

REHABILITATIVE ARCHITECTURE: influences on bodily injury

Ryan Roselli

REHABILITATIVE ARCHITECTURE: influences on bodily injury

Ryan Roselli

A thesis submitted in partial fulfilment of the requirements for the degree of
Master of Architecture (Professional), Victoria University of Wellington, 2011.

Abstract

New Zealand has elite athletes of a very high level ranging from world champions in athletics, rowing, and cycling to highly competitive rugby, football, and netball teams. Physical injury is a common threat within all sports and it is found that New Zealand does not provide an adequate rehabilitation facility to deal with such bodily injury. In this context, this research proposes to test the idea that architecture may positively influence the recovery from injury.

This research explores the psychology of healing and the notion of control over environment. Furthermore, the rehabilitation of building will be examined to discover the positive links between body and building in the domain of healing environments. Alternative healing facilities will be studied in contrast to traditional health providers. Design will play a major role, testing theoretical and observational outcomes.

The intimate relationship between the body and its environment will be considered as an essential element in the definition of rehabilitative architecture.

Table of Contents

Abstract.....	v
Acknowledgments.....	ix
1.0 Introduction.....	1
2.0 Background.....	5
3.0 The Psychology of Healing.....	13
3.1 The Effects of Natural Light.....	15
3.2 The Effects of Colour.....	17
3.3 The Effects of Sound.....	21
3.4 Case Study – Maggie’s Centre London.....	25
3.4.1 Introduction.....	25
3.4.2 The Influence of Effects of Natural Light.....	26
3.4.3 The Influence of Effects of Colour.....	26
3.4.4 The Influence of Effects of Sound.....	27
4.0 The Patient and the Environment.....	33
4.1 The Surrounding Environment.....	34
4.2 Social Climate in the Healing Facility.....	37
4.3 Patient Control of the Environment.....	40
4.4 Case Study – Maggie’s Centre Edinburgh.....	41
4.4.1 Introduction.....	41
4.4.2 The Influence of the Surrounding Environment	43
4.4.3 The Influence of a Social Climate in the Healing Facility	45
4.4.4 The Infleunce of Patient Control of the Environment.....	47

5.0 Rehabilitation of Building.....	49
5.1 Descriptive Section.....	51
5.2 Connection to Historical Uses.....	53
5.3 New versus Existing.....	56
5.4 Materiality.....	61
5.5 Case Study – Documentation Centre at Nuremberg.....	62
5.5.1 Introduction.....	62
5.5.2 The Influence of the Connection to Historical Uses.....	63
5.5.3 The Influence of New versus Existing.....	65
5.5.4 The Influence of Materiality.....	67
6.0 Design Application.....	71
6.1 Introduction.....	71
6.2 Brief and Programme.....	71
6.3 Site and Analysis.....	73
6.4 Design Response.....	77
7.0 Conclusion.....	103
Figure References.....	99
Bibliography.....	103

Acknowledgements

Firstly, I would like to thank my supervisor Philippe Campays, without whom, you would not be reading this thesis.

Similarly, I would like to acknowledge Anna Hall for all her support during this process. She has encouraged me to arrive at this point, even if it is three months later than planned.

I am grateful for the help supplied by the Student Learning Support Services at Victoria University of Wellington, in particular, Ann Pocock for her effort in helping me edit this document. She put up with my substandard writing to help develop it into something worthy of the thesis title.

To my parents, thank you so much for the financial support to get me through the last five years. Without you, I would not have been able to live as I have.

And finally, I would like to thank all my classmates for answering the Call of Duty. They have provided me with entertainment and support to get through to submission. As long and hard as the road has been, I have enjoyed every minute of it, and will forever remember our times together.

1.0 Introduction

This research proposes that treatment for physical injury can involve the environment as an active participant in the healing process. Carol Venolia writes in her book *Healing Environments*, “the environment should not conflict with the goal of healing... every opportunity should be explored for creating an environment that plays an active, positive role in the healing process. In a place of healing, the place itself must heal” (Venolia, 1988, p. 183). But, can the environment we all inhabit have an influence on the healing from injury? Can we enhance the healing properties of architecture in order to recover from injury? Can a disregard for architecture in turn delay the healing from injury?

This research promotes the idea that a progression of medical treatment and advances in direct bodily experience with architecture can begin to influence one another to create a better environment for the rehabilitation of the body. A parallel is drawn between rehabilitation of human body and of a building, where similar terminology is used in both fields. This research, therefore aims to discover to what extent rehabilitated architecture can assist in the recovery of bodily injury. It provides suggestions for a transition from the generic hospital ward toward a user-friendly environment focusing on the patient and their well-being.

Throughout the research, precedent is used to compare the theory to design application. Each chapter discusses a particular aspect of the process from healing psychology to building rehabilitation. Each aspect is supported by illustrated case studies relating to the specific issues. The case studies that conclude each chapter contain a short, succinct introduction providing a background on the building and why it was chosen. This is followed by the strategy of the design and how it applies to architecture in order to generate a more coherent design solution.

Chapter two reviews current theory about healing environments and provides a descriptive review allowing an understanding of healing, its meaning, history and influences and to discover how the rehabilitation of body is currently approached. The focus concentrates on the understanding and application of architecture to healing environments and how it can influence a faster recovery from bodily injury.

Chapter three examines the psychology of healing, its effects upon the body and the recovery from injury. Through an interaction with light, colour and sound, the human body responds in certain ways to different tones, variations and levels. By understanding the bodies interaction and its response, it will become apparent how, through architecture, the body can be persuaded into certain moods, in order to generate a faster recovery from physical injury. This concept continues, and concludes with a case study of Maggie's Cancer Care Centre in London, by Rogers Stirk Harbour and Partners, discussing the application of psychological effects to architecture.

Chapter four introduces the interaction between the patient and the environment. It identifies how the environment the patient inhabits can have an influence on healing. From the environment of the external architecture to the immediate environment within, the research reveals how the environment can alter the outcome of healing. Chapter four utilises a case study on another Maggie's Cancer Care Centre, by Richard Murphy in Edinburgh, Scotland, 1994, to demonstrate how patients are treated in an unorthodox centre designed for patients' health.

Chapter five details the rehabilitation of a building by comparing similar notions in the rehabilitation of the body. An understanding of palimpsest and the comparison of new architecture placed along side old architecture, highlights ways to alter buildings to create an environment that is sympathetic and conducive to the healing process. In chapter five, a case study on the Documentation Centre at Nuremberg, Germany,

by Gunther Domenig provides an exemplar of building rehabilitation in respect to previous use and site palimpsest. This becomes an important factor in the design of the new integration with the existing structure.

Finally, chapter six presents a completed design project of a sports rehabilitation centre. The project tests the theories realised throughout the research and demonstrates theory and practice co-existing effectively.

2.0 Background

The word rehabilitation renders varied and different connotations. A car can be rehabilitated to its former glory, land can be rehabilitated after it has been damaged due to use, or criminals can be rehabilitated from their unlawful ways. Whatever the connotation, the common theme throughout meaning is to “restore to effectiveness.” Thompson’s theory states that rehabilitation in medicine is to “restore to effectiveness...by training etc., esp. after...illness” (Thompson, 1995). Furthering this notion, Thompson indicates a similar meaning applies to the rehabilitation of building: “restore to proper condition” (Thompson, 1995). The two meanings provide a solid foundation to explore the theory of rehabilitation: in health as ‘healing’ and in architecture as, ‘rehabilitation’.

Rehabilitation origins date back to 1570-80, coming from the Medieval Latin word ‘rehabilitare’, meaning to restore (Partridge, 1977). It is derived from the Latin word, ‘habere’ meaning to hold and control (Partridge, 1977). Architecture as a means for rehabilitation of the body has been around as long as architecture itself. The recent term for this type of architecture is ‘healing environment’. It is a term that implies many different meanings. Venolia believes a healing environment should,

“... 1. stimulate positive awareness of ourselves; 2. enhance our connections with nature, culture, and people; 3. allow for privacy; 4. do us no physical harm; 5. provide meaningful, varying stimuli; 6. encourage times of relaxation; 7. allow us to interact with them productively; 8. balance constancy and flexibility; 9. be beautiful”(Venolia, 1988, p. 11).

The combination of these aspects is a seemingly straightforward healing environment, however, the form in which this occurs is equally important. It is through form that these aspects are conveyed so the form itself becomes the medium in



Figure 1: Florence Nightingale



Figure 2: 'Florence Nightingale' hospital ward

which the ideas of healing are translated. The architectural form becomes the cover of the book for the healing that happens within, thus the aesthetics in which it is translated becomes equally important in the translation of healing itself.

Historically, ancient Greece saw healing as resulting from the effect of a combination of water, sun and gods. Thus it was common place for healing sites to be situated at thermal springs exposed to the sun and sky as it was thought that water and sun would heal and if exposed to the sky, the gods could heal. Esther Sternberg (2009), in her book *Healing Spaces* refers to historical natural healing when she talks about the Greek god of healing, Asclepius. She described temples being built far from cities over-looking the sea as it was thought that inspiring views were essential to the healing process. Healing was a very natural process, however, without technology it had to be, and it appears to have been a relaxing process (Sternberg, 2009, p. 3). Florence Nightingale (*figure 1*) pioneered theory written around hospitals and healing. In 1860 she documented the effects of light on patients, namely, that dark lit rooms were detrimental to patients and sunlit rooms were 'healthful.' So much so that they were developed into what was known as the 'Florence Nightingale' hospital ward (*figure 2*) in which all rooms were large, bright and airy.

Many people still believe in this philosophy when it comes to hospital design but most modern architecture has moved towards the 'hygienic model,' with hospitals now designed to be sterile, hygienic, white boxes, a bore to live within, and are believed to be more detrimental than dark rooms. Similarly, tuberculosis (TB) hospitals were designed around the notions of the Florence Nightingale theory of the sun helping to cure. Beatriz Colomina (1997) writes about tuberculosis design in her article, *The Medical Body in Modern Architecture*, and how even a change in environment was enough to help TB patients. She criticizes nineteenth century architecture by saying, "[it] was demonized as unhealthy, and sun, light, ventilation, exercise, roof



Figure 3: First x-ray taken in 1895 of inventor Wilhelm Röntgen's wife's hand.

terraces, hygiene, and whiteness were offered as means to prevent, if not cure, tuberculosis” (Colomina, 1997, p. 231). It became apparent that a simple change in environment helped the patients recover from TB as it was often known as a wet disease and the sun filled rooms of Nightingales pioneering design (and common day TB wards) certainly helped in the cure of the disease. I suggest that the application of these strategies is very apparent in nineteenth century architecture but can be equally applicable today if applied for the right reasons.

In contrast, as natural healing progressed, our reliance on technology progressed as well. Machines have been used in medicine since the first x-ray (*figure 3*) was taken in 1895 (Advameg, 2011). Since, the machine has become an integral part of the healing process: there are machines for healing, machines to scan people and machines to keep people alive. Current state-of-the-art hospital environments are equipped of expensive state-of-the-art technology, believed to be essential in the healing of patients. Sternberg states that “the more scanners and X-ray devices a hospital had, the more electroencephalograms and electrocardiograms it conducted, and the more sophisticated its biochemical blood and urine tests, the more advanced its care was considered to be”(Sternberg, 2009, p. 3). Generally, hospitals are no longer designed with patients healing in mind, instead, they are more centred on accommodating the technology contained within. Sternberg also refers to hospitals in the ‘70s where the only air conditioning in the facility was in the Radiography Department where the equipment could not be exposed to the warm summer heat. However, it is noteworthy that as technology continues to progress and science opens more avenues, healing is not restricted to doctors and nurses treating patients in a hospital ward. I suggest that, in a way, the rehabilitation of the body needs to go in reverse, back to nature. Science has progressively become the predominant discipline in healing rather than hope, but what scientific experiments have proven is that the historical

manner of healing does in fact help, maybe not to directly cure disease, or repair injury, but it puts the patient in a better frame of mind for the healing process. Psychologists believe that patients, when in a positive frame of mind, become more enthusiastic about healing, and studies show that this improves the healing process.

3.0 The Psychology of Healing

The brain has a complex way of perceiving the environment, calling on many physical senses, on memory and the subconscious. Indeed, light, colour, and sounds collectively determine the environment we inhabit. On the surface, these elements do not seem to contribute to the rehabilitation process, but once the idea of psychology is brought into the equation, it becomes apparent that everything the eye sees, the ear hears and the brain comprehends, can affect the outcome of healing. When translated into the built environment, surface, form and space can change the way a person feels and influence the rehabilitation process. Venolia alludes to buildings, and how they “are nearly always in the background, so we tend to be unaware of how powerfully they interact with us—rather like subliminal messages” (Venolia, 1988, pp. 3-4). This research shows how powerfully they interact with us and through this, the notion of architecture as a healing device can be explored.

This chapter details the psychology of healing and how dealing with this through architecture can have a positive influence on the recovery of bodily injury. Through an examination of natural light within the architectural environment with respect to a patient and their healing, this research discovers how a threshold between inside and outside needs to be treated in order to establish an environment conducive to healing. An understanding of colour will provide a detailed platform for achieving a positive environment within a healing facility. Colour has a great affect on the psychological state of mind of a patient and through an exploration of how colour affects the mind (Color Psychology, 1999); it will illustrate the complexities of a positive space. Finally, an exploration of sound within an environment is used to understand its effects on the patient and how it can be harnessed or cast aside to create a successful healing environment. An encompassed understanding of colour, light and sound will provide a base from which to design a positive space for healing.



Figure 4: Theatre at Epidauros.



Figure 5: Dr. Auguste Rollier's facility in the Swiss Alps.

3.1 The Effects of Natural Light

Sunlight is often seen as a threat and is associated to serious forms of sickness, such as skin cancer. It is also thought to have advantageous healing qualities. Thus sunlight has always been considered synonymous with healing and recovery from sickness, such as the common cold or tuberculosis. Dr. Bernarr McFadden in his article *Sick? Well? ... Sunbathing Helps You and Everyone* writes, “From the dawn of history the sun has been utilized specifically as an aid to the restoration of health and as a means of maintaining and increasing it” (McFadden, 2010). The Greek theatre at Epidauros (*figure 4*) was dedicated to the god Asclepius and was considered to be essential to healing. A natural amphitheatre dating back to the fourth and third centuries BC, it combined light and theatre in an attempt to heal patients. But through developments in science, in what ways can natural light help a patient recover from an injury without placing the emphasis on a mythical god?

Sternberg (2009) refers to sunlight in healing in which she says that in 1877, citing a paper presented to the Royal Society in London, Florence Nightingale showed that sunlight could kill bacteria. This was a major influence on the 1903 sunlight facility that Dr. Auguste Rollier opened in the Swiss Alps (*figure 5*). Sternberg believes this was an “inspiration for Modernist architects of the 1920s and 1930s, who designed homes and hospitals to take advantage of the sun”(p.5). Frank Lloyd Wright, Alvar Aalto, and Richard Neutra, all designed buildings that “grow out of their natural settings”(p.5) in relation to the natural path of the sun. Sternberg refers to Aalto and Neutra, stating they were “explicit about the health benefits of well-planned architecture and about the importance of nature and natural views in health and healing” (Sternberg, 2009, p. 5). It is clear that sunlight has had a major influence on healing throughout history, which, with technology, science has proven. It is healthy for just sunlight alone to impact on the patient but when manifested within architecture it

combines effects to make the resultant effect that much greater. The challenge is how to combine it with architecture to have the most influential effect on the healing patient.

Sunlight has a direct influence on injury recovery as when it hits the skin it aids in blood flow. This results in more oxygen being available to the body, and thus a faster rate of healing. Nancy Singh (2007) in *Healing Architecture* refers to sunlight in reference to injury and states,

“More and more studies are substantiating this fact that natural light has a huge impact on the healing process. There is mounting evidence that light is critical to human functioning and can be extremely beneficial to patients as well as staff in healthcare settings.”

Natural light is more pleasant, satisfying and uplifting than artificial light. Aside from its healing capabilities, sunlight also lifts the morale of patients, frequently resulting in a positive frame of mind that supports their healing program. Staff too, are affected by it, and if staff are in a positive frame of mind, they are more likely to *want* to treat the patients rather than having to. This has a major impact on the healing process as a more committed treatment procedure is more likely to achieve better results for the patient.

Light, with night and day, comes and goes, so must be taken into account through the architecture. By means of artificial lighting, lighting levels will always affect the mood of the patient in a similar way to natural light. Graeme Brooker and Sally Stone (2004) in their book, *Rereading*, insist that,

“Light can influence the attitude towards a place. Low subtle lighting can, in the right circumstances, make a room appear inviting, or in the wrong, very

threatening. A bright sunny room can induce feelings of happiness while a dull one can be dispiriting” (Brooker & Stone, 2004, p. 184).

It is the comparison between bright, sunny, natural lighting, and low subtle artificial lighting that requires the space to be designed with the concept of change in mind.

However, as light is a fundamental element of vision and is an essential element of colour, without it, everything appears black. But because of light, we do see colour, which has an effect on the body. How then, can colour positively effect the body to assist in the recovery from bodily injury?

3.2 The Effects of Colour

Several clinical researchers have shown that our perception of colour can determine how we feel with different colours having differing impressions on us. An exploration of ‘chromo-therapy’ can reveal how colour will affect the rehabilitation of the body. Chromology, or the psychology of colour has been extensively studied by scientists, and is “used in designing everything from hotel rooms to cereal packages” (anon., 2006-2010). Although chromo therapy is seen as an alternative medicine, there are proven links between colour and emotion that can be exploited in the architectural realm for the benefit of healing. The application of colour may not be the sole determinant of the speed of recovery, however its application to architecture has a major influence on its inhabitants. By using colour as an application to architecture as a standard means of measure, this research shows which colours have the greatest effect on the body in the situations occurring within a healing environment.

It is proposed through the application of specific colours to specific spaces within the architecture, the patient will have differing responses depending on the aspect of

recovery they are undergoing. Birren (1982) argues in *Light, Color and Environment*, “The physical effects of color on the human organism will induce psychological reactions... A person is likely to feel cheerful on a sunny day and glum on a rainy one” (p. 27). Perhaps this notion can be applied to architecture in order to impress certain moods on the patient. Furthermore, “Color perception is not an art involving only the retina and ‘consciousness’ but the body as a totality” (Kouwer in Birren, 1982, p. 27). By being aware of colour and using it in a way that has a reaction upon the body, the better able we are to generate architecture that is much more inviting for the rehabilitation process. Birren (1982) highlights the difference in the way colour effects the body and alludes to possible uses within architecture in *Light, Color and Environment*. He compares different types of colours and the resulting effect. He says:

“with high levels of illumination, warm and luminous colors in the surroundings (yellow, peach, pink), the body tends to direct its attention outward. There is increased activation in general alertness, outward orientation. Such an environment is conducive to muscular effort, action, and cheerful spirit. It is a good setting for factories, schools, homes where manual tasks are preformed or where sports are engaged in” (p. 31).

In contrast, Birren states,

“color... with softer surroundings, cooler hues (gray, blue, green, turquoise) and lower brightness, there is less distraction and a person is better able to concentrate on difficult visual and mental tasks. Good inward orientation is furthered. Here is an appropriate setting for sedentary occupations requiring severe use of eyes or brain – offices, study rooms, fine assembly in the industry” (Birren, 1982, p. 31).

These notions can easily be applied to architecture simply through paint on the walls or

ceiling, coloured flooring, or furniture. The extent and shape of the surface it covers, is equally important. A colour can completely change the appearance of a surface or it walls effect on a patient so the two must be designed together in order to create an environment that will assist the healing process.

Some researchers have offered art as a solution to induce some colour into the architectural environment. In an article in *Health & Place*, Gesler, Bell, Curtis, Hubbard, & Francis quoted Martin Spring by saying, “...a survey of staff, visitors and patients in which 75 percent said that the art collection... reduced their stress levels, improved their mood and took their minds off their immediate problems and worries”(Gesler, Bell, Curtis, Hubbard, & Francis, 2004). Peoples’ perceptions can offer different opinions in regards to the perception of art. Additionally, the way art is applied to a space works in contrast to the idea of colour. In a healing environment, art would be applied to the space as an after thought, but it is proven through successful galleries, for art to have its greatest impact the space should be designed around the art¹. However, I propose that in the context of a healing environment, it is more important to first consider the architecture, its colour, and its effect before considering any such application of art. Art utilises the colours in the same way architecture can, but the way colours are combined in art offer different notions than colour alone.

The way we encounter colour stimulates our brain and affects our bodies in some manner. The application of certain colours to certain spaces can generate known responses, altering mood or attitude, which can then be applied to a specific type of recovery. In controlling a patients reaction in an environment, a more standardised rehabilitation process results. The focus can shift from the assured comfort of the patient to the treatment of the injury, as it is known that the patient will be prepared

1. The Rothko Chapel in Houston, Texas (figure 6) was designed around the artwork of Mark Rothko. The combination of the artwork and a building designed specifically to house the art, resulted in a deeper understanding of the art.



Figure 6: Rothko Chapel in Houston, Texas.

for the treatment.

Colour, like light, affects us mentally and physically through a visual connection. When we close our eyes, the world seems to disappear before us. Sound however, provides us with a constant link to our environment. This important sense may be natural or artificial. It is always present no matter what time of day. Can it affect the patient within the environment, and if so, in what way can it assist in the recovery from physical injury?

3.3 The Effects of Sound

Although touch and smell are the two senses in which we can be in direct contact with the world around us, almost everything we interact with through the course of a day produces a sound; the click of a mouse, the turn of a key, the rumble of a motor vehicle, or maybe even subtly, our own breathing. Hearing could be considered the most commonly experienced sense. I propose that people are subconsciously aware of what is happening around them just by listening. Even when we are asleep, we hear sound. Loud sounds, or noise as it is defined, can startle the body, making a person jittery or uncomfortable, whereas quiet sounds can calm them. But how can a sound have an effect on the recovery from injury? Can this sound influence a positive recovery from bodily injury? This section aims to understand how sound relates to the body and whether it can facilitate a faster recovery from injury.

Sound works by receiving the waves in the ear and sending a message to the brain that allows us to interpret it. Balwant Saini (2009) in his article *Healing through Architecture and Music* says that sound, once it is heard via this message to the brain, is sent out to the whole body. He insists that, “depending on its intensity and quality, sound can generate harmony or disturbance... When we combine the quality of the

sound with our intention, the music can either uplift the spirits or depress and drain the energy”(Saini, 2009). This would mean that in spaces where relaxation is required, a soft, harmonious sound is required and would be best suited to allow the patient to enter a calm, relaxed state, whereas an area of physical rehab, the noise might be more upbeat which would ‘uplift the spirit’ (Saini, 2009).

The lack of sound, or silence, also has an effect on the body. Christopher Day states, “Of all the healing forces in the... world around us, silence is perhaps the greatest” (Day, 1990, p. 138). Furthermore, we need regular access to silence due to its healing capabilities as noise is stressful. I propose that this can be true to an extent but noise can also have a calming effect. Music is one facet of sound that we are all familiar with. Science has proven that classical music can help one study due to its calming effect on the body, but it is not only classical music that can affect the body. Heavy metal music for example, can lift ones heart rate, giving positive energy and heightened adrenalin, but the level of noise needs to be carefully controlled. A rock band playing on a stereo at maximum volume is going to have a detrimental effect compared to the same music at near minimum volume. Day also introduces the idea of natural silence. He refers to it as living silent and applies it to architecture by saying,

“It’s even harder to define silent architecture but likewise easy to recognize it. There is dead silent or living silent architecture. To create living silent architecture we need to understand and work with the essential qualities of living silence: the gentle, the unobtrusive, the tranquil, the eternal, the life-supporting...” (Day, 1990).

Dead silent belongs to the notion of absolutely no sound, whereas living silent refers to the silent in the dead of the night, no speaking, no music. This living silent can be very calm and peaceful, and the same is said of natural sounds. Sound is also a very

personal aspect, and not just for recovery. *Mozart's* compositions for example, will have an entirely different effect, but also meaning, on a listener than a *Slipknot* performance. Through design, we need to be careful as to how we introduce sound to the patient. According to Saini “...there is ample evidence that... noise does cause physical and psychological stress that increases adrenalin and changes the heart rate...” (Saini, 2009, p. 26). Although correct, this statement is rather broad though as it depends on the type of noise to determine the exact effect on a person. Natural sounds like water running or rain on the roof, or the howling wind, are more generic sounds that humans would respond to in a similar way. Hence, depending on the situation the patient is in, a soft sound is going to calm them while a loud, intrusive noise is going to raise their heart rate and adrenalin. This generic model can be applied to spaces within a healing facility in order to assist the recovery process.

The scientific view associated with removing patients from loud, harmful environments is well documented. Sternberg says that,

“Stress has many deleterious effects on the body’s ability to make antibodies, and impairing the immune system’s ability to fight infection in many other ways. It therefore stands to reason that eliminating loud, stressful sounds from a hospital environment could only be beneficial” (Sternberg, 2009, p. 73).

It may be that this is all that is needed to put the patient in the right state for healing, and would be less perceptive than adding in multiple sources of music to influence recovery. In contrast, many scientists though still believe music is the best way to help patients recover. Mick Hamer refers to a recently conducted study in stating that,

“More research has been done into the effect of music, and this year



Figure 7: Charles Jencks, architect and co-creator of Maggie's Cancer Care Centres.



Figure 8: Maggie Keswick, wife of Jencks and co-creator of Maggie's Cancer Care Centres.

David Evans of the Royal Adelaide Hospital in South Australia reanalysed data from 19 earlier studies. He concluded that music was a cheap and effective way of relieving patients' anxiety" (Hamer, 2002).

Due to its properties, music is more perceptive than silence, and care must be taken when selecting appropriate music to play.

3.4 Case Study – Maggie's Centre London, Rogers Stirk Harbour & Partners, 1994.

3.4.1 Introduction

Maggies Cancer Care Centres were introduced in Edinburgh, Scotland in 1994. The result of architect Charles Jencks (*figure 7*) and his late wife Maggie Keswick's (*figure 8*) vision, the centres provide a drop in centre for those suffering from and fighting against cancer. Referred to as visitors rather than patients, it establishes the mood for those who come to the centre where they can find anything from refreshments to advice and a friendly face to talk too. Set apart from hospitals, the centres have a very specific design intention and resemble anything but a hospital environment. Laura Lee in the book *The Architecture of Hope* insists that the centres are supportive of traditional medicines, but they tend to "focus on the 'psycho-social' element of cancer care" that cannot be fixed with drugs and treatment, the "emotional issues, psychological trauma, practical issues such as money worries and nutrition" (Jencks & Heathcote, 2010, p. 46). The London centre, finished in 2008, is the sixth and newest to be built and is set in a challenging environment for a centre known for its more secluded nature. Sited next to London's Charing Cross Hospital, "the building appears like a hybrid of the openness and freedom... and an unexpected domestic cosiness" (Jencks & Heathcote, 2010, p. 140). It is important the centres contrast themselves against the hospital environments most of the visitors have grown used

to. The small, intimate environment is a welcome sight compared to the long, white, sterile corridors of the hospital. It is these small spaces that create the domestic environment that Maggie's has become known for all over the world.

3.4.2 The Influence of Natural Light

Maggie's London uses natural light to its greatest effect as a natural healer. The roof hovers above the external walls (*figure 9*), creating a clerestory that floods the interior with light. The furniture also plays its part, Jencks and Heathcote say that "the furniture and the partitions each stop short of the ceiling, creating a kind of clerestory, and a floating effect, which allows spaces to flow into each other while allowing a datum of physical privacy" (Jencks & Heathcote, 2010, p. 145). It opens up the interior to the outside world, not physically but visually and also through,

"the triangular cut-outs in the roof allow light to penetrate through and visually lighten the impact of what is a substantial overhang and big piece of structure in its own right. They also allow glimpses of the sky, at once bringing it down into the building while excluding the overbearing mass of the old hospital"(Jencks & Heathcote, 2010, p. 146).

The internal elements of the building facing the exterior are primarily glass, allowing; a positive, strong link to the exterior courtyards of the building, and natural light that penetrates deep into the building. The natural light is easier on the body than artificial light, as it improves blood flow and helps to kill bacteria. Sunlight and open windows provide air purification, a welcome break for the visitors from the dirty city air. It is this natural light that plays with materiality to create atmosphere within rooms.

3.4.3 The Influence of Colour

The neighbouring hospital “was obsolete almost as soon as it was built” (Jencks & Heathcote, 2010, p. 140). The podium structure built in the 1970s provides the skyline with a bleak, concrete structure, a multistorey building with rows of columns and windows and little else. In contrast to this scene is a bright walled, low-lying structure that stands out on approach to the hospital. Maggie’s London injects some much needed colour into the landscape which has become a dull, brown brick, row after row of town-house city. The centre breaks the trend and separates itself from the street with a three metre high orange wall (*figure 10*). Jencks writes in *The Architecture of Hope*, “The building’s striking orange wall...is a restorative colour, optimistic and energizing, but that same wall sets up a protective barrier, enclosing and defining the intimate space inside” (Jencks & Heathcote, 2010, p. 140). Important to the centres vision is a requirement for its own environment, with Maggie’s London enabled by the wall. In establishing the interior environment, the wall adds colour into the lives of the visitors, often recipients of recurring bad news. The centre endeavours to brighten their lives, however briefly in a day, but if that respite has an impact on the rest of the day, it is successful. The wall blocks the view of the everyday for the visitors. They come to the centre for a break and as such removes them from this reality. Nonetheless, the vista includes the hospital, but as Jencks and Heathcote say, “The juxtaposition of the classic, grey mega-hospital and the bright, intimate centre is revealing” (Jencks & Heathcote, 2010, p. 140). The bright wall provides a reprieve from the dull hospital environment (*figure 11*), and as such offers hope for the visitor.

3.4.4 The Influence of Sound

Fundamental to the Maggie’s ethos is the removal of everyday distractions of the busy environment, and once the visitor enters the centres walls they can forget about



Figure 9: Maggie's London showing hovering roof.

the worries of everyday life. Crucial to this, as with the vista, is the protection of the site from exterior sound. An article on the Maggie's London in the World Buildings Directory Online Database describes the importance of this by stating that,

“high quality acoustics are key to creating an attractive environment for staff and visitors alike. High external walls protect the inner space from the relentless daytime noise and visual distractions of Fulham Palace Road both on the ground and mezzanine levels” (Frontmedia, 2009).

Jencks and Heathcote affirm this in *The Architecture of Hope* when they write that “the new building was required to do a lot of things...[to] protect its interior from the noise and traffic” (Jencks & Heathcote, 2010, p. 136). The walls enclose the space acoustically and visually, blocking the interior from street view, while opening up to the sky. Consequently a more natural sounds filters through the site providing a more calming effect than the stressful city sounds. This creation of a small sanctuary within the city is the exact effect that Charles and Maggie hoped to achieve.

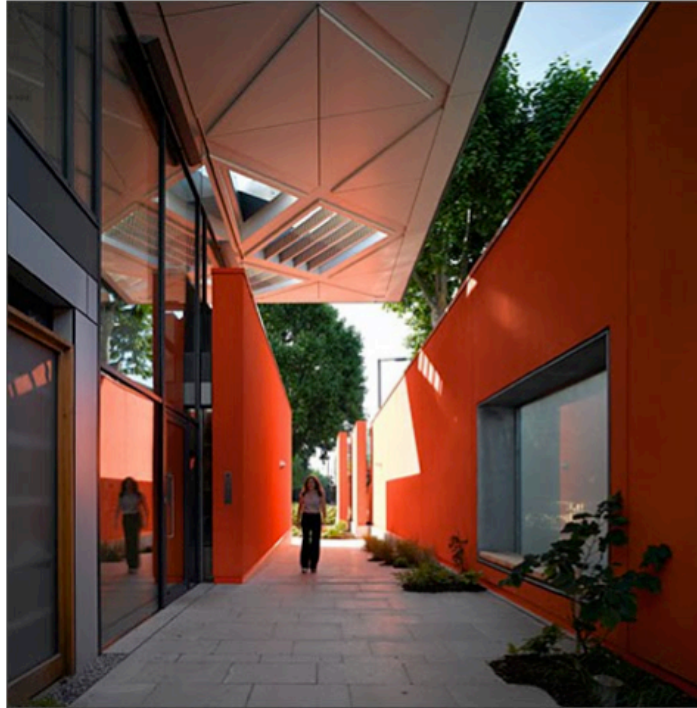


Figure 10: Maggie's London showing external wall.



Figure 11: Maggie's London against the vista of the existing hospital.

4.0 The Patient and the Environment

What determines a successful interaction between the patient of a rehabilitation facility and the facility itself? How can this relationship influence the patients' recovery from bodily injury? Suitable architecture alone cannot create a successful healing environment; however, I propose that it is the reaction of the patient to the environment that allows it to be considered as successful. By understanding the elements of the interaction between the environment and the patient, an environment that influences the positive actions of the patient can be understood. But, it is not only the impression of the environment on the patient, as a patient can begin to influence the environment and thus establish a more familiar setting in which they can become comfortable.

Fundamental to creating a successful environment is ensuring the patient's experiences are far removed from those within a hospital environment. It is important that the immediate environment has a positive effect on the patients' attitude. Hussain Varawella refers to this in Nancy Singh's article *Healing Architecture*. He defines healing architecture as,

“creating environments that make you feel good. To a certain extent, we generalise by saying that if you feel good you will ‘heal’ faster. I do not think in that sense that a surgical wound will heal faster, but your mind will heal faster” (Singh, 2007).

A healthy mind, leads to a healthy body, thus the healthier the mind is, the faster the body will recover. Similarly, Singh quotes architect Rajeev Pathni on the importance of quality architecture in healing environments: “...the quality of space in such buildings affects the outcome of medical care, and architectural design, thus playing an important role in the healing process. Hospitals should provide a cheerful, invit-

ing ambience, and a caring and healing environment.” A successful healing environment is a result of every aspect within it complementing each other in an inviting way. A complete understanding of the role each aspects plays within a space, architecturally we are able to influence the environment to become conducive to successful therapy. Lord Hunt echoed the British Governments stance on healthcare design in a speech at the ‘Building Better Healthcare Awards’ stating

“that how a building looks, and how it feels to work in can have a major impact on patients, staff and visitors. Well-designed buildings are welcoming, safe and effective. Good design lifts the spirits, helps patients to recover and inspires staff to give their best” (Gesler, Bell, Curtis, Hubbard, & Francis, 2004).

Lord Hunt introduces the viewpoint that staff too benefit from working within a pleasant facility, and thus leads to a compelling argument in favour of a rehabilitation space that is positively responsive to the people within it.

Therefore, this chapter discusses the relationship between the environment and the patient in order to create a successful healing environment. A study conducted on the view from a window, discovers the importance of the surrounding environment. Furthermore, is it possible then for a social environment within the rehabilitation facility to assist a patients’ healing? Lastly, the research shows how it can help in their recovery from bodily injury, if patients can alter their environment when living or interacting with it.

4.1 The Surrounding Environment

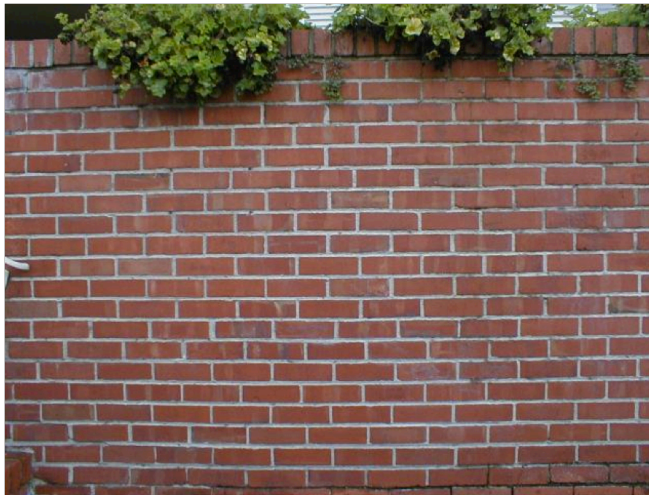
In a traditional hospital environment, patients are assigned two (or more) to a room,

often with no external view. Being bed ridden for several weeks if the patients were provided with a ‘happening’ external view, the result would be a better internal environment for healing. An exciting environment outside the hospital walls would stimulate the patient in the healing process. In a study conducted by Brian Lawson on design, the primary aspect sought after by patients was privacy. However, Lawson argues that,

“following from privacy came the matter of view - or more often the lack of it... There had already been some other evidence that patient treatment times can be reduced when they have a view... There was no evidence that in general patients wanted classically beautiful views. If anything, it is views of everyday ordinary life that seem in demand. Views in which something happens seem desirable, and views that enable conversation between patients” (Lawson, March 2002).

In effect, Lawson’s study advises the environment outside of the window has just as much of an effect as the internal environment the patient inhabits.

Roger Ulrich’s paper *View through a window may influence recovery from surgery* (1984), sought to discover whether patients in a hospital with a view out of the window are better placed to recovery faster from surgery. Ulrich was aware statistical data existed, however they needed collation, and application, to his theory. Records of 200 patients from a Pennsylvania hospital over a 10 year period indicated half of the patients looked out over a grove of trees, whilst the other half looked into a solid brick wall (*figures 12 & 13*). The same nurses attended to the patients and their treatment is assumed to be of the exact same level. Patients were compared against each other in terms of sex, age, weight, smoker/non smoker and year of surgery. The study showed that the patients with a view of the trees had shorter postopera



Figures 12 & 13: Brian Lawson's study concludes that looking over a grove of trees during recovery from injury has a better influence on recovery than a brick wall.

tive stays, needed less postoperative drugs, and had fewer negative nurses comments. Ulrich concluded that whilst the view from a window was statistically better, the brick wall was comparatively monotonous therefore the conclusions would not apply to all built environments. He implies that in the case of a lively city street (*figure 14*), it may be more stimulating therefore more therapeutic than a grove of trees. Ulrich's study conveys the importance of siting in therapeutic design. As the mastermind behind this notion, Ulrich's paper influenced hospital design and is still in effect 26 years later through the design of the Maggie's Cancer Care Centres. Ulrich's view was that "it is possible that a hospital view could influence a patient's emotional state and might accordingly affect recovery"(Ulrich, 1984). Lawson supports the importance of the exterior environment; the patient will "...appreciate an environment that appears loved and cared for" (Lawson, March 2002). This concept works in the same manner as the architecture itself; if time and care is put into the design and upkeep of it, the patient is more likely to respond positively to it. This works to establish a successful relationship between the patient and the environment.

In a facility for healing injuries, patients would spend the better part of their stay outside of the bedroom with other patients. It is, therefore, important that the relationship between patients is also influenced through the design of architecture.

4.2 Social Climate in the Healing Facility

It has suggested that social interaction is commonly overlooked in the design of healing environments however it is proven that interaction between other patients and staff can motivate patients healing. Indeed, Nick Manning in his book *The Therapeutic Community Movement: Charisma and Routinization* (1989) proposes that poor relationships between patients and staff could harm the healing process further.

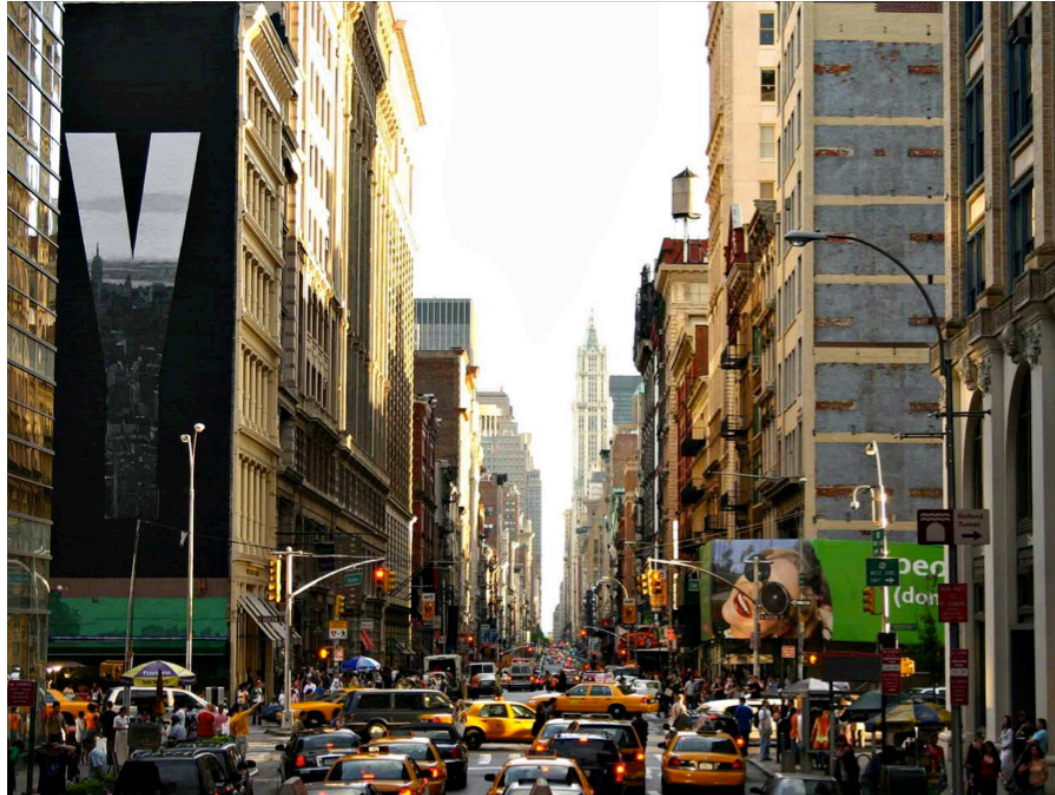


Figure 14: A lively city street may have more of an influence the recovery from injury than a grove of trees and a brick wall.

However, other studies have shown that patient interaction is one of the most sought after priorities in the period of rehabilitation. Brian Lawson's research on patient satisfaction in *Healing Architecture*, concludes that "over half of the patients... expressed a preference for multiple bed space accommodation rather than a private room", the reasons being "the wish for company and others to chat to and a feeling that they were more likely to be given attention by nurses" (Lawson, March 2002). The wish for company provides insight into patients thinking and the need for patients to rehabilitate side-by-side. The social interaction between patients' gives them hope in their recovery: as they converse with others in a similar situation they have the opportunity to feed off positive energy. In contrast to a traditional hospital where patients are confined to their bed for the majority of the day, a healing facility requires patients to move around the environment, therefore encouraging a patient interaction outside of the bedroom, whilst providing the patient comfort inside the bedroom. Overall, a facility that encourages not only patient interaction, but also staff-patient interaction results in a more rewarding experience.

An improved work environment impacts on the patients and staff alike. Charles Jencks states "that the carers are more important than the patients"(Rose, 2010) and emphasizes that it is a virtuous circle that starts with the staff; if they are happy in their work environment then the patients are better cared for. Jencks further explains that because of this the "mood in a Maggie's Centre is quite amazing"(Rose, 2010). In a different article, Jencks states that he was not aware of the issue until a doctor was debating that architecture really is important for health because "if the National Health Service is bad, we do not even turn up for work" (Group, 2005). The notion of environment only strengthens this argument, as if the building looks good, it is also a pleasure to be in.

The rehabilitation experience should not be lonely. Patients undertaking their re-

habilitation should be able to do so with other patients, whether they are at the same stage or different ends of the process. Patients will gain the most value rehabilitating alongside other people; observing where they have progressed from and where they are to progress too. Therefore, the design of spaces within a rehab facility should not force patients to interact but rather encourage them to make the interaction an enjoyable process. While rehabilitation is a much specialised, individual process, by being able to open up to that process up to others allows the patient to enjoy what can be a long and tedious road to recovery. This is why a specialised centre is so important, as patients going through a similar process from a similar background, will be able to train together and provide moral support as they work towards a final goal of re-entry into the elite sporting environment. The environment they heal within is specialised. The question is, if the patient can alter this environment, will they feel more comfortable and more assisted in their recovery from injury?

4.3 Patient Control of the Environment

To a patient, home is a familiar environment they can feel comfortable within. In contrast, a hospital is a foreign place filled with foreign technology. It is apparent that current hospital design is not conducive to efficient patient healing, with controls on how much a patient can alter their immediate environment. The patient may request the angle of their bed be changed, windows opened or closed, or for one or two pillows. For a patient who is recovering from an injury or major surgery it is fundamental that patients have some control over the space in order to establish the comfortable, homely environment they desire, such as the Maggie's Centre's.

Due to the rigorous treatment sometimes involved in the rehabilitation process, patients are often required to live at the facility. Brian Lawson's *Healing Architecture*, discusses how the patient lives within the environment and the state of the space. He

says that, “What matters most here seems to be to have some degree of control. Both patients and the staff mentioned this about such things as heating, the lighting, windows and blinds as well as noise” (Lawson, March 2002). By giving the patient a sense of control, they decide the environment they are living within, as they would if living at home. Therefore, there must be a scope for the patient to alter space, as a serious injury could result in a lengthy stay at a facility. The Maggie’s Centres provide a successful precedent, in which spaces are multi-use, and the patients can decide whether a space is for twenty people, five people, or just for themselves. The centre will be fully explored in the next section through a case study on the patient and the environment.

4.4 Case Study – Maggie’s Centre Edinburgh, Richard Murphy Architects, 1994.

4.4.1 Introduction

The Maggie’s Centre in Edinburgh (*figure 15*) was developed in 1994, and is the only one centre Maggie was personally involved with. Importantly, the Edinburgh centre is located next to the Western General Hospital where Maggie was first diagnosed with cancer. The centre completed an addition which saw the floor space doubled in 2001, without losing the essential architectural qualities the initial building was designed around. Charles Jencks and Edwin Heathcote discuss the extension and say that “there is an echo of the sanatorium architecture which so preoccupied the early modernists but the clinical whiteness of the early functionalism is absent. This is clearly not a hospital building” (Jencks & Heathcote, 2010, p. 95). The success of this centre, and its un-hospital like nature, led to the building of five more centres and the design of a further six to create a well-known identity throughout Europe in the fight against cancer. The design of this centre established the brief for any new design, but also tested the theories Maggie and Charles had long believed would



Figure 15: Exterior of Maggie's Edinburgh by Richard Murphy.

help in the treatment of cancer. Charles calls it, 'The Architectural Placebo,' and likens it to taking a pill from which you believe you will get better, and thus, you do. He says that architecture will not cure cancer itself but goes a long way to helping the patient feel better about themselves in their fight against the disease. The building is set inside a set of historic stables, whereby "Murphy's design makes a virtue of its quietness; it is a modest, modern intervention into the fabric of the existing historic stables" (Jencks & Heathcote, 2010, p. 94). Although many famous architects such as Zaha Hadid and Frank Gehry have subsequently designed centres, the use of the stables helps the centre blend into the surroundings so the building does not overwhelm the visitors for whom it is intended.

4.4.2 The Influence of the Surrounding Environment

The surrounding environment (architecture and the landscape) plays an integral part in the healing process of a patient. Ulrich's research shows the surrounding environment, whether trees, parks or courtyard, unite the inside and outside of a healing facility to create a welcoming, warm environment that stimulates healing. The visitors to Maggie's Centre, Edinburgh, are faced with an intimate scaled architecture where the small, immediate environment is very much part of the interior architecture. The important contrast in this case is to that of the nearby hospital building. As the first centre of its kind, it was more about testing the theories rather than assuring them. It was, therefore, important to set the building apart from the hospital setting. Where the surrounding environment largely consists of green space or trees to liven the visitors, this building uses other buildings to do the same thing. The study in section 4.1 discusses the nature of looking into a brick wall and its negative effect on healing. Cancer patients spend a lot of their time in hospital, and between treatments, check ups and recovery. In this sense, hospitals can become a home away from home. The



Figures 16 & 17 : Interior of Maggie's Edinburgh in comparison to interior of traditional hospital facility.

Maggie's Centres provide a retreat for the patient; a reprieve from cancer and from the hospital for a day, to help them forget about their troubles.

4.4.3 The Influence of a Social Climate in the Healing Facility

The social climate in the healing facility is fundamental to help motivate a patients healing, and in this case, their fight against cancer. As with all Maggie's Centres, the theme of the Edinburgh Centre focuses around the notions of domesticity, which stimulate the social climate within the facility. "First, there is within the domesticity the pivotal idea of the kitchen, around which the building revolves. The convivial atmosphere generated by the space in which visitors are encouraged to make their own tea is central to Maggie's conception of the centres as social spaces"(Jencks & Heathcote, 2010, p. 95). It is this basic function that help the patients feel at home within the centre. Every little aspect adds to the domestic feel, and it is this that creates the placebo that Jencks refers to. A simple task such as making their own cup of tea as opposed to having it made for them at a hospital, gives the visitor a sense of being and hope. While they are removed from the hospital environment, they can carry on living as they always have. Richard Murphy discusses the typical hospital in *The Architecture of Hope* and how, through the design of Maggie's it was, "...extremely important the design didn't go off somewhere and be institutional...so we extended the building in two directions so we could avoid circulation spaces" (Jencks & Heathcote, 2010, pp. 94,95). He is referring to the long corridors of traditional facilities that they wanted to avoid. By removing corridors, the opportunity for small spaces arises. The domesticity (*figure 18*) allows visitors to communicate with each other, in a homely environment. In contrast, in a traditional hospital they would be hurried into a room to await the doctor, whilst Maggie's encourages the discussion of their treatment and experiences with other visitors. The social climate in a Maggie's Centre is more positive for the visitors.



Figure 18: The notion of domesticity is apparent in this interior image of Maggie's Edinburgh.

4.4.4 The Influence of Patient Control of the Environment

Patient control of the environment allows them to feel comfortable in a facility that is not familiar to them. Maggie's deals with this through domesticity. This facet is the primary driver of all Maggie's Centres, and although it is widely discussed, it really is what separates these facilities from others. The domesticity is not reiterated just by carrying out tasks in the Maggie's Centres, it is built into the building. Every single turn of a corner or rise of a stair has been thought out. Jencks and Heathcote insist that,

“Most importantly there is a proliferation of nooks. The stairs, which rise through the double-height entrance hall, define and shelter a series of these elbows which allow visitors to sit or retreat, out of the way but yet still involved in the overall space”(Jencks & Heathcote, 2010, p. 95).

The design of these spaces allows them to be used primarily as a larger space, but also as separate individual, more private spaces. Murphy also alludes to this when describing the building,

“The design aimed to create firstly an atmosphere of domesticity... and secondly, to create as much accommodation as possible within the limited volume available and to make it transformable in its spatial division; the centre is capable of being combined into a series of progressively larger spaces or divided into individual rooms” (Murphy, 1991-2010).

The transformable space allows patient control of the environment.

Separate to the notions of the patient rehabilitating in the building is the idea of a building being rehabilitated to accommodate rehabilitating patients. The next section explores these notions to create an architecture to assist recovery from injury.

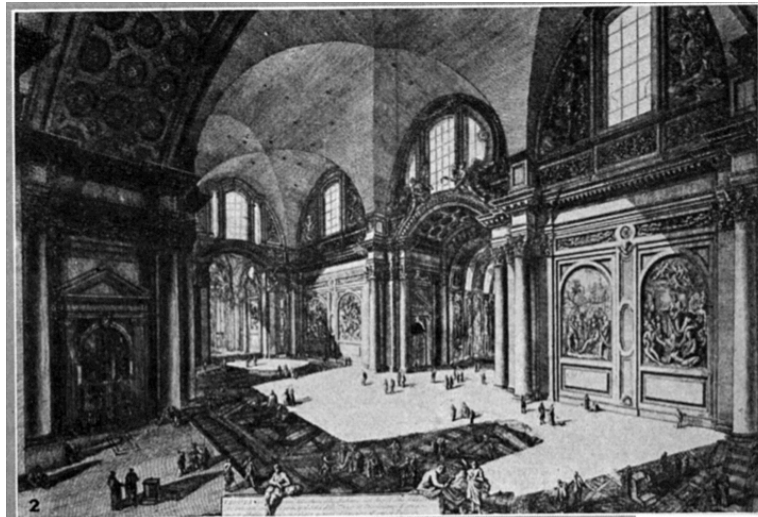


Figure 19: The Baths of Diocletian by were converted into a church by Michelangelo in the 15th century.



Figure 20: Carlo Scarpa's reinterpretation and rehabilitation of Castelvecchio has set the standard for building reuse.

5.0 Rehabilitation of Building

The notion of rehabilitation of building has been employed by architects for millennia. In the 15th century, “The Baths of Diocletian (*figure 19*) in Rome were converted into a church by Michelangelo”(Brooker & Stone, 2004, p. 9), and more recently architects such as Carlo Scarpa and Aldo Rossi have dealt with placing new buildings within built fabric. Graeme Brooker and Sally Stone in their book *rereading: interior architecture and the design principles of remodelling existing buildings*, write of Scarpa being, “... the grand master of the historical reading of a site. The understanding and interpretation exhibited in the remodelling of Castelvechio (*figure 20*) in Verona set a benchmark for all future building reuse” (Brooker & Stone, 2004, p. 38). Scarpa has an eye for being able to convert the historical into the exceptional, as though he understands the way in which the building wants to change. Louis Kahn, referring to the design of new buildings, mentioned the renowned phrase, what does this building want to be? The phrase also applies effectively to existing architecture. The modern interpretations of building rehabilitation stem from this concept, where the architect does not literally ask the building, but the new building relates to the previous use and its history. With the current economic climate people see a greater return on ‘doing a building up’ than starting from scratch. I propose the outcome offers greater architectural integrity, with the architectural driver being stronger and more pronounced. But how exactly does building rehabilitation relate to the rehabilitation of body? And more specifically, how can it assist in the recovery of bodily injury?

The comparison can be made between the notions of rehabilitation body and building, with many buildings becoming dysfunctional and unfit for purpose, similar to athletes getting injuries. Christopher Day writes about the misconception of modern architecture, that “a lot of people complain about [it]. They complain about performance aspects of old buildings (such as dampness) but about environmental aspects

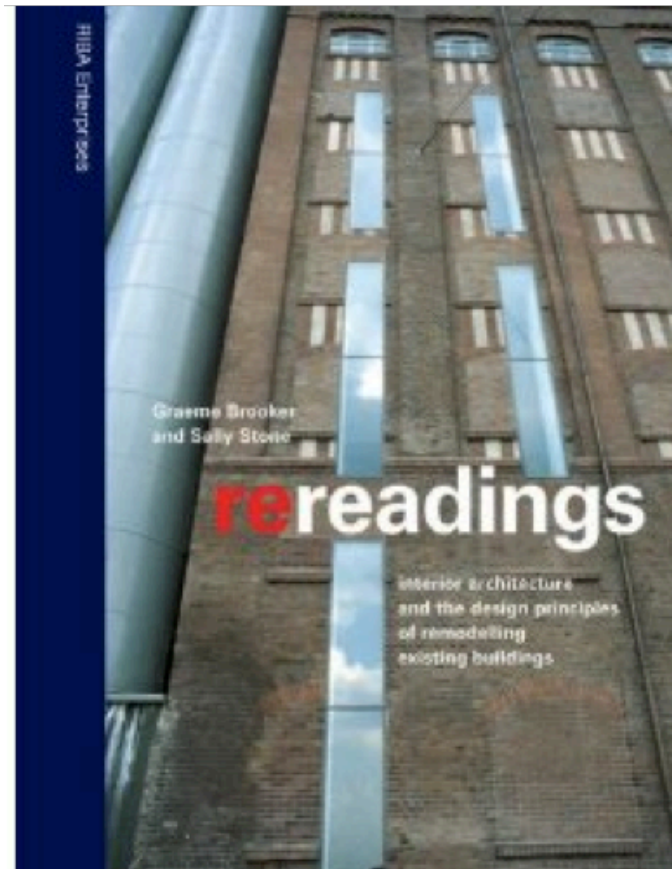


Figure 21: rereadings by Graeme Brooker and Sally Stone provides an indepth knowledge of building rehabilitation.

of new ones (such as anonymity)” (Day, 1990, p. 8). Similarly, the body breaks down over time, muscles become tired, bones become frail, and the risk of injury becomes greater. The rehabilitation from injury aims to repair the damage and allow the body to continue being. This chapter explains how the performance of an old building can be turned into a reusable piece of architecture, how old buildings do not have to remain ‘old,’ and can be rehabilitated to function successfully as though they were designed for the exact purpose. It introduces concepts of rehabilitation of a building in relation to the rehabilitation of the body. Each concept is compared to how it translates from building to body, which becomes fundamental in how the final rehabilitation of a building is undertaken. The first section offers insight into Brooker and Stone’s book *rereading* (2004) which provides a strategy for building rehabilitation. The research also investigates how the relevant notions can be applied to buildings in New Zealand. Being a ‘young’ country, New Zealand lacks the connection to historical uses that are present throughout much of Europe and the United States. Nonetheless, there is still history engrained into every site, from previous building usages to Maori Pa. This leads into a section on new building versus old building, which highlights how the old building is re-functionalised and how materiality can alter a buildings rehabilitation process.

5.1 Descriptive Section

Building rehabilitation is a fairly uncommon theme in contemporary architectural research. *Rereading* provides indepth insight into the different methods of building rehabiltion and with each method it provides various examples of successful application. The methods proposed by Brooker and Stone (2004) are *preservation*, *restora-*

tion, renovation² and remodelling. The *remodelling* “is the process of wholeheartedly altering a building”(Brooker & Stone, 2004, p. 11) and can consist of additions or demolitions, but is better compared to a remodelling of the body and soul. When an athlete goes through the rehabilitation process, it is not just the body that needs fixing. There are strict nutritional requirements for the athlete to adhere to, and it is beneficial to undergo sports psychology in order for them to be mentally prepared for their return to the sporting arena. Brooker and Stone (2004) provide the necessary steps needed in to understand how to engage with building rehabilitation and is useful to support this chapter.

Through building rehabilitation, the main aim is to “restore to effectiveness”(Thompson, 1995). The architecture must create an environment that is conducive to healing, that puts the patient in a positive mental state in order to heal physically. Therefore, the building must treat the patient with respect, the building must aid the patient physically and mentally and the building must heal. While the outcome of the building rehabilitation has already been discussed, this chapter addresses the process rather than the result.

The new architecture must have a significant relationship to the existing. Brooker and Stone insist that, “whether a factory with huge open spaces and even natural north light, or a house with domestic-scale rooms and windows... the previous function of the building will of course have had an enormous influence upon its redesign” (Brooker & Stone, 2004, p. 38). The challenge then becomes how to successfully connect the new architecture to the historical background of the site or building?

2. Preservation “maintains the building in the found state”, restoration “is the process of returning the condition of the building to its original state” and renovation “is the process of renewing or updating a building” (Brooker & Stone, 2004, p. 11).

5.2 Connection to Historical Uses

A common strategy in building rehabilitation is to investigate and research the connections of the site and building to historic uses. This generates an understanding of how the site was utilised, even before the current building was constructed. Examples of buildings that refer to historical uses come from Europe where the buildings being rehabilitated can be as old 1000 years in the case of a palace in Prague (*figure 22*), which was rehabilitated to accommodate the president. Indeed, New Zealand is a relatively new country both in terms of Maori and European settlements, compared to Europe as a continent. New Zealand a relatively short engrained history, which can still encourage a strong sense of building rehabilitation.

The word that references the historical use of a building is *palimpsest*. Palimpsest refers more to writing but has long been associated to architecture and its rehabilitation. In the article, *Old Buildings as Palimpsest*, author Rodolfo Machado (1976) defines palimpsest as, “scraped again; a term referring to any inscribed surface from which one text has been removed so the space can be used again for another.” He gives an example of vellum in classical and medieval times where the text was written over up to three times when it was then rendered useless. Machado then compares architectural drawings to this method of ‘reuse’. “In Japelli’s remodelling of a garden at Castelgomberto,... the original drawing’s were drawn over; some elements of the composition that were due to remain were redrawn, some to be torn down were erased” (Machado, 1976, p. 48). He further explains that if the original building was considered as a first draft, it allows itself to be ‘inscribed upon’, where remodelling can be thought of as rewriting. He returns to this notion of building as text where he argues that,



Figure 22: This castle in Prague was rehabilitated to house the president. It is over 1000 years old, providing much deeper history than New Zealand buildings.



Figure 23: Maori Whare at Pipitea Pa in 1839. This type of building was prevalent throughout New Zealand up until the Europeans settled in 1840.

“when the alterations in the building’s content are of such a type that the building’s original or latest function is changed; then the building is refunctionalized, a different story is born, a new plot is composed out of the old words, a new interpretation has taken place” (Machado, 1976, p. 48).

He offers many different metaphors through the translation of palimpsest to architecture, however, the same notion applies, that the new interjection should be designed with the existing building or existing use in mind.

Buildings have a way of retaining their function and signs of former use. Whether through the wear and decay of materiality or objects left behind that symbolise former use, there is always something that conveys a buildings age and permanence. Brooker and Stone pertain to this when they state that, “buildings outlast civilisations, they evolve and they are changed, but their reuse emphasises continuity” (Brooker & Stone, 2004, p. 9). It is this evolution of building and function that Machado refers to as palimpsest. The complexities involved in the former site and building add to the architectural integrity of the rehabilitated building. Brooker and Stone maintain that these complexities, “combined with the anticipation of the future use, produce a multi-layered complexity impossible to replicate in a new building” (Brooker & Stone, 2004, p. 9). I suggest that a new building provides insight to a former building, a former function or a former site, but it does not capture the essence of it as well as the original building or site itself. It is the understanding of the previous values that are fundamental to formulating design principals from which a design can be generated.

It is imperative that the new interjection has a significant influence from what is there and what has stood before. The character and history contained in an existing

building and site far outweighs a new buildings character. Even in New Zealand where recorded history does not extend back more than two centuries, there is still history associated with the site. This history becomes an important design generator. In a rehabilitated building, it becomes difficult to get the right balance between new and old, there must be a dialogue between the two elements in order for them to co-exist. The question is how to achieve this balance to create an architecture that will assist in the recovery from bodily injury?

5.3 New versus Existing

The threshold between new and existing becomes the important point of building rehabilitation. The existing must accommodate the new but the new must respect the existing in its placement and functionality and further enhance it. There are a lot of influential aspects from the existing building to be taken into account in the design of the new element. For this purpose, Brooker and Stone (2004) classify three categories of building remodelling. Three sub-categories, “have been developed based upon the sheer extent of the integration between the host building and the new elements... intervention... insertion... installation³” (Brooker & Stone, 2004, p. 79). This section introduces the notions of intervention and insertion in comparison to the healing of the body and seek to understand how these notions are best applicable to rehabilitation of a building. In the building’s rehabilitation process, the new element must be as, and if not more, accommodating than the existing, as studies show that new buildings are more influential in the healing process than older buildings (Lawson, March 2002). This influences areas of the building that need more rehabilitation than others, but

3. *Installation*, consists of new and old working together but with “very little rapport between them established” (Brooker & Stone, 2004, p. 79). The translation from the rehabilitation of building body begins to move away from the common goal of healing. When something is inserted into the body to stimulate the healing process, there must be a rapport between elements or the process becomes pointless.

it is the future knowledge of how the spaces need to function, both together and separately that directs the designing process.

It is difficult to predict how spaces will function together, but is an important element of architecture. Brooker and Stone's three categories are formulated to garner an understanding of building rehabilitation. It is how these categories relate to the rehabilitation of body that gives an insight into space relationships and functionality. *Intervention*, is where the original building "accepts and establishes an intimate relationship with the new design... the two become one" (Brooker & Stone, 2004, p. 79). This form of rehabilitation of building translates well into the notions of rehabilitation of body. Intervention with, for example, a broken bone consists of a steel plate being placed across the break and fixed with screws in order for the bone to be held in place to reform correctly. *Insertion* is where the "host building allows and accommodates new elements... in or around it yet remains very much unchanged" (Brooker & Stone, 2004, p. 79). Using the same example of a broken bone, insertion relates more to the idea of a cast. The host relies on the cast surrounding it for functionality, a relationship similar to that of a cast on a broken bone. The cast allows the bone to heal independently from it with no direct relationship, but without the cast, the bone would not heal in the correct manner. *Insertion* and *intervention* have their own positive and negative attributes and a combination of the two strategies would provide an encompassed solution to building rehabilitation.

Brooker and Stone insist, "interventions are rarely function-led. The form of the new building is dictated by the form of the old building" (Brooker & Stone, p. 83). To generate a successful rehabilitation centre, all elements must work together; staff, patients, visitors, spaces etc., therefore the functionality of spaces is vital. *Insertion* takes over where *intervention* lacks, providing a narrative for sufficient functionality. Intervention has tight links to the notion of palimpsest and the understanding and



Figure 24: An example of a titanium plate placed across a broken bone and a cast encassing the leg. These healing treatments translate effectively in Brooker and Stone's notions of building rehabilitation; intervention and installation are strategies used to rehabilitate a building.

re-writing of the original building, where insertion operates as a different element from the original building. Through a successful combination of strategy, the ultimate solution can be derived for the rehabilitation of body and building. Brooker and Stone describe insertion and how it “must... sit easily within or around it... For a successful dialogue to be established, the two components must be speaking equally loudly, albeit in different languages” (Brooker & Stone, p. 102). Different languages can be conveyed, through form and materiality, the latter to be a section of its own. The link here is that although both strategies take cues from the original building they tend to offer differing solutions. By understanding the benefits of each, it becomes apparent which strategy needs to be utilised in certain situations, where one would undermine the design intentions and interrupt the buildings functionality, the other ultimately replaces it to establish a strong, successful relationship between new and old.

As suggested by Venolia (1988), architecture has a subliminal effect on people. Brian Lawson conducted a study on patients recovering from surgery where the patients were moved from an old ward into a newly built ward, the patients in the new facility showed signs of a significantly better recovery. In his article *Healing Architecture*, Lawson (2002) insists the patients “in the new buildings seem to spend less time in hospital and appear to feel less physical pain or to be psychologically calmer.” Furthermore, they “believed they were receiving better treatment even though the treatment was from the same nurses, and the environment helped them to feel better” (Lawson, March 2002). The new facilities were rated better for appearance, design, and spatial consideration than the old facilities and the patients showed “significantly higher levels of satisfaction with their surroundings” (Lawson, March 2002). The same philosophy must then be applied to building rehabilitation. Spatial consideration will be the most important factor; adapting an existing building to work with a

modern design. An open plan is easier to adapt than small, secluded spaces, but both offer their own advantages and challenges whilst trying to achieve a space that is conducive to healing.

To retain the delicate relationship between new and old, there must be a balanced threshold between them, but the hierarchy of spaces must remain. Figuratively speaking, the old is representative of the old, and the new the new. Old and new does not relate just to the building though. It also relates to the function and the users of the space. Brooker and Stone insist that,

“those who occupy the remodelled building generally want to feel that it is theirs, that their functional requirement have been met and yet that the past has not been obliterated but incorporated and embraced as part of the pattern of the present” (Brooker & Stone, 2004, p. 67).

It is important that the user does not feel they are forgotten about in the creation of the intervention. Furthermore,

“...when a building is reused, the most important and meaningful factor in the design is, of course, the original building, and it is the establishment between the old and the new that is the most influential device in the design. The new could not exist without the original” (Brooker & Stone, 2004, p. 79).

In contrast, it is equally important in the design process, as they become the result of the design. The building must be designed on three different levels to allow it to function successfully for all users. If they aren't happy in the space, if the space does not do what it is intended to, then the space is unsuccessful. The architect must work with the old to create the balance for the new, all the while thinking of how the space is be

best suited towards the various users.

The derivative of this design is formulated through the layout of the space: walls, divisions, corridors, doors, windows and furniture. These elements can all have differing effects depending on their inherent materiality. The materiality of elements have just as great an effect of a person's understanding of a space as the space itself. Metal can come across very harsh while timber is calmer and softer. How then, can materiality contribute to the successful rehabilitation of an athlete's injury?

5.4 Materiality

Architecture is expressed through form and spatial experience, which both take shape through materiality. Materiality becomes the point where all architectural detail is expressed. Much time and thought must be put into the conveyance of this detail. Graeme Brooker and Sally Stone insist that, "the manner in which materials are used creates atmosphere and mood" (Brooker & Stone, 2004, p. 197), therefore it becomes especially important that materials are carefully selected to impress this on patients. The architectural intentions can be rendered pointless if the materiality fails to deliver the notions put forward in the building's design. In the case of building rehabilitation, materials need to be carefully selected to co-exist with the existing palette of materials. Multiple options arise when configuring materiality palettes; to contrast or compliment. It must be decided early on in the design process whether the original building materials will be retained or relinquished.

When choosing materials for use in building rehabilitation, whether contrasting or complimenting, it is always possible to use the materiality with the same techniques as the existing. Where a brick wall creates the structure and the aesthetic, the new materiality can provide the same function but in a different look. The architectural

solution seems worlds apart, but in fact, the design principles and intentions remain very much the same, just expressed in new materials and via different methods. The look and feel of a material can relate to the existing building, and Brooker and Stone conclusively state,

“the properties of the specific material will often determine its use. This is usually the case for the conventional architectural materials: timber creates warmth, steel is and appears strong, brick is traditional, concrete has modernist connotations and glass is transparent” (Brooker & Stone, 2004, p. 197).

The selection of materiality based on properties will determine a strong link between new and old, an important step in creating a strong architectural intervention with an existing building.

5.5 Case Study – Documentation Centre at Nuremberg, Guther Domenig, 2001.

Although this case study deviates away from the healing nature of the other studies, it provides the opportunity to explore notions effectively that have been presented throughout this chapter.

5.5.1 Introduction

Guther Domenig was commissioned to create a museum of the former Nazi Rally Grounds in Nuremberg, Germany. Comprising a colossal building that housed gatherings of the Nazi party of over 50,000 people, the hall was the centre of the Nazi Party during their rise to power. To the German people, the Nazi era represents evil and shame, however due to the sites divisive rich history, a centre for learning was essential. The original centre, built in 1935 and designed by Ludwig and Franz Ruff, was added

onto by Domenig in 2001. The new architecture appears as a direct response against the Nazi Party, driving straight through the centre of the building, and seemingly without any respect. Claudia Kugel in her Architectural Review article, *Letting in the Light* explains the Domenig addition,

““Domenig’s new intervention impinges only on the Kongresshalle’s northernmost courtyard block, but his tactics are unequivocally and admirably confrontational. Here the present grabs the past firmly by the lapels. Driving a literal and symbolic wedge through the Reich’s ponderous Cartesian geometry”(Kugel, 2002, p. 66).

Melanie van der Hoorne in her Archis article *Injection in a Nazi Ruin* describes the new addition as; “‘A thorn in the flesh of Nazi architecture’, is how most newspapers described it” (Hoorne, 2002, p. 108). It is clearly evident people see it as a positive reaction against the Nazi era, as if through a brutal architectural language. The means by which the new building intervenes on the old becomes fundamental to the success of the documentation centre, and it is this that is explored.

5.5.2 The Influence of Connection to Historical Uses

The background of the existing building is rich with historical events, providing the architect with an unlimited number of options when it came to intervening. The new building was to document the historic use thus it becomes even more important that it is intervened with correctly. The people of Germany have a certain hatred towards the site, and rightly so. van der Hoorne insists that,

“This attitude to architecture of the Third Reich was something that struck Gunther Domenig years ago on his first visit to the site. He wondered why the site had not been listed as a monument and concluded,

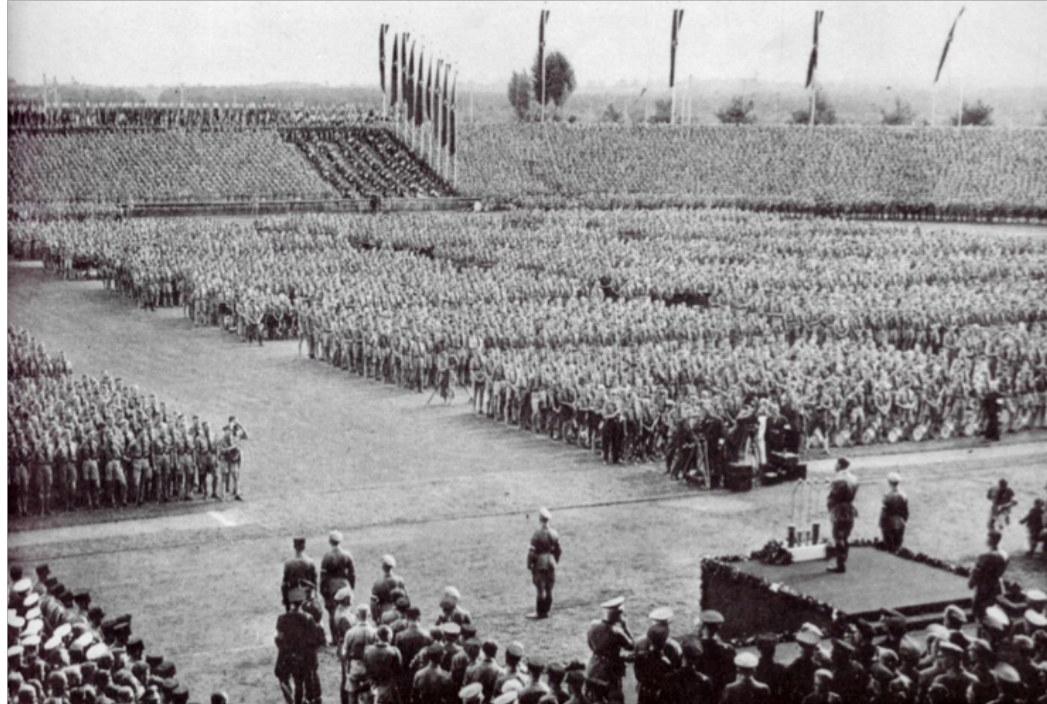


Figure 25: Adolf Hitler addresses Hitlerjugend (Hitler Youth) at a Nazi Party Day rally in Nuremberg, the site of the Documentation Centre.

“They have completely repressed, ignored and kept silent about it. All they wanted was to be rid of it”(Hoorn, 2002, p. 112).

The German continue to raze this era from their memories, but it is precisely this that has shaped their most recent history and made them who they are. Thus the site is of a certain national significance, which they should not necessarily be proud of but one they should uphold and promote. Conceivably, the centre could easily have been a new building on a far removed site that showed videos and images, but due to the connection to what has been before, it becomes so much more significant. As can der Hoorne says, “What makes the documentation centre so special is that it relates directly to the place it occupies. The desired effect can only be achieved through a permanent interplay between the exhibition and the location”(Hoorn, 2002, p. 113). Undeniably correct in her statement, the dramatic effect one feels when walking through the building, imagination running wild as to what previously occurred here, would not have a great as effect should the museum be located elsewhere. It is comparable to the Holocaust Museums built around the world. To walk through these museums experiencing the videos of events as they occurred is extremely disturbing, but compared to walking through a concentration camp, to connect with the site, would be alarming on a completely different level.

5.5.3 The Influence of New versus Existing

In order to properly connect to the history of this significant building, and to house the new function, Domenig has created an insertion through the northern wing of the building. The architecture creates an interesting tension between the old and the new. The sheer size of the existing building allows for a carefully augmented addition, the contrast of which sets up interesting thresholds. In describing these thresholds, can der Hoorne states that, “Complex, intriguing joints develop in the



Figure 26: Original building with interjection through bottom corner.



Figure 27: Entrance to Documentation Centre showing the aggressive nature of the interjection.

interior where the old and new structures intersect” (Hoorn, 2002, p. 108). The seemingly uncompromising insertion has however, been placed with a delicate precision that strengthens the link between old and new. Through form and materiality, Domenig establishes a counterpoint that ‘transforms the Congress Hall into an exhibition’ (Hoorn, 2002). When judged against Graeme Brooker and Sally Stone’s sub-categories of remodelling, the building is realised as an *insertion*. Where “host building allows and accommodates new elements... in or around it yet remains very much unchanged” (Brooker & Stone, 2004, p. 79), and although the insertion extends amid the northern wing, the majority hangs above the space looking over rather than disturbing the ground plane. This allows the two elements to continue to function naturally, the original remains the dominant figure throughout, but relies on the insertion for the new functionality to be operative. It is this insertion which creates that which can der Hoorne insists is, “...a stark contrast to the architecture of the Party Rally Grounds and in particular that of the Congress Hall. Domenig has added relatively little new floor space but has still produced a completely new building within the existing one” (Hoorn, 2002, p. 110). Kugel’s article also refers to this distinction and the resultant tension between new and old stating: “The sense of physical dislocation and uneasy co-existence between old and new seems well suited to the building’s reconstituted role as a means of evaluating and coming to terms with a profoundly disturbing past” (Kugel, 2002, p. 66). Domenig has successfully created a counter-balance between new and old, to house the new function as a museum. Aesthetically uncompromising but functionally delicate, the insertion establishes a well-planned addition to an already powerful piece of architecture.

5.5.4 The Influence of Materiality

The existing building is generally built from clinker and granite façade panels. The

sheer size of the building is overwhelming, with dimensions of 35m high and a diameter of 250m. Domenig has employed a palate of glass and steel to sit with the existing palate of materials, and thus enhance the aesthetic of the insertion: sharp, strong, powerful. It is precisely this dominant architectural language that makes the choice of material so relevant and effective. Hoorn describes the insertion by saying “It consists principally of a long, glass-walled walkway that literally bores through the north wing of the Congress Hall”(Hoorn, 2002, p. 108).

In contrast, an alternative material such as timber would be ineffective as this aesthetic promotes a softer feel, as opposed to the harsh nature of steel (*figure 28*). Coupled with glass the detailing is expressed, and nothing can be hidden from view. As stated previously, Graeme Brooker and Sally Stone in their book *rereadings* insist that, “the manner in which materials are used creates atmosphere and mood” (Brooker & Stone, 2004, p. 197). The harsh materials create a harsh atmosphere, something that would be congruent with such a rich and meaningful history. Domenig’s choice of materiality certainly adds to the sombre atmosphere of the building to create a powerful architecture space.



Figure 28: Interior of Documentation Centre showing materiality. The steel creates a strong tension against the revealed existing brick.

6.0 Design Application

6.1 Introduction

This section will present a design solution as a response to this thesis. The application of the thesis to a design is a means for testing the ideas and theory as a way to best generate an environment that is conducive to healing. Without testing the theories, they remain ideas. The design critiques the research to help understand the influence each aspect has on the healing process. The chapter tests the ideas through the application to architecture. It introduces the chosen site and analyses the design and presents how the theory has been translated into an architecture form, detailing the planning elements and aesthetic arguments.

Foremost, when designing a rehabilitation centre the architecture must support and challenge the patient in all rehab phases.

6.2 Brief and Programme

The theory is tested with an architectural programme for a sports rehabilitation centre for elite New Zealand athletes. With a high level of competitive athletes throughout the country and injury being common, New Zealand lacks an appropriate facility for athletes to undertake a rigorous rehabilitation programme. Currently, there are various facilities offering differing rehabilitation throughout the country, but if the facilities were grouped it may lessen the length of the rehabilitation period. For various reasons, it is important that the rehabilitation process is as fast and effective as possible. By applying some of the ideas expressed in the first part of the thesis to this specific programme, an environment conducive to healing is created. It seeks to accommodate athletes back to full health in a fast and effective manner.

The New Zealand Academy of Sport (NZAS) is the theoretical client of this project. With current facilities based in Auckland, Waikato, Christchurch and Dunedin, the base is widespread and caters to a large number of people. The current facilities are not specialised and most are training based with a physiotherapist who administers rehabilitation. By combining rehabilitation facilities into one location, patients will receive a more dedicated treatment for their injuries. Wellington is an obvious centre as it is situated in the centre of all current facilities of the NZAS and would provide a central rehabilitation centre for athletes.

The programme requires a comprehensive facility in which a patient can undertake a full rehabilitation from a sporting injury. When the patient leaves the hospital, the facility will cater for them before they resume their sporting activities. From the minute the patient sets foot in the building, they would experience the atmosphere that will guide their healing. The length of stay determines the need for comfortable living quarters with entertainment. Living, sleeping, eating, and reading spaces would keep the patient motivated during their rehab process. Full rehab facilities will ensure the patient has the best treatment and rehabilitation techniques available to them while also being exposed to the influential, natural side of healing. Athletes can access more individual spaces like physiotherapists and masseuse', and less specialised spaces such as a running track, gym, sauna, spa, hydrotherapy pool, lap pool, and a half basketball court. The treatment, although quite individualised, has a focus on patient interaction. A patient entering the rehab phase is able to workout along side a person that is nearing the end. The athletes can inspire one another, for an effective and faster progress throughout the rehab process.

Several points remain crucial to the design process. Firstly, social interaction needs to be just as important as the rehabilitation process. Patient interaction increases satisfaction within a healing facility and becomes an important aspect in creating an environ-

ment that is conducive to healing. A happy and socially stimulated patient is more likely to heal faster than one who is generally bored of the surrounding environment. Hence, this well designed facility would encourage social interaction between patients, staff and visitors. The ensuing positive environment would be an enjoyable place for patients to live and heal. And secondly, awareness of space. It is not until we become dysfunctional that we become aware of the world around us. This is introduced in Christopher Day's (2002) book *Spirit and Place*. He insists that,

“a broken bone, for instance, affects our physical structure... The regenerative forces of the body heal the fracture. The injury hurts which tends to depress mood, and the incapacity forces us to be conscious of actions which were formerly habitual, thereby changing our relationship to the world” (Day, 2002, pp. 229-230).

The functionality of the space has become even more important than it already is, where a patient in a wheelchair experiences it differently from a patient on crutches. An architecture that allows the patients differences to shine but use the space in the same way as each other is essential in a successful healing facility.

6.3 Site and Analysis

The chosen site is at 140 Alexandra Road, Mount Victoria, Wellington. It is the site of the Former Chest Hospital or Old Chest Ward, an infectious diseases facility and later a tuberculosis ward, designed in 1917 by Crichton and Mackay and built in 1919. Positioned on the hill above the public hospital, the facility is isolated from the hospital. This concept “was well understood by this time and the building of fever hospitals was evidence of a gathering understanding of the need to fight disease” (Heritage Inventory, 2010). With a specific architectural intention, the building is designed around “architectural features such as sun porches and verandahs attached



Figure 29: Site in relation to surrounding sporting facilities.

- sporting facilities
1. proposed site
 2. alexandra park (football)
 3. hataitai park (cycling, rugby, netball, softball)
 4. basin reserve (cricket, rugby)
 5. kilbrinie park (cricket, rugby, swimming)
 6. newtown park (athletics, football)
 7. mt albert park (hockey, golf)
 8. cobham park (under construction - netball, basketball)

to wards” and “are indicative of medical requirements that were current at the time but do not apply today”(Heritage Inventory, 2010). It has become apparent that these ‘architectural features’ in fact play as much a part in current rehabilitation as they used to. It is my intention to retain as much original building as possible while trying to accommodate new elements to enhance the overall functionality of the existing planning and structure.

Natural plantation is prevalent on Mount Victoria and this provides the setting for the Former Chest Hospital. Roger Ulrich’s (1984) paper *View through a window may influence recovery from surgery*, supports the notion that the trees provide the perfect break from the hustle and bustle of the city a mere 1000m away. Therefore, by utilising the outlook over the trees in combination with the discoveries and suggestions of Ulrich’s paper, a successful facility can be designed for the healing patient.

The site is located in close proximity to many large sports venues (*figure 29*). Within 2000m of the site there are ten separate sporting facilities encompassing 13 different sports. The proximity to these facilities allows rehabilitating athletes access to their known sporting environment during the rehabilitation phase. Being able to train in a familiar environment would stimulate the athlete to recover faster in order to return to full fitness and the sporting environment. Similar to a newly injured athlete training alongside an athlete at the end of their rehabilitation process, a patient who is training with a fully fit athlete is going to receive more encouragement and be stimulated to recover faster than if undertaking the rehabilitation program alone. The facility 150m north of the site is currently a flat field that includes two football pitches. These will become utilised by the rehab facility as the main exterior training facility.

As accommodating as it is, it is important to have a break from the confines of a facility of this nature and an external field like this, provides patients with a vast training space in close proximity to the centre.



Figure 30: Entrance to site showing existing nurse's home.



Figure 31: Existing building, north wing showing sunroom and toilet block.

6.4 Design Response

The design response is a literal translation of my design metaphors but with more emphasis on the process than the design itself. It focuses on the foreign insertion within the existing body, with the aid of a natural healing process, to stimulate healing of an injury. The images of the titanium plate inserted into the body and the cast wrapped around the body drive the process of the design, meaning the outcome does not translate directly from the image of the inserted plate, but more the process of a radical incision intervening with the body. This provides a general process of how to intervene with an existing building rather than a strict design generator, which would govern the way to design.

The rehabilitation centre has a free flowing design that can be split into three sections - an accessible public space where rehabilitation is undertaken, a removed living space for live-in patients, and a space specific for staff. These spaces are separated by new insertions into the building, which themselves house critical phases of the rehabilitation process. The new inserts create a threshold between the public and private; the first being the entrance that separates the staff quarters from the everyday users, the second insertion is the lounge facility which creates a threshold between the patients living quarters and the everyday, useable building. The track insertion creates the boundary between social and rehabilitation specific spaces. This rehabilitation space is for more individualized use but does not mean that patient interaction should not occur. Due to the different stages of the rehabilitation process, patient one may be in the first week of rehab, while patient two may be in the closing stages. Although the two are undergoing very different processes, they can train together in order to encourage one another's progress while still being focused on their individual goals.

NORTH
←

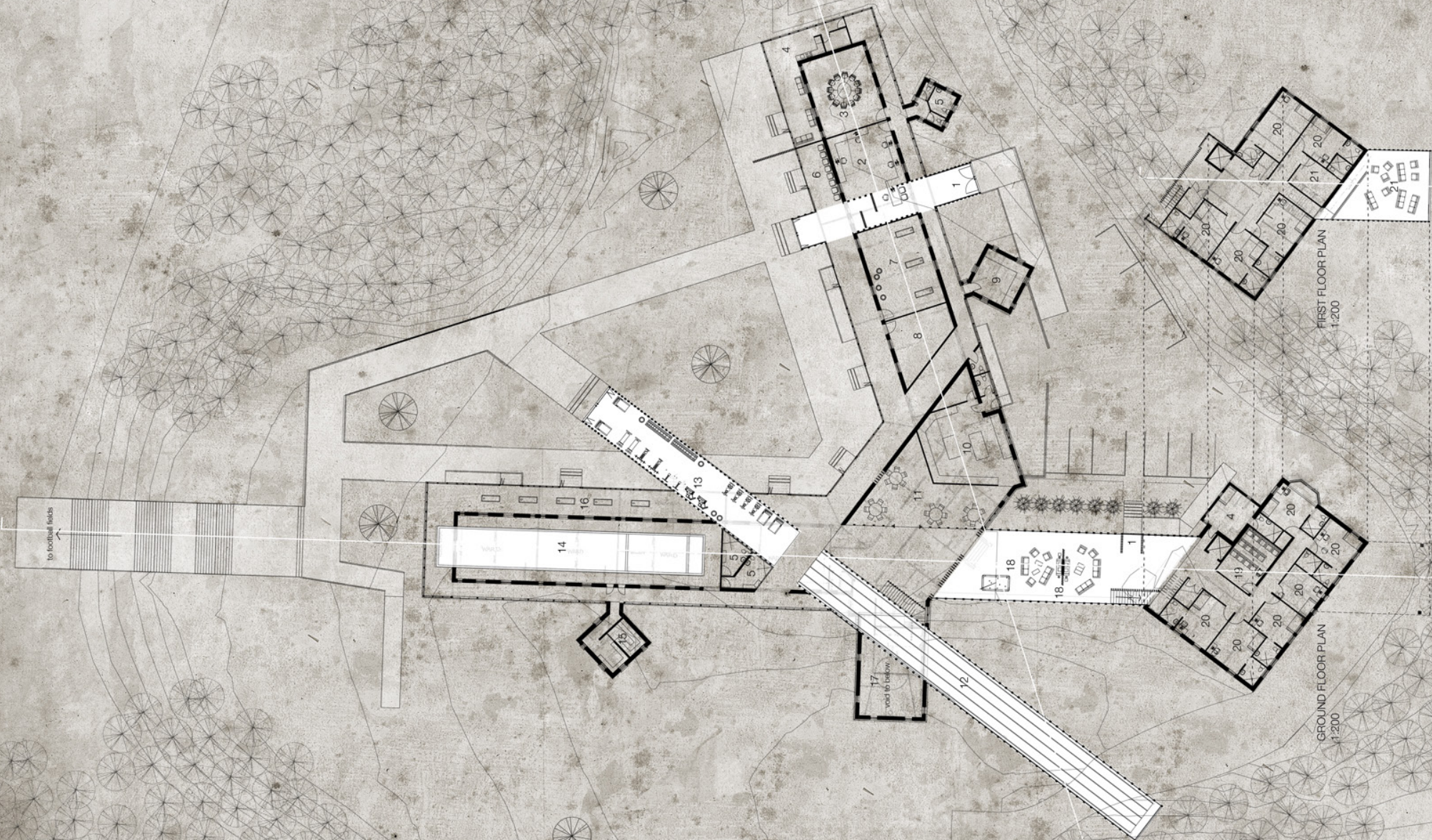


Figure 32: Floor Plan, not to scale, 1:200 @ A1.

- 1 entrance
- 2 offices
- 3 meeting room
- 4 staff room
- 5 toilets
- 6 waiting room
- 7 physiotherapist
- 8 testing room
- 9 laundry
- 10 kitchen
- 11 dining room
- 12 running track
- 13 gym
- 14 pools
- 15 sauna
- 16 massage tables
- 17 basketball court
- 18 lounge
- 19 cinema/classroom
- 20 bedroom
- 21 hyperbaric chamber
- 22 reading room

The spaces provided to rehabilitate within the existing building are large, whereas the best space for the rehab process is a smaller, intimately sized space. While not wanting to completely separate one patient from another, it is important to provide a level of domesticity to the design. A patient should feel in a homely environment during their rehabilitation process so the spaces should allow for this. As proven in chapters three and four, the Maggies Cancer Care Centres utilise the notions of domesticity in a similar way, their patients are using the centres daily, and the homely feel within them lifts the mood and spirits. By not being overwhelmed by the spaces, the patients feel empowered; important in the fight against cancer. In order to create this within my design, I have separated large spaces into smaller, more inviting spaces with the use of vertical wooden slats. Ranging in size from 200-300x50mm and spaced 150mm apart, the slats successfully separate space while not confining it, such as the space outside of the café/dining area (*figure 33*). The transition space between this and the lounge is large, but the simple use of slats divides the space visually to create separate areas that are primarily used for different things. The slats conform to where the main entrance to the building was and a separate side entrance. Section 5.2 discusses the connection to historical uses, and it is elements as small as this that establish a link between the new building and what was there before. The slats that divide the space do so differently from different angles. From a north-south axis, the slats completely block off the space, but when sitting in the café, the slats are positioned on such an angle that the view to the outside is not obstructed. It also means that the spaces are not so defined as to prevent an interaction between patients in different spaces. Social interaction between patients is an important aspect in the healing process. This is taken into account throughout the design. If patients are confined they can get trapped in a mundane routine and have little to look forward to each day. When placed with other patients going through the same process, they can encourage each other and form close bonds. This, like the Maggies



Figure 33: Lounge looking at cafe showing varying degrees of visibility through slats.



Figure 34: Swimming pool facility with three different stages for rehabilitation.

Centres, heightens spirits and places the patient in a better psychological position for healing. An example where this is successful is the swimming pool. Typically, separate pools allow different aspects of rehabilitation to take place. Within this facility though, the pool is layered to allow multiple stages of rehabilitation to take place at once. The three pools positioned in the same space allow the most basic forms of rehabilitation to take place alongside the more progressed rehabilitation processes. This allows those patients who have just begun rehabilitation to see those who are more advanced in their process, thus it creates a better patient atmosphere for healing. The bedrooms are designed around a small central courtyard on each level. I felt it was important to steer away from long corridors with rooms off each side as seen in traditional hospital design. It provides a spacious entry point to each room. The bedrooms are spacious to accommodate wheelchairs if necessary and house a queen sized bed, desk, shelving, wardrobe and ensuite. In Brian Lawson's article he states that "over half of the patients... expressed a preference for multiple bed space accommodation rather than a private room", the reasons being "the wish for company and others to chat to and a feeling that they were more likely to be given attention by nurses" (Lawson, March 2002). However, in a specialised rehab facility, the social interaction takes place outside the bedroom so it can have more of a focus on patient comfort. The aim of the facility is for the patients to feel at home, therefore large beds and ensuites are essential for the rooms. It gives the patient freedom behind closed doors, which they often lack in a traditional hospital facility while roomed with other patients. The patients are no longer based in bed all day. However, the bedrooms provide the luxuries of home while encouraging the patient to interact socially outside of the accommodation spaces.

The existing building has three interventions running through it, and the programme contained within each is an important part of the rehab process. The interventions



Figure 35: View from football field.



Figure 36: Looking out through gym to courtyard.

all relate to the existing building, and are derived from a grid that relates to the existing building. The grid is 3800x3800mm, which is based off the distance between the existing brick walls. The interventions contain the entrance, the social interaction spaces and running track and gym. The entrance becomes the first step in the rehab process, from this point the patient will be fully focused on recovery. The social interaction spaces consist of a lounge and separate reading room and are important as this is where the patient relaxes. They cannot be physically active all day, and therefore need to rest and interact with other patients. This is just as important as the rehab as it can influence how the patient feels about their recovery. If the patient enjoys their down-time they are more likely to carry this through to their rehab and feel better about it, setting up a better recovery from injury. The last intervention is the running track and gym, where the patient becomes more aware of their physical progress. The patient moves from assistance to walking, from walking to running. The layout of the facility is derived around these three spaces.

The entrance separates the staff and patient spaces. Although there is an encouraged interaction between patients and staff, their individual spaces must remain separated to distinguish the boundary between them. The transition across the track/gym intervention separates the treatment side of rehab from the physical side of recovery. This gives the patient a focus when they cross the threshold from one form of treatment to another. To the side of the main transition route is the café and dining space. It forms the threshold between public and private, where the day patients do not need to progress past and creates a transition point for live in patients from relaxation to rehabilitation. The running track (*figure 37*) provides a sloped surface falling away from the main thoroughfare through the building. In rehabilitation, it is easier to walk/run downhill. In contrast, it is more difficult to go uphill and gravity is used as a strengthening exercise. It provides difference in the physical rehab process and uses different mus

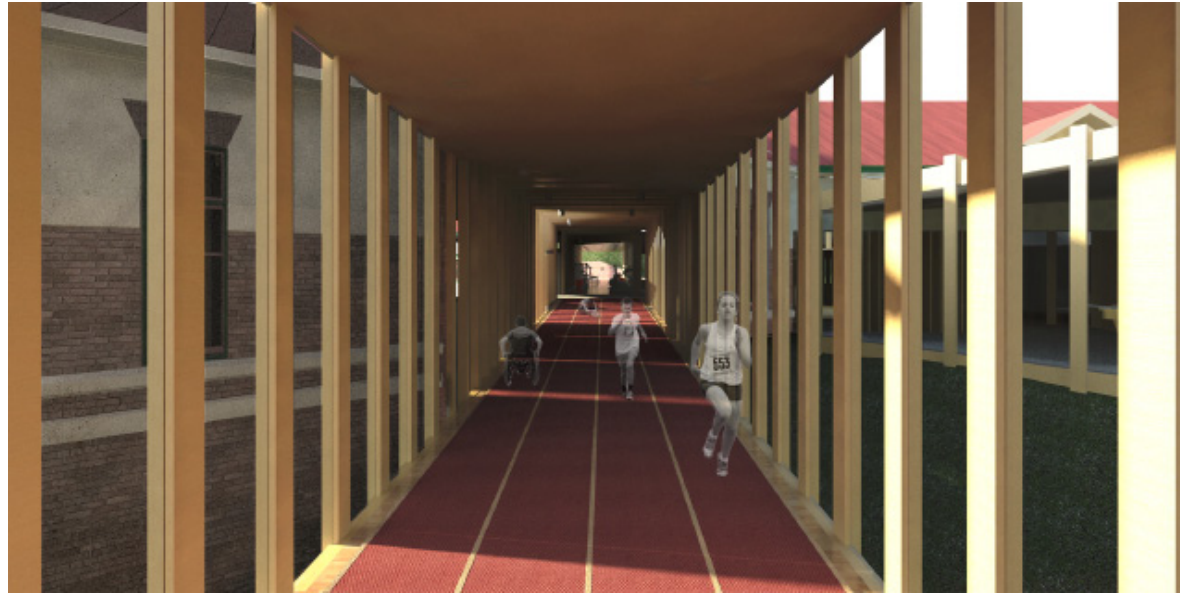


Figure 37: Looking along running track intervention towards existing building. Lounge to right.



Figure 38: From L to R, running track, lounge, accommodation and reading room. The spacings of the wooden slats are clearly evident.

cles in the athletes' body than walking on a flat surface does as they can do throughout the facility. This gives an all-round better recovery for the patient.

The new façade is designed around the notion of an accelerated perspective. Whether a person is in a wheelchair, walking or running, the façade gives the effect of a faster movement. When walking through the interventions, the converging façade lines give the effect of a faster movement, not dissimilar to the blurred effect when driving past rows of trees. The façade is self-supporting. A metal plate, when inserted into the body, is designed around its function. This notion is applied to the façade where the structure is the aesthetic and every component that makes up the façade serves a purpose. The wood that makes up the façade was chosen due to its soft, inviting nature. It compliments the inviting existing interior spaces that are stripped back to the exposed brick. This has been done to expose the structure of the facility. Extended from the same notion of the function of a metal plate, the exposure of the structure of the original building, the user has an encompassing experience of the facility, gaining an understanding of the building's structure, similar to that of the way they understand their body whilst undertaking a rehabilitation programme. The wood is used in the same manner in which the original brick was used by being the form and the function. It is these links between old and new, which establish a successful architectural relationship and create inviting spaces.

It is important to remember that the building is not going to magically heal a broken bone or strained muscle, but it creates an environment in which the patient wants to heal. The design successfully creates this working and healing environment, in direct opposition from a traditional hospital environment.



Figure 39: Looking back towards entrance interjections.



Figure 40: Looking across the courtyard at the entrance and gym injections.



Figure 41: Site model showing building in relation to existing sporting facilities and topography.

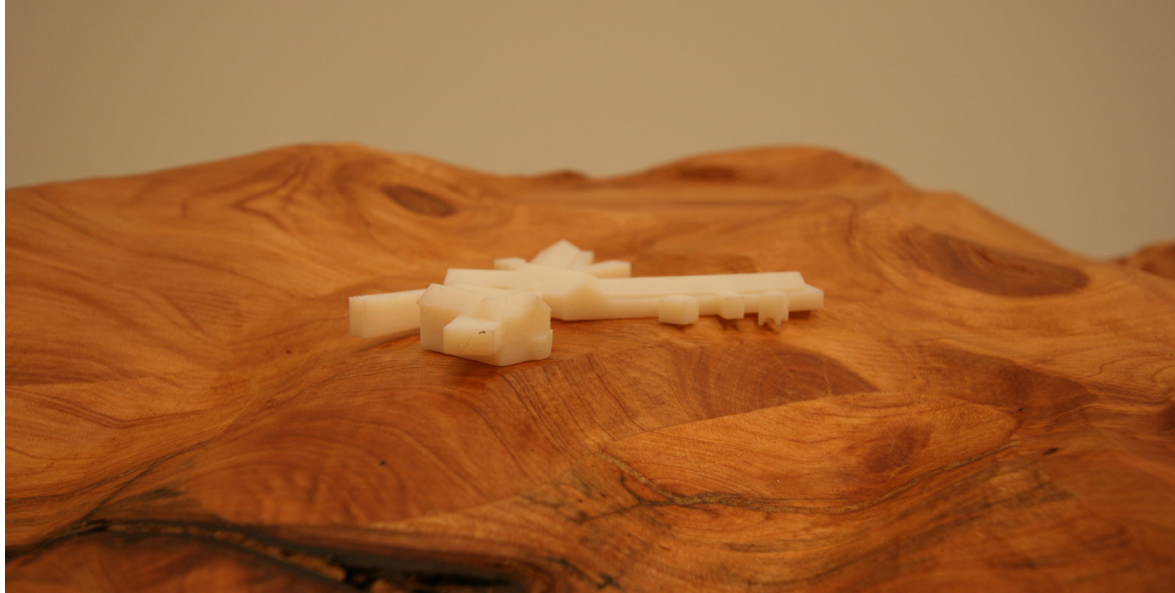


Figure 42: Site model showing building in relation to topography.

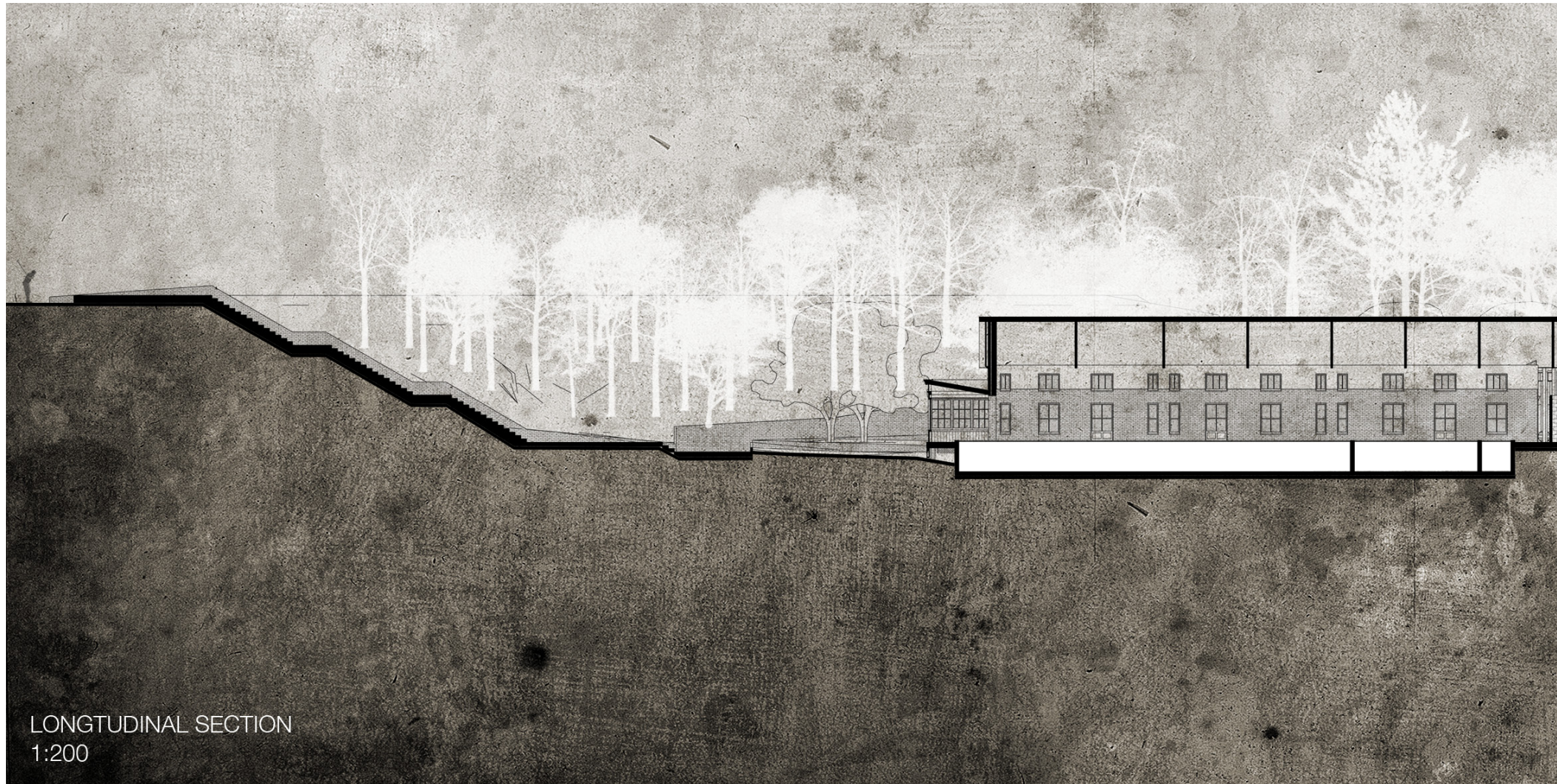
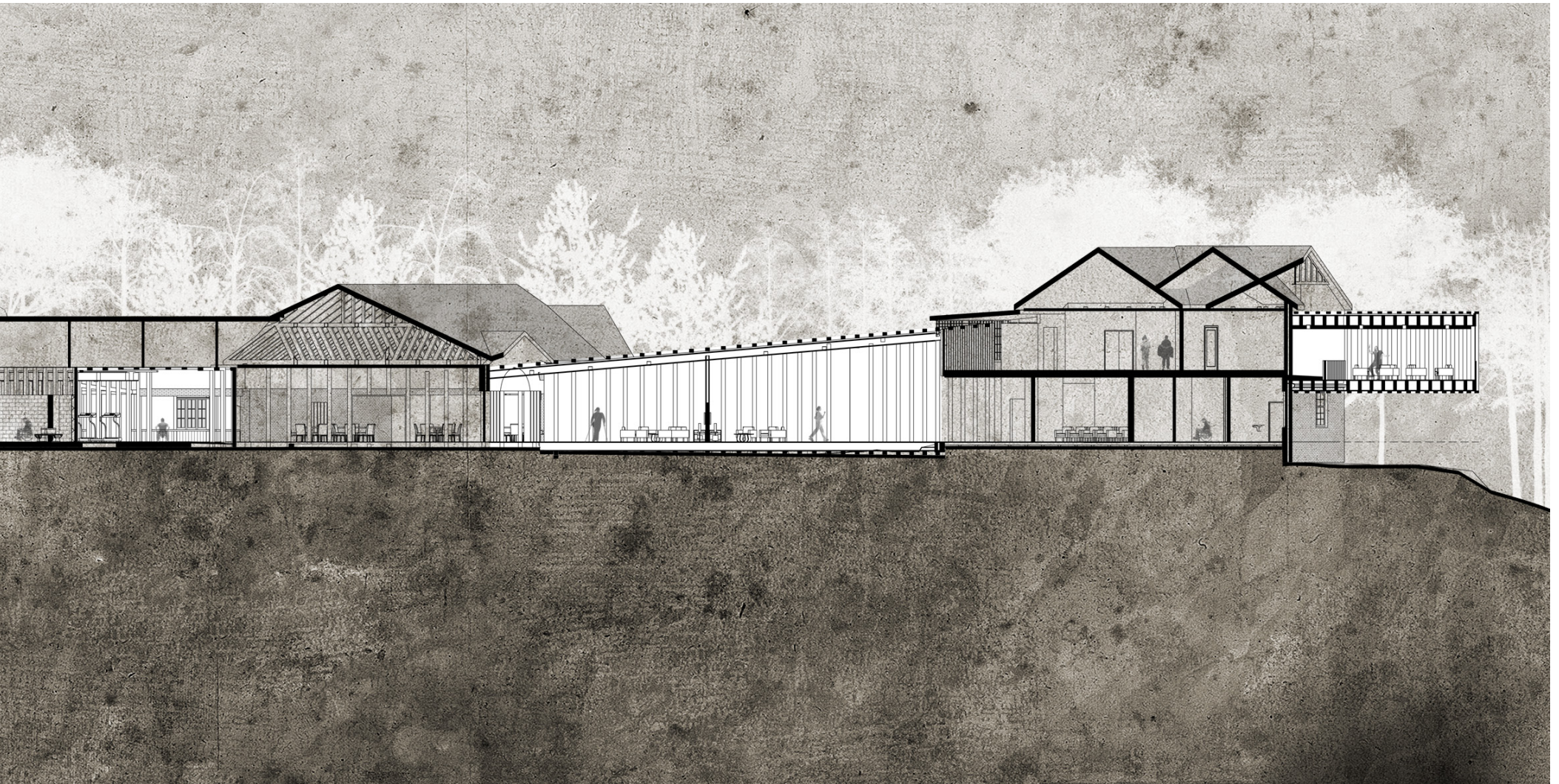


Figure 43: Longitudinal Section, not to scale.



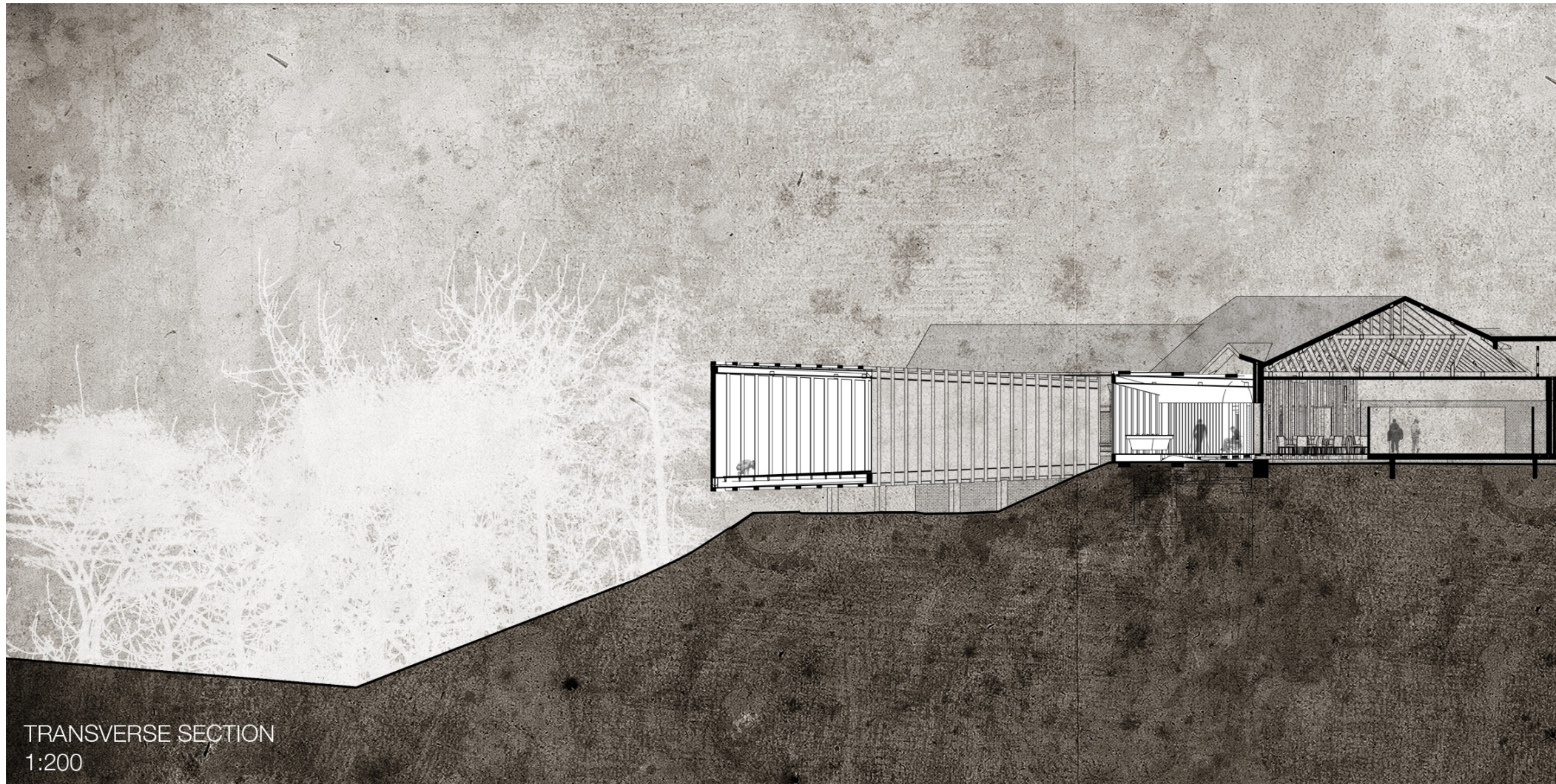


Figure 44: Transverse Section, not to scale.

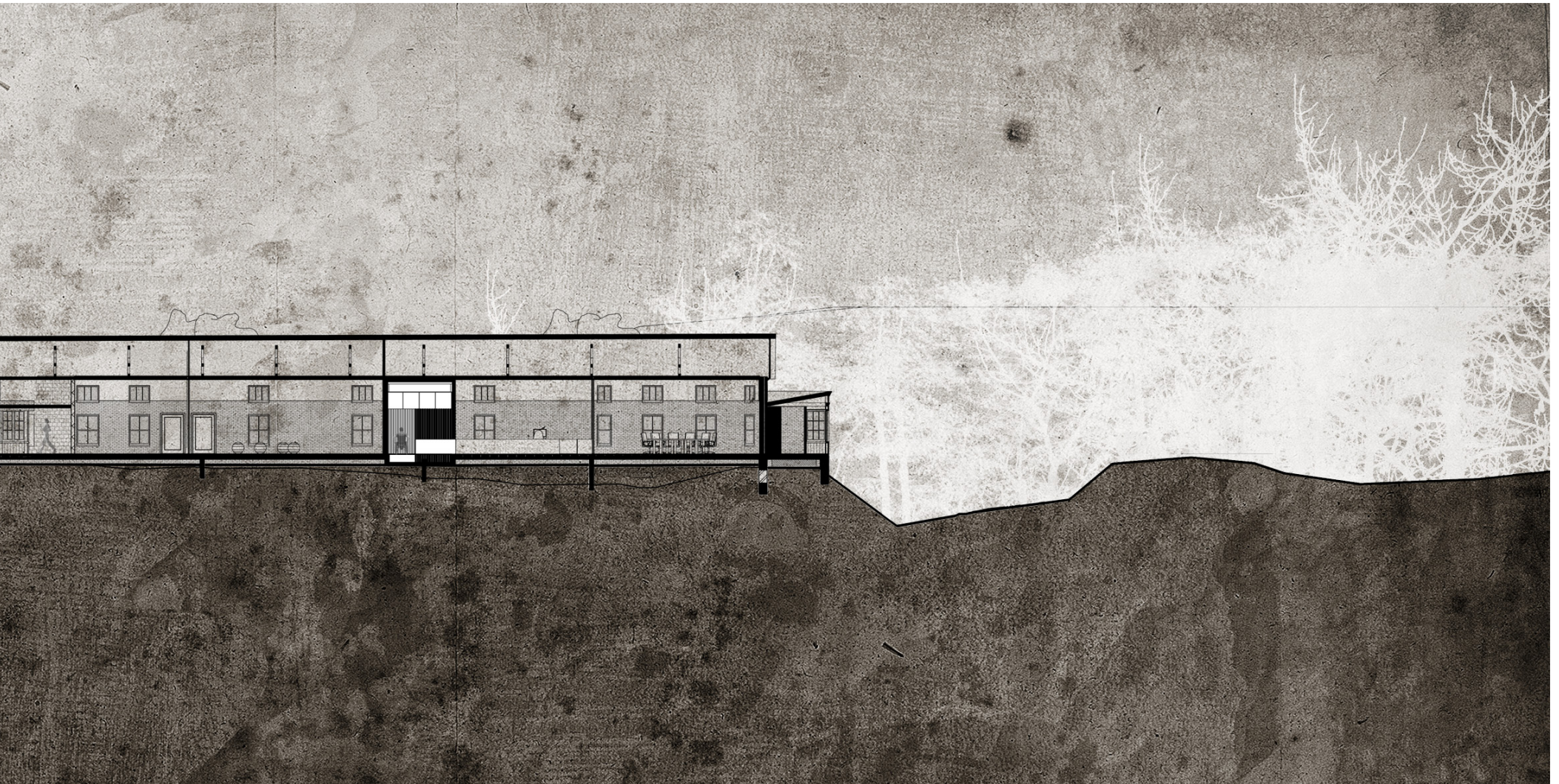




Figure 45: Entrance to site looking at L to R, reading room, accommodation and lounge.



Figure 46: Inside patients lounge showing separation of spaces and soft, inviting nature of wood.



Figure 47: Main entrance intervention.

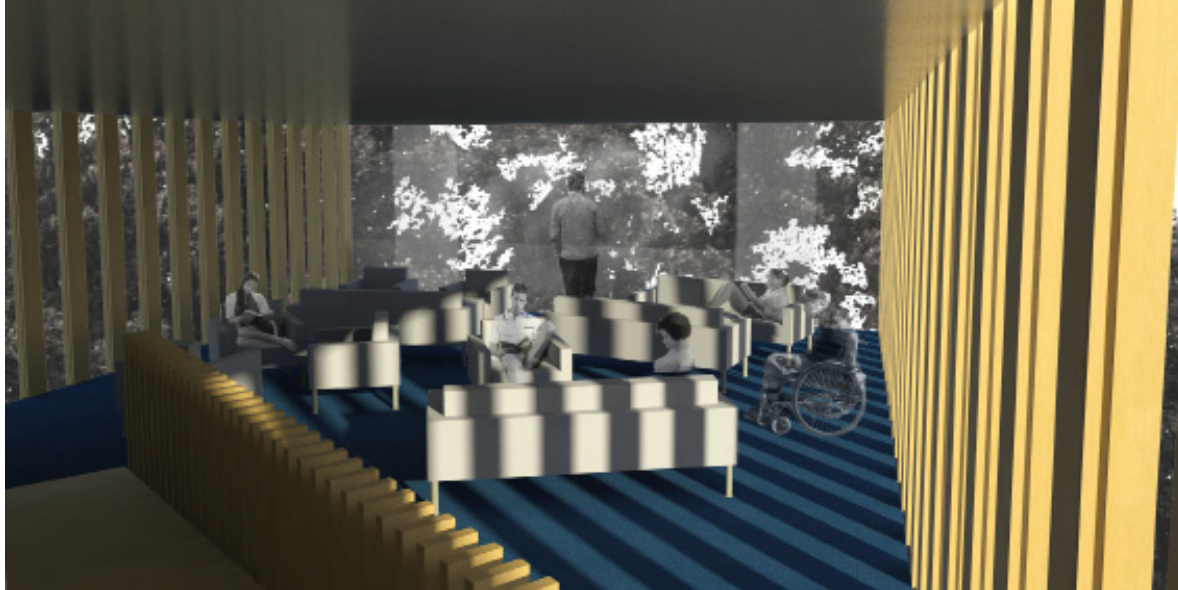


Figure 48: Patients reading room with view out into the trees surrounding the site.

7.0 Conclusion

This research has shown that treatment for physical injury can involve the environment as an active participant in the healing process. The environment we all inhabit can have an influence on healing, whilst it is also possible to enhance the healing properties of architecture to influence a faster recovery from bodily injury.

Traditional hospital facilities insufficiently accommodate the healing of patients through their rehabilitation process. This research demonstrates that an extended knowledge of a healing environment helps the design of a better space for patients to heal. Case studies such as Maggie's Centres in London and Edinburgh, have demonstrated the theories where successful application to architecture are currently operating.

By understanding the psychology of healing architects can design effective buildings to influence the recovery from bodily injury. Collectively, light, colour and sound, when applied successfully to architecture, begin to establish the healing environment. Each aspect can be altered and applied in specific ways to determine mood and atmosphere within the healing facility to encourage a patient to have a more positive rehabilitation process. As has been convincingly shown, if a patient is enjoying the rehabilitation process, they are more likely to have a successful recovery.

The research gives substance to the fact that when a patient is comfortable within their environment, they are more likely to heal more quickly. Domesticity is discussed throughout the research and argues that when patients are in a foreign environment, with personal control, they are able to create an environment that becomes familiar and comfortable to them. Staff also benefit from a successful healing environment that helps patients receive better treatment. The external environment is proven to have an influence on the internal aspect of architecture and healing, and

by controlling the interaction with this, the patient is further stimulated throughout the rehabilitation process.

A parallel analogy between the rehabilitation of the body and rehabilitation of a building has been used to discover the best way to undertake building rehabilitation. The exploration of architectural palimpsest discovers notions of utilising the existing body, the importance of which is discovered through the examination of new architecture versus old architecture. New material can be combined with old material to create an architecture that assists the recovering patient.

Finally, the application of theory and practice is demonstrated in a successful rendition of the research as a way to assist the recovery of bodily injury. The sports rehabilitation centre presents a specialised centre where rehabilitation is essential in the comeback of the injured sporting elite.

Therefore, this research highlights the value of rehabilitative architecture as a way to assist the recovery of bodily injury. The intimate relationship between body and architecture is demonstrated as essential to physical injury recovery. It provides architects and designers with an important set of principles in which to conduct a coherent and credible design solution for any healing environment, for the benefit of the patient and their recovery.

Figure References

- Figure 1* - <http://library.thinkquest.org/J001554F/gallery.htm>
- Figure 2* - http://images.wellcome.ac.uk/indexplus/obf_images/90/50/4bdc2bbe748f8946ee3164ae92eb.jpg
- Figure 3* - http://en.wikipedia.org/wiki/File:Anna_Berthe_Roentgen.gif
- Figure 4* - <http://natestravels2010.blogspot.com/>
- Figure 5* - <http://patientcircle.org/>
- Figure 6* - http://blogs.chron.com/artsinhouston/2008/09/was_the_rothko_chapel_designed.html
- Figure 7* - <http://calitreview.com/70>
- Figure 8* - <http://www.maggiescentres.org/about/whowasmaggie.html>
- Figure 9* - http://www.e-architect.co.uk/awards/stirling_prize.htm
- Figure 10* - <http://hdstudioa.blogspot.com/2009/10/maggies-centre-by-rogers-stirk-harbour.html>
- Figure 11* - http://www.curatedobject.us/photos/uncategorized/2008/01/10/r_rogers_at_the_design_museum_mag_2.jpg
- Figure 12* - <http://lesliesobel.blogspot.com/2009/08/summer-views.html>
- Figure 13* - <http://www.math.utoronto.ca/~drorbn/Gallery/Symmetry/Tilings/2S22/BrickWall.html>
- Figure 14* - <http://www.newyorkwallpapers.net/the-busy-new-york-city-streets-wallpaper-1280x960>
- Figure 15* - http://www.edinburgharchitecture.co.uk/maggies_centre_edinburgh.htm
- Figure 16* - http://www.davidnarro.co.uk/maggies_centre.html
- Figure 17* - <http://www.brightside-contracting.co.uk/Clean.htm>
- Figure 18* - Jencks, C., & Heathcote, E. (2010). *The Architecture of Hope*. Lon-

don: Frances Lincoln Ltd.

Figure 19 - <http://holycrossrumson.typepad.com/my-blog/2009/10/09/>

Figure 20 - http://www.christiankerber.de/architecture_05.html

Figure 21 - <http://www.amazon.co.uk/Re-readings-Architecture-Principles-Re-modelling-Buildings/dp/1859461328>

Figure 22- <http://travel.webshots.com/photo/2572999640061967875hsWuaf>

Figure 23 - <http://www.nzetc.org/tm/scholarly/WarEarl-fig-WarEarl011a.html>

Figure 24 - http://orthopedics.about.com/od/footanklefractures/ss/tibialplafond_3.htm

Figure 25 - <http://www.orange-papers.org/orange-rroot480.html>

Figure 26 - <http://www.kubiss.de/kulturreferat/reichsparteitagsgelaende/englisch/dokuzentrum.htm>

Figure 27 - http://commons.wikimedia.org/wiki/File:Reichsparteitagsgelaende_Kongresshalle_Doku_48.JPG

Figure 28 - <http://www.kubiss.de/kulturreferat/reichsparteitagsgelaende/englisch/dokuzentrum.htm>

Figure 29 - Image by author

Figure 30 - Image by author

Figure 31 - Image by author

Figure 32 - Image by author

Figure 33 - Image by author

Figure 34 - Image by author

Figure 35 - Image by author

Figure 36 - Image by author

Figure 37 - Image by author

Figure 38 - Image by author

Figure 39 - Image by author

- Figure 40* - Image by author
Figure 41 - Image by author
Figure 42 - Image by author
Figure 43 - Image by author
Figure 44 - Image by author
Figure 45 - Image by author
Figure 46 - Image by author
Figure 47 - Image by author
Figure 48 - Image by author

Bibliography

Advameg. (2011). *X-Ray machine*. Retrieved 01/14/2011 from Medical Discoveries: <http://www.discoveriesinmedicine.com/To-Z/X-ray-Machine.html>

Birren, F. *Light, Color, and Environment*. 1982. New York. Van Nostrand Reinhold Company.

Brooker, G; Stone, S. *rereadings: Interior architecture and the design principals of remodelling existing buildings*, 2004. Cambridge. Steven Cross.

Colomina, B. *The Medical Body in Modern Architecture*, 1997. Anybody pp. 228-239.

Color Perception. Retrieved 14/09/2010 from PsychologistWorld.com: <http://www.psychologistworld.com/perception/color.php>

Color Psychology. (1999). Retrieved 01/18/2011 from ThinkQuest: <http://library.thinkquest.org/27066/psychology/nlcolorpsych.html>

Day, C. *Places of the Soul*, 1990. Somerset. The Aquarian Press.

Day, C. *Spirit and Place*, 2002. Oxford. Architectural Press.

Frontmedia. (2009). *Maggie's Centre London*. Retrieved 12/09/2010 from World Buildings Directory Online Database: <http://www.worldbuildingsdirectory.com/project.cfm?id=1666>

Gesler, W; Bell, M; Curtis, S; Hubbard, P; Francis, S. *Therapy by design: evaluating the UK hospital building program*, 2004. Health & Place. pp. 117-128

Hamer, M. *The Art of Healing*, 2002. New Scientist. p. 38.

Hoorn, M. van der. *Injection in a Nazi Ruin*, 2002. Archis 3108. pp. 110-115.

Jencks, C., & Heathcote, E. (2010). *The Architecture of Hope*. London: Frances Lincoln Ltd.

Kugel, C. *Letting in the Light*. Architectural Review, October 2002. v. 212 issue 1268. pp. 64-[67]

Lawson, B. *Healing Architecture*, March 2002, The Architectural Review.

McFadden, Dr. B. *Sunbathing, How and Why It Heals*. Retrieved 30/05/2010 from <http://www.healsself.org/sun.html>

Manning, N. *The Therapeutic Community Movement: Charisma and Routinization*, 1989. New York. Routledge.

Murphy, R. (2010). *Maggie's Cancer Caring Centre, Edinburgh*. Retrieved 12/09/2010 from Richard Murphy Architects: <http://www.richardmurphyarchitects.com/projects/222/>

Machado, R. *Old Buildings as Palimpsest*. Progressive Architecture, Nov. 1976. pp. 46-49.

Partridge, E. *Origins - An Etymological Dictionary of Modern English*. 1977. London. Routledge.

Rose, S. (2010, 5 6). *Maggie's Centres: can architecture cure cancer?* Retrieved 17/11/2010 from Guardian UK: <http://www.guardian.co.uk/artanddesign/2010/may/06/maggies-centres-cancer-architecture>

Saini, B. *Healing through Architecture and Music*, 2009. Architecture+Design. pp. 26-36.

Sternberg, E. *Healing Places. The Science of Place and Well-Being*, 2009. London. Harvard University Press

Thompson, D. *The Concise Oxford dictionary of current English*. 9ed, 1995. New York. Oxford University Press

Ulrich, R. (1984). *View through a window may influence recovery from surgery*. Retrieved 19/04/2010 from Academic OneFile: <http://find.galegroup.com/helicon.vuw.ac.nz/gtx/infomark.do?&contentSet=IAC-Documents&type=retrieve&tabID=T002&prodId=AONE&docId=A3238205&source=gale&srcprod=AONE&userGroupName=vuw&version=1.0>

Vendome Group. (2005, May, 2001). *Healthcare Architecture as Placebo*. Retrieved 06/06/2010 from Healthcare Design: <http://www.healthcaredesignmagazine.com/me2/dirmod.asp?sid=9B6FFC446FF7486981EA3C0C3CCE4943&nm=Articles&type=Publishing&mod=Publications::Article&mid=8F3A7027421841978F18BE895F87F791&tier=4&id=F02F847D175E4B219A7FC9CADA8703B7>

Venolia, C. *Healing Environments. Your Guide to Indoor Wellbeing*, 1988. California. Celestial Arts.

Wellington City Council. *Heritage Inventory*, 2010. Retrieved 30/05/2010 from <http://www.wellington.govt.nz/services/heritage/details.php?id=8&m=search&building=fever>

