The Most Potent Unifying Force:
Using Architecture to Reflect the Essence of Sport in the Post-Disaster Context

By

Arran Lewis

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01

introduction

What is the role of sport in the post disaster context and, more importantly, how can this be reflected through its associated architecture?

Abstract:

The characteristics of sport, both participating and spectating, have the ability to address the negative impacts of disasters, making it an effective tool for recovery. Sport as a support mechanism allows victims of disasters, who for many, sport will be a regular lifestyle rhythm, to shift their focus from the experience of loss to finding elements of normality in their routines; experiencing familiar bodily functions and re-establishing community identity and personal belonging.

Sport facilities are often the platform for which many community relationships and networks are created and it is not often that sport is disassociated from the venue it occurs in. This is due to the shared memories and experiences that become embedded within the venue.

On the 14th of November, 2016, a magnitude 7.8 earthquake struck the provincial New Zealand town of Kaikoura. The event took the lives

of two people and caused significant damage to buildings and homes, displacing many families and disrupting many local businesses. Of significant impact was the damage to State Highway 1, that resulted in the roads in and out of Kaikoura being closed making travel to and from the area initially impossible but still significantly more difficult. Sport in New Zealand is culturally intrinsic and these road closures meant that the ability of the community to participate in sport, especially younger generations, was effectively cut off and that as a consequence the role that sport could play in their recovery was compromised.

In response to discovering the role of sport as a tool for community resilience, this design led investigation will test how that role can be reflected through architecture. This will be in the form of a community centre that gravitates around sport in Kaikoura.

Problem Statement:

This design research is intended to investigate why sporting facilities are not often a priority in terms of rebuilding following a natural disaster. While sport is appreciated as a valuable aspect of community fabric this research will ask how this is the case in the context of a disadvantaged community having been significantly affected by an earthquake.

Aims:

The proposal has two primary aims:

1. To develop an understanding of the role sport can have in disaster recovery and the specific characteristics that make it effective.
2. To investigate how that role can be translated into an architectural solution that captures the essence of the research.

Objectives:

The corresponding objectives that relate to these aims are:

1. To define, through community consultation, what the 'essence of sport' is to a post disaster community.
2. To investigate what principles of sport make it an effective relief platform.
3. To understand what makes community sport facilities successful.
4. To translate key terms derived through the community into architectural concepts and solutions.

Methodology:

Early in the research the idea of design experiments was established. The purpose of the experiments was to develop the research in a personal and quantitative manner that refined and developed any lessons learnt from reviewing literature surrounding sport as a support mechanism. Each design experiment was different in the output but used the results from the earlier ones as a simple means to ground and validate them. The different outputs across the experiments were useful as they each provided clarity in the direction the research could proceed moving into the formal design process. A simplified breakdown of the overall methodology is as follows:

- Analysis of the literature surrounding the characteristics of sport in the community especially in those that are disadvantaged and including those affected by disasters.
- Design experiment one: Participatory experiment in Kaikoura to investigate what sport means to them as a community affected by a natural disaster and how sport helps in the recovery process. This was treated as a way to develop and refine what the literature was suggesting.
- Design review one: The first design review occurred after the conclusion of establishing the research problem and question, the literature review and design experiment one. This review provided valuable feedback on how to apply the content of the research that was completed and areas that could be further investigated moving forward.
- Design experiment two: Using a set theory analysis approach, hierarchical decomposition, to determine the relationships and importance of the characteristics identified through the literature review and design experiment 1. This served to establish 3 primary concepts to take further into the design process.
- Design experiment three: Using photographs to both gain an understanding of what the terms generated through design experiments 1 and 2 ‘looked like’ but also validate that the concepts that had been generated do exist in community sport. This experiment provided the first visual aspect to the research and acted as a conceptual starting point for formal iterations.
- Case study analysis used to identify how design elements of community sports venues can represent or facilitate the terms and the concepts derived from the initial design experiments.
- Selection of the site and corresponding analysis to begin identifying design constraints and opportunities.
- Conceptual design through to design development and final design outcome with conclusions that reflects on the aims and objectives and questions the successfulness of the project.
- Design review two: Following the completion of the preliminary design the opportunity for feedback was provided in design review two. This feedback was valuable in generating discussion of areas of development in the design, especially in regards to how the design was integrating the research but also how the building was functioning as architecture

Scope of the Design Research:

The product of this research is a tangible and believable building concept that encapsulates what sport means to Kaikoura as a provincial New Zealand town whose identity was significantly effected due to the earthquakes of late 2016. The building addresses holes in their community left after the events and aims to be a catalyst for recovery through a platform of sport and the personal and communal characteristics sport can foster.

In a small community like Kaikoura there are realistic limitations such as cost. However, while a cost effective design approach has been adopted, no cost or cost benefit analysis has been completed for the specific building. This was not seen as an important part of the scope in terms of answering the research question.

Thesis structure:

The structure of this thesis simply reflects the basic breakdown of the methodology previously discussed. Firstly, by introducing the research area and the existing literature surrounding the topic with the corresponding lessons learnt from the review of the literature. This then informed the content of the design experiments, which are next in the sequence of chapters. The practical and theoretical knowledge obtained through the literature review and design experiments provides an answer to the first part of the question and hence the basis of how specific design criteria were created. This leads into the formal design process, broken down into chapters by phase with the corresponding critical reflection addressing the second part of the question. The final component of this thesis is the concluding and reflecting chapter. This section provides insight as to the lessons learnt through completing this design research, what could have been completed differently and where the research could be progressed further.

02

literature review

Literature Review:

The literature that was reviewed is divided into four main categories. This review provided a theoretical understanding of the context of disasters and their effects on the physical and mental wellbeing of both individuals and communities. It also provided an initial, theoretical answer to the first part of the research question regarding the role of sport as a support mechanism for disaster recovery. Theoretical research into participatory design also occurred as field research was seen as important to the validity of the methodology especially in a provincial community like Kaikoura.

01

socially based
disasters

02

natural disasters
and sport

03

place identity

04

participatory
design

Figure 1: Literature review categories.

Socially based disasters:

The idea of disasters being a social construct is a change from the historical perspective that disasters and their associated risks ‘simply exist’ (Tierney 2014). Natural environmental events such as earthquakes, floods and storms are hazards, but what makes them disasters is the result of human acts of omission and commission (Nations 2010). The ramifications of each disaster are often unique, but they expose prior social actions from both individual and governments that had they been different, the scale of the disastrous event could have also been different (Nations 2010). Despite this uniqueness, at a general level, a consistent set of casual factors and everyday society workings may be traced back to the origins of disasters (Tierney 2014). These origins do not lie within nature or technology but the social, political, economic and cultural factors of everyday society (Tierney 2014). Disaster risks come as a consequence of social structure and human decision making where all degrees of social entities, whether individual, community or government scale, make or fail to make decisions that could impact the potential complications of a disaster (Tierney 2014). These decisions could include failing to implement systems for warning in less developed areas, not upgrading seismically vulnerable buildings, not improving

city levees or stop-banks or even a distant historical decision of humans to build cities at coastlines and river basins where they are more vulnerable to natural hazards (Tierney 2014).

Kathleen Tierney describes disaster resilience as the ability of social entities to absorb the impacts of external and internal system shocks without losing the ability to function, and failing that, cope, adapt, and recover from those shocks (Tierney 2014). Increasing resilience capacity can both contain and reduce risk and help affected individuals better cope with the consequences (Tierney 2014). Tierney describes two types of resilience; inherent and adaptive (Tierney 2014). Adaptive resilience consists of novel and pre-planned actions that happen once the disaster has occurred that allow people to cope and bounce back from the experiences of loss and disruption. This form of resilience includes widespread pro-social behaviour and therapeutic communities (Tierney 2014). The concept of adaptive resilience is relevant to this research due to the capacity of sport as a tool for disaster resilience that will be discussed later in the literature review. The principles of adaptive resilience are encapsulated within the literature discussing sport in post-disaster communities.

Natural Disasters and Sport:

The impacts of natural disasters extend far beyond physical. As well as ruining buildings and infrastructure a disaster can seriously affect individuals and society on a widespread mental level (Kunz 2009).

Habits and routines become naturally embedded within people through repetitive bodily experiences in familiar local spaces. This repetition becomes a 'part of the way things are' and creates ontological predictability and security (Thorpe 2015). These habits and routines are often only noticed through experiences of irregularity. The term arrhythmia refers to the disruption of everyday rhythms and routines which explains the widespread mental impacts on individuals and society created from natural disasters (Thorpe 2015). People who organise routines around participation in sporting activities can experience emotional and psychosocial stresses where damage to sports facilities restricts their ability to participate (Thorpe 2015).

Sport is becoming increasingly recognised as an innovative means of providing support to the rehabilitation processes in post-disaster situations (Kunz 2009). It is a valuable tool for post disaster recovery and resilience because of its nature as a stable pastime (Kunz 2009). In disadvantaged communities like those affected

by environmental disasters, sport can offer a platform for individuals to encounter and address any problems in a safe and familiar environment. Additionally, it can help to rebuild social networks and community, personal identity and affective relationships to place (Thorpe 2015). Damage to sporting facilities was strongly felt following the 2011 earthquake in Christchurch where damage significantly impacted the community's ability to both participate and host large fixtures (Thorpe 2015). For many people sport is a familiar bodily rhythm and through the experience of the earthquake people became aware of the importance of sport, both emotional and physical, in their everyday lives (Thorpe 2015). Sport offered people short-term escapism, taking their minds off the stresses caused from their disaster compromised lives, returning to a familiar experience, regaining a sense of belonging and community and developing a connection to the physical environment (Thorpe 2015). The ability of sport and its characteristics to directly address some of the negative implications of natural disasters on communities illustrates an argument about the importance of sport as a resilience tool. It also illustrates the underlying values of sport as being wider than winning and including features such as team work, co-operation and having a common purpose.

Place Attachment:

Place attachment is defined as an affective emotional bond between people and places created through repeated encounters and complex associations (Tonts and Atherley 2010). It relates to social cohesion, participation and community development (Manzo and Perkins 2006). People are considered to create their individual personal identity and values through interactions with particular places which in turn has an effect on how significant places are deemed to be as well as dictating the level of engagement with these places (Manzo and Perkins 2006). Place attachment is linked to sense of community and involves a development of the connection between individuals, groups and their shared environments over memories, interests, history and experiences (Tonts and Atherley 2010). People with a strong attachment to place and sense of community experience greater social cohesion and control (Manzo and Perkins 2006). The impacts of natural disasters on place attachment and sense of community are significantly disruptive which highlights the importance of these concepts in community revitalisation projects (Manzo and Perkins 2006). Facilities and interventions within communities that encourage social participation are linked to emotional bonds with place and these emotional bonds contribute to the formation of both personal and community identity (Manzo and Perkins 2006).

In many instances sport is seen as a primary component of community life due to its ability

to create local identity using shared narratives and experiences to construct a sense of place (Tonts and Atherley 2010). Especially in places like New Zealand, where sport may be an integral part of many people's lives, sport can underpin the construction of place identity (Tonts and Atherley 2010). Sport and its associated architecture, whether large scale such as national stadiums or small scale like school gymnasiums, are the outcomes of social relations but also the platform for which many community relationships and networks are created and performed (Tonts and Atherley 2010). At both a grassroots and a professional level sport has beneficial impacts on community participation, local identity and pride, feeling of belonging and sense of place (Tonts and Atherley 2010). Sport is not often disassociated from the places where it takes place, where the memories, narratives and networks becoming embedded and bound with the physical place (Tonts and Atherley 2010). In communities compromised by natural disasters the role of place identity is crucial. The process of rebuilding individual and collective identities relies on the establishment of familiar bodily experiences and rhythms, a sense of community and social values and cohesion. The capacity of sport and its associated architecture to create these opportunities is high and begins to illustrate how important sports architecture can be to the complex process of disaster resilience.

Participatory Design:

Despite a common view that user involvement is not useful in the design process, it is becoming more accepted that participation is a right of people affected by a design and can lead to a greater acceptance of both the design process and its consequences (Reich et al. 1996). Participatory processes can bridge the gap between designer and user, allowing knowledge to be shared and meaning the needs of the users become better understood and represented in design (Reich et al. 1996). This process ensures that the quality and direction of user's lives is determined by social decisions of the users themselves (Luck 2007). Yoram Reich's particular participatory design theory talks about the trace and the salience of an object as the factors that will influence the interest and degree of engagement likely to occur during the

design process. Trace is a term referring to the impression left on a community/user group and salience the importance or associated meaning with the object (Reich et al. 1996). Products, or in the case of architecture, buildings, with high trace and salience commonly elicit a greater willingness to be involved in extended participation and this is likely to be the case with sports facilities (Reich et al. 1996). An additional interesting element of this particular theory discusses how participatory design can benefit from an application that supports the articulation of informal knowledge (Reich et al. 1996). This informal knowledge could be interpreted as an 'essence' and similar to the desired outcome of participatory design in this scenario.

03

design experiments

Design Experiments:

This chapter documents the three design experiments that occurred following the literature review. These three experiments were the primary component of the methodology. The aim of these experiments being to expand on the theoretical knowledge that was attained through the literature review regarding the first part of the research question, discovering the ‘role’ and refining it to an applicable format. The 3 experiments were different in output but used the content of the previous ones to develop and refine the results. They served in generating concepts and validating the research that had been undertaken.

Design Experiment One:

The first design experiment occurred as a participatory exercise in Kaikoura with members of the community whose lifestyles had been directly affected by 2016’s earthquakes. Two questions were posed to these community members and they were invited to write their responses on small wooden blocks that were supplied. Their answers seen right in figure ?.

The questions that were posed to them were:

- What does sport mean to Kaikoura as a provincial New Zealand community?
- How has sport helped as part of your recovery from last year’s event?

After all of the responses had been created the participants were invited to identify how they thought their answers related by creating links between them using string (Figure 3.). This served as a starting point to identify correlations that influenced how the initial concepts, and hence, design elements were established. Of particular note at an early stage was the emphasis on the social characteristics of sport beyond the physical participation benefits.

Right: Figure 2: Individual responses from design experiment one.

Next page: Figure 3: Responses of design experiment one placed into wall with relationships.

He wāhi

tō mātou kura i ngā wā katoa

MONEY
(cost)

PRESSURE

Refocus

Belonging

Co-operate

Pride

Adapting to
change
Finding a way

KOTAHITANGA

Boredom
Something to do

FRIENDSHIP

Competition
Healthy

Competition

Achievement

Lack of
community
support

Unity

NEW
BEGINNINGS

opportunity

Design Experiment Two:

Design experiment two used the results created from design experiment one and ran them through a set theory analysis called heirarchical decomposition. Using a specific software program where the individual terms are input and followed by what terms related to each other the output is a family tree-like map. The map introduces and establishes a level of heirarchy or prioritisation that was seen as a valuable way of creating concepts moving forward into the design phase of the research. Three separate tests were run each representing a different set of relationships that were modelled in the program. The clusters of terms were analysed in regards to how they were ordered and grouped and always compared to how literature said they should relate and how the field research experiment in Kaikoura illustrated how a specific post disaster community said how they relate.

Iteration One:

The first iteration (Figure 4.) of the map was the product of modelling the exact realtionships that the Kaikoura community created with the string exercise. The flatness of the map indicates a lack of complexity in the input making it difficult to gauge how the program deemed how important each term was in respect to each other. The clustering is interesting however grouped with similar terms creating a strong starting point for concepts.

Iteration Two:

The second iteration (Figure 5.) of the map was the product of modelling how the literature that had been reviewed suggested they should be related. Similarly to iteration one there is a lack of heirarchy among the strong clusters. The grouping of the terms was largely similar to the first iteration further grounding the idea of concepts being established from these maps.

Figure 4: Results of iteration one of design experiment two.

Figure 5: Results of iteration two of design experiment two.

Figure 6: Results of iteration three of design experiment two.

Iteration Three:

The final iteration (Figure 6.) of the hierarchical decomposition experiment combined the modelled relationships for both iteration one and two to test how the hierarchy of the results developed based on the more complex input. The increased depth and new layers indicates that a greater level of hierarchy exists. Generally across all of the iterations the terms remained in similar clusters with slight variations in the primary relationships. The structure of the map works by suggesting a group of terms that sits below another group can be summarised or categorised by the above group. It was through this analysis that each cluster of terms was able to be narrowed down to a single two terms. This method provided a definition of

the primary terms and a more manageable result moving forward. Three initial concepts were established using the three primary clusters of terms, categorised by the primary two terms, as seen below. It was important to note that the fourth cluster of terms featured the negative characteristics and restrictions of sport that the members of the Kaikoura community had said existed. These were not ignored as the research progressed but approached in the way that the concepts, or positive characteristics of sport, did enough to counter-act the negative aspects. Focussing on the positive and enhancing them through architecture was seen as the most appropriate way forward.

Figure 7: Grouping of terms in iteration three of design experiment two.

Figure 8: Three main concepts established from design experiment two.

Design Experiment Three:

After having identified the concepts in design experiment two, the intention of the third experiment was to introduce the first visual component to the research. The goal was to gain an understanding of what the terms and concepts looked like and what it might mean to facilitate them. This was achieved through photographing moments in sport that were interpreted to represent the concepts. This experiment occurred at Kilbirnie Park on a Saturday afternoon in June during the winter sport season. This experiment also served as a

way of validating that the responses generated from the exercise in Kaikoura existed in sports outside of that specific area and context. This visual aspect of this experiment also served as a conceptual starting point for formal iterations later in the research.

The following sets of images (Figure 9,10,11.) are the product of the experiment. 12 photographs for each concept were taken with a specific term from the concept intended to be captured. The term is outlined alongside the photograph.

love & life history

pride history

unity kotahitanga

unity passion

history passion

history kotahitanga

unity kotahitanga

unity

pride history

history passion

pride history

unity kotahitanga

Figure 9: Photographs taken for concept one.

meeting people friendship

peer support

friendship meeting people

meeting people belonging

team work peer support

team work belonging

team work

meeting people

meeting people belonging

peer support friendship

meeting people belonging

friendship belonging

Figure 10: Photographs taken for concept two.

achievement

achievement

competition

exercise fitness

achievement fitness

competition

achievement

competition

competition

fitness

competition

achievement

Figure 11: Photographs taken for concept three.

Design Experiment Findings and Summary:

The three design experiments allowed the understanding gained through the literature review to be developed and refined from a tangible and contextual perspective. The experiments investigated the role of sport in the post disaster community of Kaikoura, how it helps their recovery process and how it could be enhanced to help the community re-establish normality and identity. The experiments also provided a means of summarising what the role of sport and establishing the three main concepts moving forward in the process. They also provided initial understanding of how this role could be facilitated through architectural design elements.

The key learning of the experiments was the apparent importance of the social aspects of sport. Characteristics such as meeting people, unity, friendship and belonging stood out as the most important. This began to suggest that it was not the physical participation in sport but these social factors that would be the most crucial to reflect through architecture for the successfulness of the design solution. Designing spaces and a building with emphasis on facilitating these social characteristics would prove the most appropriate way of achieving the question and allowing sport to be the most potent unifying force as all the research was suggesting.

04

case study analysis

Case Study Analysis:

This chapter documents the analysis of existing case studies. Following on from the literature review and three design experiments and having established the three concepts and what they 'looked' in design experiments one and two, and three, this provided an additional area for consideration and the opportunity to analyse these particular designs as case studies.

The case study analysis had two objectives:

- Provide an understanding of how sporting facilities are planned and the required ancillary program and where it is located.
- Identify design elements in existing precedents that facilitate the concepts that had been established in the research.

Six case studies were selected as part of this analysis. They were selected for reasons including contextual and programmatic relevance and planning configuration including a sport hall and aquatic facilities.

Nga Purapura - Tennent Brown Architects:

This building was selected due to its provincial New Zealand relevance. It is a sporting and education facility located in Otaki, a small town with a similar population to the Kaikoura district. For this reason, it was seen as an effective case study for analysis of scale and provincial relevance (Archdaily Aug 2013).

Noteworthy characteristics:

- scale and provincial context - similarly populated area to Kaikoura
- formal composition driven through context, history, pride.
- expression of identity through detailing
- efficiency of plan
- flexibility of court spaces
- provision of support/learning spaces

Design elements that facilitate concepts:

- social/gathering spaces - friendship/meeting people/kotahitanga/new beginnings/adapting to change
- perimeter spaces - meeting people/beloning, kotahitanga/friendship/adapting to change/opportunity
- embrace community and celebrate Tikanga Maori (detailing, formal composition) - kotahitanga/belonging/history/pride/unity
- teaching spaces - peer support/health/togtherness
- flexible sporting spaces - achievement/competition/fitness/exercise

Figure 12: Drawings and photographs for cast study one.

Gymnasium Régis Racine - Atelier d'Architecture Alexandre Dreyssé

This gymnasium in France was included in this analysis due to the inclusion of complex design elements that were interpreted as creating identity in a smaller scale building. This was especially in regards to structure. This was an issue that was anticipated for the design phase of the research where identity and context were important concepts (Archdaily Dec 2012).

Noteworthy characteristics:

- intricacy of architectural elements in a small scale building
- efficient formal composition
- allowing natural light without open facades
- using structure as architectural design
- less flexibility and variety of sporting spaces
- only a single gym space

Design elements that facilitate concepts:

- architecture that creates pride in a small community - kotahitanga/unity
- perimeter spaces - meeting people/unity/friendship/new beginnings/opportunity
- meeting rooms - peer support/friendship/unity/kotahitanga/adapting to change

Figure 13: Drawings and photographs for cast study two.

Gleneagles Community Center - Patkau Architects

This particular sporting facility has a major focus on community and catering for different occupants while creating a place for the community to gather. The social characteristics of sport were identified as significant in the design experiments which is the justification for why this case study was analysed (Archdaily Jan 2011).

Noteworthy characteristics:

- intricacy of plan across split levels and multiple entries
- building as a community destination - life and energy palpable through visual connections
- structure as visually interesting architectural elements
- combination and organisation of variety of programs of different occupants
- simultaneous views of all activity from community spaces

Design elements that facilitate concepts:

- visual connections/simultaneous views - kotahitanga/unity/meeting people/friendship/belonging/peer support
- spaces for community 'living room' - unity/kotahitanga/friendship/belonging/history, pride/adapting to change/new beginnings
- variety of program - achievement/competition/fitness/stress relief

Right: Figure 14: Drawings and photographs for cast study three.

Palace Of Water Sports In Kazan - SPEECH Architectural Office

The way this aquatic centre in Russia used architecture to reflect the riverbank context of the building was the reason this case study was selected for analysis. Having identified the alpine and coastal setting as major contextual references for Kaikoura this case study was seen as an effective example for celebrating that context (Archdaily Jul 2013).

Noteworthy characteristics:

- reflection and celebration of site context through architecture
- using structure as visually interesting architectural elements
- design around sustainable materials
- scale - larger than this design needs to be
- plan configuration - simple rectangular form will not work on the selected site in Kaikoura

Design elements that facilitate concepts:

- reflection of context through architecture - history/pride/unity/belonging
- viewing stands - meeting people/peer support/pride/friendship/opportunity
- different pool options - competition/fitness/exercise/stress relief

Figure 15: Drawings and photographs for cast study four.

Latymer Upper School Sports Centre - FaulknerBrowns Architects

This sport facility was the first one analysed that including both a gym/courts facility and a swimming pool. These spaces require different environmental conditions so how these spaces are arranged with their corresponding ancillary program was the reason this particular building was studied (Archdaily May 2014).

Noteworthy characteristics:

- efficient configuration of sports hall and pool with access to support program
- arrangement of plan and the required supporting program
- variety of spaces - multipurpose studios to create flexibility for users
- intention to improve appreciation for fitness and wellbeing
- formal sections and elevations - limited to site constraints

Design elements that facilitate concepts:

- architecture facilitating appreciation of fitness and wellbeing - fitness/exercise/stress relief/pride
- variety of spaces and multipurpose studios - fitness/exercise/stress relief/pride/unity
- viewing standings and multipurpose spaces - meeting people/belonging/pride/friendship/peer support/new beginnings/adapting to change

Right: Figure 16: Drawings and photographs for cast study five.

Lentpark / Schultz Architekten

Similarly to the previous case study, this facility in Germany combines multiple major programs with different environmental conditions. This building combines court spaces, an ice rink and an elevated running track. This will prove useful in planning during the design phase especially the provision of ancillary program (Archdaily Oct 2016).

Noteworthy characteristics:

- incorporation of 2 programs with different environmental conditions and corresponding supporting program
- elevated skating track with internal and external views
- celebrating context through visual connections
- formal composition influenced by site and supports site activity
- provision of perimeter spaces

Design elements that facilitate concepts:

- elevated track and visual connections - meeting people/unity/friendship/belonging/opportunity
- community spaces - meeting people/unity/friendship/belonging/kotahitanga/new beginnings/adapting to change
- views (indoor, landscape, parklands) - unity/kotahitanga/belonging/pride
- pool and rink and flexibility of options - stress relief/fitness/exercise

Figure 17: Drawings and photographs for cast study six.

05

site analysis

Figure 18: Kaikoura location in the context of the North and South Islands of New Zealand.

Kaikoura's History and Background:

Kaikoura is a small coastal town 180 kilometres north of Christchurch. Its mixture of spectacular natural geography, complex marine systems and variety of seabirds and marine mammals make it one of New Zealand's most popular tourist destinations.

When Tama ki Te Rangi arrived in the Kaikoura area hundreds of years ago he found an immense supply of crayfish and named the area "Te Ahi Kaikoura a Tama ki Te Rangi". Kai translating to food and Koura to crayfish (Kaikoura; The Official Site for Kaikoura 2016). Despite its small size, the area has a rich Maori and European history. Archaeological remains suggest there were early Maori Moa hunters in the area over 900 years ago and in Maori legend, Maui used the Kaikoura peninsula to plant his foot as he 'fished-up' the North Island (Kaikoura; The Official Site for Kaikoura 2016). Evidence of several pa sites can still be seen around the peninsula today. European settlers first arrived around 1770 when Captain Cook first discovered the peninsula, initially believing it was a separate island. In 1843,

the first whaling station was established with many soon to follow. Hundreds of men were employed in the whaling industry at one stage in the Kaikoura district alone. Numbers dropped when those employed in whaling turned to more economic lifestyles such as farming (Kaikoura; The Official Site for Kaikoura 2016). Whaling in the area continued through until 1964 but whale watching is now a major tourist activity.

The Kaikoura region has a permanent population of 3,800 residents, 600 of which are of Maori heritage, with around 130,000 tourists visiting the area each year (Aotearoa 2013). The median age of the Kaikoura District is 45.6, seven years above New Zealand's median. 19.4% of this population is aged over 65 and 17.2% is under 15. Less than 5% of Kaikoura's population belong to ethnic groups outside of New Zealand European and Maori (Aotearoa 2013). The three largest industries in the Kaikoura district are accommodation and food services, retail trade and agriculture, forestry and fishing and they make up 52% of the total employee count (Aotearoa 2013).

Figure 19: Kaikoura township location on the Kaikoura peninsula.

The Earthquake:

The 2016 Kaikoura earthquake was a magnitude 7.8 earthquake centred 60km south-west of Kaikoura. It was the second largest recorded earthquake in New Zealand history (Stuff 2016). The Kaikoura region suffered immense damage including destroyed homes and displaced families, damaged infrastructure including the main water supply and roads and two casualties (Stuff 2016). The quake caused damage to both the local pool and the high school gym, the community's primary indoor sports facility, making them both unusable (Clubs 2016). A new indoor pool and sports facility is seen as a crucial step in the recovery of the community.

Kaikoura's Geographical Context:

During the trip to Kaikoura that involved the participatory exercise (design experiment one) it was the geographical context that stood out the most as the strongest contextual identity. The alpine backdrop that contrasted against the immediately adjacent ocean coastline was very unique to the area and part of the reason Kaikoura is such a popular tourist destination. As celebrating and embracing context through architecture was established as a design criteria this became an significant influence as the design process progressed.

Figure 20: Kaikoura's coastal and alpine geographic context.

Figure 21: Site analysis surrounding community facilities and walking distances.

The Site:

The site in Kaikoura that was selected is a piece of current park land on State Highway 1, visually prominent as you enter the town and obvious to possible tourists. Its wedge shape is bound by Churchill Street (State Highway One), Deal Street and a residential boundary. The site sits on the main thoroughfare through to the southern area of Kaikoura, South Bay, and the main entry and exit of the coastal town.

It sits opposite the recently upgraded Kaikoura hospital and adjacent to the local Takahanga Marae. The site has close proximity to the surrounding schools and other community facilities, all within five minutes as indicated by the walking radius on the map to the left. The site is elevated up from the coastline above tsunami level and forms part of the existing Kaikoura cycle trail map.

There is a wellness hub opportunity being so close to the hospital and certainly the potential to cater for parking of motor homes and facilities were there any future earthquakes. The site has panoramic views of the coastline and mountains that became an important influence throughout the design process and the final design.

Figure 22: Sperm whale.

Figure 23: Site photograph.

Figure 24: Site photograph - panoramic views of coastline and mountain ranges.

Figure 25: Crayfish.

Figure 26: Site analysis - movement, physical dimensions of site and contours.

The Site:

The site is approximately 20,000m² with the two biggest boundaries, the east and west boundary (the two long edges of the wedge) measuring 270m and 230m respectively. There is a gentle slope through the length of the site from south to north with the southern end approximately three vertical metres higher than the northern end. There are existing pathways across the site as well as a small existing pavilion, seating and a small playground.

Pedestrians accessing the site are anticipated to enter the site in the north-western corner as they walk from the surrounding amenities and town centre to the north. Visitors using vehicles to access the site are more likely however, to enter the site from the south-eastern corner as they move from the wider properties and South Bay. There is existing car parking associated with the hospital explaining this anticipated movement. The prevailing wind is a north-westerly, an important consideration for access.

The area of most interest in the site for the design proposal is the southern portion of the site for a number of reasons; it is the most visually prominent area of the site from most of the surrounding boundaries; it has the opportunity to leave the larger areas of the site as open green area that is already well utilised; it has a greater opportunity for views of the surrounding context because of its elevation; and finally it is away from the directly adjacent residential boundary.

Figure 27: Site photograph - from south.

Figure 28: Site photograph - from south-west.

Figure 29: Site photograph - from north.

Figure 30: Site photograph - from north-east.

Next page: Figure 31: Kaikoura township and context illustration.

06

design criteria

What is the role of sport in the post disaster context and more importantly
how can this be reflected through its associated architecture?

FACILITATE & REPRESENT

KOTAHITANGA	ADAPTING TO CHANGE	ACHIEVEMENT
WIN & HEALTH	NEW BEGINNINGS	COMPETITION
UNITY - HISTORY - PRIDE	MEETING PEOPLE - BELONGING	STRESS RELIEF - FITNESS
LOVE & LIFE - PASSION	PEER SUPPORT - FRIENDSHIP	BOREDOM - EXERCISE

EMBRACE AND REFLECT CONTEXT THROUGH ARCHITECTURE

KOTAHITANGA - UNITY - HISTORY - PRIDE - PASSION - BELONGING

PERIMETER SPACES - MEETING SPACES - COMMUNITY SPACES

MEETING PEOPLE - FRIENDSHIP - BELONGING - PEER SUPPORT - KOTAHITANGA - UNITY - STRESS RELIEF

VISUAL CONNECTIONS - VIEWING AREAS

BELONGING - PRIDE - MEETING PEOPLE - FRIENDSHIP - KOTAHITANGA - UNITY - PEER SUPPORT

FLEXIBILITY OF SPORTING SPACES & OPTIONS

COMPETITION - ACHIEVEMENT - WIN & HEALTH - STRESS RELIEF - PASSION - EXERCISE

Figure 32: Research concepts and design criteria.

Research Summary:

Through the research that has been completed the role of sport in Kaikoura as a community recovering from a natural disaster was investigated and is summarised (left). It combined theoretical and practical knowledge for a grounded and thorough result. The goal moving forward into the design was to test ways in which the three concepts could be reflected through the architecture in a way that facilitated these characteristics occurring and celebrated their capacity to help the community recover from the earthquake. The process of testing how these concepts could be reflected through the specific architecture occurred early in the concept phase of the design process.

Design Criteria:

The outcome of case study analysis, when informed by the design experiments that had been carried out earlier, allowed for the establishment of design criteria. These criteria were specific design/architectural elements that were interpreted as beginning to facilitate the concepts throughout the various case studies. These criteria and the terms that they are associated with are summarised below. While these criteria were applied in a different context, they provided a starting point as to how they might be incorporated into this design. This process involved testing them individually to ensure they were relevant to context but were facilitating in a way they were intended.

Figure 33: Design criteria.

07

concept design

This chapter covers the conceptual design process and how the preliminary design was reached. Starting with an initial building program and conceptual formal iterations this chapter documents how the development process occurred with reflection and justification of choices outlined as they occurred.

Initial Building Program:

The first step of the concept design phase was to establish the initial building program. There were three major influences that informed what was included in this program:

1. The damage caused to the existing community pool and primary indoor sports facility in Kaikoura that caused them both to be closed.
2. Conversations that occurred in Kaikoura with members of the community during design experiment 1. What they dreamed for Kaikoura and what they thought was most needed.
3. Additional supporting program spaces that were identified throughout the case studies analysis that facilitated opportunities for the concepts and the community.

The spaces that were selected to be included are shown right. These included two multi-use courts (basketball size), a 25 metre length pool, a learners pool, a small indoor turf for winter sports, a gym, a community lounge, meeting spaces and finally a cafe. These program spaces were initially seen as a good balance between sport and community with enough opportunity to incorporate the concepts and corresponding design criteria that was then tested through formal iterations.

Right: Figure 34: Initial building program.

Formal Iterations:

The formal aspect of the design iterations occurred in an abstract manner using some of the photographs from design experiment three. Two photographs were selected from each of the three major concepts that were interpreted as best encapsulating what the concept meant. The formal qualities of the image influenced the selection also as the intention was to derive volumes from the images as formal starting points. The images below and right are the six images that were chosen to use. The first step of the process was to make the images black and white and pixelate them to both simplify them and exaggerate the contrast and form. The second step was to use the edited images to create line drawings that introduced a new aspect to the forms embedded within the images. This provided some interesting results.

Figure 35: Selected photographs for conceptual line drawing experiment.

Formal Iterations:

These line drawings were the result of the second step. The simplicity of the lighter and darker areas provided an opportunity to extract volumes from them that could be used as a formal starting point. It was appreciated that as a conceptual starting point it was an abstract way of using the research to create forms which is why the volumes are applied to site and program considered early to ensure the abstraction did not become too foreign. As a formal starting point there were elements in them that began to stimulate ideas, both small and large scale, about design elements and the concepts that they related to. It was ensured through the process that the capacity of the volumes to house program and work on the site was not considered less important than the formal abstraction.

Left: Figure 36: Products of experimental line drawings all images.

Extrapolated Volumes:

The diagrams, right, show the simple volumes that were derived from the line drawings. It was quickly apparent that some were more applicable as formal volumes whereas some of them were more applicable on a smaller scale as design elements. Some of them also were chosen not to proceed further with as the formal qualities or stimulated ideas were not as powerful as others. This process was found to be an effective way of creating initial ideas and envisage possible inhabitation and an interesting reference moving forward in allowing earlier research to further enhance design work through the visual components of the research.

Application of Volumes to Site:

Three of the volumes were used at a large scale to test the constraints of the site and possible design opportunities that they were creating at this scale. The three that were tested were seen as the most applicable at this scale. This process involved manipulation of the forms to better relate to the boundaries of the site. Each concept was different in the opportunities it was creating which provided a good initial basis to test what was working on the site and what was not.

Left: Figure 37: Simple formal extractions from experimental line drawings.

Figure 38: Concept one and adaptation to selected site.

Figure 39: Concept two and adaptation to selected site.

Figure 40: Concept three and adaptation to selected site.

Figure 41: Analysis of concept one.

Figure 42: Analysis of concept two.

Figure 43: Analysis of concept three.

Analysis of the Initial Volumes:

These sketches illustrate some of the early analysis that occurred of the initial concepts. Potential courtyard areas, street dialogue and incorporation of views were especially focused on at this stage.

Figure 44: Incorporation of program in concept one.

Figure 45: Incorporation of program in concept two.

Incorporation of Program:

In order to ensure the initial abstract forms did not become impractical for housing the program and function as intended, this step of the concept development was to manipulate each of the early forms by housing the program and their necessary areas. This process adapted the concepts quite significantly proving a valuable step in ensuring their pragmatism. In all concepts the community/shared volumes were centralised with sporting facilities located adjacent to them. The idea of the entrances being in these central volumes was seen as most sensible and aligning with the design criteria of providing effective meeting spaces.

Figure 46: Incorporation of program in concept three.

Figure 47: Analysis of concept one.

Figure 48: Analysis of concept two.

Figure 49: Analysis of concept three.

Conceptual Development:

The forms and volumes of the three simple concepts were then tested more thoroughly looking at larger scale design elements and their implications. During these tests there was focus on how the form was celebrating the context of the mountain ranges and coast, addressing the active boundaries of the site, creating courtyards and entrance possibilities and finally how the central community oriented program was linking to the adjacent sporting areas. There were elements from each that were working however at this early stage one particular concept was addressing the previously mentioned elements and was determined as having greater potential moving into the development of these concepts.

Next page: Figure 50: Conceptual development process.

concept drawing experiment

formal extrapolation

application to site

adapt to site constraints

incorporate

rate program areas

iteration one

iteration two

iteration three

Figure 51: Developed concept one.

Figure 52: Developed concept two.

Figure 53: Developed concept three.

Conceptual Development:

Each of the three initial concepts had reached a point where certain design elements were identified as requiring further detailed development. Each also had particular design elements that were not seen as successful which informed how the development of these concepts progressed. The bottom of the left three was the concept selected to move forward with at this stage because of initial program layout, the volumes reaction to the site's boundaries, the axial form through the centre with the community facilities and the capacity to create panoramic views from the main sporting volumes; the courts and pools.

Conceptual Development:

The next form of development used only the preferred concept. The form had three main volumes so the next iteration of testing involved the treatment of these three volumes. Each one was tested individually to see the design relationship each option had and the possibility of each volume. During these tests it became obvious that the central, axial form was where the architectural focus could be most successful. The large sporting volumes could be more simple to allow for emphasis to be on celebrating the communal nature of the building and letting these spaces be the most interesting to inhabit.

volume one iterations

volume two iterations

volume three iterations

Figure 54: Formal iterations of selected concept.

preferred concept

Figure 55: Developed concept to be taken further in the design process.

Preferred Concept:

This preferred concept stood out and was selected to proceed with as it provided emphasis on where the community facilities were intended to be housed, it allowed the sporting volumes to spread from the central area sympathetically, it had the greatest opportunity to celebrate the context of the surrounding landscape and it subtly spoke of Canterbury's context in the expansive flat plains and significant mountain ranges.

The next steps of the development needed to include resolving ancillary program, structure, and how the form could use the landscape of the site's slope.

Importantly also, the development of this concept included the incorporation of the design criteria at a more refined scale to ensure the capacity of the design to achieve its goals and allow sport to facilitate its supportive characteristics.

Concept Refinement:

The process of refining the initial concept occurred mostly through sketches before digital modelling. As mentioned previously and evident left, this included the resolution of structure; designed as a high importance building for earthquake resistance to provide the opportunity for it to be used as an emergency centre for any future earthquakes. Each of the three main volumes of the building were treated as seismically isolated which ensured a more logical earthquake design. The structure was also treated as a way of incorporating the concepts and design criteria allowing the structure to be exposed and read as a reflection of context. Also developed was the placement of support program such as changing rooms, storage and seating spaces and how their location could best serve the various sporting spaces throughout the building. This process also included tested opportunities to incorporate the design criteria such as viewing areas, view shafts, active/permeable street edges and celebrating the surrounding coastal context.

Critical reflection of this developed concept occurred after the documentation of the preliminary design where the successfulness of the design criteria and the building as an inhabitable entity was clearer. Important lessons were learnt through the reflection of the preliminary design which quite significantly affected the treatment of particular design elements and as a result the final design outcome.

Left: Figure 56: Development sketches including plan, structure and ancillary program.

08

preliminary design

Preliminary Design:

This chapter documents and reflects upon the preliminary design that was the product of the conceptual development process. How the design was using the design criteria and communicating the three concepts was the focus of critical reflection during the analysis of the design in its current state. It was also possible to analyse if design elements like circulation, site interaction, ancillary program and the sporting spaces were working, all of which were all further refined post-reflection.

This chapter firstly documents and describes the design before illustrating the incorporated mechanisms that were intended to achieve the design criteria before describing the reflection, the lessons learnt and the most important areas of development.

Right: Figure 57: Preliminary design site plan.

Site Plan

Churchill Street

Deal Street

Preliminary Design Description:

The building was situated in the southern portion of the site for the reasons mentioned earlier in the site analysis chapter. The design at this stage did not alter the existing form of the remaining park space as it was seen as a sensible move to leave this area with its well utilised open green areas and paths that cut through from one side to the other.

The building's main entrances were located off an entry courtyard on Deal Street and directly opposite the hospital. This entrance location was seen as the most appropriate from the site analysis where the predicted movement, especially vehicular was towards this direction. Occupants would enter into the area where the primary community oriented program was housed. This included a small cafe space, meeting spaces and the community lounge which included a raised mezzanine. This central area featured the most prominent roof form that opened the volume to the north allowing plentiful light and views of the mountains and coastline from the mezzanine area. Perspectives of this area are seen on the following page.

To the south the indoor turf, gym and multifunctional studio space were located with ancillary program including changing spaces and toilets servicing them. To the north were the two primary sporting volumes in the pools and courts. These spaces were located at the level below the entrance alongside the primary changing rooms and toilets. The spaces were separated with a concrete shear wall due to different environmental conditions. Each of these spaces had a viewing deck also located above with access off the central community area and making full use of the views to the north. Terraced seating and storage was also included for these spaces.

Upon critical reflection on the plans there became areas of development to be further tested. It was questioned why the building did not enhance and utilise the remaining site by expanding the program and blending the boundary of the sporting capacity by developing the northern section of the site. This question also raised another about whether there should be an additional entrance on the north elevation that served as a formal or ceremonial entrance with multipurpose crush area and the same formal emphasis as the preliminary design's central volume.

One mechanism to achieve the design criteria regarding viewing areas was the provision of permeable facades with strong dialogue of activity both inside and outside the building. This was considered a successful move however it was questioned why this could not be further enhanced by improving the building's relationship with the boundaries of the site which was a significant design influence from the beginning.

The program was questioned and especially in regards to whether the community volume was designed in a way that best facilitated interaction which was unclear because of its long narrow configuration. It was also questioned if there was enough community oriented program and if a larger facility like a communal hall and kitchen could be a successful addition to the building's program.

The final question was regarding ancillary program where it was not clear if the provision of this, especially the size of the changing spaces was suitable for the sporting spaces that had been designed.

Top left: Figure 58: Preliminary design ground floor plan.

Bottom left: Figure 59: Preliminary design lower ground floor plan.

Entrance Courtyard Perspective

Figure 60: Entrance courtyard perspective.

North Perspective

Figure 61: North perspective.

South Perspective

Figure 62: South perspective.

Figure 63: Building entrance.

Figure 64: Community living room.

Figure 65: Court space.

Figure 66: Pool space.

Figure 67: Courts viewing deck.

Figure 68: Pool viewing deck.

Preliminary Design Description:

The building used the slope of the site to inform the location of where program was situated especially the courts and pools that required a double height volume, as illustrated through the sections. In order to ensure the emphasis on the central community volume the courts and pools were positioned further north on the site allowing them to sit a level below the other facilities and as a result create the dominant feature space in the centre. In the southern portion of the building the gym and studio space were able to be slightly raised also to allow for light penetration into these spaces.

The sections, right, also illustrate the structure that had been design and how significant of an element it was in the scheme of the building. How this tied together, especially the repeated triangular nature, is emphasised through the perspectives shown on the previous page. As mentioned earlier the structure was seen as an opportunity to achieve design criteria especially allowing the context of the alpine landscape to be a focus. In the court and pool space, trusses were used as full height perimeter wall elements as the most significant reference to context. The permeable treatment of these trusses created active building edges with clear communication of activity both inside and outside as well as completely opening the panoramic views to the north to occupants inside those spaces.

This concept is also reflected in other areas including structural elements supporting the roof in the southern portion of the building in front of full face glazing permitting the permeability and visual connections. Similarly, the triangular motif was reflected through the structure in the central volume with more exaggerated structural elements improving its presence as the focus area.

More opportunities of development were identified through critical reflection of how the sections and perspectives. Similarly, following analysis of the plans, the ability of the central community space to facilitate engagement and provide options for non participants was considered something that could be revisited and improved. This was due to its long and narrow geometry which, especially for larger groups, is less effective in creating interaction and engagement.

Despite visual connections and permeability being a significant design criteria, the question of light and glare was considered. In spaces like sporting areas, too much direct light can diminish the experience of using them and obscure vision which is an important part of playing sport and spectating. This was identified as needing to be revisited as it was negatively impacting the building's functionality. The current structure and triangular elements were considered an effective tool for context reflection but they were the main elements for light so this was a tension that needed extra consideration as the context celebration was something that needed to be maintained.

Another point of development was the viewing spaces associated with the volumes. The spaces were limited in terms of their ability to gather people and facilitate interaction and did not create relationships between sporting spaces. It was considered that developing an alternative area that better addressed these issues would enhance the reflection of the concepts and also provide a more exciting and successful space.

These drawings also emphasised the idea of expanding the program of the building to the wider park to enhance the community relationship.

Figure 69: Preliminary design section one.

Figure 70: Preliminary design section two.

Figure 71: Preliminary design section three.

Figure 72: Preliminary design elements addressing design criteria.

Achieving Design Criteria:

The drawing left indicates all the specific design elements that were included in the preliminary design as an attempt to achieve the design criteria and integrate the concepts. This allowed for understanding of how they were working but more importantly how they could be both retained and enhanced despite addressing the areas of development that were noted through critical analysis of the design in its current stage.

1. Embrace and reflect context through architecture:

This was achieved through the reflection of the alpine setting and whale tale in repeated triangular structural elements. Also achieved through framing important views of the mountain ranges and coastline to appreciate setting.

2. Perimeter spaces/meeting spaces/community spaces:

This was achieved through the provision of numerous areas for non-participants to gather and interact. Most opportunity for development moving forward.

3. Visual connections/viewing areas:

This was achieved through permeable building edges that create dialogue with internal and external activities. Also achieved through creating view shafts through the building relating to context and user relationship.

4. Flexibility of sporting spaces and options for users:

This was achieved through the multipurpose nature of sporting volumes and creating opportunities for both participants and spectators. There is opportunity to enhance the community oriented program to better facilitate interaction and meeting.

embrace and reflect context
through architecture

perimeter spaces
meeting spaces
community spaces

visual connections
viewing areas

flexibility of sporting
spaces and options

Key Areas of Development:

1. Further enhance the relationship with the wider park and surroundings.
2. Allow the community focused, distributing space to distribute and facilitate engagement more effectively.
3. Address glare and viewing areas without disrupting visual permeability and connections.
4. Centralise the supporting facilities and ensure efficient access
5. Further test the community oriented program allowing greater engagement and atmosphere.

These five key points are the summarised areas of development through the next stages of the refinement process. They are seen as the areas that are hindering the communication and integration of the concepts but have the greatest opportunity of enhancing the successfulness of the design. The development is documented throughout the next chapter.

09

design development

Design Development:

This chapter outlines and analyses the design development that occurred after the critical reflection of the preliminary design and the key areas of development that were outlined previously. The product of this development section was the design solution so the thought processes involved in this section play an important role in the achievement of the end product.

Configuration of Plan:

The first area of development was the plan, where at a large scale there were two major questions; how could the design better enhance and utilise the relationship with the site and could the community/sporting spaces provide additional emphasis on the community focussed areas of the building's program.

The sketches left illustrate the development process that occurred. Firstly, opportunities were identified; which included expanding the program into the site by including additional facilities like a field and skate park, centralising changing spaces and ancillary program, enhancing the relationship to the site's boundaries, including an additional community hall area, widening the central core space and introducing an additional formal entrance on the north elevation.

The progression of sketches (far right) illustrate how these changes were incorporated and tested to see the implication of these design changes. It was important to ensure the entrance and engagement spaces worked and circulation through connecting spaces was optimised sensible.

The court space was rotated to align with the street boundary so each of the two primary sporting volumes in the northern portion of the building interacted directly with the adjacent edge of the site. This change created an additional area in between that was seen as an opportunity to move the community lounge to an area that had views into each sporting volume and better views to the north of surrounding context. This space formed the additional entrance.

The central core area was made wider as a mechanism to better facilitate engagement in this area. Moving the community lounge created an opportunity for additional program where a rock wall was introduced. This used the height of the central volume and was informed by Kaikoura's tourist population and action sport context to enhance the variety of community in the building.

A community hall was added in the southern portion of the building next to the turf space. This was intended to enhance the building's capacity to create opportunity for the wider community and allow variety, engagement and interaction.

All of these changes were directly influenced by reflection of the preliminary design and how it was achieving the design criteria. During the sketched development, ideas these were seen as becoming more successful especially in regards to the wider relationship to the site and context. The occupation of the design was extended which was seen as a more effective way for fostering interaction and enhancing the social characteristics of sport that were identified as significantly important.

Right: Figure 73: Plan development.

Detailed Development:

Following the development of the plan at a large scale, the opportunity came to develop the integration of the more detailed items within the building. Often these were specific design elements targeted at the design criteria especially reflecting context, facilitating engagement, and enhancing the overall site.

The sketches, left, indicate areas and design elements of development that were tested. These included the initial planning of materials and material consistency, further reflection of concepts and context through elements such as structure where this was changed due to the question about glare in the sporting volumes. The initial intention to maintain the truss form in the north elevation was altered and no longer a structural truss. The triangular motif was maintained alternatively through the treatment of materials. Design elements that tested the overall inhabitability of the building were tested also which included the provision of a covered carpark and walkway around the perimeter of the building to make the building and the site more inhabitable.

The idea of testing the orientation of the central community volume also developed as the new location of the community lounge meant the mezzanine space was no longer necessary. By having the southern wall of that space higher with the structure to the north it was possible to cast triangular shadows of the structure onto the large axial wall. This made this tranverse space more interesting and reflected the context in the structure to additional elements in the building.

Visual permeability was addressed by having glass on the sporting spaces elevations but only one level high with canopies above that to prevent direct sun hitting the sporting floors. This meant the idea of interior and exterior communication with occupants on each side of the building was maintained which was a successful element from the preliminary design.

Ancillary program was centralised and made larger in order to ensure the pragmatics of using the building was successful. Widening the central volume also increased the capacity of this area to facilitate engagement.

Key Areas of Development:

1. Further enhance the relationship with the wider park and surroundings:
 - achieved through expanding the program into the site, creating an additional entrance on the northern elevation and adjusting the edges of the building to better relate to the site's boundaries.
2. Allow the community focused, distributing space to distribute and facilitate engagement more effectively:
 - achieved through widening the area and adjusting the program within it so the areas that were intended to facilitate engagement could be more successful.
3. Address glare and viewing areas without disrupting visual permeability and connections:
 - By reducing the height of glazing to one level and including canopies, the views in and out of the building were maintained but eliminated direct sunlight in sporting spaces.
4. Centralise the supporting facilities and ensure efficient access:
 - Access to ancillary program was centralised to ensure users of the spaces had efficient access from all areas of the building.
5. Further test the community oriented program allowing greater engagement and atmosphere:
 - Achieved through the introduction of the community hall, more effective location of community lounge, views into sporting spaces and treatment of central community volume.

10

design solution

Figure 75: Design solution site plan.

Final Design Solution:

This chapter documents and describes the final design solution that was developed through the reflection and refinement of the preliminary design. The solution features a range of design elements that facilitate and represent the three primary concepts and these will be highlighted throughout the explanation in this chapter. The solution is grounded and has the potential to foster community resilience in ways the initial research said sport could.

The building has remained in the southern end of the site, for the same reasons as discussed earlier in the site analysis and early design phases. It has been developed, however, to expand beyond the edges of the building in the north by extending the program and sporting facilities into the open park space. This is through the introduction of an additional entrance on the north elevation, an outdoor field space for turf sports with terraces built into the topography and a skate park that celebrates Kaikoura's young and action sport orientated community. These additional aspects of the program further enhance the potential to cater for many users, providing options for the community and allowing the spaces to be flexible (design criteria four).

Figure 76: Design solution location plan.

Figure 77: Design solution ground floor plan.

Final Design Solution:

The design now has two primary entrances, a functional entrance on the east elevation for users likely to be arriving by car where there is the street parking and also the inclusion of a small covered carpark. The formal/ceremonial entrance is located, as mentioned, on the north elevation where people are likely to be walking from the town centre and accessing the building from the developed park space. The formal treatment of this area with its fully glazed façade and expressed triangular structure highlight it as a focal point and welcoming space to those accessing the building from this direction.

Figure 78: Design solution lower ground floor plan.

The program in the south of the building remains similar with the studio, gym and indoor turf, however now it includes a community hall and kitchen space for gathering of the community. This feature as a focus for gatherings emphasised during the community research phase the central axial volume is now wider than the previous design iteration to allow this space to better accommodate people and facilitate interaction. It has a more dedicated café space upon entrance and a rock climbing facility that encourages tourists, families and celebrates Kiakoura's action sport identity. The north portion of the building still includes the court spaces and swimming pools. The rotation of the court spaces to better interact with the boundary of

the site created an additional volume in between the two sporting volumes. This allowed for the inclusion of the formal entrance way that upon entry included a crush space that doubles as a venue for teams/families to meet and discuss and also a volume for ceremonies or prize-giving's that may follow any sporting event. On the level above this crush area the community lounge space from the preliminary design was developed. This space was now larger, oriented to the north with views of the mountains and coastline and also viewing areas down into the two main sport facilities from above. This community lounge was seen as the most crucial programmatic element in the design solution.

Reflection of design criteria:

1. Embrace and reflection of context through architecture.

This was primarily achieved through two major design elements. The first was to celebrate Kaikoura's coast and alpine setting by creating view frames and locating program with strong visual access to the north. While the amount of glazing was significantly reduced to address glare, each of the two primary sporting spaces had effective visual connections to the north that celebrated context. This was also achieved in the community lounge space above the sporting facilities that featured panoramic views of the coastline and mountain ranges. The second major design element was the structure, where the repetitive triangular nature of the structure was a direct reference to the significant alpine backdrop of the landscape. These triangular structural elements are primarily included in the communal areas of the building such as the central axial volume and the community lounge space. This triangular motif was also translated into the treatment of the concrete material on the north elevation and the permeable screens in the southern portion of the site. This particular design criterion and its corresponding implications in the building were mostly seen as a means of representing kotahitanga, unity, pride, passion. These were key terms from the experiment in Kaikoura and the way these have been reflected is successful.

*Top left: Figure 79: Design solution bird's eye perspective.
Bottom far left: Figure 80: Design solution field walkway perspective.
Bottom near left: Figure 81: Design solution section one.*

Reflection of design criteria:

2. Perimeter spaces, meeting spaces, community.

The planning of the building was prioritised around these spaces as the initial research and design experiments highlighted the social connotations of sport as being of high importance. The café space, community hall, multipurpose studio, lounge, and outdoor terraces are all effective elements that achieve this criterion. The solution features a range of spaces where the community can gather and be involved without necessarily participating in sport. This allows for a wider inclusiveness and extends the opportunities for the design to support community resilience. The community lounge space as previously mentioned is the most important and successful meeting space that effectively facilitates friendship, belonging, peer support and unity.

3. Visual connections and viewing areas.

There were two main elements that were able to address this particular requirement. The first was the treatment of the building's perimeter where visual permeability was the goal. Each sporting space and street edge is glazed in order to create dialogue between people inside and outside the building. This effectively facilitates belonging and pride where people can be involved regardless of activity. The second element was the provision of viewing areas at each sporting facility. There are bleachers and allocated seating at each of the sporting volumes for people to gather and watch, especially parents and families, to illustrate pride in their community.

Top left: Figure 82: Design solution section two.

Bottom left: Figure 83: Design solution formal entrance perspective.

Reflection of design criteria:

4. Flexibility of sporting spaces and options.

This particular design criterion was more targeted at addressing and facilitating the physical characteristics of sport whereas the others targeted the social characteristics more. The nature of large sporting volumes is that they are flexible and not limited to a singular use, especially the large court space. The variety of internal sporting options as well the extended program in the outdoor park space allows for the community to be involved with each other in a number of ways. This effectively targets the third concept regarding achievement, competition, stress relief, passion and exercise.

Top left: Figure 83: Design solution section three.

Bottom left: Figure 84: Design solution Deal Street perspective.

Top right: Figure 85: Design solution covered carpark perspective.

Middle right: Figure 86: Design solution functional entrance perspective.

Bottom right: Figure 87: Design solution circulation perspective.

Figure 88: Design solution cafe and entrance perspective.

Figure 89: Design solution pools perspective.

Figure 90: Design solution courts perspective.

Figure 91: Design solution community mezzanine perspective.
Next page: Figure 92: Design solution exterior from field perspective.

11

reflection and conclusion

Exegesis:

This chapter critically reviews the final design solution at its associated process in achieving it; the theoretical and experimental research, design principles and criteria and the translation of that into an architectural response. The previous chapter documented how the design criteria were met however this chapter addresses the successfulness, especially in regards to the two main parts of the research question; the role of sport in the post-disaster context and its translation into architecture. This evaluation will discuss the limitations in the scope of the design as well as areas which could have been developed further or any future possibilities.

The heart of this research portfolio was to test how a community sports facility could reflect the essence of sport in a recovering post disaster context. Investigating whether architecture could help facilitate the characteristics of sport that are so beneficial to the resilience of a community, this research provided an additional area of focus for post-disaster recovery.

Throughout this research portfolio, design experiments were carried out and design principles were outlined and discussed. The following evaluates the strengths and weaknesses of these especially in regards to their application and development through to the final design solution.

Conclusion:

What is the role of sport in the post disaster context and more importantly, how can this be reflected through it associated architecture?

Sport is not just a variety of games, the theoretical research and field research that was conducted throughout the course of this research portfolio indicates that sport as a tool for recovery from a disaster has significant positive effects on compromised individuals and communities. It is interesting, however, that sport facilities are not often a priority in the context of a community's rebuild. This design led research process was able to identify the role of sport in a specific post disaster community and test how architecture could facilitate this role of sport in a way that allowed it to be in itself, the most potent unifying force.

Aims and Objectives:

This research portfolio had two primary aims:

1. To develop an understanding of the role sport can have in disaster recovery and the specific characteristics that make it effective.
2. To investigate how that role can be translated into an architectural solution that captures the essence of the research.

Each of these objectives were achieved in the design research process. Through analysis of existing theoretical knowledge and field research involving members of a community whose lifestyles had been compromised by a significant natural disaster, a grounded

knowledge of the role that sport can play in the recovery process was developed and refined to a usable format. This was then tested in an iterative design process that investigated ways architectural design elements could facilitate that role. The iterative nature of this process meant that the application of the research changed from a sporting facility to a wider community facility that gravitated around sport. In the context of the research, that highlighted it was the social characteristics of sport, rather than the physical participation, that was the important area of focus, this development was a significant moment in the research. This moment is represented in the final design solution with evident development between the final design solution and the earlier preliminary design. The final solution provides the Kaikoura community an opportunity to recover together through sport with key design decisions and architectural elements directly influenced from their own responses.

Strengths, Weaknesses and Areas of Future Application:

The first strength of this design research portfolio was how the research was completed. The existing theoretical knowledge offered an understanding of the impacts of disasters on people and communities and the characteristics of sport that make it a valuable tool for recovery. It would have been sufficient for the research to have been concluded there and for the existing literature to be the only influence however the field research provided an additional and more personal influence on the project.

Through the participatory experiment and the design experiments that followed the content of the research was able to establish a greater hierarchy within it. It was not until the Kaikoura community was consulted that the social characteristics of sport were understood to be so crucial. This meant that the concepts and design criteria were significantly more relevant to the specific context of the research and that the solution had a greater opportunity to truly facilitate sport as a unifying force.

Another strength of the project was its believability and credibility. The final design solution itself is a pragmatic response to a brief that is serving an important role in regards to the recovery of a community. An abstract or exuberant response to the issue was considered a less effective approach as the final design solution may not have provided the community with any belief that it may be possible. The scale of the project in relationship to the community is suitable but also creates an opportunity as a true community hub and has been designed to have the capacity to act as a centre point for any future similar disasters. This scale and authenticity is seen as a significant strength to the project. The relationship to the selected site and its application to that site is also considered a strength as the form of the site was unusual and did not accommodate rectangular sporting volumes in a straight forward manner.

The reflection of the concepts and design criteria is another strength. The design encapsulates the context of the Kaikoura community and geography effectively, reflected through

design elements and visual connections. The facility provides a variety of opportunities for members of Kaikoura where the characteristics of sport are celebrated to allow them to promote their resilient nature. The emphasis on community with plentiful spaces for people to gather contributes to the previous point and is a significant positive in the outcome of this research.

While the final design solution had a number of strengths and effectively achieved the design criteria there was perhaps the opportunity to test formal volumes and qualities more thoroughly during the development stages of the process. The concepts were created conceptually but maintained their integrity through the application of building program which proved effective. The formal volumes were tested and analysed in a simple manner and the process of developing the formal concepts into more detailed design could have been tested further. The focus on the design criteria and introducing them into the design could have meant that less consideration was offered to architectural principles such as circulation. The relationship between serving and servant spaces, the sporting volumes and their ancillary program could have been further tested.

Design experiments one and two were effective and provided an additional dimension to the theoretical knowledge that significantly pushed the research in a good direction. Design experiment three was an effective way of both introducing a visual component to the research, illustrating what the concepts 'looked' like and

also verified that the terms do exist in contexts outside of Kaikoura. This experiment however could have been pushed looking at additional sports, levels of sports and sporting venues to see if any differences existed. This perhaps would have refined the knowledge of what design elements could facilitate the criteria better.

The field research that occurred was tailored specifically to the context and responses of Kaikoura. An additional area of direction for this research could be how the responses would differ in other communities. This could be larger communities in New Zealand or even internationally. With the number of disaster occurring increasing the content of this research will prove increasingly useful and perhaps an area of focus for any future recovery processes. It is unlikely that sport will become less popular and that is characteristics as a support mechanism will change. As the application of the research was in the form of a community sporting facility, another application of this knowledge that could be tested would be alternative sporting venues such as stadia. How could the same characteristics be reflected in alternative sports architecture?

Concluding Statements:

The contextual questions regarding the role of sport in post disaster communities was answered. It cannot be denied that sport as a tool for support and recovery can be significantly beneficial and perhaps this research highlights sport can be a priority activity in the context of

community resilience.

The design shows that through an understanding of sport and its supportive characteristics, architecture can both represent and facilitate these in a way that allows for sport to be the most potent unifying force.

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bibliography and figures

Bibliography:

Aotearoa, Stats NZ Tatauranga. 2013. “2013 Census QuickStats about a place: Kaikoura District.” http://archive.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-a-place.aspx?url=/Census/2013-census/profile-and-summary-reports/quickstats-about-a-place.aspx&request_value=14704&tabname=#.

Archdaily. Aug 2013. “Palace Of Water Sports In Kazan / SPEECH Architectural Office.” accessed May. <<https://www.archdaily.com/409119/palace-of-water-sports-in-kazan-speech-tchoban-and-kuznetsov/>>.

Archdaily. Dec 2012. “Gymnasium Régis Racine / Atelier d’Architecture Alexandre Dreysse.” accessed May. <<https://www.archdaily.com/304603/gymnasium-regis-racine-atelier-darchitecture-alexandre-dreysse/>>.

Archdaily. Jan 2011. “Gleneagles Community Center / Patkau Architects.” accessed May. <<https://www.archdaily.com/100591/gleneagles-community-center-patkau-architects/>>.

Archdaily. Jul 2013. “Nga Purapura / Tennent + Brown “, accessed May. <<https://www.archdaily.com/405034/nga-purapura-tennent-brown/>>.

Archdaily. May 2014 “Lentpark / Schulitz Architekten.” accessed May. <<https://www.archdaily.com/502781/lentpark-schulitz-architekten/>>.

Archdaily. Oct 2016. “Latymer Upper School Sports Centre / FaulknerBrowns Architects.” accessed May. <<https://www.archdaily.com/797481/latymer-upper-school-sports-centre-faulknerbrowns-architects/>>.

Bennett, B. W., James Macbeth Dann, Emma Johnson, and Ryan Reynolds. 2014. *Once in a lifetime : city-building after disaster in Christchurch* / edited by Barnaby Bennett, James Dann, Emma Johnson and Ryan Reynolds with foreword by Helen Clark featuring contributions from Kevin McCloud, Rebecca Macfie, Raf Manji, Shamubeel Eaqub and many more: Christchurch : Freerange Press.

Clubs, Kaikoura Combined Sports. 2016. “Kaikoura Pool and Sports Facility.” <https://givealittle.co.nz/cause/kaikourasportsfacility>.

Education, International Council of Sport Science and Physical. 2008. “Sport and Physical Activity in Post-Disaster Intervention.” In. Berlin, Germany: ICSSPE. <https://www.icsspe.org/sites/default/files/Handbook%20Sport%20and%20Physical%20Activity%20in%20Post-Disaster%20Intervention.pdf>.

Kaikoura; The Official Site for Kaikoura, NZ. 2016. “Where the Mountains meet the Sea...”, accessed June. <http://www.kaikoura.co.nz/main/Kaikoura/>.

Kunz, Valeria. 2009. “Sport as a post-disaster psychosocial intervention in Bam, Iran.” *Sport in Society* 12 (9):1147-1157. doi: 10.1080/17430430903137803.

Luck, Rachael. 2007. "Learning to talk to users in participatory design situations." *Design Studies* 28 (3):217-242. doi: 10.1016/j.destud.2007.02.002.

Manzo, Lynne C, and Douglas D Perkins. 2006. "Finding common ground: The importance of place attachment to community participation and planning." *Journal of planning literature* 20 (4):335-350.

McCrone, John. 2013. "The \$100 million question." Last Modified 18/05/2013, accessed 02/05. <http://www.stuff.co.nz/the-press/business/the-rebuild/8689845/The-100-million-question>.

Nations, United. 2010. *Natural hazards, unnatural disasters: the economics of effective prevention*: The World Bank.

Reich, Yoram, Suresh L. Konda, Ira A. Monarch, Sean N. Levy, and Eswaran Subrahmanian. 1996. "Varieties and issues of participation and design." *Design Studies* 17 (2):165-180. doi: 10.1016/0142-694X(95)00000-H.

Rodr, xed, Havid guez, xe, Joseph Trainor, and Enrico L. Quarantelli. 2006. "Rising to the Challenges of a Catastrophe: The Emergent and Prosocial Behavior following Hurricane Katrina." *The Annals of the American Academy of Political and Social Science* 604:82-101.

Rodríguez, Havidán. 2006. *Handbook of Disaster Research* / edited by Havidán Rodríguez, Enrico L. Quarantelli, Russell R. Dynes. edited by Russell Rowe Dynes, Enrico L. Quarantelli and SpringerLink. Boston, MA: Boston, MA : Springer Science+Business Media, LLC.

Stuff. 2016. "Earthquake: Deaths, major damage after severe 7.5 quake hits Hanmer Springs, tsunami warning issued." <http://www.stuff.co.nz/national/86416268/Earthquake-Deaths-major-damage-after-severe-7-5-quake-hits-Hanmer-Springs-tsunami-warning-issued>.

Thorpe, Holly. 2015. "Natural disaster arrhythmia and action sports: The case of the Christchurch earthquake." *International review for the sociology of sport* 50 (3):301-325.

Tierney, Kathleen J. 2014. *The social roots of risk : producing disasters, promoting resilience* / Kathleen Tierney. Stanford, California : Stanford Business Books.

Tonts, Matthew, and Kim Atherley. 2010. "Competitive sport and the construction of place identity in rural Australia." *Sport in Society* 13 (3):381-398.

Wang, David. 2013. *Architectural research methods*. edited by Linda N. Groat and Corporation Ebooks: Hoboken : Wiley.

Zealand, Christchurch and Canterbury New. 2012. "Kaikoura." accessed June. <http://www.christchurchnz.com/destinations/kaikoura/>.

Figures List:

All other figures throughout document are author's own.

Figure 12: Drawings and photographs for cast study one. Archdaily. Jul 2013. "Nga Purapura / Tennent + Brown", accessed May. <<https://www.archdaily.com/405034/nga-purapura-tennent-brown/>>.

Figure 13: Drawings and photographs for cast study two. Archdaily. Dec 2012. "Gymnasium Régis Racine / Atelier d'Architecture Alexandre Dreysse." accessed May. <<https://www.archdaily.com/304603/gymnasium-regis-racine-atelier-darchitecture-alexandre-dreysse/>>.

Right: Figure 14: Drawings and photographs for cast study three. Archdaily. Jan 2011. "Gleneagles Community Center / Patkau Architects." accessed May. <<https://www.archdaily.com/100591/gleneagles-community-center-patkau-architects/>>.

Figure 15: Drawings and photographs for cast study four. Archdaily. Aug 2013. "Palace Of Water Sports In Kazan / SPEECH Architectural Office." accessed May. <<https://www.archdaily.com/409119/palace-of-water-sports-in-kazan-speech-tchoban-and-kuznetsov/>>.

Right: Figure 16: Drawings and photographs for cast study five. Archdaily. Oct 2016. "Latymer Upper School Sports Centre / FaulknerBrowns Architects." accessed May. <<https://www.archdaily.com/797481/latymer-upper-school-sports-centre-faulknerbrowns-architects/>>.

Figure 17: Drawings and photographs for cast study six. Archdaily. May 2014 "Lentpark / Schultiz Architekten." accessed May. <<https://www.archdaily.com/502781/lentpark-schulitz-architekten/>>.