WATER AS A SOCIAL GENERATOR

Activating social and water security in residential Kilbirnie

Water as a Social Generator: Activating social and water security in residential Kilbirnie

How can underutilised space in a residential area be transformed to provide social and water security in an everyday and resilience context.

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ABSTRACT

Residential streets make up a large proportion of accessible public space while failing to facilitate community activity. These streets carry a relatively low volume of traffic, yet are standard in form. This factor in conjunction with the self-contained nature of houses in residential areas results in a lack of social capital in areas with a large amount of social potential.

The suburbs of Kilbirnie on the Rongotai isthmus in Wellington have been selected as the site due to the potential of the streets; in particular due to their width and mono-functionality. The five sites that have been selected have potential far beyond their current use and are going to be used as a design case study to explore pre-emptive disaster design in conjunction with providing social amenities.

The streetscape within the identified site is excessively wide with a large amount of on-street parking. This thesis argues that this extra, underutilised space has the potential to be adapted into an aesthetically pleasing, functional community amenity. The designs will break up the monotonous nature of the residential streets and create a hub for surrounding residents through the exploration of programme and form. The introduction of water storage infrastructure as a programme will pre-emptively service the suburb in the event of a disaster. The likelihood of the potable water supply being severed to both the Wellington CBD and to the Rongotai Isthmus and Miramar Peninsula is high due to the location of the service pipes in relation to the dominant fault lines in the suburb.

The study proposes exploring programmes which challenge people's perception of ownership of public land and amenity. Re-allocating and prioritising parts of street space to provide amenity for surrounding residents has the potential to initiate a change from monotone, mundane functionality into a hub of social activity, community building and disaster resilience. The design methodology uses precedents which employ techniques that can be used to challenge the norm and provide a design outcome which creates engaging residential spaces.

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PART 1

1.0

I N T R O D U C T I O N

1.0 INTRODUCTION

This 'research through design' thesis investigates the potential for underutilised spaces to provide water and social security in an everyday and post-disaster context in residential Kilbirnie through the application of contemporary landscape architectural methods.

1.1 PROBLEM STATEMENT AND OPPORTUNITY

Water and social interaction are the two of most important elements of human society. Fundamentally they allow us to survive and to function as a community. Natural disasters threaten the stability of social and water infrastructure through either partial damage or destruction to the networks and facilities which sustain them. Central Wellington is particularly vulnerable due to the location of the dominant reservoirs far out of the city in Te Marua and Wainuiomata, coupled with the fact the trunk water mains which supply all the local reservoirs, follow the coast and intersect with the Wellington fault line.

This part of the problem statement forms itself as more of an identified opportunity. The site which will be used to test the question is Kilbirnie, which is a suburb of little note, having little to no defining features other than the natural geography which make up its surrounds. The streets among the residential areas are especially wide for the amount of traffic they carry, and have a latent potential for alternative uses. So the question is: What is the best way to design spaces which create a reciprocal relationship between water infrastructure and social activity within Kilbirnie's underutilised spaces?

SITE, PROBLEMS AND OPPORTUNITIES

Five sites which adhere to a number of criteria were selected for experimenting with the question. The sites fit into two different categories.

- Major Hub
- Minor Hubs

The Major Hub is situated adjacent to the Bus Barn, in what is a neglected, dilapidated space which partly functions as a pedestrian route between blocks. It runs between the western side of the suburb through to Rongotai College. This site was chosen partly because of the potential for development. However, the site does have an interesting constraint as it is the main drainage easement for delivery of sewerage from the city out to the Moa Point treatment plant. With 6 pipes running below the land, this limits the location of development, and the nature of the materials that are situated on the site.

The Minor Hubs were selected to be equidistant from the Major Hub to create a network across the suburb in which no resident was further than 400-500 metres away from a site. All of these sites are adjacent to existing community amenities; shops, dairies, churches etc. They all have excessively wide streets and have been observed to carry relatively minimal traffic across the day.

The identification of this network of sites leads to a hypothesis aimed to develop a methodology and a design:

The creation of a network of equidistant and connected sites can be used to develop social networks and provide water security in both under-utilised street space and neglected space. The equidistance between sites creates a central anchor that allows for social pockets to form. The design at the sites provides social amenity and space which encourages gathering and play through the use of seating, shelter and play spaces integrated with water infrastructure elements.

1.0 INTRODUCTION

1.2 MOTIVATION

The motivation for this research topic arose out of an interest in the idea of streets achieving more as spaces. It seems that throughout New Zealand it is accepted as fact that streets are solely for the transport of cars, and I believe this is something that needs to be challenged. The amount of public space which is dedicated to transport infrastructure, a necessary amenity, is too focused on only providing efficiency, and the opportunity for these public spaces to provide a social amenity is overlooked. This is especially true in residential areas where wide streets encourage traffic to move fast through an area where speed isn't a priority. People live in these spaces; therefore the streets should be able to provide more functionality and amenity for residents and the community.

1.3 AIMS

- To examine sites across the suburb which are equidistant with an aim to create social pockets for residents, and encourage the development of social networks.
- To explore reciprocal relationships between social and infrastructural interventions in under-utilised space within the suburb.
- Using contemporary landscape architectural practices to experiment with rapidly accessible, robust public space which will help create awareness of the vulnerability and provide resilience for Kilbirnie to natural disasters.

1.4 SCOPE

The scope of this study is to explore how social pockets can, as a social infrastructure, function in the Lyall Bay and Kilbirnie suburbs of Wellington to provide social security in conjunction with water security as a component of resilience.

The main topics which the literature review will examine are:

- Social Capital and the ideal size for social pockets
- Emergency Recovery and disaster readiness
- Pre-emptive design

These topics will then be integrated into a design methodology informed by landscape architecture techniques amongst other criteria. The methodology will test their potential and worth through development and iterations in the specific sites within the identified suburb.

SOCIAL POCKETS

RECIPROCITY

EVERYDAY + POST DISASTER

Figure 1. Aims diagrams

1.0 INTRODUCTION

Figure 2. New Zealand
Context Map

1.5 OVERVIEW OF STUDY: METHODOLOGY, STRUCTURE AND SUPPORTING THEORETICAL BACKGROUND

Part 1 Includes this introduction, and goes on to provide a background to the concept of the design, discussing the connection between water and society, the disaster potential of site and the water tanks role and street's as a flexible social space.

Part 2 is a three part section which (1.) Explains the methodology used to reach the final product. This is done by showing the site analysis undertaken, explaining the precedent study. (2.) Examines the theoretical background of literature which was used to enhance the project and present a precedent study which aims to provide landscape architecture strategies to develop the design. The identified topics are Social Capital, Emergency Recovery/ Disaster Readiness and Pre-emptive Design. (3.) Analyses precedent case studies as a method towards developing the final design.

Part 3 is a two part section which firstly covers a site analysis of Kilbirnie and the mappings which were used to select the five selected sites for the design. Second is the Design section where the final design images for the 5 sites are displayed in succession with annotation explaining the design.

Part 4 is made up of the Design Discussion, which is a critical discussion of the design, as well as the conclusion to the thesis. This critique will assess how successful the design and project has been and If it has met the criteria set in the initial chapters.

1.2

BACKGROUND

1.2 BACKGROUND

Figure 3. Diagram of
waters influence on
society

There are three main concepts that form the basis of this project.

CONNECTION BETWEEN WATER AND SOCIETY

Water systems and the rise of modern society are intrinsically linked together, requiring a reciprocal relationship between the two for either to start to develop to a high quality. Humans rely on water to survive, and being deprived of water for 3 days in certain climates can bring most life close to death. Access to water has been described as being “a social good”. Peter Gleik et al. in their paper *The New Economy of Water* state that:

“Social goods are those that have significant “spill-over” benefits or costs. Literacy is a social good, for example, because it benefits not just literate individuals but also makes possible a higher level of civilization for all members of a society (2002).”

This same analogy could be used to describe all infrastructural systems within society, they become Social Goods because they allow for people to prioritise their time and spend less energy on the collection of water for example. When these infrastructural systems become damaged or compromised in the event of a disaster, alternate ways need to be found to deliver the same goods as the original system, temporarily or semi-permanently until the system can be restored. These alternate methods have the potential, in turn, to act as a social good; in this case as a catalyst to bring community closer together.

1.2 BACKGROUND

DISASTER POTENTIAL OF SITE AND WATER TANKS ROLE

Kilbirnie is a vulnerable site in the event of a disaster. The security of its water supply is put at risk due to the location of the infrastructure which supplies the city in relation to the major fault lines which run through greater Wellington. As seen in figure 4, the major Wellington Fault line crosses the path of the main water pipelines twice.

These pipes supply the whole of the CBD and the surrounding suburbs excluding Karori which is supplied by the main line as well as another line from the Porirua area. The proposed programme of water tanks will increase the resilience of the suburb in a social and infrastructural sense. They will provide a temporary service for residents of the suburb until the potable system can be restored.

Figure 4. Map of major Wellington Fault lines, the water network and water reservoirs in Greater Wellington

1.2 BACKGROUND

Figure 5. Diagram of improving the streets flexibility.

STREETS AS A FLEXIBLE SOCIAL SPACE

The function of a street has slowly been changing over the past few decades. While it is obvious that the purpose of today's street is to carry traffic, there has always been a sub-layer of informal programme and social activity which occurred naturally on the street. Children used to play in the street, there used to be strong interaction between neighbours and these freedoms have been eroded away by the dominance of the car in residential areas (Tranter, Doyle 1996). In his paper *Changing the Residential Street Scene*, Ben Eran-Joseph takes a quote from the Urban Land Institute's *Residential Streets* which states:

"Residential streets do not only provide direct auto access for the occupants to their homes, but they also provide a visual setting; an entryway for each house; a pedestrian circulation system; a meeting place for residents; a play area (whether one likes it or not) for children, etc" (Eran-Joseph, 505) (Urban Land Institute, 20).

While it is true that these types of interaction still occur in some areas, it is less prominent due to the transport focused nature of suburbs and the reduction in walking as the prominent mode of transport. It can be argued that high fences for privacy within suburbs have played a factor in this, as visibility on to the street is cut off and the likelihood of 'chance' meetings between fellow residents and neighbours is reduced. Challenging this in particular will be a priority for the development of this thesis.

PART 2

METHODOLOGY, METHOD. LITERATURE REVIEW.
PRECEDENT STUDY

2.1 METHODOLOGY

Figure 6.Methodology process diagram

The methodological structure this thesis follows is 'research through design.' Research through design fundamentally means that the research was undertaken through the exploration and experimentation of form, and form within a sites context to develop concepts, programme and designs, with the goal of coming to conclusions that are visual. This is in contrast to a more traditional theory or literature based research method, which inherently results in a more writing focused output.

The research through design method has been promoted in this thesis programme over the course of the year through an initial intensive two week design crash course and two semi-formal, organised design reviews throughout the year. These design reviews encouraged the development of concept and form through presentation based deadlines and forced an output of design work and provided feedback from a panel to aid in further development of concept.

2.12 METHOD

Design Workshops: These design workshops were crash courses in developing ideas. The first intensive one involved challenging the ideas presented in the initial proposals through regular and sometimes hourly deadlines. This resulted in sketch concepts which were then critiqued in a group setting.

Design Review 1 (June): The period leading up to this design review in June was mainly allocated towards developing concepts in. At this stage of the thesis the concept was attempting to do too much. Water storage and security had been identified as a programme, however the focus was primarily looking to reallocate street space and fill it with programme that was multifunctional. The main concepts that I carried forward out of this review were challenging the public/private boundary through multifunctional fence lines and water security as a programme.

Figure 7.Design Review 1 drawings

Design Review 2 (September): This design review took place at the beginning of September. Developing the original concept from the first design review was aided by the feedback from the panel which helped to refine the concept down to a few key concepts. Creating multifunctional elements was a goal. This resulted in the façade support in the bus barn site, as well as water tanks in the streets with covers which facilitate drainage and socially encourage activity through seating and play.

Post Design Review 2: The feedback from the design review was relatively positive. It pushed the concept forward through trying to create a unique street side typology. The criticism suggested that the existing design was boring and uninspired, and something needed to be done to make it more exciting.

Figure 8.Design Review 2 drawings

2.2 LITERATURE REVIEW

SOCIAL CAPITAL

The role of social interaction as tool towards creating a resilient community is one of the key focuses of my research question which aims to improve the social and physical resilience of Kilbirnie.

Kilbirnie is a relatively small and contained suburb, being flanked by hills to the east and west, and the ocean to the north and south. J. Eric Oliver, in his paper *City Size and Civic Involvement in Metropolitan America*, states that smaller communities, with more defined boundaries result in a more socially and politically active community, stating that “city boundaries are important for defining social behavior and perceptions”...(369) which result in stronger social connections and increases social capital. Social capital can be defined as the idea “that individuals invest, access, and use resources embedded in social networks to gain returns” (Norris, 137). However, Kilbirnie’s size does not necessarily indicate a socially active and successful community. Utilising the concept of social capital as a concept behind design and process will help to create spaces which provide for everyday social interaction, as well as increasing the resilience capabilities of the suburb and its resident’s post-disaster through improved social networks. Walker and Salt in their book *Resilience Thinking* elaborate on this; saying “Trust, strong networks, and leadership” will ultimately influence the “capacity of the people in that system to respond,

together and effectively, to change any disturbance” (147). It can be hypothesised that creating equidistant central hubs throughout the suburb will help to improve social capital as Oliver states that “despite the fact that boundaries in many metropolitan areas are invisible amid a continuous urban sprawl, they nevertheless influence the behaviour of the residents within them” (371). This can be interpreted as meaning that the boundaries don’t have to be clearly defined and visible to improve social capital. In terms of successful community pocket sizes, Oliver says “compared to people in places smaller than 2,500, people in cities of more than one million score nearly 0.40 lower, on average, on the five-point local political interest scale ” (369). This is an indication of improved social and political mobilization due to inherently stronger social networks in smaller communities. In Kilbirnie, creating social pockets at equidistance will result in a size closer to 1400 people, based on 2006 census information. The number of equidistant sites will result in the suburbs entire population being within a 500m radius of a central community hub.

EMERGENCY RECOVERY/ DISASTER READINESS

Being prepared for a potential disaster is one of the aims of the equidistant hubs proposed for Kilbirnie. Studying the strategies in *Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness* (Norris et al.) will give these hubs increased depth and value through

2.2 LITERATURE REVIEW

programme required to be adaptive post-disaster. Norris et al. propose “that resilience-resources have three dynamic properties: robustness, redundancy, and rapidity” (134). Robustness is defined as “resource strength, in combination with a low probability of resource deterioration”, redundancy as “the extent to which elements are substitutable in the event of disruption or degradation” and rapidity as “how quickly the resource can be accessed and used” (Norris et al., 131). Using these criteria to inform the intervention designs will turn them into resilience-resources, and will give them a guarantee of functionality beyond their everyday social capacity. Norris et al. state that for a resource to stimulate resilience it only needs to embody one of the three dynamic properties named above; however it can be considered that embodying all three will improve the resources capacity to function post-disaster when it has to withstand and adapt to a myriad of possibly unknown challenges.

Another set of criteria Norris et al. identify is the “three key social psychological dimensions of social capital”; these being “sense of community, place attachment, and citizen participation” (2007, p.131). Sense of community is the emotional bond that one has with other members of the community and is “characterized by high concern for community issues, respect for and service to others, sense of connection, and needs fulfillment,” (Norris et al. p.139). Place attachment is the emotional connection a resident has towards

its locale and “place attachment often underlies citizens’ efforts to revitalize a community (Perkins et al. 2002) and thus may be essential for community resilience.” (Norris et al. p.139). Citizen participation is defined as “the engagement of community members in formal organizations, including religious congregations, school and resident associations, neighbourhood watches, and self-help groups (Perkins et al. 2002; Wandersman 2000)” (Norris et al. 2007 p. 139). As far as the way these three social criteria can be influenced through my design, place attachment is the one with the most potential for influencing the social behaviour of residents, although it is good idea to keep the other two in mind while designing. Place attachment will inherently already exist in a residential setting, however I think creating a distinctive design at the centre of social pockets, which embodies the three dynamic properties and provides a platform from which the three social criteria can spring from, can improve this.

PRE-EMPTIVE DESIGN

The title of this design strategy brings to mind designing in anticipation pre-disaster, for a worst case scenario post-disaster. This is not the case however, as Miho Mazereeuw in her article Pre-emptive Landscape: A prototype for coastal urbanization along the pacific ring of fire (2011) examines the disaster struck Japanese coast as a precedent for developing pre-emptively designed cities post disaster. Mazereeuw identifies that post-disaster is the ideal time to

2.2 LITERATURE REVIEW

re-design cities to not make the same mistakes that led to such destruction, and to take advantage of derelict space to improve the cities resilience. However, this scenario does not apply to my case study, and I will be using the idea of pre-emptive design through retrofitting to work within the confines of a well-established suburb, rather than utilising space cleared of any substance by a destructive disaster as Mazereeuw is proposing. A pre-emptive design in response to such an enormous disaster will inherently be more drastic and holistic, because when you have to start from scratch, and you know what a disaster can do to a site, you have more opportunity to completely change the way a city is designed. Mazereeuw touches on designing “multiple levels of redundancy” into urban areas as way of creative an adaptive city (2011, p. 82). Having identified redundancy as the main design consideration indicates the capacity for elements to fail and for the slack to be picked up by other physical and social infrastructures. This relates back strongly to Walker and Salt (2007) and the idea of modularity and fluctuation within resilience thinking, and the recognition by Norris et al. that “resilience is better conceptualized as adaptability than as stability” (130). Embracing the ideas of redundancy and adaptability is an important design consideration. Designing within my hubs, both for separate sites, and for separate elements within individual sites to to be more effected than others will improve the social and adaptive capacities of the sites by not compromising the system as a whole.

2.3

P R E C E D E N T

S T U D Y

INTRODUCTION

This chapter's purpose is to provide a series of tactics which help drive the design. The analysis will take into account aesthetic, functional and programmatic considerations from relevant modern landscape architectural projects with an outcome of broad scale and specific design moves.

THE REAL ESTATE

Figure 9. The Real Estate images -
by AL/Arch, *The Real Estate* AL/Arch.
Photography. Webshots. Web. 15 August 2012.

Firm: AL/Arch – Avi Laiser Architecture, Dana
Hirsch Laiser
Location: Bat Yam, Israel
Date Completed:

Figure 10. Intimate spaces tactic
diagram

Tactic: Create intimate spaces
which feel private but are still
visible public space.

VAN BEUNINGENPLEIN

Figure 11. Beuningenplein Playground - by Carve Landscape Architecture, *Beuningenplein Playground*. Photography. Webshots. Web. 15 August 2012.

Firm: Carve in collaboration with Dijk&Co and Concrete A.A.
Location: Van Beuningenplein, Amsterdam
Date Completed: 2011

Figure 12. Building frame extension tactic diagram

Tactic: Extension of building frame to create shelter and using vertical elements to encourage gathering and create play space.

PLAYGROUND IN BELLEVILLE PARK

Figure 13. Belleville Park Playground by BASE. *Le site officiel de la base Paris: Playground*. Photography. Webshots. 20 August 2012.

Firm: BASE - Build A Super Environment
Location: Paris, France
Date Completed: 2008

Figure 14. Linear and indirect paths tactic diagram.

Tactic: Have a direct linear path as well as interventions which allow thoroughfare while encouraging play and inhabitation.

DUNE STREET FURNITURE

Figure 15. Dune by Ferpect. *Ferpect Dune*. Photography. Webshots. 20 August 2012.

Firm: FERPECT

Location: La Défense Square, Paris

Date Exhibited: March 28th - December 21st 2012

Figure 16. Modular and interactive tactic diagram.

Tactic: Disrupt paths, create interest and encourage interaction along thoroughfares while being Modular and moveable.

CIVIC EXCHANGE

Figure 17. Civic Exchange by Antenna Design. *Antenna: Projects - Environment*. Photography. Webshots. 15 July 2012.

Firm: Antenna Design

Location: Proposed for Lower Manhattan

Date Completed: 2005

Figure 18. Modular and interactive multifunctional shelter tactic diagrams.

Tactic: Create multifunctional designs with modular elements. Particularly shelter which collects resources and encourages gathering.

LEYTEIRE SQUARE

Figure 19. Civic Exchange by Antenna Design.
Antenna: Projects - Environment. Photography.
Webshots. 15 July 2012.

Firm: Debarre Duplantiers Associés
Location: Bordeaux, France
Date Completed: 2012

Figure 20. Non-uniform engaging edges diagram.

Tactic: Spaces with clear pathways, with staggered edges and planting to create privacy while remaining permeable.

PASSEIG DE ST JOAN BOULEVARD

Figure 21. Civic Exchange by Antenna Design.
Antenna: Projects - Environment. Photography.
Webshots. 15 July 2012.

Practitioner: Lola Domènech,
Location: Barcelona, Spain
Date Completed: 2011

Figure 22. Permeable street buffer and ground treatment diagrams.

Tactic: Using planting to create pockets of gathering and as a permeable buffer from traffic on the street.

NORTH WHARF PROMENADE

Figure 23. North Wharf Promenade by TCL and Wraight + Associates. *T.C.L Taylor Cullity Lethlean: Projects*. Photography. Webshots. 20 October 2012.

Firm: Taylor Cullity Lethlean and Wraight + Associates
Location: Auckland
Date Completed: 2012

Figure 24. Viewing and interactive structure diagram.

Tactic: create interaction with an area which would otherwise be ignored through a climbing structure

MANGUINHOS RAMBLA

Figure 25. Manguiinhos Rambla by Jorge Mario Jáuregui. *MoMa, Small Scale Big Change. Manguiinhos Complex*. Photography. Webshots. 20 September 2012.

Firm: Jorge Mario Jáuregui
Location: Manguiinho District, Rio De Janeiro
Date Completed: Ongoing

Figure 26. Retaining infrastructure function through re-orientation diagram.

Tactic: Relocate infrastructure without inhibiting its functionality, and reusing reclaimed space to encourage pedestrian movement and creating social space.

PART 3

SITE ANALYSIS AND DESIGN CHAPTERS

3.0 PRINCIPLES

In the process of selecting a site for the, the basic criteria for selection were: relative proximity to Wellington; and an area with wide streets and under-utilised space. Based on these criteria, Kilbirnie and Lyall Bay were an obvious choice.

This design aim is formed around the idea that residential suburbs should have a level of both social capital building and social security, while providing resilience in the event of a disaster. The suburb should therefore provide spaces which actively encourage these criteria. There are four key principles which will guide the design.

KEY PRINCIPLES

1. SITE PRINCIPLE:

Equidistance between sites. This equidistance, as discussed in the previous chapter, will begin to create clusters of people in social pockets throughout the suburb. Oliver (2000) has documented this as positively encouraging political and social mobilization which increases social capital and strengthens social networks.

2. PROGRAMME PRINCIPLES:

Designing for the everyday and the post disaster scenarios. This proposes the integration of infrastructure which encourages daily social activity, while having a sub-layer of programme that provides security for the residents of the suburb in the event of disaster.

Reciprocity and Redundancy: When designing, creating elements which are multifunctional in the services or functions they provide is important when working with limited space. Taking this further; implementing elements which are reciprocal allows for duplicated elements to be redundant without compromising the entire system.

3. INFRASTRUCTURAL PRINCIPLE:

Water tanks as a resilience element: In the event of a disaster in

Wellington, the entire city could potentially be cut off from the water supply due to location of major fault lines in relation to our potable water system which supplies the city. While it is a realistic goal for each household to have their own stockpile of food and water; using water tanks as a focal point within Kilbirnie, around which to create spaces which encourage social activity, highlights the suburbs vulnerability to natural disasters and increases awareness.

4. FORM PRINCIPLES: BOUNDARIES BETWEEN PUBLIC AND PRIVATE SPACE.

This principle is about challenging the norms within residential areas. Targeting fence lines in particular due to their segregating nature in what should be, and once was, social and inclusive by nature. Breaking down the boundary between the street and the front yard aims to encourage a development of social networks between residents and their neighbours.

3.1

S I T E A N A L Y S I S

LANDSCAPE PROGRAMME

This series of mappings helps to fully understand the site that is being dealt with. It does this by examining the layers and levels of programme which constitute the suburb and allow myself and the reader to understand what it means to be an inhabitant of the area. To achieve this number of main elements have been analysed:

- Suburb scale programme
- Density of housing
- Physical nature of streets

Identifying opportunities at the larger scale brought a level of clarity to selecting smaller sites, through beginning to see where there was a lack of alternate programme amongst residential areas in conjunction with excessive street width and denser housing.

With the selection of Rua Street, Apu Crescent, Yule Street, Tirangi Road and the Bus Barn Drainage Easement sites, a more detailed analysis of the particular functionalities of these sites, as well as a character analysis of the facades along the streets. The results taken from these heavily inform the locations selected for the specific designs.

1:12,500

Figure 27. Kilbirnie Landscape
Programme plan

DEMOGRAPHICS

Figure 28. Kilbirnie Suburb Population Plan

Diagrams and populations based on 2006 census information. Kilbirnie and Lyall Bay combined have a total population of 6537.

Illustrates the family living situations in Kilbirnie and Lyall Bay. Even split between

The majority of both suburbs drive or bus to work which is likely an indication of the location of their workplace rather than a reflection of walkability in the suburbs.

High amount of professionals. Indicates the Wellington CBD as the workplace which corresponds with Fig X above.

Figure 29. Demographics bar graphs. Information retrieved from < <http://profile.idnz.co.nz>>

DWELLING TYPES

Figure 30. Dwelling totals in Kilbirnie and Lyall Bay Plan

There is a trend moving towards higher levels of medium density housing in both Kilbirnie and Lyall Bay which necessitates a need for more rapidly accessible outdoor space.

Figure 31. Dwelling Type graphs. Data Retrieved from
< <http://profile.idnz.co.nz>>

STREET WIDTHS

Kilbirnie as a suburb has a relatively standardised street width. There are very few streets narrower than 10 meters from kerb to kerb in width. The majority of streets are 12 meters or more, and a lot of these carry a very low amount of traffic.

>10

Endeavor St 7.0m

Sutherland St 9.2m

10-12

Queens Dr 11.5m

12-14

Yule St 12.5m

Tirangi St 13.5m

14<

Onepu Rd 14.5m

Lyall Parade 15.5m

Figure 32. Specific Street width images. Kilbirnie. Google Maps Street View. Google. 27 September 2012.

1:12,500

Figure 33. Kilbirnie Street Width Plan

SITE SELECTION

With the selection of Rua Street, Apu Crescent, Yule Street, Tirangi Road and the Bus Barn Drainage Easement sites, a more detailed analysis of the particular functionalities of these sites can be undertaken.

YULE STREET

TIRANGI ROAD

BUS BARN DRAINAGE EASEMENT

APU CRESCENT

RUA STREET

Figure 34. Site Selection Plan

MINOR SITES PROXIMITY TO AMENITY

Figure 35. Minor Sites Proximity to Amenity

CONTEXT MAP

Figure 36. Rua Street Context Map

8AM

12PM

4PM

Figure 37. Rua Street Aspect diagrams

NORTHWESTERLY

SOUTHERLY

Figure 38. Rua Street Wind diagrams

RUA STREET

This site is heavily influenced by the mountain ranges to the west which are the dominant element in the space.

Figure 39. Rua Street Off Street Access.

Figure 40. Rua Street street-side garages.

Figure 41. Rua Street Front Yards.

Figure 42. Rua Street Bus Route.

Figure 43. Rua Street Sectional Perspective

Figure 44. Rua Street Photos. Authors own images.

RUA STREET CONNECTIONS ANALYSIS

NORTHERN SIDE

Low fences with triangular front yards due to the north/south orientation of the houses and the angle of Rua St.

The only buildings perpendicular to the street. A couple of garages and a back section property, and one house with a decent facing onto the street with a low fence and a high volume of planting.

SOUTHERN SIDE

Low picket fences with visible front yards and houses with a front facing facade. Well connected to the street through large windows facing the street and little front yards with seating and planting.

High fences with a very poor connection to the street.

Figure 45. Rua Street Facade and Street Connections Images. Rua Street, Kilbirnie. Google Maps Street View. Google. 27 September 2012.

Figure 46. Rua Street Analysis Diagrams.

APU CRESCENT CONTEXT

CONTEXT MAP

Figure 47. APU Crescent Context Map

ASPECT

8AM

12PM

4PM

Figure 48. APU Crescent
Aspect diagrams

WIND

NORTHWESTERLY

SOUTHERLY

Figure 49. APU Crescent
Wind diagrams

APU CRESCENT

There are a large number of garages on the northern side of the street which limit the amount of space which can be reclaimed for executing the concept. The southern side of the street is essentially perfect as it only has a few instances of off street car access or on street garages.

Figure 50. Apu Crescent Off Street Access.

Figure 51. Apu Crescent street-side garages.

Figure 52. Apu Crescent Front Yards.

Figure 53. Apu Crescent Sectional Perspective

Figure 54. Apu Crescent Photos. Authors own images.

APU CRESCENT CONNECTIONS ANALYSIS

Figure 55. APU Crescent Facade and Street Connections Images. APU Crescent, Kilbirnie. *Google Maps Street View*. Google. 27 September 2012.

Minimal connection to the street. Long dominant facades but no connections onto the street.

Long facade and windows which overlook the street, with a small front yard.

Low fences with adequate front yards.

Front yards with minimal connection to the street through set back houses and a combination of high fences and dense planting.

Figure 56. APU Crescent Analysis Diagrams.

A large number of garages with a street facade. Means more obstacles and less space to design in due to necessary access way.

YULE ST CONTEXT

CONTEXT MAP

Figure 57. Apu Crescent Context Map

ASPECT
8AM

12PM

4PM

Figure 58. Apu Crescent
Aspect diagrams

WIND
NORTHWESTERLY

SOUTHERLY

Figure 59. Apu Crescent
Wind diagrams

YULE ST

Selected due to wide street, equidistance to other sites and as a low traffic carrying, quiet residential street. Adjacent to high traffic carrying Rongotai Road to the north. There are a large number of on street garages and off street parking on the eastern side of the street.

Figure 60. Yule St
Off Street Access.

Figure 61. Yule St
street-side garages.

Figure 62. Yule St
Front Yards.

Figure 63. Yule St
Sectional Perspective

Figure 64. Yule St Photos.
Authors own images.

YULE ST CONNECTIONS ANALYSIS

Figure 65. Yule Street Facade and Street Connections Images. Yule Street, Kilbirnie. Google Maps Street View. Google. 27 September 2012.

High fences and facades which aren't oriented towards street.

Low picket fences and strong connection through large windows and front yards.

Space in front of houses with more emphasis on parking, generally uncovered and moderate connection to the street.

Large front yards with grass area and windows which overlook yard and street.

Fences and garages which dominate boundary .

Moderate connection to street, with more emphasis on parking rather than

Figure 66. Yule St Analysis Diagrams.

TIRANGI ROAD

CONTEXT MAP

Figure 67. Tirangi Road Context Map

ASPECT

8AM

12PM

4PM

Figure 68. Tirangi Road
Aspect diagrams

WIND

NORTHWESTERLY

SOUTHERLY

Figure 69. Tirangi Road
Wind diagrams

TIRANGI ROAD

The most topographically interesting of the five sites. In close proximity to the airport. The houses on the eastern side of the street drop down a lot from the level of the street. Having structures on this side of the street may be too imposing and would block a significant amount of sun. Having the intervention on the western side will facilitate more of a flow between public and private space.

Figure 70. Tirangi Road
Off Street Access.

Figure 71. Tirangi Road-
street-side garages.

Figure 72. Tirangi Road-
Front Yards.

Figure 73. Tirangi Road
Topography.

Figure 74. Tirangi Road
Sectional Perspective

Figure 75. Tirangi Road
Photos. Authors own images.

TIRANGI ROAD CONNECTIONS ANALYSIS

Figure 76. Tirangi Road Facade and Street Connections Images. Tirangi Road, Kilbirnie. Google Maps Street View. Google. 27 September 2012.

Figure 77. Tirangi Road Analysis Diagrams.

Corner dairy with attached house. Long facade. Inherent connection to the street. Small courtyard.

Garages make up street front with the houses set back in the property. Minimal interaction with the street. Topography helps to inform this.

Decent relationship to the street considering dip in topography. Low fences, low planting enhances visual connection.

Buildings overlooking street due to topography on the west side of the street. Low planting. Strong connection to the street despite distance from footpath.

Minimal connection with street. Relatively high fence. Although decent sized backyard adjacent to the street has potential for connection. On corner so oriented towards Coutts Street.

BUS BARN DRAINAGE EASEMENT

CONTEXT MAP

Figure 78. Bus Barn site Context Map

Figure 79. Bus Barn site Aspect diagrams

Figure 80. Bus Barn site Wind diagrams

BUS BARN DRAINAGE EASEMENT

The Bus Barn itself is one of the most characteristic buildings in Kilbirnie. The adjacent empty site is a strange one, devoid of any development due to it being a drainage easement. 6 sewerage pipes run underneath the ground below it from Central Wellington out to the Moa Point sewerage treatment plant.

This has resulted in a dilapidated, run down site that forms part of a larger informal walkway which runs between Tirangi Road to the east and Queens drive to the west.

Figure 84. Bus Barn Informal Walkway

Figure 85. Bus Barn site Photos. Authors own images.

Figure 81. Bus Barn site drain locations

Figure 82. Bus Barn site back yards

Figure 83. Bus Barn site Sectional Perspective

FUNCTIONAL AND SPATIAL RELATIONSHIPS

As a conclusion to the site analysis chapter, these spatial and functional relationships for both the minor sites and the major drainage easement site have been developed. The two sets of flow diagrams illustrate the essential similarities and differences in programme and spatial organisation between the two types of site.

MINOR SITES

FUNCTIONAL RELATIONSHIPS

SPATIAL RELATIONSHIPS

DRAINAGE EASEMENT

FUNCTIONAL RELATIONSHIPS

SPATIAL RELATIONSHIPS

3 . 2

D E S I G N

3.21 KILBIRNIE DEVELOPMENT PLAN

The Kilbirnie Town Centre Revitalisation Plan is a 3 part document which outlines landscape and architectural issues within Kilbirnie/Rongotai. It proposes a series of 12 broad Key Goals which have been identified to combat the outlined issues, then backs up the goals with 13 specific opportunities which become part of a programme and strategy in which there is a distinct prioritisation of the opportunities to provide the maximum benefit to the centre and suburb as a whole.

The proposed interventions in the research work in conjunction with goals 4, 5 and 11 from the district plan. These being:

- #4: Improve sense of place
- #5: Improve public spaces
- #11: Maximise the potential of community infrastructure

Streets provide an ideal site for interventions which aim to provide a service to the community due to the rapid accessibility of them. An apt analogy to explain this further is the idea of having a vege garden on your property; if the garden is situated close to your front door, there is a higher tendency to maintain and utilise the garden, which is not the case when it is out of sight.

Having community and resilience amenity integrated into the streetscape results in people experiencing these interventions by default on a daily basis, and this will contribute to a change in behaviour through either conscious or subconscious use of the space.

The Plan's identified opportunities which align with my proposal for the suburb are:

- Opportunity 11: Community Walkway and Cycleway

Opportunity 11 turns the drainage easement, which I have identified as my Major Site, from what is currently informally used as a walkway,

into a recognised and designed walkway and cycleway. The drainage easement is ideally located in relation to a number of key features within the suburb. It provides a relatively unobstructed, pedestrian dedicated route all the way across the suburb: from the hills in the west, passing through a number of key roads and past Rongotai College, through to the Big Box Retail outlets on Tirangi road by the airport.

3.23 FOUR PROGRAMMES

At the design's core there is a basic combination and conversation between four basic programmatic functions. These are:

- Shelter
- Water infrastructure
- Play
- Gathering.

These programmes were identified to align with the research question and to facilitate the main aim of providing for everyday social activity and encouraging the development of social networks, in conjunction with providing water security for the suburb.

SHELTER

The shelters facilitate an extension of private space into public space and vice versa and help to blur the boundary between the two corresponding with the form principle at the beginning of this chapter. The glulam material was selected for ease in creating an interesting form. The angular form was selected to create a sense of movement, to be a dominant form and respond to the current materiality of the residential area of the suburb. Timber structures are also more robust and withstand earthquake forces to a much higher strength than other materials without the introduction of base isolators or similar technology.

WATER INFRASTRUCTURE

This programmatic element encompasses two main things. Firstly, the water tanks which store the water which supply the suburb with potable water in the case of an emergency. These tanks vary between two sizes. The first is tanks within the minor hubs are only 1.1 meter high, holding 4000 litres each with 8-10 tanks per site. This size was selected to be less intrusive and to integrate into the fence-line. The minor sites tanks are supplied water through a connection from both the shelter elements

and the adjacent housing. The second size of tanks are located within the Major Site, the Bus Barn Drainage Easement and are more sizeable holding 12,000 litres a tank with 9 tanks on the site. These tanks are fed from the bus barn roof through the support structure they are integrated into.

GATHERING AND PLAY

Gathering and Play are reciprocal in that where one is the other is inherently facilitated. Gathering encourages the development of social networks through facilitating social interaction and within the minor residential street sites it is informed by the form principle of *Boundaries between Public and Private Space*; creating spaces with which shelter, seating, planting and engaging edges draw people into the site. Within the major site, gathering is aided by large open spaces, an interactive edge, and clustered seating elements which encourage both viewing outwards, and create an intimate space inwards through their proximity and reclining nature. Play as a programme encourages gathering through children using the space, sometimes for an extended amount of time, and the default supervision of the children. The rope play space typology which has been implemented in all of the sites is non-prescriptive in its function, and encourages creative use of the space and interaction with other design elements on the site because flexible nature.

3.24 MINOR SITES

Figure 86. Minor Sites context map.

The Minor Sites are equidistant from both the Major Hub and themselves in accordance with Oliver's (2000) ideal size of social pocket identified in the literature review. These sites focus on creating an extension of space private property into public space by reclaiming part of the street as opposed to the functional purpose of the street of moving from A to B. This is done by realigning the carriageway along part of the street down to the legal minimum of 5.6m and no provision of on street parking for the small 50 to 100 meter length of the sites. This provides space for social and infrastructural amenity in the street and the result is a series of multi-functional public spaces embedded in the mono-functional street system.

All four sites have a unifying material palette, modular kit of parts and programme, with differences through responding to the site's physical attributes and context. Through necessity, the sites are split into areas separated by car access. There isn't a clear cut distinction between the function of the separated areas as over prescription of programme would limit the freedom of the designs. The idea was to create a street side space which was flexible in its provision of the four over-arching programmes of Gathering, Play, Shelter and Water Harvesting.

The dominant unifying elements of all four designs are the glulam timber, water harvesting/shelters and the water tanks themselves. The shelters are harnessed as organisational devices; because of their size and function they inform the layout of the rest of the site through how

they relate to residential open space and off street access for cars, and how they connect to the roofs of adjacent houses. The form of the shelter aims to be robust, dynamic and to indicate an extension of private residential space through its orientation and connection to private space.

In combination with shelters, the fence-lines in these sites are designed to be engaging for people both using the site as a thoroughfare, and for the residents whose properties they border with the goal of starting to dismantle the boundary between public and private land. Creating interest in these fence lines, helps to draw attention to the underlying water security infrastructure. Users of the site engage with the fence-line through its provision of seating and a variable edge. Infrastructurally, water tanks, as well as 20litre jerry cans are stored in these fences towards the goal of a complete functional system where water is harvested, stored, and the means to take water away are provided on site.

Creating multiple possible paths for users to move within and through the site helps to transform the space into an area with potential for play. In conjunction with this, rope based play spaces are incorporated into a shelter on each of the sites. This typology of play space was selected as it is highly flexible and doesn't force a specific type of play such as swinging or sliding. Creating a buffer from the carriageway of the street and using planting as a medium to provide a level of privacy within the space was an important consideration.

3.31 MINOR SITE COMPONENTS

Figure 87. Minor Water Tanks
Cages dimensions and functions.

Figure 88. Fence Component and Jerry can dimensions diagrams.

Figure 89. Shelter component dimensions and functions.

3.3 2 RUA ST

Catering to the south-westerly portion of the suburb, the Rua Street site is broken up regularly by off street access to cars, but the more northern side of the street was selected partly due to the existing one way bus route that passes through the site. The orientation of the shelters defines this site, and is informed by the existing north/south orientation of the houses which creates a playfulness as you move through the space. Adhering to the existing leading lines on the site generates a stronger connection between public and private space on the site through the creation of more intimate gathering and play spaces along the property boundary.

Figure 90. Rua St Sectional Perspective

Figure 91. Rua St Plan 1:200

Figure 92. Rua St view 1

Figure 93. Rua St view 1 Play and Planting area Iso

Figure 94. Rua St view 1 Play and Planting movement plan

Figure 95. Rua St view 2

Figure 96. Rua St view 2 Movement and Permeability iso

Orientation informed by house

Figure 97. Rua St view 2 plan

1:200

Figure 98. Rua St view 2 section

1:100

3.33 APU CRESCENT

The orientation of the shelter elements is relatively orthogonal reflecting the position of the adjacent houses. Three of the shelters on the site aim to create an extension of form from private into public land and vice versa. The other structure provides privacy to the windows of the house from the play area through wooden beams which span the structure, while simultaneously adding another element of the play to space through a climbing facade. Grassy areas were utilised to facilitate gathering, with an alternating concrete/grass ground treatment, in combination with jerry can holding structures providing an intimate gathering space, with strong organisational lines which encourage interaction with the property boundary.

Figure 99. Apu Crescent Sectional Perspective

Figure 100. Apu Crescent Plan 1:200

Figure 101. Apu Crescent view 1

Figure 102. Apu Crescent view
1 movement iso diagram

Figure 103. Apu Crescent view
1 sectional elevation

Figure 104. Apu Crescent view 2

Figure 105. Apu Crescent view 2 Play and Planting movement diagram

Figure 106. Apu Crescent view 2 sectional elevation

Figure 107. Apu Crescent view 3

Figure 109. Apu Crescent view 3 fenceline interaction diagram

Figure 108. Apu Crescent view 3 plan

3.34 YULE ST

At the northerly end of Kilbirnie, Yule St creates a sequence of spaces which encourage users to take different paths, weave through and around the shelters and engage with the fence-line. The shelters are used as organisational devices to inform this through installing the shelters at different distances from the property boundary line and allowing a separation to occur between the shelters and the fence-line.

Figure 110. Yule Street Sectional Perspective

Figure 111. Yule Street Plan 1:200

Figure 112. Yule Street view 1

Figure 114. Yule Street view 1 sectional elevation

Figure 115. Yule Street view 2

Figure 116. Yule Street view 2 plan

3.35 TIRANGI ST

The initial shelter on the entrance corner forms a dominant structural element, imposing first impressions on new users of the site and drawing attention to the functionality of the site from the adjacent higher traffic carrying roads. A fence line with a varying edge enhances the engagement between public and private boundary and the 10 water tanks on this site take up a larger proportion of the fence line on this site when compared to the others. Intimate spaces are created on both the public and private side of the fence-line through a response to the angles informed by off street car access and the orientation of the shelter elements.

Figure 118. Tirangi Road Sectional Perspective

Figure 119. Tirangi Road Plan 1:200

Figure 120. Tirangi St view 1

Figure 121. Tirangi St view 1 Private interaction with fence-line

Figure 122. Tirangi St view 1 Multiple Paths diagram

Figure 123. Tirangi St view 2

Figure 126. Tirangi St view 3

Figure 127. Tirangi St view 3
Fence-line to Street elevation

Figure 128. Tirangi St view 3 iso

3.4

MAJOR SITE

BUS BARN

BUS BARN - MAJOR SITE

The Major Hub is the central anchor of the network of sites. It is the most central, has the most space to utilise as well and thus it holds the most water through more water tanks.

The challenge here was to find a way to integrate the water tanks into the site where they don't take up most of the valuable space that can't be built on. The Bus Barn Building is the most dominant building in the entire suburb by a long way. The design encompasses a large support structure to protect from any collapse into the site. This steel structure also supports 9 of 12,000 litre water tanks to provide for enough water for 5 litres per day for 3 days for the entire population of Kilbirnie in the event of a disaster. Providing an excess in the major site proportional to the other sites allows for redundancy in the system. The tanks are supplied water through drainage off of the bus barn roof which would be treated with a non toxic, water harvesting approved paint. The experiential side of this site includes interaction with support structure and façade through two levels. One, on the ground level includes weaving through the supports, seating and play spaces. Two, steps provide access to a raised level in which supports are built off of the water tank supports to provide a viewing platform and provide interaction with façade, supports and water tanks.

The community walkway element is made of a compressed limechip material. The justification for this move is to provide a solid, durable walkway, that is inexpensive due to the need for maintenance on the drainage component of the easement. This means the pipes below can be maintained, and the pathway can be re-layed inexpensively and with ease.

The empty lot element of the site is going to facilitate the gathering component of the programme

3.41 MAJOR SITE COMPONENTS

Figure 129. I-Beam component diagrams

Figure 130. Platform and Stair components

Figure 131. Bus Barn water tank component

Figure 132. Bus Barn seating component

Figure 133. Bus Barn site fence-line component.

VIEW 2

Figure 135. Bus Barn Plan 1:200

7000m² water catchment: 8,890,000L pa

Figure 136. Bus Barn view 1

Figure 137. Bus Barn view 1 planting area movement diagram

Height corresponds to building

Lower height encourages
interaction with private property

Figure 138. Bus Barn view 1 section
between private properties

Figure 139. Bus Barn view 2

Figure 140. Bus Barn view 2 Onepu
Road entrance plan

Figure 141. Bus Barn view 2
Gathering entrance section

Figure 142. Bus Barn view 3

Figure 143. Bus Barn view 3 east end support access

Figure 144. Bus Barn view 3 play space plan

1:200 Figure 145. Bus Barn support elevation

PART 4

DISCUSSION AND CONCLUSION

4.1 DISCUSSION

Water and social security are a topical issue; following recent disasters, the architectural professions are beginning to reassess the way we prepare for the potential of devastating disasters. Resilience thinking is a positive step forward in terms of thinking about the way the world functions; it isn't static; systems are constantly fluctuating. Disasters have devastating effects on established infrastructural and social systems. The predominant problems that this thesis addressed were (1) Kilbirnie, Wellington's water security and vulnerability, (2) the residential street's mono-functional nature; and (3) the excessively wide streets and underutilised spaces in the suburb. The application of 'research through design' to these problems developed the research question: How can underutilised space in a residential area be transformed to provide social and water security in an everyday and resilience context?

The thesis proposed five designs in equidistant sites across the suburb as a move towards creating pockets of social and water security (1. Site Principle). In Kilbirnie this equidistance loosely aligns with Oliver's (2000) research which suggests that the ideal social group size to encourage political and social mobilisation, to be around 2,500 people. Although Kilbirnie's current population is looking to average approximately 1400 per site (based on 2006 census information), there is a trend towards an increase in medium density housing (see fig. 31 in section 3.1 Site Analysis) the distribution will become closer to this Oliver's ideal number. Creating a hub of social space and water security equidistantly in an attempt create a social pockets would also provide additional outdoor amenity for people living in medium density housing with inherently less outdoor space than free standing houses. Oliver's (2000) paper suggests that defined boundaries are not a necessity; however visibility of the site from areas that are supposed to be a part of that social pocket may result in it not providing for the majority of the area due the sites not traditionally being a central point of the

neighbourhoods; although siting the designs adjacent to amenity such as corner dairies would likely contribute to a change in this mentality. The programmatic principle that guided the concept was designing for the everyday and the post disaster scenarios. In an everyday sense, the aim was to provide rapidly accessible space which encouraged social interaction through its proximity to residential houses. In a post disaster context, the infrastructural element would be revealed and allow the community to continue to function with a level of relative normality. In retrospect, this principle could afford to be more flexible. This principles rigidity of either providing for one or the other has effectively limited its potential applications; expanding this programme in conjunction with the infrastructural principle of water tanks as a resilience element to encompass residential productivity would be a good application of the water harvesting infrastructure to explore. The amount of water provided allows for redundancy within the system.

The predominant form principle within the proposal was; to explore boundaries between public and private space. This principle is responding to the streets lack of social capacity. Streets are inherently mono-functional now due to a focus on infrastructural efficiency (Tranter, P and W. Doyle) and the nature of peoples travel habits (see Transport To Work in fig. 29). The principle and designs goal was to transform sites to be multi-functional and socially engaging through a multifunctional fence-line which integrated the infrastructural principles water tanks. Personally, something I find very engaging in public space is non-uniform, irregular edges and the playful and intimate spaces they can begin to create. The justification behind the approach was to encourage a connection between the street and the home; implementing a fence which creates an active edge, and encourages both residents and pedestrians to interact with it.

4.1 DISCUSSION

The four minor designs, Rua Street, Apu Crescent, Yule Street and Tirangi Rd, are all street-side spaces which use a set of components to experiment with rapidly accessible public space. These experiments test the aim of creating central hubs within social pockets through reciprocal relationships between social and infrastructural interventions. As discussed in the introduction chapter, the aim of these designs is to provide rapidly accessible, robust public space which simultaneously creates awareness of Wellingtons water vulnerability and increases the resilience of the Kilbirnie.

The fence and water tank cage component creates non-uniform edge with which users of the site can engage with; the main influence for this came from the projects examined in the precedent study (2.3) . The combination of these low fences, which hold 20 litre jerry cans, and the larger water tank components forms a major infrastructural benefit to the site in providing both the water, and the means to take it away in the form of a socially, spatially organised design element. The form of the components is influenced by the slat boards which are a common exterior housing material in the context; the gaps allow for visibility into the interior of the components to draw awareness to their function.

The shelter/water harvesting component is constructed with glulam timber to allow for interesting form and continue with dominant housing material within the context. The form of the component aims to add a new type of aesthetic and to create a feeling of movement and dynamism to help foster interaction at public/private boundary.

The Bus Barn Drainage Easement is the major site due to its central location and larger size. Because of its size it holds more water tanks. The support structure provides an obvious functionality in its reinforcing of the facade which faces onto the easement and prevents its collapse

in the event of a disaster. Its design aims to be multifunctional and reciprocal, from both an infrastructural and socially generative viewpoint. Infrastructurally it supports the building, holds water tanks and facilitates the supply of the water through harvesting and draining from the roof of the bus barn. As an inhabitable space, it provides interaction with both the water infrastructure, and the bus barn facade through a raised platform, a space underneath which draws people in and encourages weaving and climbing due to its interactive edge, as well as a rope play area at the eastern end of the structure.

As a reflection on the process of completing this thesis; the 12 month length of the project allows continued development of an idea that cannot be compared to anything experienced in previous years. This may purely be due to the inherent constraints of time within the length of a normal paper, but having an extended amount of time to spend on identified problems, in conjunction with continued feedback from external forces allows for the development of a more complex level of concept and design. Undertaking this topic has fostered interest in water resilience as a subject. Both exploring the use of water as part of a resilient system as a means to enhance the functionality of space, as well as the integration of a non-traditional infrastructure in a residential neighbourhood context as a means of enhancing social capacity. Exploring how this concept could be explored through placing it in completely different contexts would be a logical next step. I think rainwater harvesting has potential to become a standardised part of new developments; particularly in large public and civic buildings which have massive water catchment potential, as well as on a small residential scale.

4.1 CONCLUSION

As the general trend of providing multifunctional public space progresses, and in conjunction with increasing population, the streets and neglected sites in Kilbirnie become more viable sites for the development of valuable public space. Creating space and place which has a large infrastructural component has been especially popular in recent years, and because it offers more functionality than just a space for people, it will continue to be a prominent part of the profession. The contrast between this thesis topic and popular landscape architectural infrastructure is the delayed return on investment. For example, with storm water retention and treatment, the benefit is continuous and on-going as the vegetation filters and treats the water. Whereas the water storage and harvesting infrastructure's main benefit is dependent on a hypothetical disaster.

The provision of water storage within the concept is essentially a secondary function, partly due to the relative unlikelihood of a devastating disaster. There is a potential conflict between the sewerage line and water storage in a post disaster situation, but this has been effectively mitigated through the raising of the water tanks off of the ground. The primary function of the design is; enhancing social networks and improving social capital within the suburb. From a property ownership point of view, the predominant form principle of challenging the Private/Public boundary through fence reclamation starts a discourse on creating a social good versus the rights of an individual. There are definite pros and cons for a property owner, and a scheme such as this would likely be challenged due to concerns about loss of privacy.

The goal of utilising the water storage and harvesting component to drive the design to influence how people inhabit the space begins to challenge the existing nature of residential areas through a social

and infrastructural capacity as a pre-emptive move towards a resilient community. As the field of pre-emptive design grows in popularity, it is likely there will be more of an accommodation for civic projects which facilitate a level of resilience in vital systems with the aim of mitigating the impact of a disaster through socially oriented public space.

WORKS CITED

Absolutely Positively Wellington. Kilbirnie Town Centre Revitalisation Plan. 2010. 10 July 2012. <<http://wellington.govt.nz>>

Ben-Joseph, E. Changing the Residential Street Scene: Adapting the shared street (Woonerf) Concept to the Suburban Environment, *Journal of the American Planning Association*. 1995. 61:4, 504-515.

Gleik, P et al. The New Economy of Water: The Risks and Benefits of Globalization and Privatization of Fresh Water (2002). 5 February 2013. <http://www.pacinst.org/reports/new_economy_of_water/new_economy_of_water.pdf>

Mazereeuw, M. Pre-emptive Landscape: A prototype for coastal urbanization along the Pacific ring of fire. *Topos* 76: Crisis Landscapes. 2011. 82-85.

Norris F, and S. Stevens et al. Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness. *Am J Community Psychol* (2008) 41:127–150

Oliver, J. City Size and Civic Involvement in Metropolitan America (2000). *The American Political Science Review*, Vol. 94, No. 2 (Jun., 2000), pp. 361-373. 12 August 2012. <<http://www.jstor.org/stable/2586017>>

Salt, D and Walker, B. Resilience Thinking: Sustaining Ecosystems and People in a Changing World. Washington: Island Press. 2006.

Tranter, P and W. Doyle. Reclaiming the residential street as play space. *International Play Journal*. 1996. 4, 91-97. <ecoplan.org>