n.d.)
Figure 5.9. Contours at 1m and Information from the 1856 Black Map by Cass and Thompson (Authors own)
Figure 5.10. Ecosystems Map (Lucas Associates, 2011) Source: Wetlands, Waterways and Vegetation of the Christchurch Region (Cass & Thomas, 1856)
Figure 5.11. Subsurface cross section of Christchurch CBD along Hereford Street (reproduced and modified from Elder and McCahon, 1990)
Figure 5.12. Dead Elms, Avonside Drive (Authors own, 2017)
Figure 5.13. Armourguard talks to Drone Flyer (Authors own, 2017)
Figure 5.14. Peach tree has been pruned (Authors own, 2017)
Figure 5.15. Driveway to a back section (Author own, 2017)
Figure 5.16. Swann Rd Bridge looking west (Authors own, 2017)
Figure 5.17. Damage to Swann Rd. Bridge (Authors own, 2017)
Figure 5.18. Rhododendron (Authors own, 2017)
Figure 5.19. High ground on Dallington side of east bridge (Authors own, 2017)
Figure 5.20. High ground on Avonside side of the east bridge (Authors own, 2017)
Figure 5.21. High ground for Richmond side of the west bridge (Author own, 2018)
Figure 5.22. Araucaria/Monkey Puzzle on the Richmond side of the river (Authors own, 2018)
Figure 5.23. Richmond Transitional Community Garden (Authors, 2018)
Figure 5.24. Community paddling pool (Authors, 2018)
Figure 5.25. Shade tree with house (Authors own, 2018)
Figure 5.26. Diagram of Design Programme (Authors own, 2018)
Figure 5.27. Full Master of Commemorative Landscape in Christchurch RRZ (Authors own, 2018)
Figure 5.28. Resilience layer, Tiki Forest and Mihi Circle (Authors own, 2017)
Figure 5.29. Tiki (Authors own, 2018)
Figure 5.29a Handrawn scale for analysis (Authors own, 2018)
Figure 5.30. Connection layer (Author own, 2018)
Figure 5.31. The entrance from the east into through the Tiki Forest and into the Mihi Circle shown with 5mm flooding (Authors own, 2018)
Figure 5.32. The Twisty (Medway) footbridge twisted in February 2011 (Cosgrove, 2011)
Figure 5.33. The eastern waka bridge (Authors own, 2018)
Figure 5.34. Perspective of the eastern waka bridge (Authors own, 2018)
Figure 5.35. The 5m wide path from the east bridge to Mihi Circle (Authors own, 2018)
Figure 5.36. Elevated path (Authors own, 2018)
Figure 5.37. Connection layer showing mown paths (Authors own, 2018)
Figure 5.38: Grass paths through the kahikateas (Authors own, 2018)
Figure 5.39. Commemoration layer house sites (Authors own, 2018)
Figure 5.40. Perspective of bracken houses without fences (Authors own, 2018)
Figure 5.41. Cross section of bracken planting depths (Authors own, 2018)
Figure 5.42. An example of a kōrero circle in a cul de sac (Authors own, 2018)
Figure 5.43. The 2m Contour sitting wall (Authors own, 2018)
Figure 5.44. White bait net in Avonside RRZ (Authors own, 2018)
Appendices

Appendix A

Appendix A.1 Thee realms of influence explained (Authors own, 2018)

Appendix A.2 Maslow’s hierarchy of needs (Maslow, 1943)

Appendix A.3 Reconstruction phases of New Orleans after Katrina (Kates, Colten, Laska & Leatherman, 2006)

Appendix B

Appendix B.1 Flood inundation in the Avon catchment with 1 m sea level rise (GHD, 2017)

Appendix B.2 Christchurch median water table elevation report (GNS/Tonkin & Taylor, 2010)

Appendix B.3 Liquefaction information sheet by New Zealand Society of Engineers (NZSE, 2011)

Appendix B.4 Land movement on 22 February 2011 (Quigley et al., 2016) Retrieved from https://doi.org/10.1016/j.tecto.2016.01.044

Appendix B.5 Active submarine faults beneath Pegasus Bay (NIWA, n.d.)
**Figure A.1:** The three realms of influence explained (Authors own, 2018)

**Figure A.2:** The three realms of influence explained (Authors own, 2018)

**Figure A.3:** Reconstruction of New Orleans after Hurricane Katrina: A research perspective (Kates, Colten, Laska & Leatherman, 2006)
Appendix B.2: Christchurch median water table elevation report (Tonkin & Taylor, 2012)

Figure B.1: Avon River flood inundation (GHD, 2017)
Liquefaction and its Effects

Before the Earthquake

Areas of flat, low lying land with groundwater only a few metres below the surface, can support buildings and roads, buried pipes, cables and tanks under normal conditions.

During and after the Earthquake

During the earthquake fine sand, silt and water moves up under pressure through cracks and flows out onto the surface. Heavy objects like cars can sink into these cracks. Sand, silt and water cover the surface.

Power poles are pulled over by their wires as they can’t be supported in the liquefied ground. Underground cables are pulled apart. Lateral Spreading. River banks move toward each other. Cracks open along the banks. Cracking can extend back into properties, damaging houses.

Tanks, pipes and manholes float up in the liquefied ground and break through the surface. Pipes break, water and sewage leaks into the ground.

Figure B.3: Liquefaction Fact Sheet (New Zealand Society of Engineers, 2011)

Figure B.4: Land movement 22 February 2011 (Cubrinovski & Robinson, 2016)
Figure B.5: Active submarine faults beneath Pegasus Bay (NIWA, n.d.)
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ORCID number (Optional): …………………………………………………

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