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PROCESSES OF PROMOTION OF WELL-BEING AS A GENERATOR OF BUILT ENVIRONMENTS: THE DESIGN OF A COMMUNITY HEALTHCARE FACILITY FOR DURBAN.

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DECLARATION

I declare that this dissertation is my own work unaided work. All citations, references and borrowed ideas have been duly acknowledged. I confirm that and external editor was not used. It is being submitted for the degree of Master in Architecture in the faculty of Humanities, Development and Social Science, University of KwaZulu-Natal, Durban, South Africa. None of the present work has been submitted previously for any degree or examination in any other University.

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Talente Khayelihle Mngoma

………day of…………………………year………………

ACKNOWLEDGEMENTS

DEDICATION

Adv. Busisiwe Mngoma, you have always been such an inspiration and role model. You have defied the odds when they have been stacked against you; shone brightest when night fell at its darkest; you are my definition of a true champion. I am proud to call you my sister. Continue paving the way.

> *"I will always thank God for you because of his grace given you in Christ Jesus. For him you have been enriched in every way – in all your speaking and in all your knowledge."*
>
> ***1 Corinthians 1:4-5***

ABSTRACT

Health, in whatever form remains a worldwide issue just short of being declared a global pandemic. Current urban architectural environments in modern day lifestyle contribute immensely to ill-health and negative well-being of humans. This dissertation investigates the shortcomings of architectural environments, how they can be improved to promote good health and well-being and how this practice results in a positive domino effect to other fields such as social and economic discourses.

The research explores the improvement of healthcare facilities through the primary concept of biophilic design; the incorporation of nature in built form, to promote healthy and living environments thus in-turn re-identifying an appropriate typology as a tool for the promotion of well-being. This concept is supported by the Genius Loci theory and the Critical Regionalism theory of *place and placelessness* with particular reference to the South African context.

Research methodology focused on a qualitative study to meet the aims and objectives of the dissertation by addressing key and relevant questions. The answers and findings would be extracted from literature, case and precedent studies and posed to specific groups and individuals relevant to the health and built environment sectors including the users.

The literature review and theoretical framework form the basis criteria used in which the case and precedent study were assessed and analysed; the findings were such that the biophilia hypothesis is a viable concept which has been employed successfully among a few projects. Persons interviewed also displayed a fondness towards nature and a belief in its healing properties.

Essentially, the research document suggests a multi-faceted architecture which considers broader aspects of well-being such as alternative treatment, community and social involvement, financial liberty and environmentally conscious.

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PART ONE
CHAPTER 1: INTRODUCTION

"In wilderness I sense the miracle of life,

and behind it our scientific accomplishments fade to trivia."

Charles A. Lindebergh, 1967.

"There is new life in the soil for every man. There is healing in the trees for tired minds and for our overburdened spirits, there is strength in the hills, if only we will lift up our eyes. Remember that nature is your great restorer."

Calvin Coolidge, 1924.

1.1 INTRODUCTION

1.1.1 Background

The 1994 first democratic election in the Republic of South Africa was a major turning point for the country in virtually every sense. The liberation of the oppressed saw population growth in urban areas in rapid numbers, *sprawl* became eminent in the city and much of the land and biodiversity had to be replaced by the increased demand of a built environment among other factors. 20 years later, the population has continued to grow and the response to this phenomenon has been a demand-and-supply quota with few considerations made regarding the effects and outcomes.

The city has in-turn become a concrete jungle, where the high density coupled together with added stresses of the developing and demanding economy and dangers associated with sprawl become hazardous to basic human health. The city of Durban is one such example in this context. The population does not have access to adequate services and as a result live in unhealthy environments. Citing the Health Minister Aaron Motsoaledi, he said that *"since 1994, access to health services had been a priority for the government: Many areas, especially black rural areas, did not even have primary healthcare facilities in the form of clinics. Hence, a lot of clinics were constructed in the rural areas under a special programme foreseen at the national level but implemented at provincial level"* (Reporter, 2014: 1). The government has placed forth an initiative to construct a number of hospitals and clinics over the next governmental tenure including refurbishment of 870 clinics to assist with the proposed National Health Insurance system.

Architecture plays a significant role in creating liveable environments; this study proposes a trajectory from the current architectural methods which neglect theories and concepts which aid proper responsive design to a new approach which sees architecture playing a significant role in creating living environments. The study will employ a methodology that first seeks to critically assess and analyse architectural environments and their relationship to health. The quality of life for people living in unhealthy environments could be improved by incorporating healthier natural environments in architectural spaces such as the practice of biophilic design, which suggest that nature and the working of buildings present positive experiences fundamental to human health and well-being (Sanders, 2011: 1). The ultimate objective of this

dissertation is to derive and establish suitable ways to complement and merge the built environment with the natural environment in creating ideal healing spaces for humans. Incorporation of nature in architectural design principles has the potential of becoming positive experiences for people with or without ailments.

The scarcity of natural landscapes is becoming more apparent as globalization, urbanization and general growth dominates the planet. Repercussions of inaction would be environmentally crippling resulting in desolated areas effectively impacting negatively on livelihood and human environments. Moodliar (2011) asserts that when addressing healing architecture, past literature illustrates efforts have not addressed healing a particular illness in the human body, but instead have only looked at people's general well-being. It is therefore a step forward to take these new theories to address more specific issues within the human body and mind which will provide environments that achieve better healing properties.

1.1.2 Justification of the Study

It is imperative to commend the dedication the government has placed upon healthcare; this is only the first step in responding to the health crisis. There are still many shortcomings with the process which require a holistic collective of research and experiential input from academics and professionals in addressing appropriately and accordingly the problem.

There is a lack of realization that the human body in its totality is natural, like all things organic, it belongs to nature. There is a dire need for built form to be conscious of this. Current architectural environments are domineering over their occupancies; they appear as hard harsh structures unlike the nature of human beings. The human living and working environments are contributing more to illness and aesthetic than to creating environments that comfort, engage and heal the human being. There is a need to create architectural environments aimed at enhancing the well-being of people while researching and discovering elements of nature that make these health innovations possible.

1.2 DEFINITION OF THE PROBLEM, AIMS AND OBJECTIVES

1.2.1   Definition of the Problem

Buildings are the most important physical mass to human life because they surround people on a daily basis but the basic functions are not being met due to focus being on mass reproduction and personal gain (Moodliar, 2011: 4). Architectural environments including healthcare facilities come up short in explicitly addressing health concerns. The aforementioned information regarding the construction of buildings is one such indication of that failure. A poorly designed built environment contributes negatively to the well-being of people. Architectural considerations have the ability to rehabilitate and revitalize these environments. Biophilia as a concept is one such example that needs to be explored. The research will focus on determining the relation between man, the natural environment and built form, and how formulating guidelines and a framework can assist professionals in manifesting architectural environments that enhance well-being.

1.2.2   The Aims of the Study

The study's aim is towards creating, by means of appropriate academic research, an architecturally responsive healthcare and community centre using biophilia as a guiding design concept. The study shall recognize the importance of nature in sustaining a healthy lifestyle, as a healing element and additionally a rehabilitation of desolated urban environments.

1.2.3   The Objectives of the Study

The study's objective will be to:

- Investigate and identify threats to basic human health thus understanding their needs.
- Understand the impacts of built environments on human well-being.
- Explore and demarcate natural therapeutic elements that can be used in architectural environments as a healing aid.
- Evaluate success and failure of existing relative literature manifesting biophilic properties.

- Inform policy in the healthcare sector about the findings and recommendations with the hope to influence the framework from an architectural study.
- Create awareness to architects, designers and urban planners in the built environment about the impact they have on characteristics to aid well-being.
- Demonstrate the concept through a proposed healthcare and community centre prototype.

1.3 SETTING OUT THE SCOPE

1.3.1 Delimitation of Research Problem

This dissertation does not propose that biophilic design can cure illness nor replace conventional medicine but it can make a positive contribution towards basic human health and well-being. The research will also consider human benefits such as the social, physical and mental aspect. It is imperative for this study to consider the symbiotic relationship between man, and their relationship with the environment.

The study will seek to delineate causes of stress within urban environments which include the effects of urbanization and sprawl, environmentally unfriendly and anti-social public spaces, Sick Building Syndrome and artificial versus organic components which impact on health.

The focus of the study will be based on the performance of basic public healthcare facilities relative to its context and users. The study will place extra focus on the Durban Metropolitan area, in the KwaZulu-Natal region; South Africa.

1.3.2 Definition of Key Terms

- *Biophilia* – "An innate love for the natural world, supposed to be felt universally by humankind" (*Collins English Dictionary, 2003*)
- *Built Environment* - A setting which has been created by man to harvest activity, experience and use. Commonly refers to a structure serving a purpose and belonging to its surroundings (www.wikipedia.com).
- *Architectural Environments* - explores the aggregate of surrounding things, conditions or influences that surround and influence the built form (dictionary.com)

- *Genius Loci* - creating a 'sense of place' within the macro, the inter-mediate and the micro- specific context (Norberg-Schulz, 1980: 5).
- *Health* – "[1] the general condition of the body or mind, [2] soundness of body or mind" (dictionary.com)
- *Non-communicable diseases* (NCDs) – "[1] chronic disease; a disease of long duration and generally slow progression" (who.int). [2] "A disease which is not infectious. It may result from genetic or lifestyle factors" (ifrc.org).
- *Nature* – the collective phenomena of the material world including its forces and processes, as opposed to humans and man-made creations (Moodliar, 2011: 6)
- *Well-being* - can be defined as "a good or satisfactory condition of existence; a state characterized by health, happiness, and prosperity; welfare" (dictionary.com)

1.3.3   Stating the Assumptions

An assumption can be made that designing buildings using the prescribed methods is a shift in the right direction superseding current models. It is also an assumption that the physical infrastructure of healthcare facilities in South Africa is inadequate in addressing appropriately the social, physical and mental needs of users through design.

1.3.4   Stating the Key Question

This research will address the following key question in pursuit for possible solutions.

Main question:

- How can nature and good health be contribute towards the design of built environments?

1.3.5   Stating the Sub Questions

Secondary questions:

- What are the appropriate elements of Nature that can be contributed to healing?
- What is the 'well-being' or healthy status of individuals?
- What is the relationship between the built environment and its users?
- What design issues are pertinent in the built form to promote well-being?

1.3.6 The Working Hypothesis

Natural elements encompass and exhibit fundamental healing properties. Incorporating nature in built form creates for better healing environments. Biophilic design is not limited to promoting positive health but extends rehabilitation and healing to the damaged ecosystem.

1.4 CONCEPTS AND THEORIES

The dissertation draws on numerous concepts and theories which form the basis of the research topic. These will form the structural framework to the literature review, research methodology and architectural approach. The theories discussed below will assist in creating architectural environments which complement and promote basic health and well-being as well as healing environments.

Biophilic design as a concept considers the inter-association of man, nature and architecture. This approach in design emphasizes the role of architecture in people's lives such as what "hives are to bees" (Sanders, 2011: 4). Executed accordingly, biophilic design has the ability to enhance architectural environments by restoring and maintaining human health, well-being, reducing stress, increasing concentration, productivity and enhance learning. David Sharkey (2012) cites Sjoquist (2003) by reiterating that positive health is far more evident in people who are exposed to nature and its elements (Sharkey, 2012: 7).

Architecture can benefit immensely from the **biophilia hypothesis;** places which manifest positive well-being and encourage social interaction can be created. In essence, architecture should seek to tackle issues such as pollution, response to noise levels and connecting with all aspects of nature (Sanders, 2011: 4). Biophilic design is a primary concept worth exploring in light of the research topic. Precedent demonstrates that biophilia can complement architecture as Pollack (2006) describes it: *"Biophilic design recognizes the inherent human need for nature together with sustainable and universal design strategies to create environments that truly enhance life"* (Pollack, 2006: 38).

Positive architectural design considerations significantly enhance human livelihoods. This consideration emphasizes the importance of places and spaces, and recognizes that architecture as a function stretches beyond creating visual pleasantries and shelter. General

perception is that architecture is the profession of designing buildings whilst putting much emphasis on the aesthetic appeal; some even go as far as believing it is about drawing plans on large sized paper. This perception falls short. According to Norberg-Schulz (1980), "*A place is a space which has a distinct character.*" (Norberg-Schulz, 1980: 5). It is imperative therefore to consider architectural treatment as much more than a space or building. Biophilic design creates such spaces and is supported by the theory of **genius loci**. Moodliar (2011: 12) cites architects Christopher Day and Carol Venolia as they theorize that healing can be triggered and supported by external factors, such as architectural environments that have healing qualities. These qualities attain to be physically and psychologically therapeutic as endorsed by **environmental psychology**. Emphasis should then be placed on these external factors; choice of building material finishes for instance need to perform for the benefit of human comfort. The current image of the city appears too harsh for human temperament resulting in long-lasting negative effects on human health.

The concept of 'genius loci' is a rather complex one; it is not a factual or physical piece of evidence but based uniquely on a person's emotions and feelings of his or her environment. Many may relate to this notion at a very practical level; the concept of 'genius loci' does not necessarily evoke words but a 'sense of place' which is summoned from the individual's layering of consciousness about their surroundings. The theory puts emphasis on identifying places as habitable conscious spaces, an idea which considers design to be the epitome in creating architecture with a positive impact on its users and surroundings.

Such an approach in design can be classified as a **critical regionalist** methodology. It places emphasis on the identity and characteristics of a particular place or setting, making it priority by implementing design principles that compliment rather than incorporating universal principles which may not relate socially, physically, mentally nor economically. In architecture critical regionalism has been adopted and utilised to enhance communities which particularly lie in historical or cultural settings. This theory sets to resolve the conflict between international interventions or globalization and local identity by celebrating technological advancements and progressive movements whilst proportionately protecting local cultural ethnicity, their heritage and building construction (Moodliar, 2011: 13). The critical regionalism hypothesis states that the physical, social and cultural identity of place should be valued and echoed through architectural design. Critical Regionalism places great sensitivity on context. The

theory is highly relevant in the South African setting and others alike; a country with a rich history plagued by apartheid, impoverished societies and a vast racial diversity with its copious influences; to a developing democratic state in the modern world influenced by globalization. The theory is aimed at resolving the challenges imposed by the complexities of such an environment.

> *"The fundamental strategy of Critical Regionalism is to mediate the impact of universal civilization with elements derived indirectly from the peculiarities of a given place. Critical Regionalism depends upon maintaining a high level of critical self-consciousness. It may find its governing inspiration in such things as the range and quality of the local light, or in the tectonic derived from a peculiar structural mode, or in the topography of a given site."*

<div align="right">Kenneth Frampton (2002)</div>

Critical regionalism as an application is a conscious approach in implementing biophilic design within a context of any region. The apparatus is the foundation of **sustainable** architecture; this demonstrates an environmentally responsive attitude.

1.5 RESEARCH METHODS AND MATERIALS

This dissertation will employ qualitative research. This will explore primary data in the form of literature, case studies, surveys, questionnaires. The collected data will; used as a sample for reference; form part of the final design assumptions and solutions; and will be synthesized and used to answer key questions previously stated. This section presents forth the proposed research methods and materials to be utilized by the researcher to inform this dissertation.

1.5.1   Research Methods

The research methodology is divided to two categories, namely; *primary data collection (active),* which is sourced from interviews, questionnaires and local case studies. The interview questionnaires will be conducted across four different categories. The first set of questionnaires will be directed at built environment professionals, these include mainly architects, architectural technologists and planners. The second set would be structured for

medical professionals; the third set will be a general questionnaire directed at public citizens who are above the age of 21 years, and lastly, the fourth set of questionnaires directed at users of case studies to be analysed to attain their experience and thought of the facility. Only residents within and around the Durban Metro will be interviewed.

The first three sets of questionnaires as listed will be compiled on a Microsoft word document and emailed to participants with the general questionnaire also being issued as a hardcopy for convenience to certain individuals. The research methodology shall also include oral surveys; questionnaires conducted at case studies will be digitally recorded. Permission shall be obtained from higher authorities to conduct research on the healthcare facilities. Questions posed to participants shall be strictly about their personal experience about the use of the facility and their understanding or belief of nature and the building. The survey would not seek to attain individual's health status.

Responses shall be analysed by means of a criteria set forth by review of literature, mainly, a theoretical framework.

Secondary data collection (passive) shall be collected and analysed with the intention to draw conclusions from the findings. Collectively the data collected will aim to provide resolutions to key research problems and aims to achieve the following:

- Testing the validity of the hypothesis. A comparative evaluation of data can be conducted for both primary and secondary sources.

- A general understanding around the key research question can be derived by evaluating and through the use of secondary data sources. This allows for a broader perspective to be applied to the research topic processing data which may influence the outcome of the hypothesis.

The nature of research calls for a methodology. It is imperative to conduct research based upon relevant questions which will inform the aims and objectives within the study (Sharkey, 2012: 11). Although the research is helpful, it does not necessarily give definite answers to the key questions posed.

1.5.2   Research Materials

Primary Sources

The primary research methods will constitute the following:

- **Case Studies**: The Umkhumbane Community Healthcare Centre and Prince Cyril Zulu Communicable Disease Centre will form the case studies and present working examples of the product of the applied concepts and theories. They further present the impact of the study for its intended purpose and indirect impact. An analysis of the study will include site visits and inspection, critical analysis and evaluation of the site within its context, acquiring informative pictures and drawings and a conclusion to be made from these findings.

- **Questionnaires**: A questionnaire survey will be employed to obtain much of the required information from participants. The questions will be informed by the aims and objectives of the study with the intention to answer the key questions. These will be distributed by email or as hardcopy print to various professionals and relevant personnel.

- **Still Photography:** These provide factual moments with no ambiguous meaning. These will also form part of the evidence or explanation of theoretical practices for untrained individuals.

- **Observation:** To critically analyse with the use of a framework or criteria all relevant discourses.

Secondary Sources

The secondary research will form the basis for research on the study of the relationship between the environment and human well-being. The data will be sourced from literature in the form of:

- **Books**: Fundamental in forming the basis of all literature as they consist of an understanding of historical and theoretical context.

- **Journals:** Usually a source of recent and trending information discussed among certain to various groups and communities relating to the topic.

- **Newspapers:** Similar to that of journals but only provide very brief information which could be considered to be factual. These usually highlight a point of reference to conduct in-depth research.

- **Electronic resources** (e-books, e-journals, articles): The internet provides access to a greater body of knowledge that is both local and international.

Once the primary and secondary information has been observed, these data sources are then combined and synthesized with the intension of informing the design process.

1.6 CONCLUSION

These findings from both primary and secondary data collection will be further analysed critically and compared respectively to establish common or uncommon ground to define a point of departure. This section aims to concentrate mainly on the architectural concepts and sustainable theories, which will ultimately form a single constituent of the research process in health care. Architectural environments can be innovative health care systems which give back to the community much more than the current state. The theoretical framework is such that instead of being a place that treats illness but to be a place that instigates the core of healthy living by promoting a health conscious lifestyle.

CHAPTER 2: LITERATURE REVIEW

2.1 UNDERSTANDING BASIC HUMAN HEALTH AND WELL-BEING

2.1.1 Introduction

Architecture has been subjected to many different and contrasting movements over the past couple of decades. These indicated progression and form of expression of the current times; a complete shift in paradigm. But most significantly, these movements influenced the image of the city and affected people's way of life. The historical timeline of these movements illustrate epoch periods of religion, deities and hierarchy; through the expression of identity and admiration of art to modern and post-modern movements to name a few (Craven, 2002).

It is definitive proof that consideration of communal social aspects have stretched through architectural history. Certain issues have become more apparent to humans in recent years as people's perceptions and needs changed; these now require the attention of architectural responsiveness. Royal (2011) states the coexisting relationship between architecture and society has since evolved substantially since the turn of the Twentieth Century. This evolutionary epoch has witnessed the distinct differences between architecture once governed by natural forces and architecture that began to reflect society's preoccupation with the "Age of Industry and Technology"; a Technocratic Era which man considers pertinent to their ultimate survival when (Royal, 2011: 32).

The aforementioned era is part and parcel of the great Urbanization movement. During this period, health has been a general concern among other issues. The importance of positive health and well-being is one that has been deliberated on both a macro and micro level. The success or failure of architectural environments is assessed upon its impact on people; individually or collectively. A successfully effective environment impacts positively on health and human well-being. Being conscious of architecture in this manner reiterates the notion that architecture is much more than just structure with considerations to aesthetics, but is an essential component of social, economic and environmental development; thus forming the basis for sustainability.

The various aspects of human well-being, health and healing should first be understood before one can understand the impact of architecture on an individual and the extended environment. This chapter will explore the various characteristics that delineate these terms. Furthermore,

it will seek to find the interrelationship between them if any and give a better understanding to the term 'stress' and how it affects human well-being. The aim is to create awareness among designers who influence the outcome of these environments.

2.1.2   Basic Health and Well-being Defined

The Oxford English dictionary simply defines well-being as "*the state of being comfortable, healthy, or happy*" (Oxford University Press, 2014) but since so many different aspects of our lives can affect our health and happiness, human well-being is a concept that reflects all of the economic, social, cultural and ecological aspects of our lives. The breakdown of these components includes material well-being where we associate assets to personal value; the relationships kept with family and friends; and, emotional and physical health. It includes work and recreation, one's personal perception of their community, and personal safety (The Puget Sound Science Review, 2011).

The term 'health', for one, solely is vast and complex and may be used to describe an array of different conditions. Breetzke (2010) refers to an article by the World Health Organization; it elucidates the difference between 'well-being' and 'health'. The latter being mostly associated with a specific condition hence its dominant use in the medical field (e.g.: of someone having good or bad health), whereas well-being is as an indication of assessing a person's health factors and outcomes (Breetzke, 2010: 14). The World Health Organization (World Health Organization, 1948) defines health as a "*state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*" (World Health Organization, 1948: 100). Day (2002) affirms that 'health' is an elusively defined term. He attempts describing this complexity as consisting of multilevel; involving processes, functions and psychological state as well as bodily structure. Physical, life-energy, state-of-soul and fulfilment dimensions are inclusive of these levels which consistently interrelate to (Day, 2002: 181).

Similarly human well-being is a confusing term lacking a universally acceptable definition. Authors have used many different and competing interpretations. In addition to the complexity of the definition, the concept cannot be directly measured because it cannot be directly observed. Though McGillivray and Clarke (2006) seem to be at Schrodinger's (1935) theory on this notion contending that well-being can be simply defined by a host of terms such as

"quality of life, welfare, well living, living standards, utility, life satisfaction, prosperity, needs fulfilment, development, empowerment, capability expansion, human development, poverty, human poverty, land and, more recently, happiness" (McGillivray and Clarke, 2006: 3). At the same time these interchangeable terms or 'measurements' of well-being are relative to an individual and are often subject to layering of the observer's perception thus could be highly inaccurate in reading and concluding .

In principle, social scientists accede on the term's ambiguous concept by categorising or subdividing an array of components which consist of general distinctions of human well-being.. The Puget Sound Science Review (2011) refers to Diener and Suh (1997) Boelhouwer (1999), Marks (2007), Costanza (2007), Flynn (2002) as sharing similar attributes within these components. These include items such as *"education; employment; energy; human rights; shelter, housing; health and health care access; income, income distribution, purchasing power; mobility; transportation; infrastructure; governing institutions; social participation; population; reproduction; leisure activities, sports participation and vacation time; spirituality; public safety and crime; traditional activities and cultural responsibilities; and more"* (The Puget Sound Science Review, 2011). Corburn (2009) describes these attributes as *"social determinants of health"* (Corburn, 2009: 13).

Despite the non-definite nature of human well-being, there is a considerable body of research covering the subject. Research has been conducted on multiple fields including psychology, medicine, economics, environmental science and sociology (The Puget Sound Science Review, 2011). According to Diener and Eunkook (2000), psychological literature explores the main and most detail specific issues associated with well-being. Measurement apparatus of research on 'subjective well-being' has been the evaluation of a person's individual perception of their own 'quality of life' Pollnac (2006). Characteristics of an urban setting can be used to measure the quality of life which exists. These include schools, cultural offerings; the beauty of the place; the climate; the healthcare system and job opportunities to mention a few (Kane, 2002). Sharkey (2012) cites biologist Stephen Boyden (1971) describing two significant needs which define biological foundations of well-being; survival needs and well-being needs, the latter being the evaluation of quality of life (Sharkey, 2012: 16). Gasper (2002), Travers and Richardson (1997) and others note 'well-being' is an apparatus to measure what is being assessed in a person's life situation or 'being' (McGillivray, 2007: 3).

Stiglitz (2009), McGillivray and Clarke (2006) highlight income being closely related to well-being and consumption levels in recent times. Sumner (2006) enforces the notion by stating that 'well-being' has been placed at the heart of economic development and has been labelled as 'poverty reduction' (Sumner, 2006: 54). Similar sentiments are expressed by Drury (2012), Cocking, Beale, Hanson & Rapley (2005) and Reicher (2009); that the pathways to well-being are both direct (empowered action itself) and indirect (the positive emotions associated with empowerment); meaning they can be associated with positive emotions of relief, exhilaration, pride, and joy (Drury, 2012: 207). McKenzie (1983) and Slesnick (1998) both define well-being as a direct function of consumption (McGillivray and Clarke, 2006: 4). This understanding is based on a demand and supply quota; where human satisfaction equates to increased well-being as their needs are met by consumption. Income allows individuals to purchase items and acquire services from markets which provide these items; therefore, finances are directly proportional to human well-being (The Puget Sound Science Review, 2011). These are part of 'survival needs'. Much of this shift reflects Sen's (1985, 1987a, 1987b) work on capabilities and functioning, and other work such as Nussbaum's (1988, 1992, 2000) central human capabilities, and Doyal and Gough's (1991) intermediate human needs. Subsequently, among others, gender is a typical example of a broadened spectrum of efforts to measure human well-being (McGillivray and Clarke, 2006: 4).

Architecture encompasses the three main pillars of sustainability which are social, economic and environmental components therefore it is undoubtedly essential to human well-being. Architecture can be used as a basis to create environments which promote positive health and being; and most importantly healing environments. Figure 1 below shows the intensity of connection between certain groups within nature and human well-being constituents. It indicates the degree of connection between socioeconomic factors (Millenium Ecosystem Assessment, 2005: vi).

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Figure 1*: Linkages between Ecosystem Services and Human Well-being.*

(Source: (Millenium Ecosystem Assessment, 2005: vi)*)*

Critical analysis of figure 1 clearly depicts the important role that architecture plays on a macro and micro context in regards to well-being. A macro scale concept is that architecture occurs/and is part of the ecosystem services. Urban design in architecture is the platform to affect the outcome of the environment directly by allowing the process of *support, provisioning, regulating* to occur. By the same token, this happens on a micro scale and also inclusive of *culture* thus directly impacting on the constituents of well-being.

2.1.3   Stress and its Effects

Stress and human well-being are directly related. The urban environment contains a great deal of *stressors* and it is with reason to investigate, firstly, an understanding of stress and its effects on both a macro and micro context.

Breetzke (2010) in her study of understanding stress cites McKay et al (2004) defining the difference between 'stress' and 'stressors'; *"stress is a product of an imbalance between individual resources and various environmental demands (stressors)"* (Breetzke, 2010: 15). She goes on to state that study conducted by Jex, Beehr and Roberts (1992) explores a lack of to the term, defining it as a stimulus from the environment. Members of an Institute of Medicine panel, Elliott and Eisdorfer (1982), for example, state: *"... after thirty-five years, no one has formulated a definition of stress that satisfies even a majority of stress researchers"* (Lazarus and Folkman, 1984: 11).

In research though many authors have formulated definitions to the term, although not identical as in word for word but fundamental principles are very similar. Kellert, Heerwagen and Mador (2008) define stress as "*a process of responding to events, environmental features, or situations that are challenging, which exceed coping resources, or threaten well-being*" (Kellert, Heerwagen and Mador, 2008). Similarly Sharkey (2012) remarks Butler (1993) defining stress as a "*dynamic process reflecting both internal and external factors, which are characteristic of an individual and their circumstances, as well as the interactions between them*" (Sharkey, 2012: 17). Lazarus and Folkman (1984: 19) share similar thought processes.

It can be concluded that the concept of stress features too many definitions proposed by numerous authors. Goldstein and McEwen (2002), McEwen (2002) and Sapolsky (2004) declare that each definition focuses on aspects of *"an internal or external challenge, disturbance, or stimulus; on perception of a stimulus by an organism; or on a physiological response of the organism to the stimulus"* (Dhabhar, 2001: 48).

Stress has a major impact on human well-being. Trauma and abuse for example are an epoch sometimes linked with habitable environments such as home, workplace, or neighbourhood may contribute to stressful experiences (McEwen, 1998: 171). The workplace in particular has become a major contributor (Jetten, et al., 2012; Perrewe & Ganster, 2005). In these built environments architects play an important role and have amountable influences . *Acute stress* (in the sense of "fight" or "flight" or major life events) and *chronic stress* (the cumulative load of minor, day-to-day stresses) can both have long term consequences (McEwen, 1998: 171). The major distinguishing characteristics between the two are duration and intensity. Acute

stress is temporary usually over a couple of minutes to hours whereas chronic stress is recurring for a certain period each day over weeks and even months (Dhabhar, 2001: 48).

Bryce (2001) lists some of the common disorders that are said to be stress related, these include high blood pressure, strokes, heart attacks, diabetes, menstrual problems, increased vulnerability and cancer, depression and anxiety (Sharkey, 2012: 17). Stress may even result in fatality as suicides are often indicators of life. Other behavioural indications of despair such as alcoholism and political extremism may also be a result of life dissatisfaction (Veenhoven, 2007: 224).

The built environment consists of stressors. Processes governing land use, housing, transportation, job opportunities, social services, the quality of the urban environment and opportunities for public participation in local government are associated to stress. These are increasingly understood as powerful determinants of population health (Corburn, 2009: 1). This is important because our lives are unquestionably shaped by them – a field within architecture.

2.1.4 Conclusion

Basic health and human well-being has been defined for the reader to grasp an understanding of the context at which the issue is being addressed in this dissertation. Stress has also been defined and the relationship between stress and well-being illustrated as it has been shown, stress or potential stress will constantly co-exist in architectural environments.

It is apparent that human well-being will be affected by an array of factors as long as they live among each other and all other ailments. The field of study is particularly vast on this subject for this particular reason. Researchers aim to sub-categorise such that other disciplines may extensively engage and research to contribute for the benefit of human health. Further success in different fields edges closer to a holistic proposal of a perfectly balanced life.

Architecture seems to address the issues of health and human well-being directly and indirectly as architecture encompasses other fundamental fields such as social, economic and sustainability. It is imperative to look at architectural environments with an extremist methodology in order for this, and any other works to contribute positively. At a grander scale, ecosystems are part of architectural environments. They can be shaped to contribute

positively or negatively to people's lives; there is an option of either creating or harvesting fresh clean water or polluting it and reducing the supply, by the same token, treating light/energy, air, land and nature in the same respect. The effects on a macro-scale unquestionably will affect the micro-scale. The outcomes could either be limited materials to sustain positive welfare with regard to depreciation of 'good' building materials, the inevitable inflation of prices resulting in financially constrained and depressed communities. Urban sprawl, traffic congestion, vehicle dominated contexts, lack of social spaces, parks, green spaces, plazas and the general street quality potentially create un-necessary stressors on the users.

An extremist theory would conclude that therefore good architectural practice, one that considers all research and study brought forward, would create perfect environments which limit negative health and well-being to issues independent of such environmental behaviour such as genetic diseases, accidents in some cases, politics and laws, and a certain length of economic burdens such as insufficient earnings to fulfil one's personal objectives.

As this dissertation continues, it will unfold the relationship between architectural environments and how a human's well-being is affected to a greater extent.

2.2 THE ARCHITECTURAL RELATIONSHIP WITH WELL-BEING

2.2.1 Introduction

Good, responsible and informed design has the ability to manifest places which achieve various goals. Enabling and promoting healthy lifestyles would likely result in beneficial long-term goals like financial savings. This could be achieved through small consistent improvements or renovation; and not necessarily complete redevelopment. Architecture becomes the fundamental component by which humans conduct their livelihood; the role it plays on our senses, our emotions, participation in physical activity and community life, our sense of community, and general well-being. Human activity between buildings is interpreted from the meaning acquired in architectural spaces e.g. degree of access; use of space etc. (Butterworth, 2000: ii).

Each place and/or space is unique to its own identity and characteristics. These include availability of healthy foods, healthcare services and community customs etc., which influence health behaviour. Butterworth (2000) affirms a common theory often heard when the topic of health concerns arises that ill-health is aggravated in poor communities. Health promotion strategies should place emphasis on social structure and place including peoples' health-related knowledge, attitudes and behaviours (Butterworth, 2000: ii).

Today we live in environments which are a result of urbanism and have also resulted in what is known as *sprawl* effects. Most people do not believe that they live in sprawl. The belief that sprawl is where other people live as a result of other people's poor choices implies that cities that sprawl and, by implication, the citizens living in them are self-indulgent and undisciplined (Bruegmann, 2005: 18). The worldwide phenomenon of sprawl is linked with many diseases and the unhealthy outcomes associated to it. Obesity, heart disease, stroke, diabetes, asthma, hypertension, depression, chronic kidney disease, osteoporosis, and cancer are just a few that have been related to it (Verberder, 2012: 1). The World Health Organization adds to this notion on their World Health Statistics 2012 report by documenting that NCDs have become a major health issue in the 21st century by listing similar issues to be main causes of death (WHO, 2012: 35).

Cities worldwide are in a process of urban transformation in order to accommodate to the infrastructure requirements of the new world economy (Butterworth, 2000: v). This chapter will explore the urban transformation and how it has affected cities, people and liability in these environments.

2.2.2 The Effects of Urbanization and Sprawl

Urbanization dates back to the origin of cities. In the process, people witnessed the evolution of cities from their ancestral form (the village) through small port/rail based towns and eventually to the current image of cities with skyscrapers adorning landscapes (Bekele, 2005: ii). Breese (1966) points out that J. Clyde Mitchell refers to urbanization as being the process of becoming urban, moving to cities, and corresponding changing of behavior patterns (Breese, 1966: 3). Generally, urbanization in newly developing countries is associated with industrialization, though the degree of association varies. In these countries this trend is rising at an alarming rate resulting in cities growing both in number and in physical size (Bekele,

2005: 1). The relation of population growth and urban sprawl is that the population growth is a key driver of urban sprawl (Breese, 1966; Bekele, 2005), one of the major concerns to city planners and administrators (Bhatta, 2010: 1).

From the beginning, sprawl has been one of those words more useful in suggesting an attitude than in indicating any actual conditions. The attitude has almost always been negative. Even the sound of the word suggests something unpleasant (Morris, 2005: 17). The term "sprawl" was originally a reference to a bodily position—*"to lie or sit with arms and legs spread out"*— the word has more recently assumed a broader meaning: *"to spread or develop irregularly"* (Frumkin, et al., 2004; Bekele, 2005). The Vermont Forum on Sprawl (www.vtsprawl.org) offers a succinct definition of sprawl as *"dispersed, auto-dependent development outside of compact urban and village centres, along highways, and in rural countryside"* (Frumkin, Franck and Jackson, 2004: 1). Brueckner (2000) in his paper refers to urban sprawl as excessive spatial growth of cities (Brueckner, 2000: 161) whilst Frumkin, et al. (2004) refers to sprawl as the way land is used, the way people travel from one place to another, and even the way a place "feels." (Frumkin, Franck and Jackson, 2004: 2). Similarly Frumkin's (2002) independent paper reiterates this notion and expands on this also including transportation, social and economic development.

Works by Bekele (2005) and Fumkin (2002) seem to suggest that urban sprawl is rather a recent phenomenon setting trend and accelerating greatly during the second half of the 20th century. Although these authors acknowledge that sprawl has been evident only briefly and steady during the 19th century. This view differs from works by Frumkin, et al. (2004) which published an article written by writer and social critic William H. Whyte from *Fortune* magazine of January 1958, which states that Whyte observed *"huge patches of once green countryside have been turned into vast, smog-filled deserts that are neither city, suburb, nor country." "It is not merely that the countryside is ever receding,"* he warned, but *"in the great expansion of the metropolitan areas the subdivisions of one city are beginning to meet up with the subdivisions of another."* During this period Whyte saw highways that were allowing cities to expand rapidly into surrounding rural areas (Frumkin, Franck and Jackson, 2004: 1). Similarly Bhatta (2010) reiterates this notion. It is possible that similar developments in countries took longer to happen elsewhere which then would sensitise the difference. In the same article Whyte described urban sprawl in the following manner;

"Sprawl is bad aesthetics; it is bad economics. Five acres is being made to do the work of one, and do it very poorly. This is bad for the farmers, it is bad for communities, it is bad for industry, it is bad for utilities, it is bad for the railroads, it is bad for the recreation groups, it is bad even for the developers."

(Frumkin, Franck and Jackson, 2004: 2)

Bruegmann (2005) argues though that the characteristics currently associated with sprawl have actually been visible and present in most prosperous cities throughout history. To make sense of this statement it is imperative to understand Bruegmann's (2005) definition of sprawl: as low-density, scattered, urban development without systematic large-scale or regional public land-use planning (Bruegmann, 2005: 18). Throughout this history, as cities have become economically mature and prosperous, they have tended to branch outward at decreasing densities. What was new in the twentieth century, and similar to Bekele (2005) and Fumkin (2002), was that sprawl at last became a mass phenomenon (Bruegmann, 2005: 18).

Compounded urban growth meant that cities could only expand outwards to accommodate the increased demand and population. By the 21st century city living had become dependent on automobile and commuting between great destinations. Las Vegas, Melbourne, Boston, Mexico City, Beijing (China) and local cities such as Johannesburg and Durban are a few typical examples of urban sprawl in cities across the globe (Sharkey, 2012: 21). Sprawl consumes and exhausts excess space in an uncontrolled, disorderly manner. This results in poor distribution and loss of open spaces, high demand for transportation, and social segregation (Bekele, 2005: 5). Sharkey (2012) cites Bray, Elliott and Vaki (2005) sharing similar thoughts in that an increase in the use of vehicles is the major source of air pollution and a lack of physical activity is evident (Sharkey, 2012: 21). Due to the great distances between things, walking and biking become impractical, and the low density makes mass transit uneconomical (Frumkin, Franck and Jackson, 2004: 2).

The causes and catalysts of urban growth and sprawl have been discussed by a number of researchers (Burchfield et al., 2006; Squires, 2002; Harvey and Clark, 1965) and can be summarised as follows; there are two major factors which result in rapid urban growth: (1) a natural increase in population; and, (2) migration to urban areas. In general, cities are perceived as places where one could have a better life; because of better opportunities, higher

salaries, better services, and better lifestyles. This is a common belief among rural or impoverished communities. People move into urban areas mainly to seek economic opportunities (Bhatta, 2010: 18-19).

In sprawling metropolitan areas, the city expands outward over large geographic areas, sometimes in a "leapfrog" pattern. Figure 2 illustrates sprawl on a regional scale (Frumkin, Franck and Jackson, 2004: 2). As the scale of the affected city expands and developments ensue on the peripheral areas of the city, more services and infrastructure is needed to serve a low population which lives in these small density areas instead of investing in the development of the city (Torrens, 2006: 249).

Figure 2*: A subdivision near Columbus, Ohio, encroaching on farmland.*

(Source: (Frumkin, Franck and Jackson, 2004: 3)*)*

Issues associated with sprawl have been laid out. It is imperative to clearly distinguish and show relation of how sprawl affects health. Land use and transportation interact to affect many aspects of human activity, well-being, and health. Vehicles as a primary source for commuting will result in more air pollution, which contributes to respiratory and cardiovascular disease. More driving also means less physical activity; contributing to a national epidemic of

overweight and associated diseases (Frumkin, et. Al., 2004; Bray, Elliott and Vaki, 2005). More time spent driving or commuting means a greater risk of road accidents with other vehicles or pedestrians which could result in injuries and even death. Among other issues, sprawl threatens the quality of drinking water sources and the availability of green spaces. Even mental health and the network of social interactions and trust known as "social capital" may be affected. To fully comprehend the health implications of sprawl and to cultivate better public policy requires, therefore, an understanding of the physical attributes of sprawl and how people are affected (Frumkin, Franck and Jackson, 2004: 2-3).

2.2.3   Sick Building Syndrome

2.2.3.1 Sick Building Syndrome Defined

It is clearly important that buildings should provide a healthy, safe and comfortable environment for their occupants because as human beings we significantly spend a great amount of time in them. A relatively recent phenomenon, sick building syndrome has been acknowledged as a recognizable disease by the World Health Organization (Rostron, 1997: 1). Hedge and Ericsson (1996) reveal an extended definition by the same organization: *"A collection of nonspecific symptoms including eye, nose and throat irritation, mental fatigue, headaches, nausea, dizziness and skin irritations, which seem to be linked with occupancy of certain workplaces."* (Abdul-Wahab, 2011; Broderbund, 1999; Okolie & Adedeji, 2013). According to Bouberki (2008) however, the term sick building syndrome describes health problems associated with the time people spend in buildings. Bouberki refers to no particular illness but one can justly conclude similar to those listed previously. In some cases no specific illness or cause can be identified (Sharkey, 2012: 50).

It is important to note that problems in the operation of buildings may be caused by other disciplines involved besides architectural design. Maintenance has been known to be a major contributor. Interior furnishing and fabrics, along with ergonomic design or workstations and psychological factors such as occupational stress may be sources of symptoms (Potter, 1988: 1). An attempt by multi-disciplines to investigate a problem have revealed findings which could be translated into a universal set of preventive guidelines although they have been specific to building typology and nature of work conducted (Potter, 1988: 1). The following research will discuss the causes and effects of sick building syndrome.
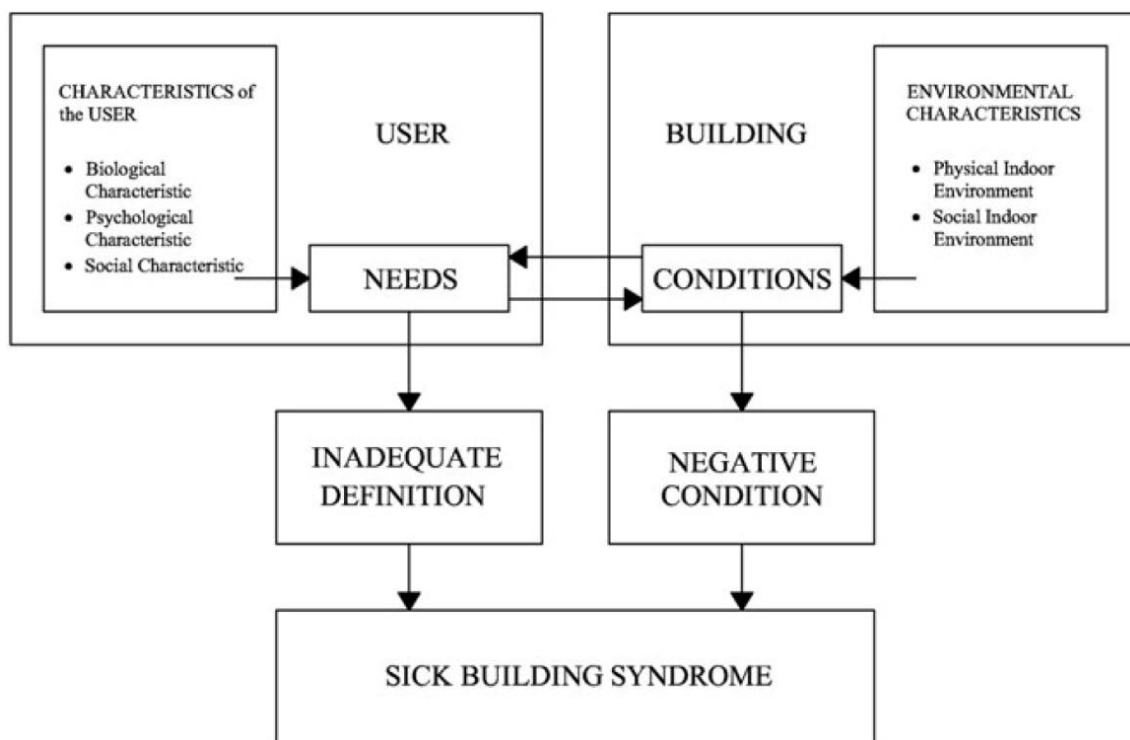
Figure 3: *Relationship between sick building syndrome, user and building.*

(Source: (Vural and Balanlı, 2011: 373)*)*

2.2.3.2 Symptoms of Sick Building Syndrome

Since its recognition in 1986, it has been estimated that up to 20-30% of refurbished buildings and an unknown but significant number of new buildings may suffer from sick building syndrome (Rostron, 1997; McLellan & McCunney, 1994; Hodgson & Morey, 1989; Potter, 1988; Atkin and Brooks, 2005). Building occupants complain of symptoms associated with acute discomfort. The effect of sick building syndrome on these individuals is a group of symptoms which are experienced specifically at work. The Environmental Protection Agency (2010), Environmental Illness Resource (2010), Odle (2010), Kipen (2010), Roy (2010), Unionsafe (2009), Milica (2009), Property Council of Australia (2009), Gomzi and Bobic (2009), Joshi (2008), Evans (2008), Tyler (2007), Greer (2007), Marmot et al. (2006), Kreiss et al. (2006), Shoemaker and House (2005), Burge (2004), Hodgson (2002), Unionsafe (2002), Mendelson et al. (2000), Workplace Services (2000), Niven et al. (2000), Thorn (1998), Brinke et al. (1998), Redlich et al. (1997), Bachmann and Myers (1995), Hedge et al. (1995),

the Health and Safety Executive (1992), Stenberg (1989) and Finnegan et al. (1984) state that Sick Building Syndrome can cause the following ill health effects (Jansz, 2011: 31-33):

Table 1: *Symptoms of Sick Building Syndrome*

(Source: (Jansz, 2011))

1. Respiratory
Runny nose
Sneezing
Dry sore throat
Blocked nose
Nose bleeds
Allergic Rhinitis (repetitive sneezing and a runny nose)
Sinus congestion
Colds
Influenza like symptoms
Dry Cough
Throat irritation
Wheezing when breathing
Shortness of breath
Sensation of having dry mucus membranes
Hoarseness of the voice due to inflammation of the throat and larynx
Sensitivity to odours
Increased incidences of building related asthma attacks
2. Eye irritation
Eye dryness
Itching of the eyes
Watering of the eyes
Gritty eyes
Burning of the eyes
Visual disturbances

Light sensitivity
3. Dermal irritation
Skin rashes
Itchy skin
Dry skin
Erythema (Redness or inflammation due to congestion in, and dilation of, the superficial capillaries of the skin.)
Irritation and dryness of the lips
Seborrheic dermatitis
Periorbital eczema
Rosacca
Uritcaria
Itching folliculitis
4. Cognitive complaints
Functional headache that affect a person's performance, but which fail to reveal evidence of physiological or structural abnormalities
Migraine headache
Tension headache
Sinus headache due to swelling of the mucus membranes
Mental confusion
Lethargy
Lethargic (The word "lethargy" comes from the Greek word lethargos which means forgetful.)
Difficulty in concentrating
Mental fatigue
General fatigue that starts within a few hours of coming to work and which ceases after the person leaves the building
Unable to think clearly
Drowsy
5. Gastrointestinal symptoms
Nausea

6. Other
Dizziness
Unspecified hypersensitivity reactions
Personality changes (that may be due to stress or ill health)
Exacerbation of pre-existing illnesses such as asthma, sinusitis or eczema.

Rostron (1997) Hedge and Ericsson (1996) and Potter (1988) extrapolate on similar symptoms. Occupants seem to suffer from these acute health and comfort problems whilst they are still within the building and they disappear soon after they leave (Okolie and Adedeji, 2013: 1).

Sick building syndrome may not be life threatening but it is unpleasant to those affected by it. The consequences of the syndrome in a work environment are, *inter alia*, increased absenteeism, reduced work performance and possibly even building closure (Rostron, 1997; Atkin and Brooks, 2005). Additional symptoms of the syndrome include nose bleeding, burning in trachea, nausea, heart palpitations, and shortness of breath and/or exhaustion after normal activities, muscle cramps and joint pains, tremors, swelling of the legs, trunk and ankles, difficulty in concentration, chronic fatigue, sensitivity to odours, pregnancy problems including miscarriages and cancer (Okolie & Adedeji, 2013; Potter, 1988).

A study in the UK has however indicated that common features can be traced and related to sick building syndrome which present that [1] symptoms may occur in naturally ventilated room but are most common in air conditioned buildings, [2] clerical staff are more likely to suffer than managerial staff, and more complaints arise in the public than the private sector, [3] people with most symptoms have least perceived control over their environment, and [4] symptoms are more frequent in the afternoon than the morning (Rayner, 1997: 6).

2.2.3.3 Causes of Sick Building Syndrome

Different experts have disparate theories despite that little have been actually proven about the causes of sick building syndrome (Rayner, 1997; Okolie & Adedeji, 2013). One school of thought suggests that the main cause is chemical, while another proffers fungi as primarily to blame or physical factors such as humidity, temperature or lighting or the air-conditioning systems (Okolie and Adedeji, 2013: 2).

Potter (1988) suggests that major cause of the symptoms can be divided into three main categories of [a] indoor air quality, [b] building service operations, and [c] operation of building (Potter, 1988: 3-4). Comparison of both categories suggests that air/ventilation is one of the primary issues. This deduction would be in consensus with authors' opinion such as Raw, Roys & Whitehead (1993), Atkin and Brooks (2005) and Firor (2006) who proclaim that sick building syndrome is influenced in part by – indoor surface pollution such as dust, fibers and micro-organisms deposited on or in surfaces of buildings (Okolie and Adedeji, 2013: 2). The United States Environmental Protection Agency (2006) lists four causes of sick building syndrome as: [1] Inadequate ventilation; [2] Chemical contaminants from outdoor sources; [3] Chemical contaminants from indoor sources; and [4] Biological contaminants (Okolie & Adedeji, 2013; Potter, 1988).

In addition to air/ventilation being a primary element, Sharkey (2012) infers that after careful consideration Balsdon's (1990) six elements can be simplified to two more primary elements which are thermal comfort and lighting (Sharkey, 2012: 51). Air/ventilation can be sub-divided and more specific to ventilation systems and volatile organic compounds.

I.   *Thermal Comfort and Humidity*

According to Potter (1988) and Jansz (2011) the most comfortable temperature inside a building is between 20 and 23 degrees Centigrade (°C) in winter and 20–25°C in summer with relative humidity of 40–60%. However human thermal comfort in a building will not be greatly affected by large changes in relative humidity and can easily tolerate values outside the specified ranges (Potter, 1988: 9).Temperatures above 25°C can cause headaches, fatigue and "stuffiness" while indoor temperature below 18°C is likely to cause chills and influenza like symptoms all associated with sick building syndrome (Potter, 1988; Jansz, 2011).

Studies regarding thermal comfort in buildings demonstrates that alleviating discomfort is just as important for occupants' satisfaction as providing comfortable conditions in the first place (Rayner, 1997: 149); thus a call for good design. The suggested findings are not definite as comfort of building occupants is also subjective to individuality. Some people may prefer warmer room temperature while others prefer cooler room temperature. Different metabolic rates also influence preference; some may be over-weight and some under-weight, some work demands employees to be physically active while other employees perform sedentary work,

but in many air-conditioned public buildings all occupants are subjected to the same building temperature. The higher the humidity in the building air, the warmer the air feels (Jansz, 2011: 48). Radiant heat from the sun entering through windows on the north and west side of the building in the afternoon may also affect air comfort levels.

II.   Ventilation

The interior space of a building is undoubtedly the single most important environment to humans since a significant amount of time is spent indoors. Natural and artificial agents pollute indoor air quality. The exterior of the building, usage of the building (user and user's activities) and building materials used may all be sources of these pollutants. These threaten the indoor air quality and as a result, the polluted air may cause biological and psychological health problems which may vary from headaches to cancer; and from fatigue to high levels of stress.

Different pollutants have different structures, this affects how they impact people therefor it is necessary to seek appropriate preventive measures (Vural, 2011: 59). Two pertinent considerations should be made regarding air quality in buildings; the first is to reduce pollutant emissions if they can be identified, and second, is to supply enough "fresh" (generally external air provided it is not the source of the problem) air to dilute all the indoor generated pollutants (Potter, 1988: 8). The CIBSE guide (B2-4) provides a minimum recommended ventilation rate for control of body odour. However, studies indicate additional ventilation is required to combat person-generated odours, the materials used and stored in the office, furniture, fittings and possible further contaminants (Potter, 1988: 8). This is when air-conditioning systems have been used.

In contrast, reports suggest that air-conditioning systems are often problematic in addressing this problem; in fact they are often the source of both biological and chemical contaminants (Mikrine, 1996: 66). Most of these issues are a result of bad design and maintenance. Another problem is that air-conditioning systems do not allow for personal or individual regulation of the habitable, window opening is restricted and heating and cooling is remotely controlled (Potter, 1988; Balsdon, 1990; Rayner, 1997; Vural, 2011). Designers often assume that comfort can be achieved solely by systems designed to *"keep the measured variables within the required tolerances"* and disregard other features. Flexible systems should be encouraged

because users are more equipped to determine the best possible solution to various internal situations (Rayner, 1997: 149).

III.   Volatile Organic Compounds (VOC)

People have grown fonder and accustomed to spending time inside buildings over the years, according to Bernstein et al. (2008), Ashmore and Dimitroulopoulou (2009), Jo and Sohn (2009) and Xu et al. (2010), the risk of suffering negative health effects from chronic exposition to lower levels of indoor air pollutants by the population subgroup sensitive to contaminants has increased exponentially (Gallego et al., 2011: 289). Lundgren et al. (1999) lists numerous factors as to why unusually high levels of VOCs may be found indoors; specification of building materials, poor malfunctioning ventilation system, recirculation of ventilation air, moisture damage to building materials, or the performance of inadvisable activities inside buildings are among the few (Gallego, et al., 2011; Potter, 1988; Okolie & Adedeji, 2013; Eaton, 1997). Effects on human health are dependent on VOC levels present in indoor environment (Glas et al., 2008; Gul, 2011). Cases of diseases of persons excessively sensitive to very low levels of VOCs have known to be reported (Gul, 2011: 96). It is also known that VOCs are detoxified in the liver (Eaton, 1997: 65). In addition, VOCs have been associated with causes of sick building syndrome symptoms so these building materials need to have a warning as to the health effects that they can cause (Jansz, 2011: 29).

VOCs are present in most construction materials as listed in Table 2 below. These compounds are colourless and odorous; they tend to disperse into the environment during application and could accumulate in certain amounts. That is why levels of concentration in small and insufficiently ventilated places are high (Gul, 2011: 94).

Table 2*: VOCs: Sources and Health Effects*

(Source: (Vural, 2011: 64)*)*

Pollutant	Sources of pollutant	Health effects
Gas and vapors		
Benzene	Vehicle exhausts Incomplete combustion Tobacco smoke Processed composite wood products Finishing Paints	Burning of eyes and lacrimation Cancer Anemia
Toluene	Vehicle exhausts Incomplete combustion Adhesives Floor materials (carpet, vinyl) Tobacco smoke Processed composite wood products Finishing Paints Thinners Ink	Fatigue Lack of coordination Disturbed sleep Eye irritation
Formaldehyde	Processed composite wood products Adhesives Insulation products Carpets Textiles Wall papers Paints	Uncomfortable of odour Burning of eyes and lacrimation Upper respiratory irritation Sneeze Headache Nausea Vomit

	Thinners	Diarrhoea
		Asthma exacerbations
		Allergen trigger
		Coughing
		Increasing in the pulmonary function
		Water retention
		Fatigue
		Inquietude
		Disturbed sleep
		Death (50–100 ppm)

Gul (2011) suggests that high emission levels of VOCs are common in new buildings because of the new materials, also in spaces with high indoor temperature and humidity; however, concentration levels could be reduced by sufficient ventilation (Gul, 2011: 94). Special attention must be given to heating, ventilation and air-conditioning systems (Fisk et al., 2009, Mendell et al., 2008). Regulations regarding regular inspection and maintenance for appropriate management of building ventilation systems has been set aside by the World Health Organization, these include rules preventing the penetration of biological contaminants inside the building (Gul, 2011; Gallego, et al., 2011).

IV. Light and Lighting

Inadequate illumination, uniform or dull lighting, discomfort glare, flickering luminaires and tinted windows which reduce levels of daylight are visual problems which may cause eye strain, headaches and are a major contributor to sick building syndrome (Rostron, 1997: 164). In addition poor lighting design is likely to irritate, distract, and produce lethargy. Inadequate lighting can affect the mental performance of occupants (Mendell et al., 2002; Abdul-Wahab & Ahmed, 2011). There must be suitable and sufficient lighting, so far as is reasonably practicable by natural light else artificial lighting is required.

Findings report incidences of sick building syndrome were reduced at appropriate lighting levels. Sterling et al. (1983) noted *"a reduction in eye symptoms by varying both the quantity of ultraviolet light and the ventilation"* (Abdul-Wahab and Ahmed, 2011: 464). Eyes are

arguably the most important feature on the human body which work as a tool across a wide spectrum of jobs and professions; therefore they have to function in an appropriate lighting environment (Drahonovska, 2005). Morris and Dennison (1995), and Drahonovska (2005) state that eye work under inappropriate lighting can be a very obvious cause of sick building syndrome, resulting in eye discomfort, eye strain and fatigue (Abdul-Wahab and Ahmed, 2011: 463).

2.2.4 Conclusion

The identity of well-planned cities and towns consist of a number of recognisable characteristics; healthcare services, housing and community resources are integrated within the community, these are supplemented by sustainable transportation systems and green spaces is maximised where possible. A collective approach from local authorities, health services and all relevant fields is required to aid the benefit of human well-being. *"Development at a neighbourhood scale can range from small-scale interventions in established communities through to the wholesale redevelopment or regeneration of failing urban areas, or the creation of new communities"* (Commission for Architecture and the Built Environment, 2009: 12).

Contrast to the formless nature of sprawled wasteland of today, the Garden City model was a successful precedent in suburban developments. This philosophy structured small towns that combined all the functions of life — schools, banks, stores, offices, restaurants, public transport, libraries, etc. — with housing for a variety of income levels and easily accessible public transportation (Morris, 2005: 5).

A lot can be learned from the Garden City concept which continues to serve as the basis for global urban planning. Ebenezer Howard started the Garden City model in England. This was a sort of establishment that resembled small English villages; it encouraged multi-use development patterns, with light industry, stores, and public buildings located alongside housing and green space. Garden City did not belong to any class or group of people but catered for all. (Morris, 2005: 5-6).

Designing a building for the well-being of people then becomes a monumental, if not near an impossible task considering that the well-being of persons is unique. In contrast, it is important to note that the individual's assessment of his status is based on how he relates to his

environment. This is the common ground where a theoretical framework can be established for a design of a building to cater across the spectrum. Creating a place, a 'good' environment for the people to meet and conduct their daily practices is pertinent in this regard. It determines the relationships they have with others and most importantly influence the state of emotion at any given moment. A theoretical framework can be based on a number of global factors without being too technical on the uniqueness of individuals but draw from the fact that there is a mutual understanding of human behaviour and space as discussed further by i.e. Lawson (2001) and Jan Gehl (1987).

CHAPTER 3: THEORETICAL FRAMEWORK

3.1 NATURAL ENVIRONMENT AND HEALTH BENEFITS

3.1.1 Introduction

Stressors and the negative impact on human health and well-being produced by / or are part of the natural and built environment have been explored. This section will now shift the focus to address how the natural environment can play a positive and healthy role in people's lives.

Maller, et al. (2006: 46) defines *Nature* as [1] *"an organic environment where the majority of ecosystem processes are present (e.g. birth, death, reproduction, relationship between species)"*. It can also refers to [2] *"any single element of the natural environment (such as plants, animals, soil, water or air), and includes domestic and companion animals as well as cultivated pot plants"* and [3] refer *"collectively to the geological, evolutionary, biophysical and biochemical processes that have occurred throughout time to create the Earth as it is today"* (Townsend and Weerasuriya, 2010: 3).

3.1.2 Historical Relevance

The natural environment has been considered to be advantageous to health for many decades now (Gladwell et al., 2013: 1). Works studied by Ottosson and Grahn (2008) describes gardens, pastoral landscapes and natural settings with miniature lakes and meadows, as *"places where people can take refuge, find shelter and comfort during moments of sadness and pain; as places where the body and mind can both heal."* (Townsend and Weerasuriya, 2010: 17).

Over 2000 years ago, Chinese Taoists (Louv, 2008) created greenhouses and gardens perceived as beneficial to health (Townsend and Weerasuriya, 2010: 17). According to Hartig and Cooper Marcus (2006) and Horowitz (2012) in the UK during the 19th century Industrial Revolution, wealthy philanthropists started considering benefits to human health in habitable environments and began developing urban parks and hospital gardens as it was believed they had healing properties (Gladwell et al., 2013: 1).

People's perception of nature began to gradually shift during the nineteenth century; it became much more than a source of beauty but a source that contained healing powers. Based on these beliefs, spas and sanatoriums were built on mountains or close to the sea (Townsend

and Weerasuriya, 2010: 17). Maas, et al. (2006) and Maas, et al. (2009) found that a study conducted in the early 21st century demonstrated an association between improved health outcomes and amount of surrounding 'green space', evidently supporting this belief (Gladwell et al., 2013: 1). Nebbe (2006) refers to a number of historic periods and events to support this theory; earlier periods saw Egyptian physicians advising disturbed patients to walk in gardens; and early 19th century European hospitals to involve patients in planting (Townsend and Weerasuriya, 2010: 4).

Figure 4: *The Healing Garden at UM Rehabilitation & Orthopaedic Institute is designed and used as part of therapy in aiding physically challenged patients with recovery as they transition into the community, and renew interest in the leisure activity of gardening.*

(Source: (http://www.umrehabortho.org. Accessed: 12/03/2015))

Kellert (2002: 118) observed that society today society has become *"so estranged from its natural origins, it has failed to recognize our species' basic dependence on nature as a condition of growth and development"*. Frumkin (2001) believes that this is due to humans

having native appreciation of close contact with nature which stems from living conditions which humans evolved (Townsend and Weerasuriya, 2010: 5). This level of intimacy with nature is declining at an alarming rate, particularly in the Western world (Gladwell et al., 2013: 1).

3.1.3 The Advantages of Nature

The effect of today's increasing fast-paced and stressful lifestyle reminds people of the lost connection that should be regained with nature, and the importance of creating and preserving attractive relaxing natural environments (Stone, 2006). Access to green space has been shown to be important for mental health and in Japan, Scandinavia and the Netherlands; it has been associated with longevity and decreased risk of mental illness (Takano, et al., 2002; Grahn & Stigsdotter, 2003; De Vries, et al., 2003). It is important to note that there is no health without mental health. *"Mental health is central to the human, social and economic capital of nations and should therefore be considered as an integral and essential part of other public policy areas such as human rights, social care, education and employment"* (Bird, 2007: 17). Access to natural environments also improves perception of general health (Maas, et al., 2009; Mitchell & Popham, 2007) and quality of life in ageing populations (Sugiyam, et al., 2008).

> *"Mental health and mental well-being are fundamental to the quality of life and productivity of individuals, families, communities and nations, enabling people to experience life as meaningful and to be creative an active citizens".*

> WHO European Declaration on Mental Health (2005)

A plethora of research demonstrates humans' appreciation of diverse features offered by nature. Fuller, et al. (2007) elaborates on quality of green space and its association with health; as the biodiversity (i.e. range of species of plants and animals that are present in the environment) enhances the psychological health benefits (Gladwell et al., 2013: 2). Frumkin (2001) goes even deeper explaining that this effect begins at the most minute detail and primary level such as *"varied foliage in a wood, the sound of bird song or the sight of ocean waves lapping at the seashore"*. Similarly Nilsson (2006) describes the therapeutic effects gained from the sounds of flowing water and the wind rustling through the leaves (Townsend and Weerasuriya, 2010: 18). Tree density and vegetated settings can be added to the intricate

details which elicit positive emotions in observers (Hull and Harvey, 1989; Ulrich, 1983). Frumkin (2001, p. 235) quotes Richard Kaplan as stating, *"Nature matters to people: big trees and small trees, glistening water, chirping birds, budding bushes, colorful flowers. These are important ingredients in a good life."* (Townsend and Weerasuriya, 2010: 18).

Figure 5*: The literature suggests that the richer the bio-diversity of the ecosystem, the more effective the healing properties.*

(Source: (http://www.midsouthirrigation.com. Accessed: 12/03/2015))

Interesting finding by Maas, Verheij, et al. (2006) revealed that benefits which coexist between green space and health relationships are more significant in low socioeconomic strata, measured by the highest level of schooling achieved, income, ethnicity and coverage under public or private health insurance (Easton, 2012: 9). Although low income populations generally have higher rates of mortality which is evident among townships and informal communities, Mitchell (2008) discovered the same population living in areas with large amounts of open, undeveloped land with natural vegetation, generally rural communities, have a lower mortality rate from all causes (Easton, 2012: 9).

An outdoor experience which awards the sense of calmness, reinvigoration and rejuvenation of mind, body and spirit (Heerwagen, 2009) relates to the rudimentary features of nature which address feelings of safety, opportunity, connection and pleasure in mental psychology (Kellert, Heerwagen and Mador, 2008). Townsend and Weerasuriya (2010: 19) refer to numerous authors and works which describe a few facets of a person's physical, mental and social life affected by contact with nature. These include:

- reducing anger, frustration and aggression (Groeneweggen, et al., 2006)
- increasing a sense of belonging and acceptance
- a range of other aspects including socialisation, mobility, mental stimulation, touch, physiological benefits, and the fulfilment of basic needs such as love, respect, usefulness, trust, self-worth and nurturing (Nebbe, 2006; O'Brien, 2005b).

Research on the physiological health benefits of gardening, for example, has shown that gardening:

- reduces the risk of cardiovascular disease (Lemaitre, et al., 1999)
- reduces HDL cholesterol levels in elderly men (Bijnen, et al.,1996)
- improves the health of diabetes patients (Armstrong, 2000a)
- reduces risk of gastro-intestinal haemorrhage (Pahor, et al., 1994).

Further, natural environments have been shown to increase feelings of social safety and to reduce crime and aggressive behaviours (Kuo and Sullivan, 2001b; Kuo et al., 1998).

It is a daunting realisation that despite the positive attributes incorporated within nature, people living in cities may now only be able to access nature only in parks and public nature reserves. This is further reinforced by Bowler, et al. (2010) who ascertains the decline in connectedness of people with nature across many regions despite evidence supporting that natural environments promote physical activity and health benefits(Gladwell et al., 2013: 3). Parks and nature reserves seem to be the last natural settings within urban landscapes to which people have limited access. The scarcity of these recourses symbolizes a diminishing or damaged ecosystem.

Figure 6: *Above is a map of Durban illustrating the conserved green spaces of the city in relation to the built environment.*

(Accessed: (http://img.docstoccdn.com. Accessed: 12/03/2015))

The quality and quantity of natural environments have been in decline over the years, more so during the industrialization and urbanization periods. There has been less concern on the natural environments as technology and people advanced their mind-set and focus shifted towards economic and social factors, this has been largely linked with Westernization. The

pertinent role of natural environments on human health and well-being has been elucidated but it is worth demonstrating that natural environments, especially of good quality and vast quantity are beneficial to itself and evidently the planet.

3.2 HEALING AND THERAPEUTIC ENVIRONMENTS THROUGH ARCHITECTURE

3.2.1   Theory of Therapeutic Environments

Research indicates that when people think about therapeutic environments they perceive institutional and rehabilitative facilities which are very hospital-like and monotonous in their nature (Beckenstrater and Smith, 2010). This perception needs to be addressed as this definition differs vastly from the concept of therapeutic environments. According to Grant (1993: 40), the first step to altering this perception is to redress the name of such facilities. This will also alter the mind-set of patients, staff and visitors (Beckenstrater, 2010: 10). A proposal for such facilities is to be referred to as 'centres for healing' would restructure the mental psychology projecting a positive image and allowing the start of a therapeutic, new building typology. This model is one that has been used many times in marketing and advertisement formally known as *rebranding*.

A definition from *whatis.com* website defines the term as: *"Rebranding is the creation of a new look and feel for an established product in order to differentiate the product from its competitors. Rebranding efforts may include a name change, new logo or packaging and updated marketing materials that include the latest industry buzzwords. The goal of rebranding is to influence a customer's perception about a product or service by revitalizing the brand and making it seem more modern and relevant to the customer's needs"* (Rouse, 2011).

Figure 7: An image depicting Addington Hospital, a state facility situated within Durban CBD, South Africa. This is the general identity of state healtcare facilities in the country.

(Source: http://kznpr.co.za. Accessed 12/03/2015))

Figure 8: Interior environment of Addington Hospital and most state healthcare facilities.

(Source: (http://www.citypress.co.za. Accessed 12/03/2015))

Figure 9*: The Henry Ford West Bloomfield Hospital in Oakland County, USA. Re-imagining the identity of healthcare facility affects a human's perception and psychological well-being of the individual.*

(Source: (http://mi.reel-scout.com. Accessed 12/03/2015)

Figure 10*: Therapeutic elements are also captured on the interior creating harmonious spaces.*

(Source: (https://ayrshirehealthandarts.files.wordpress.com. Accessed 12/03/2015))

"Therapeutic Environment theory originates from the fields of environmental psychology (the psycho-social effects of environment), psychoneuroimmunology (the effects of environment on the immune system), and neuroscience (how the brain perceives architecture)" (Smith, 2010). Smith (2008: 2) describes a therapeutic environment as a reference to a spatial experience that exhibit healing qualities (Beckenstrater, 2010: 10) whilst Gesler (1993: 171) states that therapeutic landscapes are places with *"an enduring reputation for achieving physical, mental and spiritual healing"*. Velarde et al. (2007) and Pretty (2004) also note that people may benefit positively from nature by merely noticing and observing in-lieu of being present on a primary level; studies show greener views are believed to enhance clearer thinking. Louv (2008, p. 46) states this is further reinforced by Gordon Orians, Professor Emeritus of Zoology at the University of Washington, who states that *"research suggests our visual environment profoundly affects our physical and mental well-being"* (Townsend and Weerasuriya, 2010: 39).

There are a number of examples within the medical context which exhibit positive benefits of therapeutic environments. Townsend and Weerasuriya (2010: 40) draw on the following:

- During the early 1870s, the Quakers' Friends Hospital in Pennsylvania utilised a vast open natural landscape and a greenhouse as part of its treatment plan for patients suffering from mental illnesses. Tranquillity and perceptions of danger have been associated with the degree of openness in certain settings (Louv, 2008).
- With fairly similar degree of openness except where nature has been replaced with an urban setting, people exhibited lower feelings of tranquillity and greater feelings of danger (Herzog and Chernick 2000). It appears then that positive feelings are influenced by the extent to which the setting is natural rather than urban.
- A study was done which investigates and compares the effects of urban settings against natural landscapes on human health. It found that: *"natural scenes dominated by green vegetation, including cultivated fields, improved well-being and reduced anxiety in subjects, increased positive feelings and reduced the arousal of fear"* (Ulrich, 1979).
- Another study conducted in Chicago found that people living near natural settings were more equipped and capable of dealing with important arising issues in their lives. Increased amount of green space within social residential spaces was associated with

lower mental fatigue in community members; they felt more hopeful and less helpless about confronting life.

Similarly, Easton (2012: 9) draws on further examples by numerous authors to reinforce this notion:

- Further studies by Hansmann, Hug and Seeland (2007) affirmed the positive effects of spending time in green spaces when stress levels and headaches decreased, and people got a good sense of general well-being.
- Grahn & Stigsdotter's (2010) study revealed that people's sensory perception preferred serene spaces which are shielded from noise and feel like places of refuge.

There are, of course, more reasons why nature is so therapeutic. According to Day (2002): *"it also connects us with life-energies, and is a world of harmonious relationships: symbiosis, companionship and cooperation, even harmonies through competition, parasitism and predation. More importantly, elemental interaction and the mood-auras of (largely invisible) fauna build spirit-nurturing places"* (Day, 2002: 214)

3.2.2 Biophilia

The concept of therapeutic planning is based on the biophilia hypothesis popularized by E.O Wilson during the early 1980s. A Harvard myrmecologist and conservationist, Wilson (1984) suggested that it is a daily requisite that people be in contact with nature to be healthy, productive individuals. It is found that humans have an innate need to connect or interact with nature (Easton, 2012; Townsend & Weerasuriya, 2010).

The most basic definition of "biophilia" is the love of nature and living things (Sacks, 2009). Kellert (2008: 3) describes biophilic design as *"the deliberate attempt to translate an understanding of the inherent human affinity to affiliate with natural systems and processes"* – known as biophilia (Wilson, 1984; Kellert and Wilson, 1993) – into the design of the built environment (Kellert and Derr, 1998; Kellert, 2008; Townsend & Weerasuriya, 2010). This close connection / relationship people tend to feel towards nature has been biologically encoded as it has proved instrumental in enhancing human physical, emotional, and intellectual fitness during the long course of human existence and evolution (Kellert and Derr 1998; Kellert, 2008; Konijnendijk 2008b; Wilson 1984). History illustrates that people have

been heavily dependent on nature for their entire existence; these natural influences still felt today reflect the reality of having evolved from a largely natural, not artificial or constructed, world (Kellert, 2008: 3). This realization may result in an approach in design that can create built environments that restore and maintain human health, well-being, reduce stress, increase concentration, productivity and enhance learning.
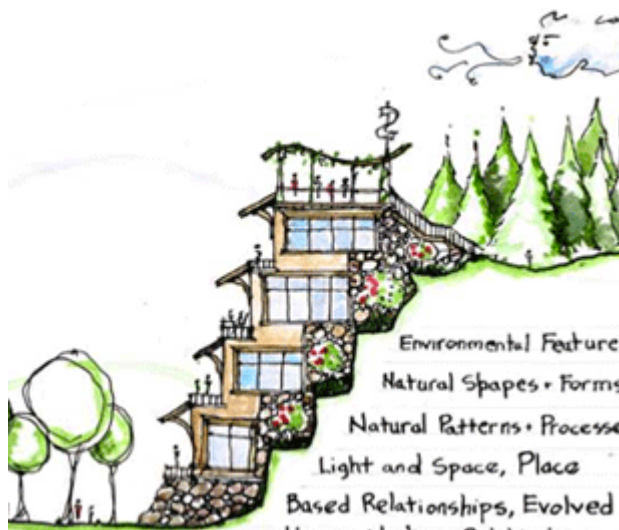
Figure 11: Biophilic design detail by Liz Calabrese of The University of Vermont Ecological Design Collaboratory illustrating the essence of biophilia.

(Source: http://www.uvm.edu. Accessed 12/03/2015)

People who use buildings expect much more from them than to simply work, play, eat or sleep as would be expected and the norm of a functional building; they want to draw inspiration from it, be invigorated and comforted, and reassured by it (Almusaed, 2011: 39). The concept of biophilic design aims to achieve this and more, Sjoquist (2003: 11-12) asserts that people exposed to or can access natural environments are far healthier than those who do not (Sharkey, 2012: 46); significant evidence that environmental features such as light, sound, odour, wind, weather, water, vegetation, animals, and landscapes are fundamental sensory applications for the development of the human mind and body (Kellert, 2008: 3). Similarly, Irons (1998) explains and elaborates further by stating that this connection may extend beyond plants and animals to inanimate objects such as streams, beaches, and wind. *"The concepts of the environment of evolutionary adaptedness and adaptively relevant environments suggest that organisms (including people) thrive best in settings that resemble those in which they evolved, giving environmental context to the biophilia hypothesis"* (Frumkin and Fox, 2011: 231).

3.2.2.1 Scales, Elements and Attributes of Biophilic Design

The theory of biophilia is evident on both a macro scale, where it creates green networks within the urban context; and the micro scale, of providing natural light into interior spaces for human comfort. The continuous sense of connectedness with nature on both scales results in a holistic and harmonious human experience within the urban environment. There is often a misconception between bionic architecture and biophilic architecture. The differences lie between the creation processes; *"the form of nature on bionic architecture and the affecting function of nature on biophilic architecture"* (Almusaed, 2011: 40). Often, the misconception happens when it is believed that a green building is traditional architecture covered by plants – this is not biophilic architecture. Biophilic design creates healthy lifestyles by improving human physical comfort through counteracting the negative effects in an urban context of a local microclimate scale (Almusaed, 2011: 40).

Figure 12*: Biophilic cities are cities of abundant nature in close proximity to large numbers of urbanites. In biophilic cities, residents feel a deep affinity with nature, climate, topography, and unique qualities of space and environment.*

(Source: http://clients.edmullen.com. Accessed 12/03/2015))

Table 3 modified from Girling and Kellert (2005), is a summary of specific biophilic design ideas and techniques which could be implemented at different primary levels from the metropolitan, through regional, down to the level of a home or building (Beatley, 2008: 278).

Table 3*: Biophilic Urban Design Elements across Scales*

(Source: (Beatley, 2008: 78)*)*

Scale	Biophilic Design Elements
Building	Green rooftops Sky gardens and green atria Rooftop garden Green walls Daylit interior spaces
Block	Green courtyards Clustered housing around green areas Native species yards and spaces
Street	Green streets Urban trees Low impact development (LID); vegetated swales and skinny streets Edible landscaping High degree of permeability
Neighbourhood	Stream daylighting, stream restoration Urban forests Ecology parks Community gardens Neighbourhood parks/pocket parks Greening grayfields and brownfields
Community	Urban creeks and riparian areas Urban ecological networks Green schools City tree canopy

	Community forest/community orchards
	Greening utility corridors
Region	River systems/floodplains
	Riparian systems
	Regional greenspace systems
	Greening major transport corridors

A similar table is presented by Geslar (2003: 8) which represents the four aspects of healing environments and their advantageous characteristics.

The cumulative contribution of green features on individual urban buildings and projects can result in a green network of neighbourhoods and cities therefore it is important to realize and acknowledge the micro scale and its impact on the macro. Kellert (2008) lists six biophilic design elements and roughly 70 attributes which he describes in further detail in his work (Kellert, 2008: 6-14). Table 4 below shows a summary of these elements and attributes.

Table 4*: Elements and Attributes of Biophilic Design*
(Source: (Kellert, 2008: 14)*)*

Environmental features	Natural shapes and forms	Natural patterns and processes
Colour	Botanical motifs	Sensory variability
Water	Tree and columnar	Information richness
Air	supports	Age, change and the patina
Sunlight	Animal (mainly vertebrate)	of time
Plants	motifs	Growth and efflorescence
Animals	Shells and spirals	Central focal point
Natural materials	Egg, oval and tubular forms	Patterned wholes
Views and vistas	Arches, vaults and domes	Bounded spaces
Facade greening	Shapes resisting straight-	Transitional spaces
Geology and landscape	lines and	Linked series and chains
Habitats and ecosystems	right angles	Integration of parts of
Fire		wholes

	Simulation of natural features Biomorphy Geomorphology Biomimicry	Complementary contrasts Dynamic balance and tension Fractals Hierarchically organized ratios and scales
Light and space	**Place-based relationships**	**Evolved human-nature relationships**
Natural light Filtered and diffused light Light and shadow Reflected light Light pools Warm light Light as shape and form Spaciousness Spatial variability Space as shape and form Spatial harmony Inside outside spaces	Geographic connection to place Historic connection to place Ecological connection to place Cultural connection to place Indigenous materials Landscape orientation Landscape features that define building form Landscape ecology Integration of culture and ecology Spirit of place Avoiding placelessness	Prospect and refuge Order and complexity Curiosity and enticement Change and metamorphosis Security and protection Mastery and control Affection and attachment Attraction and beauty Exploration and discovery Information and cognition Fear and awe Reverence and spirituality

3.2.2.2 Evidence Supporting the Biophilia Hypothesis

Biophilia is acknowledged across multi-disciplines including psychology, child development, community development, medicine, architecture and landscape architecture. These disciplines reiterate similar sentiments that biophilic design promotes positive health adding value and significance to social spaces. In addition to the positive attributes and benefits that have been mentioned throughout the literature about the positive effects of biophilic design

and therapeutic landscapes on psychological and physiological well-being, more studies on the subject will be discussed to truly determine the degree of the biophilia hypothesis (Easton, 2012: 7-8).

Place and healing could never be two separate or unrelated components. It has been a common belief among societies around the world for many years that nature has healing powers. Gesler (2003: 2) affirms the inseparable relationship of place and healing by explaining how people unconsciously associate the two. He continues to list the important aspects of the concept of healing: *"[1] its multidimensional character, [2] wholeness, connectedness, or integration, [3] healing from within, [4] an ongoing process with meaning in one's everyday life, and [5] healing as a humanistic approach"* (Moodliar, 2011: 116).

A study that employed a comprehensive methodology to determine the impact of green space on socioeconomic levels, age and urbanity was conducted among 250,782 Dutch respondents. The findings revealed enhanced general health among participants who resided in neighbourhoods with defined green space. According to Maas, Verheij, Groenewegen, de Vries and Spreeuwenberg (2006), the elderly, housewives, and lower socioeconomic groups exhibited better health (Easton, 2012: 8).

Burls (2007b: 29) draws on research by Kellert and Derr (1998) in the field of adventure therapy when highlighting the benefits of human interaction with nature in terms of nine 'values' of nature (Townsend and Weerasuriya, 2010: 9-10):

- *Aesthetic value (physical attraction and beauty of nature): adaptability, heightened awareness, harmony, balance, curiosity, exploration, creativity and an antidote to the pressures of modern living*
- *Dominionistic value (mastery and control of nature): coping and mastering adversity, capacity to resolve unexpected problems, leading to self-esteem*
- *Humanistic value (affection and emotional attachment to nature): fondness and attachment, connection and relationship, trust and kinship, co-operation, sociability and ability to develop allegiances*
- *Moralistic value (spiritual and ethical importance of nature): understanding of the relationship between human wholeness and the integrity of the natural world, leading to a sense of harmony and logic*

- ***Naturalistic value*** *(immersion and direct involvement in nature): immersion in the sense of authenticity of the natural rhythms and systems, leading to mental acuity and physical fitness*

- ***Negativistic value*** *(fear and aversion of nature): developing a healthy respect for the risks, power and dangers inherent in nature with an equivalent sense of awe, reverence and wonder, leading to learning to deal with fears and apprehensions in a constructive way*

- ***Scientific value*** *(knowledge and understanding of nature): developing a cognitive capacity for critical thinking, analytical abilities, problem-solving skills leading to competence*

- ***Symbolic value*** *(metaphorical and figurative significance of nature): being able to access the limitless opportunities offered by the process in the natural world to develop understanding of one's own circumstances, leading to cognitive growth and adaptability*

- ***Utilitarian value*** *(material and practical importance of nature): emphasising the practical and material importance of the natural world on which we rely for survival.*

. The research has outlined the connection man and nature share as a biological connection throughout history and the following two theories further demonstrate how this may affect our mental health and well-being.

3.2.2.3 Attention Restoration Theory

The Attention Restoration Theory is based on two areas of attention in our lives: voluntary (direct) and involuntary (indirect) (James, 1962; Kaplan, 1995). Direct attention requires deliberate concentration of an uninteresting task the human psyche/conscious has labelled or considered important and the effort of blocking out interesting subjects (Herzog, et al., 2003; James, 1962, Kaplan, 1995). In contrast, indirect attention or fascination holds our concentration with little to no effort. James (1962: 231) proposed that certain components within the environment such as *"strange things, moving things, wild animals, bright things, pretty things, etc."* can draw in this type of attention. This enables restoration of the brain so that we can return to direct attention (Bird, 2007; Frumkin & Fox, 2011; Townsend & Weerasuriya, 2010).

The theory outlines how excessive concentration may result in attentional fatigue which affects memory loss, diminishes the ability to focus, and causes impatience and frustration in interpersonal interactions (Frumkin and Fox, 2011: 231). Building on the work of James (1962), Kaplan and Kaplan (1989) reiterate similar sentiments by examining the outcome to distinguish the cause: *"attention fatigue as a process that occurs during the performance of cognitive tasks which require prolonged use of directed attention and active suppression of irrelevant information"* (Townsend and Weerasuriya, 2010: 11). Accordingly, contact with nature could be restorative by renewing attention and improving cognitive abilities – a construct known as *attention restoration* (Frumkin & Fox, 2011; Kellert, Ulrich and Hartig, et al., 2008; Kaplan, 1995; Townsend & Weerasuriya, 2010; Bird, 2007).

According to Kaplan and Kaplan (1989), four qualities allow natural environments to be the most effective restorative application: [1] being away from day to day routine, [2] fascination, [3] a feeling of extent allowing exploration, and [4] a compatibility to our expectations (Bird, 2007; Townsend & Weerasuriya, 2010).

Bodin and Hartig (2003), Hartig et al. (2003), Herzog et al. (2002) Herzog, et al. (2003) and Wells (2000) affirm the reason why natural environments are most effective is because nature is the most common and most reliable source of mentally restorative experiences to contain all four attributes simultaneously.

3.2.2.4 Psycho-physiological Stress Recovery Theory

Nature contact may also improve health through stress reduction. This is an intuitive notion; people often choose holiday destinations in beautiful natural settings associating that with a place of refuge and stress relief (Frumkin and Fox, 2011: 231). This theory is closely related to the biophilia hypothesis and is based on empirical findings of an immediate positive response to views of nature. Studies found that being exposed to nature, even on a secondary level by looking at pictures or videos, makes one more resilient to stressors and recover more quickly than subjects without such contact. According to Ulrich, et al. (1991), this exposure results in a quick reduction in stress (Blood pressure, muscle tension pulse rate) usually within minutes of exposure to nature and is most obvious when the body is already stressed (Frumkin & Fox, 2011; Ulrich, 2008; Bird, 2007).

Ulrich (1979) states that psycho-evolutionary theorists suggest the reason why this works so well is because natural environments do not consume processing with large amounts of information which then allows for reduced stress levels when spending time in such settings (Townsend and Weerasuriya, 2010: 12).

3.2.3 Genius Loci: Spirit of Place

3.2.3.1 Introduction

General perception is that architecture is the profession of designing buildings whilst putting much emphasis on the aesthetic appeal. This perception falls short as enhanced human living is greatly influenced by the consideration and added effort architects place on design of buildings. According to Norberg-Schulz (1980: 5), *"A place is a space which has a distinct character."* It is imperative therefore to consider architectural treatment as much more than a space or building. Norberg-Schulz (1966) discusses the fundamental need of man to be able to experience the world and environment as meaningful. This phenomenon is apparent to most individuals more significantly as they age and faced with health challenges, they aim to find a deeper meaning for their existence and the world around them.

> *"Healthy or unhealthy, every single person has a physical body, life-energy, a feeling soul and a unique individual spirit on a purely personal path of development. This brings us to 'meaning-of-life' issues. Our lives are journeys of spirit growth. We need nourishing environment. It needs nourishment by us."*

(Day, 2002: 183)

People often relate emotional and spiritual fulfilment to the sentimental value of things associated to them. Users of a residential dwelling can often change its title from a *house* to a *home* depending on its meaningful contributions to one's life. Norberg-Schulz's (1966: 422) theory describes a methodology for place-making, and proposes that the existential purpose of architecture is to turn space into place whilst uncovering the meaning of place (Carless, 2011: 11).

This section aims at creating an understanding of what is 'genius loci', its relationship to architecture, the natural environment and human well-being in modern society and will also consider what it means to have a 'loss of place'.

3.2.3.2 Understanding 'Genius Loci'

According to Hunt and Willis (1988), during the 18th century an appreciation for landscape beauty, especially in gardens and rural landscapes resulted in the excessive use of the term, expressing this as 'genius loci'. Poet Alexander Pope (1731) had used 'genius loci' in relation to landscape or 'place' (Breetzke, 2010: 26). Norwegian architect and phenomenologist Christian Norberg-Schulz is a key theorist in explaining the concept of genius loci. In his earlier works he had already started looking at the concept of 'Existential Space' (1966) which he defines as *"the basic relationships between man and his environment"*. Existential space shifts focus to the character of space in its current state enabling one to orientate themselves within a space and identify with it. Norberg-Schulz (1980) recognizes orientation and identification as the two key principles which man requires to dwell and consider a space meaningful. Pallasmaa (1996: 41) furthers this concept by stating that *"Architecture strengthens the existential experience, one's sense of being in the world, and this is essentially a strengthened experience of self"* (Carless, 2011: 11).

He only began making use of 'genius loci' by 1979, referring to the same psychological theory employed by Kevin Lynch (1960). The difference between their works was that Norberg-Schulz (1980) explored *"the character of places on the ground and their meanings to people whilst Lynch (1960) ignored meanings and focused on structure and identity"* (Tickley, 2011: 7).

3.2.3.3 The Presence of Genius Loci

Norberg-Schultz (1963) illustrates four levels that demonstrate the existence of the genius loci in a particular space; *"…the topography of the earth's surface; the cosmological light conditions and the sky as a natural condition; and buildings as symbolic and existential meanings in the cultural landscape"* (Norberg-Schulz: 1985; 33-35). When we consider something that is natural, it is best understood as the absence of human interference in what happens or what is created among all live elements. The natural identity of a place includes

the topographical landscape, a cosmological and temporal perspective such as continual changes in light and vegetation, and the unpredictable weather patterns throughout the annual cycle. This characteristic contrasts the stability or nature of man-made physical form (Norberg-Schulz, 1980: 25-32). Norberg-Schulz (1980) characterises three basic landscapes types: romantic, cosmic and classical (Norberg-Schulz, 1985, p. 48).

Jakle (1987) emphasizes the individual, subjective nature of place in his discussion of genius loci. In particular, he highlights the significance of the visual (Tickley, 2011: 8). People often rate beauty very highly therefor heightening its value. This is evident when people pay large sums of money to possess beautiful. But what is *beauty*? To a large extent beauty is subjective and with man-made things, there is plenty of disagreement. Beauty can be personal and/or universal at the same time. It is much easier to agree about 'natural' landscapes. Day (2002) concludes beauty has to do with unstinted given care, compassion and love. It is not surprising that natural beauty induces reverent, even religious feelings. It is this spirit that nourishes us, not the beauty of the place. But then beauty is a manifestation of that spirit, for to strive towards it can only be done out of love, however narrowly focused (Day, 2002: 111 & 220). Day (2002) elaborates further on beautiful places such that they are invariably underpinned by 'rightness in place' – ecological health. They have integrity, wholeness, balance. How we value such environments elevates and strengthens their spirit of place. All this can be felt by others and radiates back to us; we respond accordingly to what we feel the spirit of place is, hence define, ourselves. Our behaviour is influenced by this (Day, 2002: 113).

> *"We have to listen to the unspoken, listen with all our senses. It is this listening as an exercise that develops our sense of what is* right *– our sense of beauty. If we look at the world around us, the places most rich in life are meeting places – and not only cafés and city squares. In nature, life is at its most vigorous where the elements meet – warm sun-drenched marshes, humid jungle."*

(Day, 2004: 34-35)

Humans often consider an element in its natural form to be truthful. Day (2002) attains that more levels of truth, the more meaningful. *"So fundamental is truth that even a hint of deception undoes everything. Integrity of form and character aren't qualities that can be added to places, but a direct result of how they've come into being"* (Day, 2002: 222). Natural beauty

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invokes how we feel because it consists of both natural and visually pleasing characteristics. But feelings can be affected by a number of sensory qualities – not only sight. For example a recollection of thought and meaning to words like hard, cold, foul, fresh, warm and soft, both describe sensory qualities of environment and invoke feelings that go with them. The senses can decipher and even communicate the underlying spirit of places. *"This is about the truth that is at their heart"* (Day, 2002: 217). Breetzke (2010) agrees with this notion saying that *"the concept of genius loci cannot adequately be described in words because it is a subtle element which one experiences more at the level of feelings or emotions"* (Breetzke, 2010: 29). Walter (1988) expresses the notion of genius loci as the 'expressive intelligibility' of places; *"this is a quality that can be perceived holistically through one's senses and memory, imagination and intellect"* (Tickley, 2011: 9).

There is a significant difference between the spirit of some places and of others. Places hold memories. To be more accurate one would say familiarity in places invoke memories but in some cases physical traces can be held in that place. The spirit that grows up in a place is fed by how that place is used, what thoughts, actions, values become imprinted into it. In particular, current places of healing such as hospitals and clinics generally hold disturbing or upsetting memories and most often associated with pain, grief and discomfort. *"Fundamentally, it is the spirit of places that feeds us, that nourishes health and contributes to healing. And this spirit reflects – indeed is formed by our values. What does this mean for buildings? Buildings are houses for spirit"* (Day, 2002: 220).

3.2.3.4 Conclusion

Every place has some sort of spirit presence. We constantly exist in places of spirit – spirits affect us, we continually modify, support or even struggle against. Architecture then is creating places of opportunity to manifest spirit presence and growth. What can be done is to design and build places beautiful and truthful enough to invite positive spirit. *"For places affect how occupants behave, relate to each other, think – and hence the attitude, mood, spirit with which they do whatever they do there, and the spirit echo they'll imprint there"* (Day, 2002: 221). How can we initiate the imprint of spirit in the age of mass-production? The first step, of course, is to be conscious of the decisions we make as architects, from design concept to the building in context.

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3.3 ARCHITECTURAL SENSITIVITY TO CONTEXT

3.3.1 CRITICAL REGIONALISM

3.3.1.1 Introduction

Critical regionalism is a method that can be employed by architects to resolve issues using design as an element when addressing the site and its context in enhancing community, especially when within a full historical and cultural setting such as is the case in Durban, South Africa. There is a growing emphasis in current society to address issues in various fields without losing a sense of local sustainability. The field of architecture for one has had a gradual shift towards a built environment more respectful to site, resource consumption, and environmental well-being. Current world consumerism including the exhaustion of natural recourses, over expropriation of inhuman mechanical places and poorly planned human settlements have resulted in an imperative need for recreation and regional integration of liveable spaces (Orozco, 2011: 1).

Architecture that responds to peoples basic needs requires an authentic connection to the relative corresponding geographic locations as it becomes an extension of the local identity, and a reflection of cultural heritage. In realisation to this, a regionalist concept applies a strong sense of place especially in developing countries such as South Africa, and may even prove crucial in shaping their social structure, environmental awareness, and economic stability (Orozco, 2011: 1).

Moodliar infers *critical regionalism* as an architectural approach which attempts to refute "*placelessness*" and lack of identity in modern architecture by making use of the building's geographical context (Moodliar, 2011: 41). Ingersoll (2007, p. 387) defines the theory as an "*alternative to both the dehumanizing aspects of modernism and the superficiality of post modernism*" (Steyn, 2011: 64). Simply defined, *critical regionalism* is an investigation of "resolved difference." It undertakes the resolution of the simultaneous working dimension of local and universal paradox: the act of holding two disparate ideas simultaneously in the mind is the beginning of critical thinking (Ots, 2011: 81).

3.3.1.2 Importance of a Theoretical Discourse

A leading protagonist in the field of *critical regionalism* is architect, architectural historian, and critic, Kenneth Frampton. With the adoption of philosopher Paul Ricoeur's essay "*Universal Civilizations and National Cultures*" (Ricoeur, 1961), Frampton (1992) determines two important dimensions when creating new work; [1] the importance of rootedness to place, and [2] modern innovation. Ricoeur (1961) warns that global universalization of human culture will cause rise to a single-world civilization resulting in inevitable loss of diversity and the depletion of local traditional cultures which are the creative nucleus for defining place (Orozco, 2011: 3).

An application of Frampton's theory by authors Alex Tzonis and Liliane Lefaivre, who coined the term *critical regionalism*, in their work "The Grid and the Pathway" (1981) – a *"bridge over which any humanistic architecture of the future must pass"* (Ricouer, 1961). They caution against the ambiguity of regional reformism, a phenomenon which increasingly propagated during the final quarter of the 19th century (Frampton, 1983: 21). Regional architecture keeps within boundaries of specific identities relating to identifiable groups – it therefore becomes not only site specific but people specific (Lefairve, 2003: 12). Tzonis and Lefaivre (1981) suggest *critical regionalism* came about as a movement or idea in undertaking a different view to *postmodernism* (Moodliar, 2011: 41).

Fundamental aspects of *critical regionalism* are engagement and accentuation of the topography of the site, the use of local materials and response to light and climate (Canizaro, 2007).

> *"Critical Regionalism depends upon maintaining a high level of critical self-consciousness. It may find its governing inspiration in such things as the range and quality of the local light, or in a tectonic derived from a peculiar structural mode, or in the topography of a given site."*

> (Frampton, 1983: 21)

With similar regard, Nesbitt (1996) affirms that *critical regionalism* is based on the understanding of place and tectonics whilst Alfosin (2007) attests it promotes the employment of local materials and craftsmanship (Steyn, 2011: 65). These elements are said to enhance

people's experiences with buildings and space, rather than just focusing on providing an image – oriented building typology.

Frampton (1992) seeks an architectural language which communicates with the past, present and the future, which appeals to both the old and new by use of indigenous solutions and whilst also reflecting the technological capacities of modernity. *"Through its tectonic form, adaptability to location, social relevance, and architectural vocabulary, a building may reinterpret old traditions in a modern setting"* (Orozco, 2011: 4). Frampton breaks down the relation of man with nature or even architecture with nature. One of the main arguments is the inconsiderate nature to how buildings respond to their site, often modern construction would result in earth-moved or irregular topography as the site is flattened out for a building to easily sit on. There is nothing site-specific or responsive about this method, it is simply a notion of globalization (Moodliar, 2011: 41).

3.3.1.3 Conclusion

Review of literature suggests that emphasis can be placed on the importance of *place.* Place consists of all elements it is made from, it is one holistic dimension in which humans exist thus impacting on almost every area of one's life. The theories brought forward such as critical regionalism would be an exemplary work of architecture that considers the environment, human well-being and the ever modernizing world; *place.* Authors whose work elaborates further on the importance of place include geographers Edward Relph (1976, 1981, 1993) and Yi-Fu Tuan (1974) who grew dissatisfied with what they felt was a philosophically and experientially anaemic definition of place (Seamon and Sowers, 2008: 1).

Relph's phenomenology of space is discussed at length in his work *Place and Placelessness* (1976) where he identifies three broad dimensions of 'place identity'; the static physical setting, the activities and the meanings. Likewise, Tuan (1974) published work that has been a parallel source of inspiration detailing how place entails a continuing relationship: *"What begins as undifferentiated space becomes place as we get to know it better and endow it with value."* (Tuan, 1976, p. 6).

> *"Tuan explores how the freedom and threat of unknown space acquires the security and stability of place as the environment acquires meaning for the growing child, the*

fundamental relationship between concepts of place and the human body (an aspect which again poses issues for the more constrained forms of virtual environments), and the connections between space, place and time. Above all, spaces need to become meaningful to become places."

<div align="right">(Turner and Turner, 2007: 2-3)</div>

Much like the concept Genius Loci enforces.

CHAPTER 4: PRECEDENT STUDIES

4.1 NATURAL SYNTHESIS: DUKE INTEGRATIVE MEDICINE

UNITED STATES OF AMERICA, NORTH CAROLINA, DURHAM

DUDA/PAINE ARCHITECTS, LLP

2006
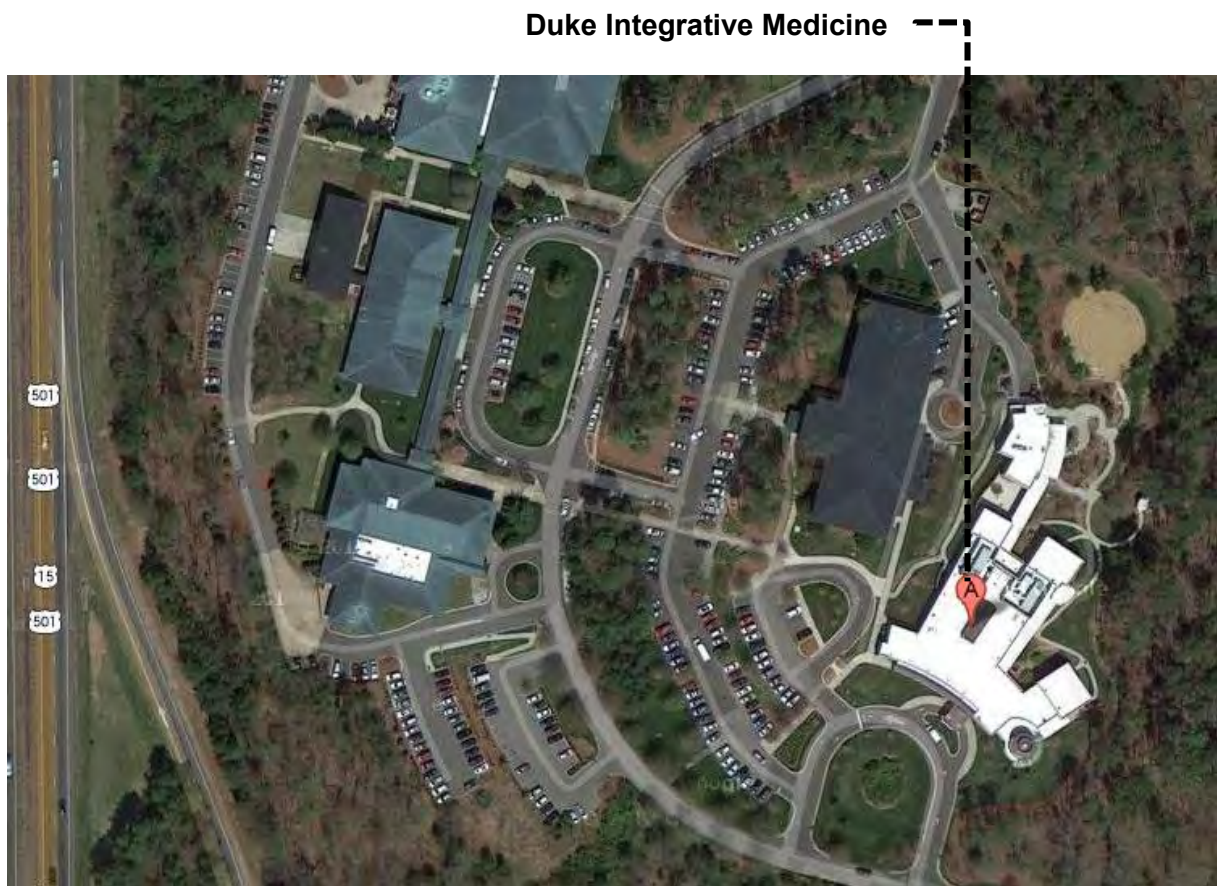
Figure 13: *Aerial view of the facility in context*

(Source: (https://maps.google.co.za. Accessed 05/06/2014))

4.1.1   Justification

The project is a relevant precedent study to discuss as the facility has been considered a first of its design to solely combine practice of alternative treatments and conventional medicine (Root, 2010). This notion is expressed explicitly through an architectural language of how design can incorporate nature and technology in such synchronicity. Duke Integrative Medicine's mission statement: *"To approach healthcare as a holistic endeavour that embraces the mind, body, and spirit"*, is further demonstrated in the design by the same language (Root, 2010). Within the context of Durban, South Africa, this concept can be broadened further where conventional western-influenced healthcare facilities begin incorporating the services of traditional doctors and indigenous medicine. This is a critical approach to issues of the region. Similarly, *"the program at Duke Integrative Medicine integrates the concepts of Eastern/Western scientific medicine, alternative/traditional medical approaches, and prevention/treatment, Duke Integrative Medicine's design concept reconciles the dualities of man-made/natural, interior/exterior, and formal/informal"* (Root, 2010). The theories that seem to be implemented in the design of Duke Integrative Medicine can be drawn and enhanced within the local context as they can be applied to the social, economic and environmental issues; parallel to the theoretical framework placed forth in this dissertation. Significantly, the facility has also been awarded the 2010 AIA National Design Award for Health Care by the American Institute of Architects (AIA).

4.1.2   Historical and Social Context

The concept of such a practice began early in the 1990s when a group of medical doctors were brought together by having the same vision. They saw a vast possibility for healing that exists in all of the scientific, cultural and spiritual traditions. They formed a journal club, and under the leadership and direction of doctors Marty Sullivan, Larry Burk, and Jeffrey Brantley, they led discussions across all the academic disciplines at the University and explored different paths for extending the boundaries of practice, research and teaching (Duke Integrative Medicine, 2014).

The journal club held their first Duke Mind Body Body Spirit Conference in 1996, which attracted more than 600 people globally including leaders in the field. Their efforts had paid off as Health System Chancellor Dr. Ralph Snyderman took note and embraced their work

proposing a vision that extends beyond the scope of the University, with the hope of creating a living laboratory which could resolve many of the most systemic challenges to the American health care system… with the support of a grant from the Duke Endowment, and with the leadership of Drs. Snyderman and Sullivan, The Duke Center for Integrative Medicine was founded in 1998. Dr. Jeffrey Brantley offered the first public program titled Mindfulness-Based Stress Reduction (MBSR) at the institute (Duke Integrative Medicine, 2014).

After the employment of Dr. Tracey Gaudet to lead the Centre and a generous gift of support from the C.J. Mack Foundation along with an endorsement from the faculty of health in 2000, a state-of-the-art healing environment to be later executed by Duda/Paine Architects was proposed. Situated within the woodlands and streams of Duke Forest, the building is not far from the main Duke University's campus, an internationally renowned medical and educational facility. At the official opening in November 2006 it was awarded the LEED (Leadership in Energy and Environmental Design) certification for its stewardship of the environment becoming the first medical facility in North Carolina to receive it (Duke Integrative Medicine, 2014).

The facility aims to be at the forefront of transformation and healthcare delivery. It will achieve this vision through four strategic initiatives: *"the development and implementation of innovative models of clinical care; rigorous academic research; medical and professional education; and the translation of evidence-based clinical models and professional education into larger academic and medical systems nationwide"* (The Bravewell Collaborative, 2014).

The concept is based on the philosophical approach of disease prevention through lifestyle change instead of treating symptoms of a harmful lifestyle (Sanders, 2011: 113). Bridget Booher questions the lack of implementation of this positive practice; *"Integrative medicine is turning out to be a powerful approach for patients' physical, mental, and emotional well-being, and it could just help solve the health-care cost crisis. So why isn't it the standard of care?"* (Booher, 2013). The services offered at the centre serve individuals across the health spectrum: from people who just merely want to improve their health; to those suffering with chronic illnesses and conditions; and those who have been through major health events such as a heart attack or the onset of cancer. Physicians and therapists consultants (acupuncturists, massage therapists, nutritionists, mind-body therapists, etc.) at Duke Integrative Medicine

partner with the patient's primary care or specialty care providers (The Bravewell Collaborative, 2014).

4.1.3   Empirical Data

The Site

The initial design stage indicated that less parking will be required than the existed off the Centre for Living Campus. This meant that the new building could be built on the parking lot and much of the tarmac could be. The utilization of a previously cleared and levelled site also meant that amount of tree removal, nature disturbance and grading was reduced to a minimum. The close proximity of the facility to the already established Duke medical community meant infrastructure was already in place which aided easy access to mass transportation without compromising on the characteristics to aid mediation and spa program. The Duke Forest offers a much welcomed break from the dense medical complex of hospitals, clinics, and teaching facilities. The natural topography was utilized as treatment for rainwater to from a design feature for meditation and contemplation purposes (Root, 2010). 31 below illustrates the development in its context.
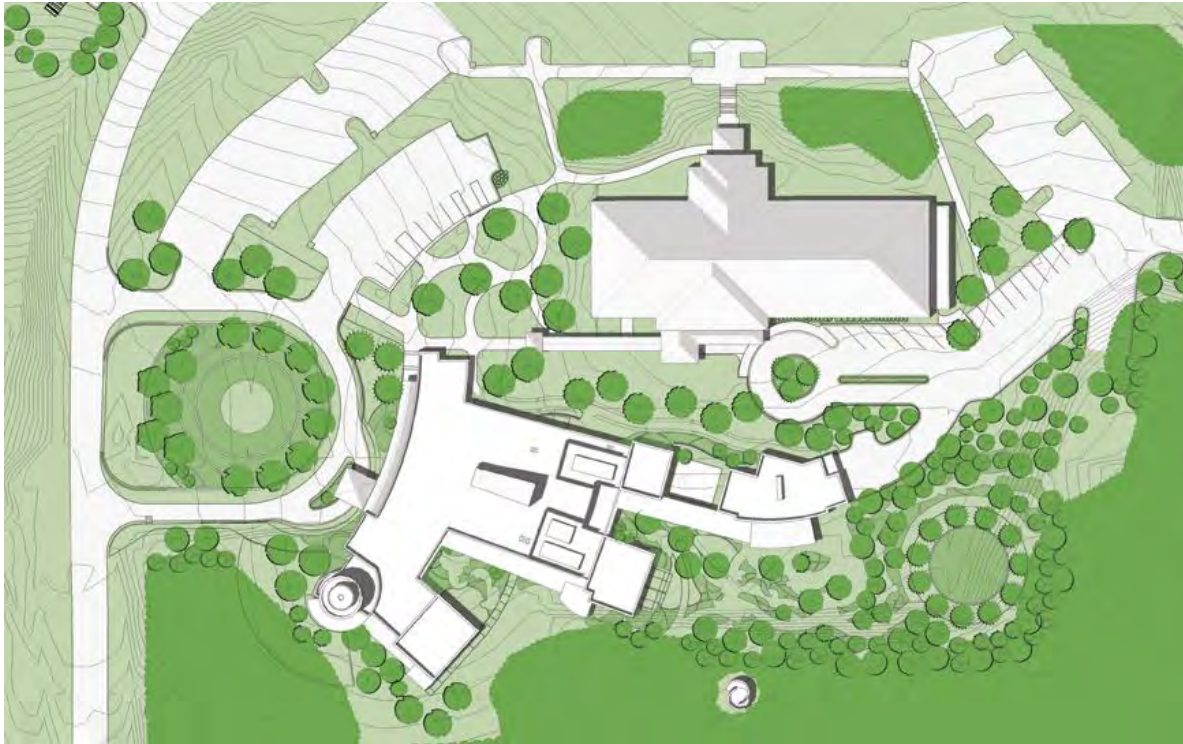
Figure 14: *Site and context of the institute.*
(Source: (Duda/Paine Architects, 2014))

The Planning

The architect had intended on breaking away from a typical hospital setting which he describes as clinical, intimidating, sterile and cool. He states, *"It does nothing to reassure you, to care for you, or comfort you—so part of the architecture can do those things,"* (Starita, 2010). The result was a warm, non-threatening environment dedicated to physical and mental well-being which incorporated both the natural and the man-made in two distinct ways. It achieved the first by connecting visually and physically the facility and the landscape (Root, 2010). The second method was by the extensive use of wood covering much of the 2430 sq/m floor area. The plan (refer to) consist of three primary branches which the authors refer to as "finger", which radiate outward from behind a curving entry loggia, whose vaulted colonnade reflects the Gothic architecture of the neighbouring buildings. These frame views and increase staff and patient comfort (Root, 2010).

EMBRACING
ARRIVAL

WELCOMING

ASSESSING

WORKROOMS

PREPARATION

ACTIVITY
INDOOR/OUTDOOR

TRANSITION
REFLECTION

RETREAT

FINGERS
INTO NATURE

LAYERING
OF EXPERIENCES
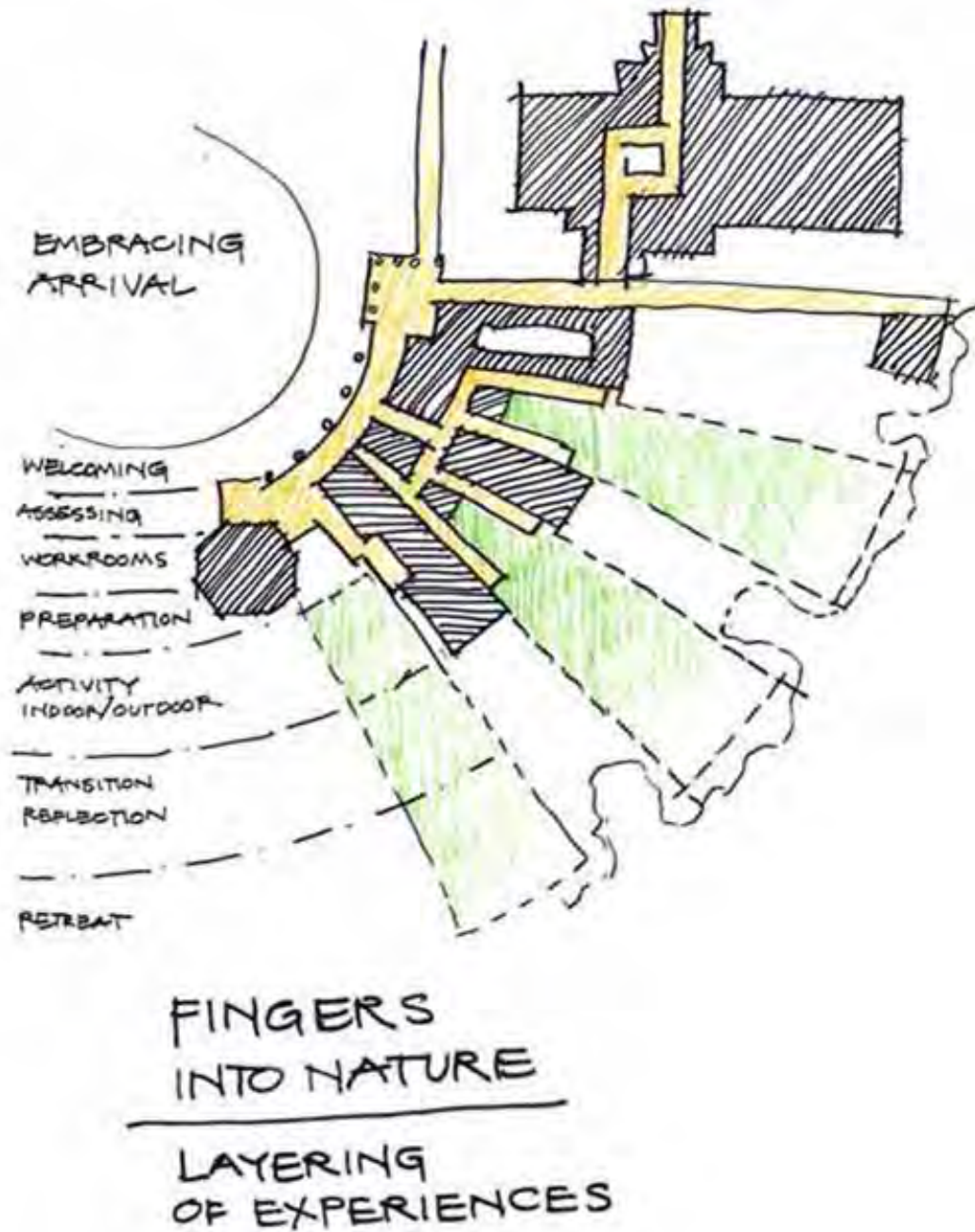
Figure 15: *Architect's conceptual sketch of the planning.*
(Source: (Duda/Paine Architects, 2014))

illustrates the facility schedule of accommodation which include; a sitting room / library; indoor and outdoor meditation spaces; evaluation rooms; treatment rooms; conference and workshop

spaces; fitness facilities which include showers and changing rooms; a kitchen / dining room where healthy cooking demonstrations can be conducted and guest meals served (Sanders, 2011: 114).
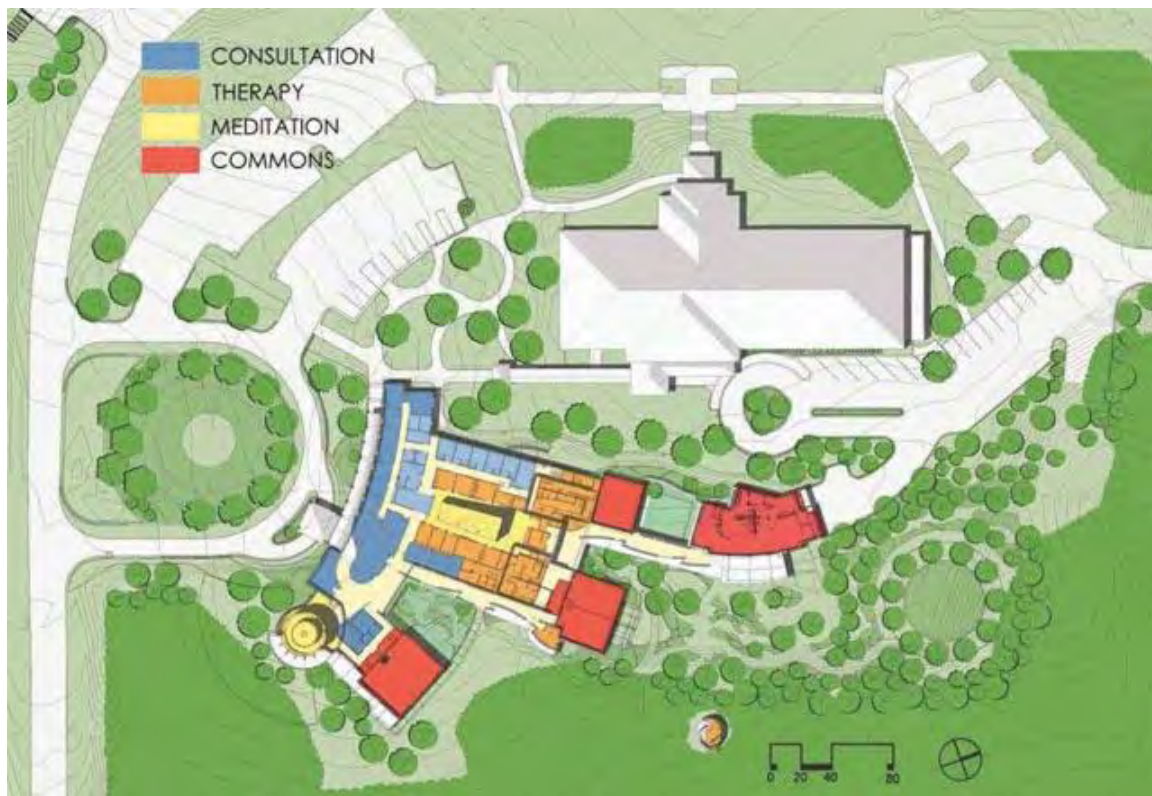
Figure 16*: The plan of the Integrative Medicine Centre showing the general schedule of accommodation: consultation, therapy, meditation and common areas.*
(Source: (Archinnovations, 2010))

The Centre's design minimizes the threshold between interior and exterior, further placing emphasis on the redefined boundaries that characterize an integrated approach to healing. The branches which reach out to the forest offers a series of discoveries as they invite nature in along the way, these include meditative corners, framed views, gardens, and fountains.

Figure 17*: Front Entryway*

(Source: (Duke Integrative Medicine, 2014))

The concave walls on the main entrance which can be viewed on plan and the vaulted timber entryway provide a much warm and much familiar yet innovative and new feeling of being welcomed. The walls give the impression that they seem to wrap around you and draw you inside (Duke Integrative Medicine, 2014).

Figure 18: *A large vaulted arch casts emphasis on the main entrance*
(Source: (Archinnovations, 2010))

Main Design Features

The exterior spaces created between the 'branches' are cultivated with gardens and water features. illustrates how the design made use of stress reduction strategies through environmental consideration. This is known as "positive distractions", it is particularly employed at the two main waiting areas as the act of waiting can provoke anxiety. This method engages with the senses by refocusing the mind. The water-wall in the main waiting is flanked by a bamboo garden (Root, 2010).

Figure 19*: Positive distractions' used in waiting spaces to provide visual meditation*

(Source: (Root, 2010))

The roof drains lead into a central courtyard fountain where the water trickles down a meandering path down the site topography, through a river rock ravine, and eventually back into nature (Root, 2010).

The wooden arches overhead the circular library and sitting room imply a canopy of trees and branches which provide a pleasant visual meditation on structure and light. The multi-textured flooring and views which redirect attention to the outside encourages walking (Root, 2010). The library space provides a great way for patients to gain knowledge on the prevention of diseases and leading a healthy lifestyle, and also provide informative literature on treatment and alternative medicine through books and computers.
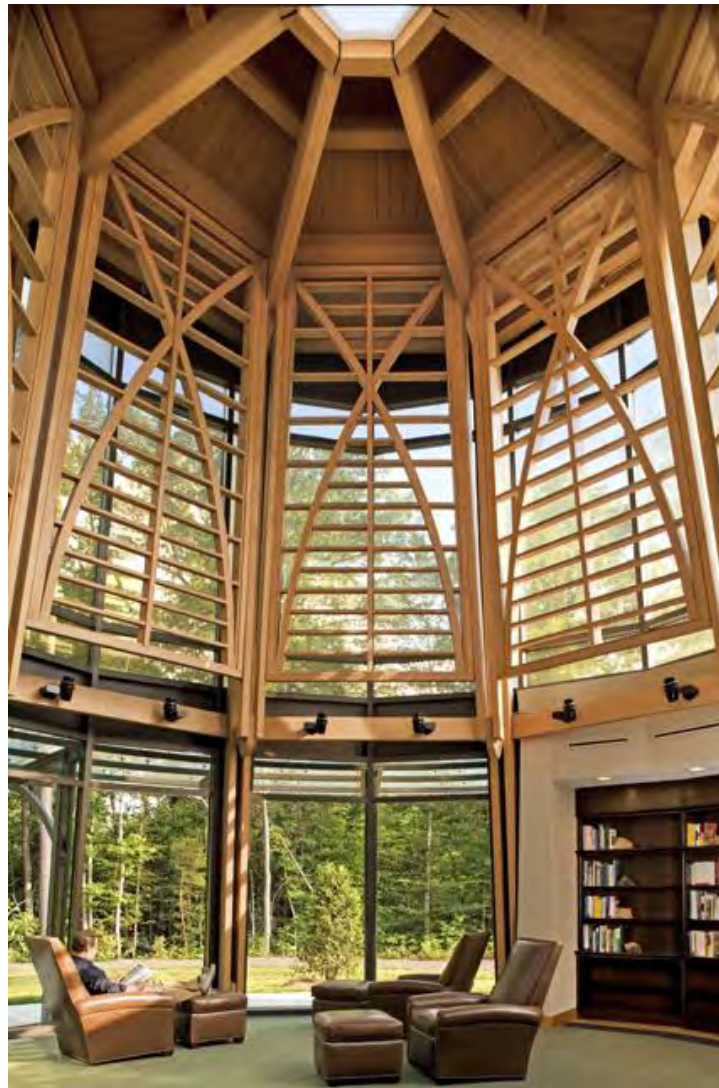
Figure 20*: "Tree canopy" library ceiling.*

(Source: (Archinnovations, 2010)*)*

Figure 21: *The Duke Integrative Medicine Centre: View of the circular library and sitting room, with soaring glass walls that open onto the surrounding forest.*
(Source: (Starita, 2010))

A retail store is located close to the library which sells books, CDs, vitamins, supplements, and exercise supplies amongst other things. It offers a lucrative restaurant-type feel which has seating on the inside and the outside under a canopy (Duke Integrative Medicine, 2014).

Figure 22*: The state-of-the-art Nutrition Centre.*
(Source: (Root, 2010))

Figure 23: *The extensive use of natural materials on the building and minimally defined edges blur the boundaries between external and internal spaces. Wood and stone are some of the materials used against a backdrop of trees and shrubs.*
(Source: (Archinnovations, 2010))

Similar to the library, the inner courtyard has a high ceiling which allows natural light to filter through. The garden room includes a high water wall which flows over the smooth rocks, comfortable furniture to sit on along a pebble-strewn path meandering through the bamboo. This serene place offers an ideal relaxation and reflecting area (Duke Integrative Medicine, 2014).

Asian influenced screening made of timber provides privacy in the calm dimly lit consultation rooms. Keeping with the theme, neutral colours are used throughout the centre to impart the perception of warmth and comfort. The quiet room acts as a noise buffer zone and transition space into the treatment rooms so that one may experience healing therapies in peaceful comfort (Duke Integrative Medicine, 2014).

The facility consists of two meditation rooms. There is one located at the end of a curving corridor and the other is a unique independent structure located at the edge of the woods, providing for undisturbed mindfulness and meditation (Duke Integrative Medicine, 2014).

Figure 24: *Meditation Room*

(Source: (Archinnovations, 2010))

The 'anteroom' or 'quiet room' is the most private space situated at the centre of the facility flanked by treatment rooms to either side. Natural light filters through the wooden trusses constructed on a golden ratio formula (see) as those on the front entrance from above this covered garden. There is water wall at one end, bamboo plants and stones to enhance the space.

Figure 25: *The anteroom is a space where patients can relax and meditate in a comfortable setting.*

(Source: (Archinnovations, 2010))

Wood has been used extensively throughout the building both as an interior finish and as a structural element. Where the material is used on the inside it offers users of the facility a perception of being warm to the touch and comforting to the mind. When used as a structure e.g. outside flanking the walkway, it resembles the forest, like trees with high branches allowing natural light to filter through the foliage and speaks a similar architectural language of identity with the surrounding buildings (Root, 2010).
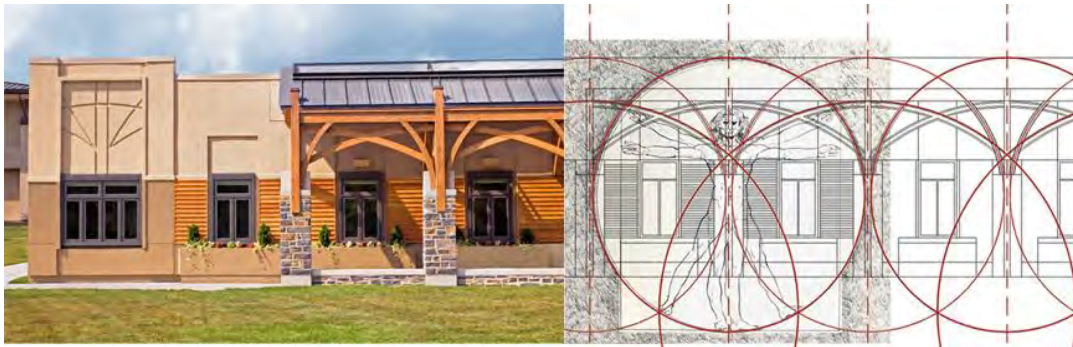
Figure 26: *Golden ratio used on arches.*

(Source: (Archinnovations, 2010))

Figure 27: *The stone labyrinth within the forest trees.*

(Source: (Booher, 2013))

The stone labyrinth situated within the forest trees provides for personal reflection and introspection as a person takes a quiet stroll along the concentric circles.

Inclusive in the facility are three workshop rooms which large windows overlooking the natural surroundings which provide a learning environment that is both inviting and inspiring. These state-of-the-art facilities include audio visual equipment and screens, projectors, microphones, audio and video taping capabilities, DVDs, music and much more. Their customizable feature means they can host a wide range of presentation requirements.

4.1.4 Conclusion

Duke Integrative Medicine serves many users: a patient population searching for a balance between traditional and alternative medical approaches; healthcare professionals from a wide spectrum of fields searching for a new paradigm of multi-disciplinary practice; and community members interested in learning about wellness and prevention. This focus on well-being and innovation by all guided the architects beyond a patient-centred perspective to what they describe as *"human-centred healthcare design"* (Root, 2010).

This facility is a good example on how a building design can incorporate the biophilic concept to create a space that promotes good health and well-being. The building also demonstrates a sensitive approach to dealing with its context. Indigenous elements have been incorporated well into the design and critical regional consideration is evident through the sustainable design principles employed. The human-centred healthcare design emanates from the way in which patients will experience the space, what emotions each space will evoke and the multitude of activities patients can engage in.

4.2 PROGRESSIVE HEALTHCARE: GRASSY PARK CLINIC

SOUTH AFRICA, WESTERN CAPE, GRASSY PARK

ANESE + BARBOSA ARCHITECTS IN ASSOCIATION WITH AMANDA KATZ ARCHITECTS

2009

Figure 28: Aerial view of the facility in context.

(Source: (Barbosa, 2014))

4.2.1 Justification

At a glance, Grassy Park Clinic is different from other clinics one may encounter in the South African context. It 'speaks' a different architectural language, it is welcoming, well designed and introduces a fresh new look to the medical field that is neither intimidating nor cold. Grassy Park Clinic is arguably the first of its kind in South Africa and most importantly implies the notion that a new improved architectural dialogue is being defined for the health sector and its social relationship. It also implies that the government is taking note of social issues related to healthcare by inviting architects to propose typologies to tackle these problems; furthermore, a greater responsibility is placed upon architects to expand their knowledge and contribute more effectively to society in critically designing buildings. In the past, and still current, certain public buildings often had a template to which was duplicated across the land regardless of context. This for example is still being done for schools, community halls and in particular to this research, healthcare facilities such as clinics. Grassy Park Clinic is one particular precedent that breaks away from these confinements structured under apartheid rule and really defines a progressive healing approach of segregation and health.

4.2.2 Historical and Social Context

Immerging from about the 1900s initially on part of the farm Montagu's Gift to extended areas now better known as the Cape Flats, Grassy Park is one of the southernmost suburbs of Cape Town situated east of the M5 and the Princess Vlei close to the Lotus River and north of Zeekoelvlei. In about 1920 the population of this small town had grew to 2000 people and by 1960 this "coloured" township became known as Grassy Park from *Koek se bos* (Cook's bush). This place is a typical example of one of many townships which are the result of the Group Areas Act of the apartheid regime in South Africa as people were forcibly relocated to such areas (SA-Venues.com, 2014).

20 years after the first democratic election Grassy Park is a rich and lively community consisting of a population of over 19,000 (2011) where Christian and Muslim live alongside one another, a thriving and colourful community lined with little shops, a minibus taxi station, a high school and the Grassy Park library on its main artery route, Victoria Road (SA-Venues.com, 2014). This image is in contrast to the infamous poverty-stricken, gang-patrolled, crime-filled image associated to the Cape Flats.

In addition to the people, Grassy Park is riddled with wildlife. One of the largest branches of the SPCA (The Society for the Prevention of Cruelty to Animals) can be found here just behind the cemetery. There is also a 2km^2 bird sanctuary, Rondevlei Nature Reserve, which is home to over 230 bird species including mammals and reptiles (SA-Venues.com, 2014).

4.2.3 Empirical data

The Site

The architects were briefed by the client, Western Cape Government, to replace the existing run-down clinic with a new day care facility that would provide primary health care services. The site was large enough to locate and construct the new facility at one end while leaving the original clinic intact and running at the other (Barbosa, 2014).

Roads flank three sides of the site each with a quite different scale and character. Victoria Road is the main street through the town; it is particularly busy with vehicular and pedestrian traffic as an array of small businesses flanks its curbs with First Avenue as a commercial feeder into Victoria Road; this is the life of this small town. Gilray Road is residential with homes opposite the site. The architects suggested these differences give clues to the building design (Amanda Katz Architects, 2014).

46 below illustrates the site and context in pictures of what one would see passing through the town on Victoria Road.

Figure 29: *Site plan of the immediate Grassy Park town centre*
(Source: (Barbosa, 2014))

below articulates the views a person would see walking or driving through the town on Victoria Road in reference to the points of interest drawn on 29.

Table 5: *Points of interest walking down Victoria Road*

(Source: (Google Images, 2014))

Figure 30: *An Islamic Mosque*

Figure 31: *Franchise across existing clinic*

Figure 32: *Garage opposite the site*

Figure 33: *Franchise next to existing clinic*

Figure 34: *The existing healthcare facility*

Figure 35: *Existing underutilized site*

The Planning
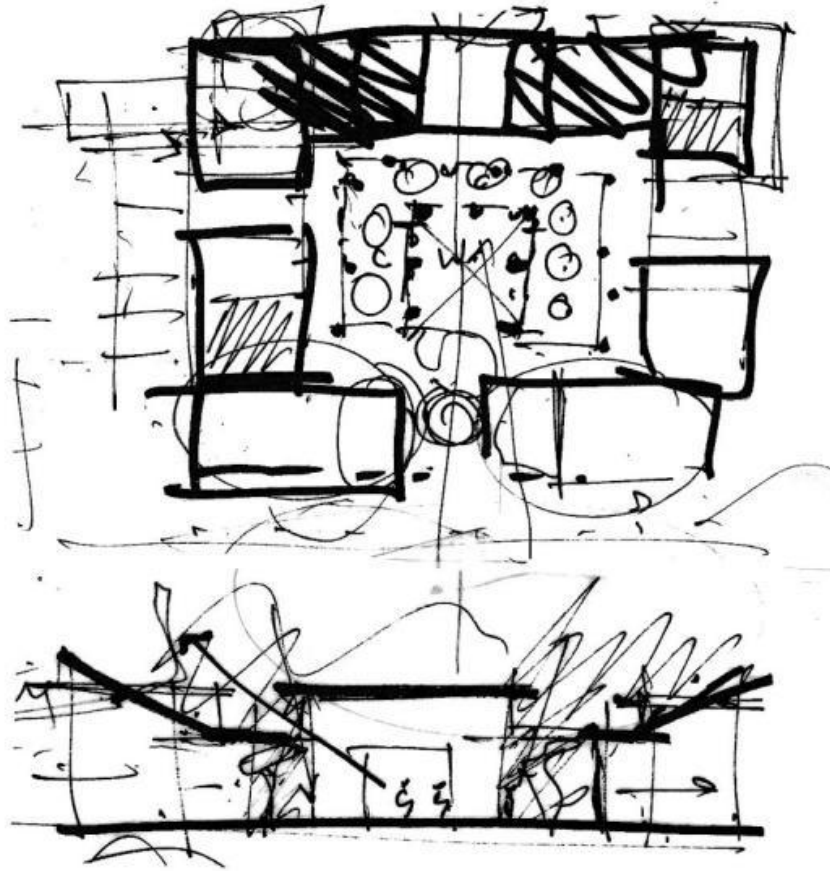
Figure 36: *Concept sketch of the clinic by architects.*
(Source: (Barbosa, 2014))

Creating a bright and friendly healing environment was the primary mandate from the onset. A plan was conceived around a transparent main waiting area within a courtyard populated by vegetation and natural stone exposed to explicit sunlight. This would create an illusion as if the waiting area was part of the courtyard and a feeling one gets when sitting outside within a garden covered by trees above. The extensive visual connection with nature employs biophilic principles. The waiting area is the central focal point about which are situated the circulation areas and all the smaller ancillary rooms (Barbosa, 2014).

The facilities include a pharmacy, treatment rooms, a baby clinic, consulting and counselling rooms with their related waiting and service areas. The circulation areas which flank the courtyards were designed with varying widths as to create spaces of built-in seating at some points. The architects decided to provide access and secure staff and public at the rear end of the building where there is less traffic. An open public parking area is available not far from the site and is often utilized by users of the. The single storey low-rise healthcare facility is in keeping with the neighbouring single storey commercial and residential fabric. (Amanda Katz Architects, 2014).
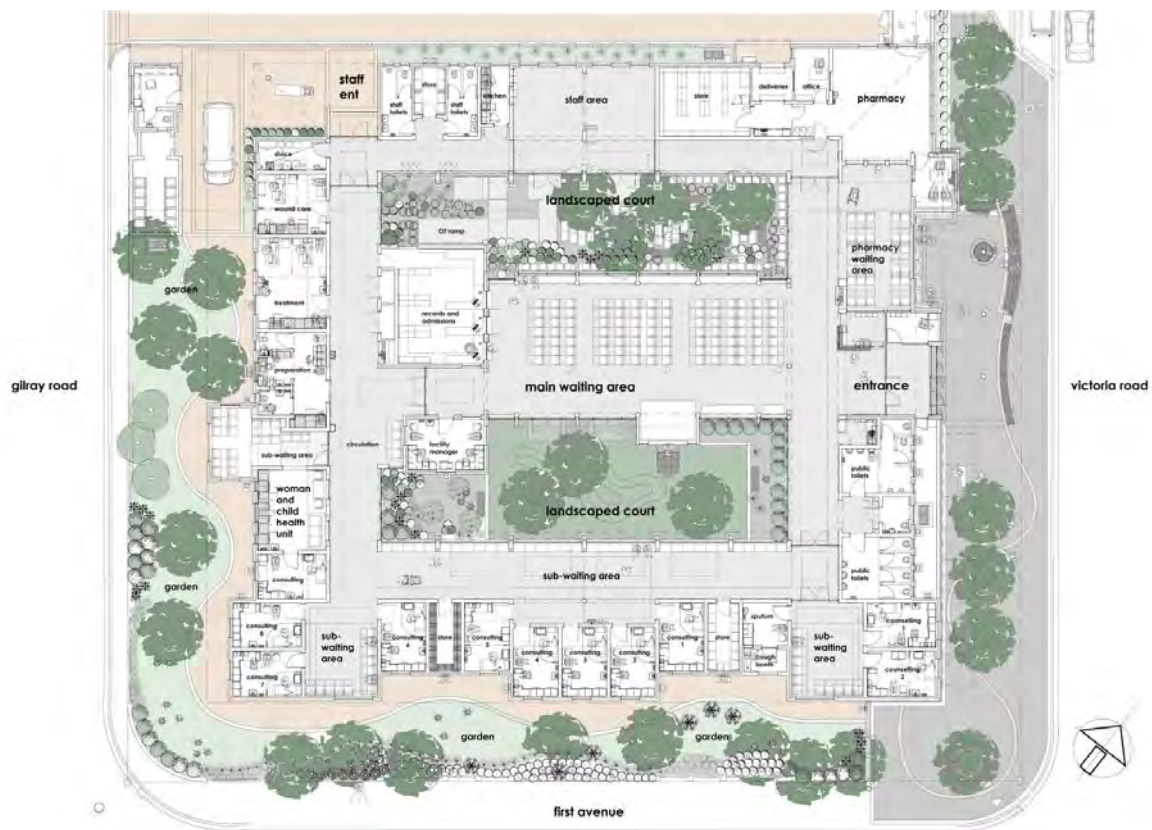
Figure 37: *Ground floor plan*

(Source: (Barbosa, 2014))

Main Design Features

The main entrance to the clinic as can be viewed on ; it has been positioned on Victoria Road. The architects utilized the entrance being off the main road as multifunction space in providing a civic function. Built-in seating for waiting or resting has been provided beneath the large canopy shelter which is supported on columns which look like trees: this theme is continued to either side by the planting of actual trees (Barbosa, 2014). *"Entering from the busy Victoria Road side feels like coming into a peaceful green oasis"* (Amanda Katz Architects, 2014).

Figure 38*: View of the main entrance.*

(Source: (Amanda Katz Architects, 2014))

This edge consists of windows which have been addressed with internal bars, security glass, and external metal screens, as security, theft and vandalism are a major issue. An outer wall which wraps around the street edge separates the passing public from the privacy of the clinic activities on the threshold on Victoria. The finish of the wall brings it to life with bright colours and plaster figures of children playing adorning its façade. This provides a fun and welcoming face offering a sense of place from the hard-edged street (Barbosa, 2014).

Figure 39*: The new visually appealing and welcoming image of the new Grassy Park Clinic*

(Source: (Barbosa, 2014))

The main waiting area is large in volume also with a sheltering canopy on tree-like columns. Ceiling height windows let in light and provide views of the courts that have been carefully landscaped to create a relaxed feel (Barbosa, 2014). The interior finishes to the main waiting area include timber on the floor and the ceiling which heightens the natural experience and relates to the external natural properties. A television provides entertainment as well as educational programmes.

Figure 40: *Concept and working sketch section through the main waiting area.*

(Source: (Barbosa, 2014))
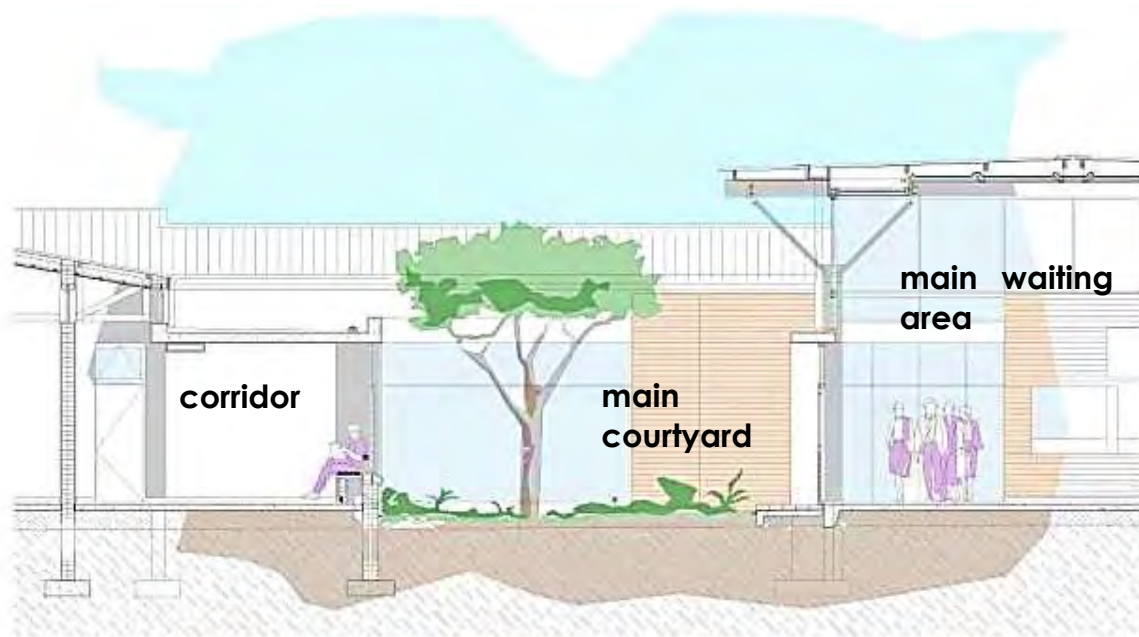
Figure 41: *Section through corridor/waiting area, courtyard and main waiting area*

(Source: (Barbosa, 2014))

Figure 42: *View of the main waiting area from the courtyard.*

(Source: (Barbosa, 2014))

The incorporation of vegetation in the design is in line with the biophilia hypothesis. The courtyards are easily accessible to gain the full benefits of nature. Compounding on that idea, the architects created a high visual connection to these spaces for people sitting and waiting on the inside. In addition, the vast amounts of glazing allows ample natural light to filter through thus reducing the use of electricity in the building, and being conscious of an already strained national power grid providing an opportunity for some of the services in the clinic to continue functioning. *Coincidently* the courts also reflect the name of the town; the association of what the users see can be related to the name thus giving a foundational meaning and identity.

Figure 43: *View of the main waiting area from the staff court.*

(Source: (Barbosa, 2014))

Figure 44*: The transition from the entrance to the main waiting area*

(Source: (Barbosa, 2014))

Visibility of the courtyard is kept as much as possible to users on the sizeable corridors. These areas also have large windows for looking out at the greenery while waiting to be attended to.

Figure 45*: View from pharmacy waiting into staff court.*

(Source: (Barbosa, 2014))

The building uses two forms of ventilation systems; natural ventilation as initially intended by the design which offers controlled comfort levels by users and is supplemented by mechanical ventilation and extraction (to keep the germs out) and heating to keep the users warm whilst they wait. The location of the windows are such to allow light and warmth from the winter sun

to filter through and shade summer whilst allowing for cross ventilation in most of the rooms (Amanda Katz Architects, 2014).

The architects chose practical and low maintenance interior finishes. The neutral colours humanize the space whilst the bright accents in natural tones create a pleasant atmosphere as they evoke joyful emotions within users. Timber has been used extensively in this particular healthcare facility too. Natural pine doors and wood-look vinyl sheet flooring adds texture and a warm touch. These finishes are complimented by the built-in timber desks and storage units (Amanda Katz Architects, 2014).

Figure 46: *Interior material finishes in the different rooms.*

(Source: (Amanda Katz Architects, 2014))

4.2.4   Conclusion

Grassy Park Clinic achieves a good balance in being sensitive to the environment by adding to nature in a genuine sense and not just pot-plants; to not impose on ecological footprint and appearance on the natural environment, context of the community and perceptions of community members; in addressing health issues by applying good design principles and theories; and, in acknowledging progressive construction technologies and still being critical of foreign demographic issues.

According to the architects this building has been well received by both patients and the Grassy Park community who have campaigned so tirelessly for their new facility. This further cements that there needs to be a positive change in existing community healthcare facilities and one of this nature is one which appeals to society. At the official opening ceremony,

Minister Theuns Botha, Western Cape Health Minister, said that it was not possible to feel sick when you walked into the building (Barbosa, 2014).

CHAPTER 5: CASE STUDIES

5.1 HUMANIZING HEALTHCARE: UMKHUMBANE COMMUNITY HEALTHCARE CENTRE SOUTH AFRICA, KWAZULU-NATAL, DURBAN

ROBERT JOHNSON ARCHITECT & ASSOCIATES IN ASSOCIATION WITH ZAI ARCHITECTS AND CONSULTING ENGINEERS

2001-2003

Figure 47: *Aerial view of the facility in context.*

(Source: (https://maps.google.co.za. Accessed 05/06/2014))

5.1.1 Justification

Cato Manor is a well-populated township close to the Durban CBD essentially comprised of low-income communities. The dependency on public healthcare facilities in the city already seems exasperated and one of the ways to alleviate this issue is for government to build efficient public healthcare facilities closer to such communities as the population keeps growing. *"The Umkhumbane Community Healthcare Centre is a public healthcare facility with an alternative view on health as was conceptualised around the concept of a 'place and wellness', and focuses on health instead of illness"* (Verster, 2010: 44). This is a vital and relevant concept to explore among healthcare facilities regardless of the demographics. There is a vast amount of literature as discussed in previous chapters which ascertain this notion. In theory, if people living in degraded communities who are at a higher risk of attaining health related problems could be treated, and or influenced in leading healthy lifestyles prior to them moving into urban areas, then we would create healthier cities.

The Umkhumbane Community Healthcare Centre seems to address these social, economic and environmental issues accordingly using the theories and concepts brought forward in this dissertation. In addition, the project was awarded the 2005 KwaZulu-Natal Regional Award.

5.1.2 Historical and Social Context

Cato manor was named after Durban's first mayor, George Christopher Cato, but the name only came to being after 1843. This township better known for its rich cultural and political heritage was established only 5km west of Durban's city centre by the 1650s when the area was occupied by numerous small-scale chiefdoms (South African History Online, 2014).

Cato Manor has seen many changes over the years. Different cultures, predominantly Indians and Africans resided at Cato Manor due to its location being close to the city. However, this often amounted to overcrowding and conflict causing tension and wars. Later, it was subject to apartheid laws such as the Group Areas Act, the Population Registration Act, the Immorality Act and the Suppression of Communism Act which separated the non-whites from whites with the intention to control and keep them at bay (South African History Online, 2014).

Today it is characterised by rapid urban growth. This population of low-income earners and informal settlement dwellers is expected to rise from 93,000 inhabitants to about 170,000 in the future.

In 1993, *"the largest inner-city urban development project in post-apartheid South Africa was initiated and funded by the EU and the Reconstruction & Development Programme, and administered by the CMDA (Cato Manor Development Association) and the Greater Cato Manor Urban Renewal Project (a Special Presidential Lead Project)"* (Robert Johnson Architects and Associates, 2009). This project was intended as a means to redress the injustices of the past and empower this impoverished community. A multitude of developments were constructed including low-cost housing, schools, libraries, community halls, roads and clinics (Robert Johnson Architects and Associates, 2009).

Robert Johnson Architect & Associates were appointed as principle architect in conjunction with ZAI Architects and Consulting Engineers by the local government. This contract was regulated by guidelines which required 50% of skilled labour and 100% of unskilled labour to be from the local community during the construction phase.

Figure 48 below shows an image of Cato Manor and the new developments in relation to the surrounding suburban areas and the city centre as the back drop. There is a significant difference between the livelihoods of these areas in just a distance of 5km.
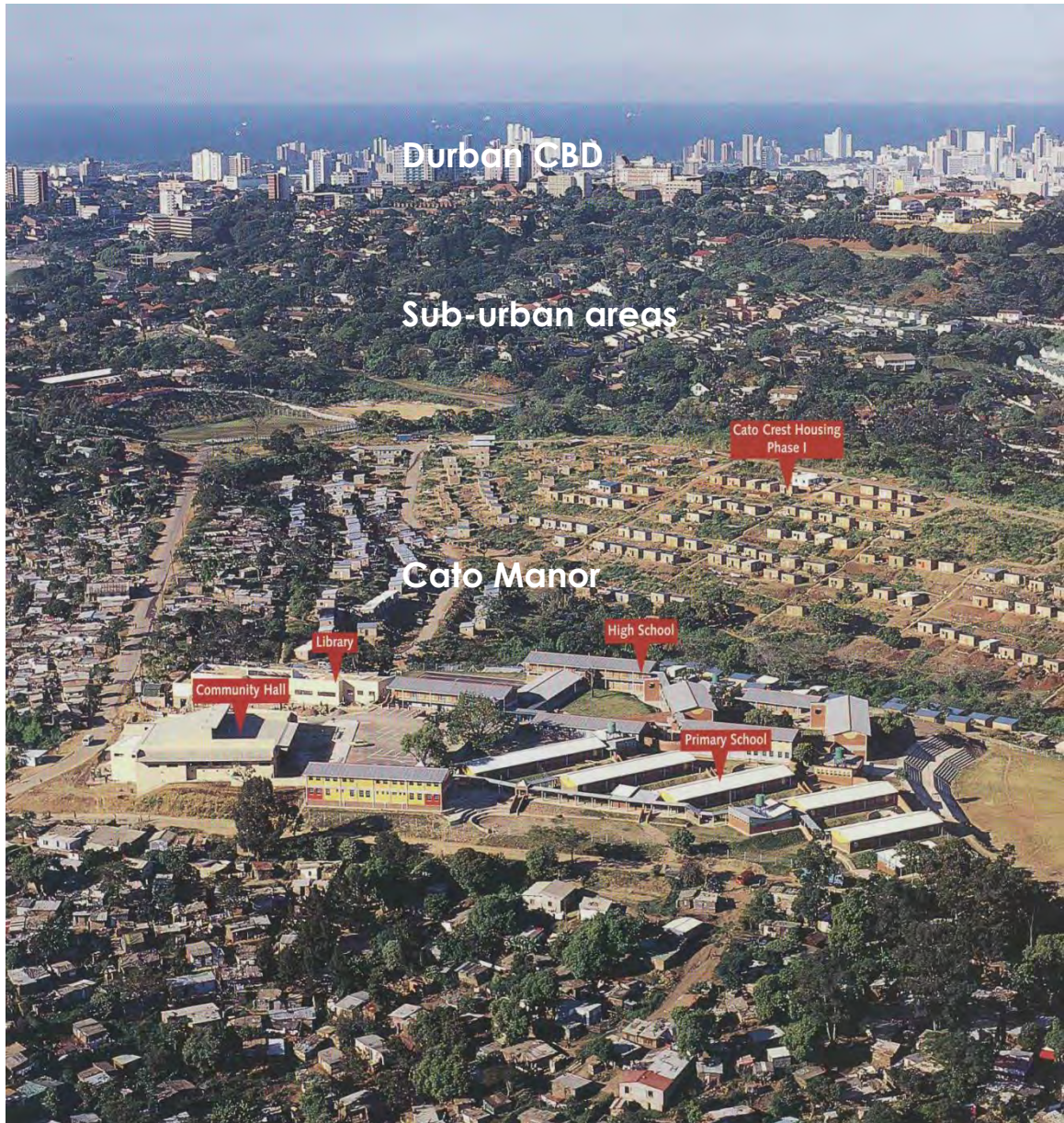
Figure 48: *The new developments of Cato Manor by the CMDA in relation to the area and the city.*

(Source: (CMDA, 2000))

5.1.3 Empirical Data

5.1.3.1 The Site

The site is situated on the periphery of Cato Manor at a walks length to the start of the hustle and bustle of the township. This results in calm and rather quiet environment which makes this an ideal space for creating meditating spaces without need to compensate through design but incorporate existing elements; the basic characteristics of therapeutic environments. Abundant trees and shrubs create picturesque views, the shades of green leaves sweep the street edge blocking off vehicles and a field of tall green and brown grass climbs towards the building site. The nature is dominant enough for one to hear whistles in the wind when the trees sway; birds chirping as they can be seen at the edges of branches in the distance and unfamiliar animal insect noises from the close bushes. This place is a habitat for wild animals. The openness of the site exposes itself to ample undisturbed sunlight and rain. The biophilic properties of the site create a strong essence of genius loci which is not evident from the rest of its context.

This area does not have many buildings and the few in the area are commercial and industrial with a service station to the south on Mary Thipe Street and another inspirational critical regionalist inspired office building to the east sharing Ashwell Road. This road is off Mary Thipe Street which separates Cato Manor and Manor Gardens, a middle class suburban area. The site slopes from the entrance road towards the west.

5.1.3.2 The Planning

The Umkhumbane Community Health Centre combines multi-faceted aspects of health, offering counselling on elements such as nutrition, diet and exercise, and also offers urban agriculture. The centre intends to be a place of *"learning, teaching and intellectual exchange"* (Verster, 2010: 44). As part of the syllabus, the centre included academic post-graduate programmes which also include practical experience. *"The architects had conceived a new health centre typology, which is more humanized, feels healthy and less sterile"* (Verster, 2010: 44).

In addition to the schedule of accommodation on the Health Plan List which included a maternity unit; eye clinic; pharmacy; and dentistry departments, the brief also called for the

following spaces to be included (Robert Johnson Architects and Associates, 2009; Verster, 2010):

- Seminar;
- Research;
- Community group activity;
- Outdoor "break-out";
- Creative "activities" space;
- An exercise lawn;
- A maintenance workshop which doubles as an occupational therapy facility; and,
- A garden store which is also used as the urban agriculture programme headquarters.

The main patient waiting area was designed to function as an independent entity despite being connected to the community projects rooms. The intention was so this space could be utilized by the community after hours. The quality of the space is questionable, upon entering the main entrance on the ramp, the waiting area is nestled at a lower level to your right over the walkway ramp, this results in a space which is restricted from natural light and makes do with artificial lighting throughout the brightest of days. The lowered floor level and positioning of the waiting area, with the reception to one end and the walkway on the other, limits any visual connection to the nature outside. The building fails in this regard to expose probably one of the most vital spaces where a significant number of people will be occupied for a period of the time to the essence of therapeutic environments. A space was also developed which could be used as a commercial gym that is accessible by the public and linked to the Rehabilitation Department. This reservation contributes positively to community upliftment and social relevance of the building. The design author combined physical exercise and nature by locating the public gym on the quieter side of the building and opening it up to views of nature; the concept is consistent with the process of promoting well-being through built environments.

LEGEND
1 MAIN ENTRANCE
2 WAITING AREA
3 ADMISSIONS
4 ADMIN & ASSESSMENT
5 PHARMACY
6 EMERGENCY / REFERRAL
7 CONSULTING ROOMS
8 MIDWIVES OBSTETRICS UNIT
9 ANTE NATAL CLINIC
10 REHABILITATION
11 DENTISTRY
12 EMERGENCY DROP-OFF
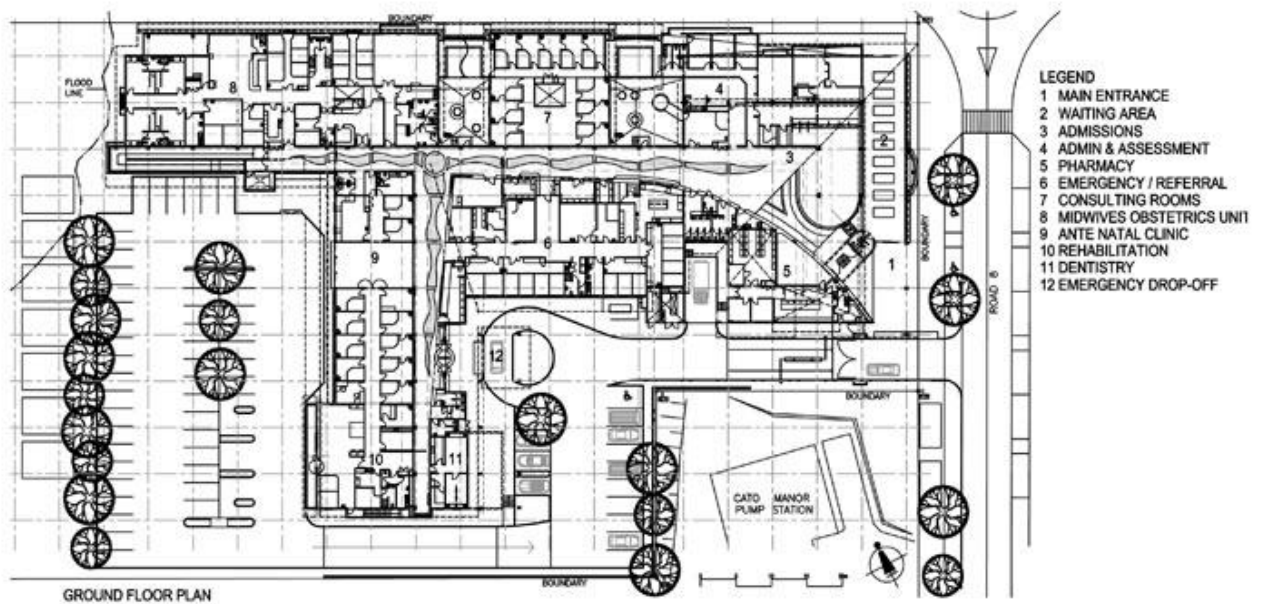
GROUND FLOOR PLAN

Figure 49: *Ground floor plan showing schedule of accommodation*

(Source: (ZAI Architects, 2014))

Based on the requirements brought forth by the brief, the floor area went over the expected amount by 45% which then brought on discussions about the sharing of space and the use of space at different times. A non-specific, generic, multi-use space was considered appropriate to which could accommodate a range of activities (Robert Johnson Architects and Associates, 2009).

The building is notable by a distinct central double volume 'spine' acting as an orientation device that guides people through the building (ZAI Architects, 2014). Central functions branch of this main circulation route; on the north end, pockets of open spaces between the health facilities allow sunlight and fresh air into the building whilst connecting people with nature (Verster, 2010: 45). Brightly decorated pot plants with various trees and flowers are situated within these pocket spaces but no seating has been reserved to be utilized by the users which would have made the connection to nature much more intimate than viewing behind window panes. A water element could have also been included in the form of a feature thus the space would encompass sunlight, air, plants and water within the building confinements thus truly creating a spirit of place.
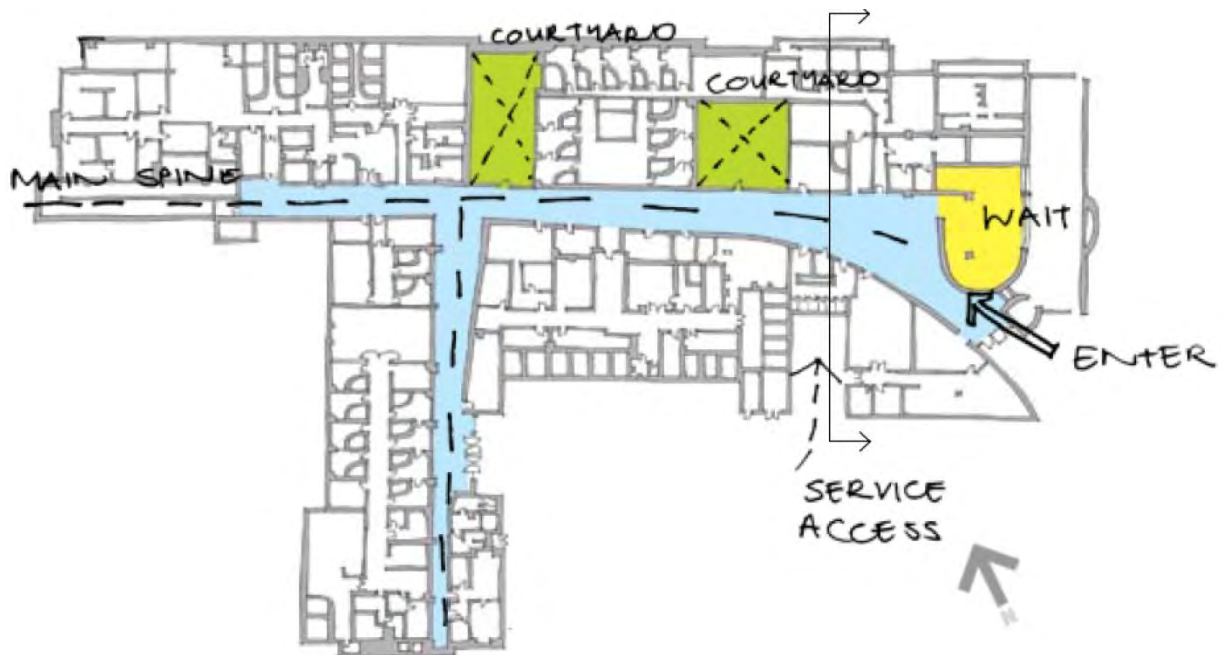
Figure 50*: Ground floor plan indicating waiting area, circulation and internal courtyards.*

(Source: (Verster, 2010: 45))
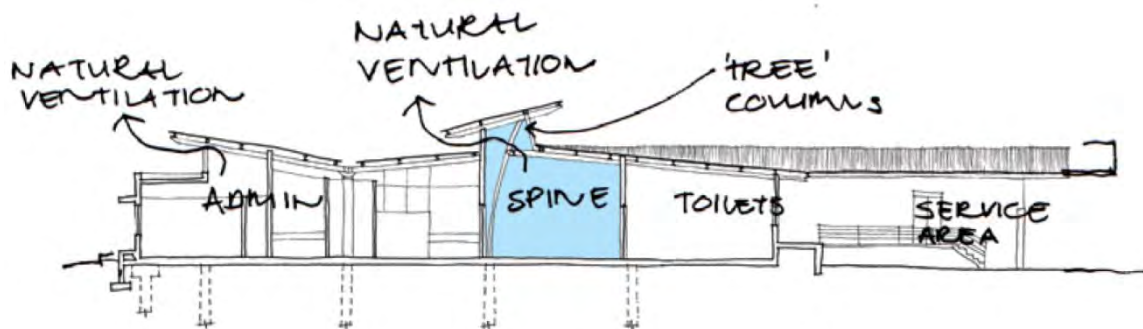
Figure 51*: Cross-section through building*

(Source: (Verster, 2010: 45))

According to the architects, regulations for health planning were very prescriptive; each consultation space had to meet specific regulations. Every department is treated as a unique entity within a holistic body; each has its own reception/ admin section. To a large degree the

consultation spaces do encompass an element of nature much more than an average healthcare facility within the region. Although some compromised, consultation rooms have a visual connection to the natural light which filters through the clerestory roof on the circulation spine and bounces of the vibrant multicoloured walls or they have a direct vision to the outside. Unique to a standard healthcare facility is the hybrid quality; youth programs and church services are conducted here. The waiting area also accommodates traditional healers and food vendors who sell fruits and vegetables (Sanders, 2011: 129). These elements add an extended engagement of the facility to the community addressing their social needs and becoming an identifiable social community facility rather than a standard clinic.

5.1.3.3 Main Design Features

Off the street, you are greeted by a harmonious bright red curved wall with the facility name above a cut-out on it. Behind this is a barricaded social waiting area with benches separated by steel burglar bars from the public street edge. This would often seem harsh and unkind but it is done in such a welcoming manner as visibility to the waiting area is high and also allowing most of what is experienced outside to be experienced below this sheltered space. The trees running the street edge become an extension of the waiting area as the distinction becomes more blurred with the local traders taking shelter below them and using the building as part of their furniture to sit and rest or display their products. A plinth at chair-seating height runs parallel to the street edge with an extended platform allowing people to sit and lean against the burglar bars. The interior waiting space lacks these fundamental biophilic and social traits. To the left of the red wall is the public entrance and exit and to the left of that, a controlled staff access point to parking and the building.
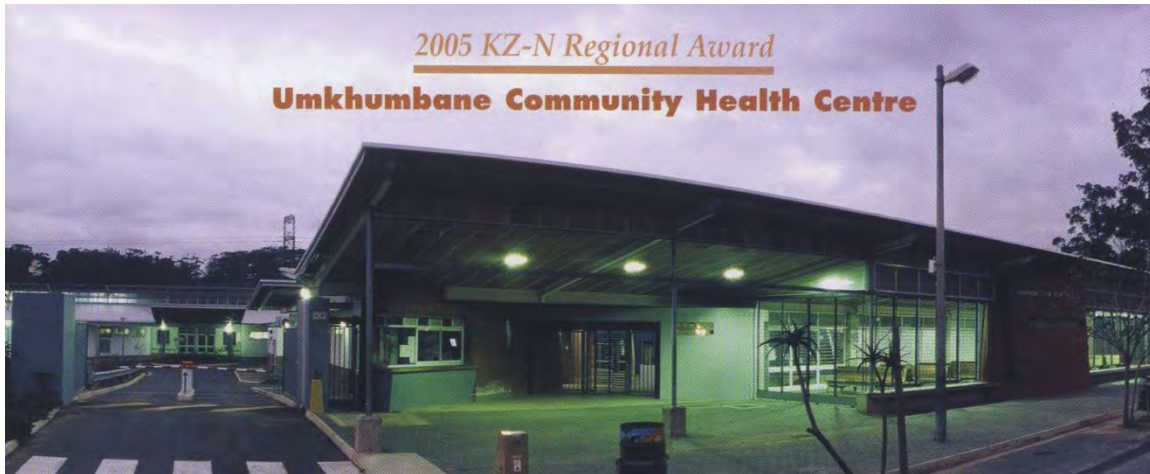
Figure 52: *The main entrance: private access on the left and public access on the right.*

(Source: (Peters, 2005))

Figure 53: *Bright red curved feature wall defines the building frontage.*

(Source: (ZAI Architects, 2014))

Figure 54*: Threshold between the exterior and the interior waiting area.*

(Source: (Peters, 2005))

The Health Department required that health service provision be at one level, a clear separation between client, staff and service access, exclusion of visitor parking from the site, and a high degree of security, especially for the 24 hour facility due to the relatively high crime rate associated with the area (Sanders, 2011: 131). There is a security guard room separating the two access points with full visual surveillance of both. Upon entering, the covered seating area acts as a transition space from the exterior to the interior where a person is met by a steel revolving gate; this is both the beginning and end of the journey along the circulation spine. The exterior waiting area has rows of seating back-to-back instead of one behind the other resulting in people having to face each other as they wait, encouraging social interaction and also utilizing one walkway for two rows of seating.

Figure 55: *Concrete pavers as floor finish to external waiting area.*

(Source: Author, 2014))

The user is immediately received by hard-wearing, low-maintenance, sustainable earthy materials selected for the finishes. The design of the building is bare and true resulting in fewer materials used to "make-up" the building such as tiles, ceilings, unnecessary wooden finishes. The aesthetics of the building is in its purest form, the structure and design elements such as clerestory lighting; floating roofs; exposed steel columns and beams; void spaces with large glazing; and, multiple levels.

Figure 56*: The start of the journey along the central 'spine'.*

(Source: (Robert Johnson Architects and Associates, 2009))

The inclined interior walls create unusual but welcome relief from the standard right angle walls. This gives the illusion of movement and dynamism of space, it is also beneficial for acoustics as it reduces slap echo. The variety of forms, vibrant colours and visual texture create a break from the clinical atmosphere as could be found in most facilities. The common organic forms found throughout the building seem to reflect the nature outside its walls. This also improves the spirit of the place (Sanders, 2011: 135).

Figure 57*: The interior treatment and finishes relieve the experience from the typical sterile treatment.*

(Source: (Robert Johnson Architects and Associates, 2009))

Figure 58*: Colourful mosaic tiles on the floor break the dullness and monotony. Enclosed courtyard offers natural light in the background.*

(Source: (Peters, 2005))

The design called for alternative methods of construction to be used for this facility. Industrial building technology determined most economical with which to form the external envelope; it was used to create large span mono-pitch roofs which connect at a centre monitor, where a pair of curved columns supports all of the members meeting at the midpoint. The large spans allowed for flexibility of room sizes to be accommodated under a roof supported independently (Robert Johnson Architects and Associates, 2009)

The single element roof unifies the numerous individual departments and activities happening below in a "shopping mall" manner or a pedestrian street through the 'downtown market' as the columns imitate street lights with their curve nature and light fitting. The column fittings are explicitly exposed for criticism by pedestrians as they walk and contemplate the intricate fixings of the steel beams and the roof with a rising slope from the north to the south, minimising and controlling the north sun and allowing more south light to penetrate through to the sheltered rooms. The indirect light reflecting of the walls provide for comfortable lighting levels; and together with the multi-coloured surfaces result in visually pleasing illumination. The use of natural lighting in what is generally expected to be a relatively dark space means less artificial lighting is used cutting down on electricity costs and strain on the national power crisis. When the need arises, light fittings on feature columns throw light upwards reflecting it on the insulation of the roof, reducing glare and creating an interesting visual feature when looking from the outside as a strip of light runs the entire length of the building at roof level.

In addition to allowing light to penetrate the space, the tilted roof monitor is also designed to ventilate the circulation spine. This feature was thought of as a shaded avenue, with places for rest and recreation, filled with fresh air and sunshine (Robert Johnson Architects and Associates, 2009).

The circulation spine leads the user of the facility from the higher edge of the site on the east where the entrance is located through the facility, to the lower west end of the site where parking and recreational outdoor facilities can be found. The design is also such that it minimises the threshold of being outside or inside the building.

Figure 59: *Light and fresh air filters through from the clerestory and vents above.*

(Source: (ZAI Architects, 2014))

One of the requirements during the planning phase was that all the health facilities to be on the same level for efficient easy access by abled or disabled persons; staff and services. The single level blueprint of the ground floor meant the building would create a void below as the site slopes away from the east. This void became useful in running gas, water and sewer

pipes. Where the height became efficient below the ground floor, service rooms were allocated.

Figure 60: *Ramp to the lower ground on the west edge.*

(Source: (ZAI Architects, 2014))

The elevations of the building are just as dynamic as the planning. With particular reference to the north face as this is one of two elevations exposed to the road edge and in full view of the public, it clearly depicts the building form in relation to the site. The façade treatment of the ground floor is clearly distinguished by colours and edges, as the site slopes away from the building and columns with inclined faces similar to the walls inside support the building, the ground level can be clearly distinguished at a constant level with the *retaining wall* below recessed further and painted a different colour. The concrete plinths, recesses, security bars add character to the building façade. The large overhang defines the termination of vertical walls and produces great shading from the north sun. The building almost seems to sprout out of nature as the grass and shrubs plaster themselves on the façade edge rising upwards towards the windows. This effect terminates towards the road edge. The intimacy between

built form and nature displayed by the external relationship should be adopted to internal spaces where the people have a closer relationship to the building.

Figure 61*: North elevation.*

(Source: (Peters, 2005))

Figure 62*: Perspective of the facility taken from the north-east corner.*

(Source: (ZAI Architects, 2014))

5.1.4   Conclusion

A hybrid quality of building encourages community participation and most importantly addresses numerous issues simultaneously. The building becomes more relevant to its intended community with more members taking ownership and benefiting from the facility due

to its variety of activities. The community tends a vegetable garden on the premises. Such a program encourages stewardship of the environment amongst the people. In essence, Umkhumbane Community Healthcare Centre addresses a wider aspect of well-being; this is the core principle of this research. As stipulated in chapter 2, human well-being is subject to numerous aspects from basic health, to emotional/spiritual, psychological, environmental and economic stability.

The building image is just as important as its functions. It has been common in Durban that current projects in the public sector have seen them adopt a fairly similar style. This is due to the critic of the region with materials such as masonry, steel, concrete and wood being financial, environmental and economically sustainable. This building technology is echoed throughout the city; in townships where government provides social housing to public entities such as community halls. Alternative and redevelopment plans for Durban's Warwick Precinct, probably the image of the city, is in similar fashion, rich with colours symbolizing the many races and cultures celebrated. These various colours consisting of African patterns have also been done to revitalize the city streets, public benches and planter boxes; RDP housing are painted with multitude of colours to offer a unique identity from one neighbour to the other and also provide visual aesthetics. Similarly, the Umkhumbane Community Healthcare Centre has been treated with such identity.

5.2 SOCIAL VALUE: PRINCE CYRIL ZULU COMMUNICABLE DISEASE CENTRE

SOUTH AFRICA, KWAZULU-NATAL, WARWICK TRIANGLE

CITY ARCHITECTS

2005

Figure 63: *Aerial view of the facility within its context.*

(Source: (https://maps.google.co.za. Accessed 05/06/2014))

5.2.1 Justification

Although Prince Cyril Zulu Communicable Disease Centre does not comprise of all the general requirements and practices of a standard basic healthcare facility and chose to restrict services to a particular group, it is an ideal case study to the research for a number of reasons. The location of the clinic is within the same area of the proposed development to be drawn from this research. This will provide an indication of the necessity of the clinic in this area bearing in mind that there are similar facilities around the city such as public hospitals; the performance of the facility within the demographics of such a complex contextual structure, particularly the social and economic aspect; and the architectural and environmental concerns.

5.2.2 Historical and Social Context

Warwick Precinct is largely known for its development as the transport hub for the city of Durban, particularly due to segregation laws enforced during the apartheid period which restricted Indian and African-owned buses to access the inner city. Warwick Avenue developed at the periphery of the city where commuting would generally start or end. This presented an array of unauthorised trading opportunities still evident today (SARPN, 2004: 7).

Warwick became an integral market 'square' for the city; by 1934, the English market was followed by the Early Morning market, a designated area for Indian market gardeners to sell their produce. Not very far, Victoria Street market supplies a range of spices, foodstuffs and curios; and adjacent to the neighbouring Roman Catholic Cathedral, a fresh fish and meat market. The social context has changed significantly over the past couple of decades; the majority of traders in the English market and Early Morning market are now black although the produce offered is still similar (SARPN, 2004: 7).

Warwick Precinct is still plagued by stigmas and issues of the apartheid era to this day and the urban renewal project by the local municipality aims to rectify these problems (SARPN, 2004). After 1994, the city was subject to a significant rise in population mobility and an accelerated process of urbanisation. The city has not been able to respond accordingly to this epidemic. The focus has historically been on rural areas but now the humanitarian sector is slowly recognising that urbanisation is compounding humanitarian issues in urbanised

environments, specifically cities. Street traders are subject to chronic, underlying and differentiated vulnerabilities, there has been estimated to be more than half a million street traders and over 8,000 kerbside traders in Warwick Precinct with the numbers still rising (Chazan, 2006).

Changing population demographics has seen a significant rise in HIV/AIDS prevalence, the KwaZulu-Natal province remains the highest in South Africa especially among the vulnerable communities with women attending antenatal clinics affected most (Chazan, 2006). A study conducted by Chazan (2006) discovered that street traders' vulnerabilities are linked to the lack of affordable housing in the city resulting in some living in hostels or sleeping on the hard cold pavements or under bridges and having more chances of being sick; lack of access to water; poor sanitation; unstable incomes and lack of social security. Added stress is also caused by being separated from their families and being unable to take care of them; working in loud noisy environments constantly polluted by traffic; not being able to access clinics as they feel they cannot take time out from their places of work and being turned away from clinics because they do not have addresses within the city. Many suffer from chronic health problems (Chazan, 2006).

There is another important dimension to Warwick Precinct other than the street traders. The city centre is accessed by over 500,000 users and residents passing through the streets of Warwick. Everyday hundreds of buses, taxis and trains transport commuters in and out of the city, significantly rural areas, townships and informal settlements (SARPN, 2004: 6).

5.2.3 Empirical Data

5.2.3.1 The Site

The place is vibrant and very noisy; blasting music, blaring taxi horns, piercing whistles of barrow boys and the roar of accelerating buses fill the atmosphere. The physical context is just as active with a train station to one side, disparate markets, unfinished flyovers, ad hoc bridges, bus shelters; a series of raised walkways and open concourses which provide shelter normally utilised by informal traders. Warwick is simply unique to the city (SARPN, 2004: 6);

> *"Here are gold 'tooth fairies', cigarette sellers, traditional herbalists, isangoma, children's pinafore sellers, lime and mphempo traders. Live chickens, fruit, vegetables*

and other items for sale. There is a buzz but also quieter spots where people can meet and talk."

(SARPN, 2004: 6)

Efforts by the municipality to revitalise and rejuvenate Warwick Precinct has led to unusual developments to create a sense of African bazaar as it has been subject to urban reconstruction. Among some of the reasons for this intervention was resentment among community members towards the government that their needs are not being met as some residential buildings, some owned by traders, have become utterly derelict; project facilities and political conflict. The urban environment is in a state of decay (SARPN, 2004: 6).

There are also quite a number of educational institutions and health facilities around the area. The Prince Cyril Zulu Communicable Disease Centre and TB Clinic is situated on Lancers Road. It has dedicated a STI and TB diagnostic facility which serves a large number of patients. Adjacent to it is the ambulance depot; directly opposite a taxi rank; and across Julius Nyerere Street are some off-street retail shops. Across the freeway is the sprawling DIT (Durban Institute of Technology). There are also a number of schools and churches nearby (SARPN, 2004: 6). There is very little natural vegetation in this area; it only exists on the neighbouring premises.

5.2.3.2 The Planning

The clinic operates off University Avenue which is much quieter than Julius Nyerere Street to which it is also situated. The ground level of the facility is elevated off the average street level which sort of implies disconnecting from the surrounding areas giving it a sense of space once inside. The building is well cordoned off from its context with relatively high windows on its façade and burglar bars for security. A ramp along the front façade is provided for access to the raised level. This area acts as a waiting area and transition space into the clinic. There are PVC chairs secured along the wall for the patients convenience.
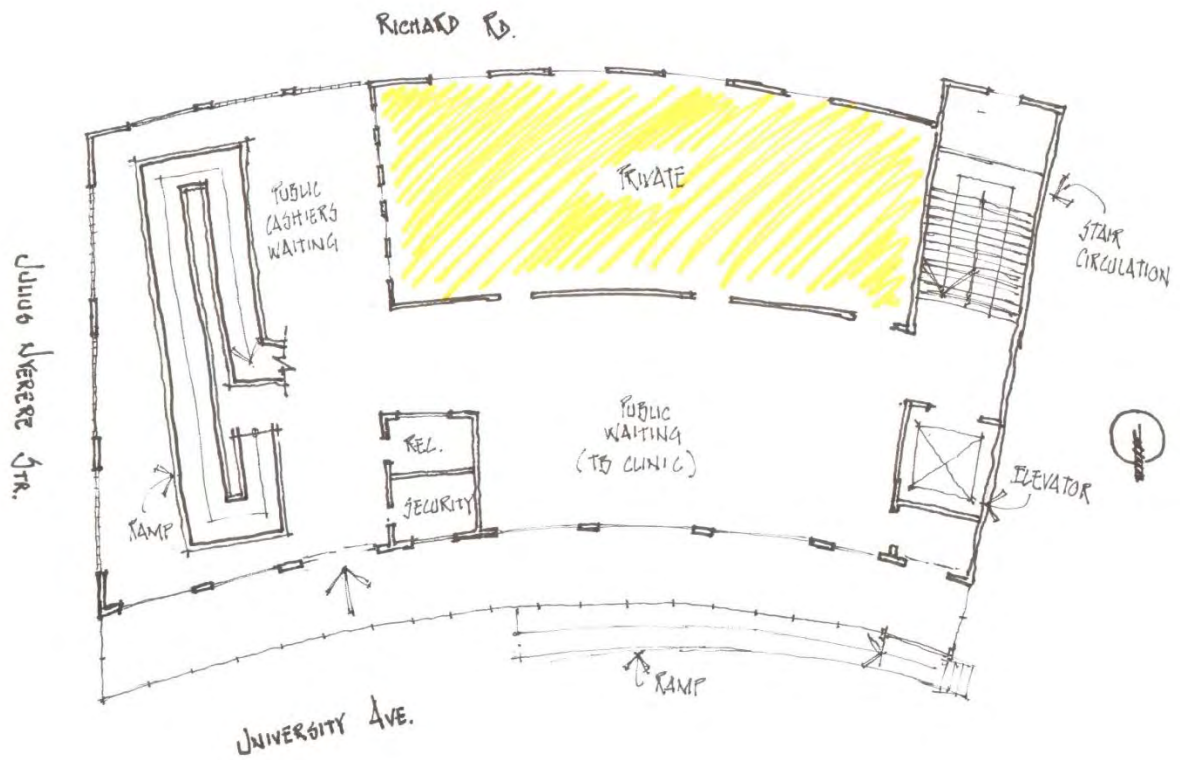
Figure 64: *Assumed ground floor plan.*

*(Source: (Author, 2014))*
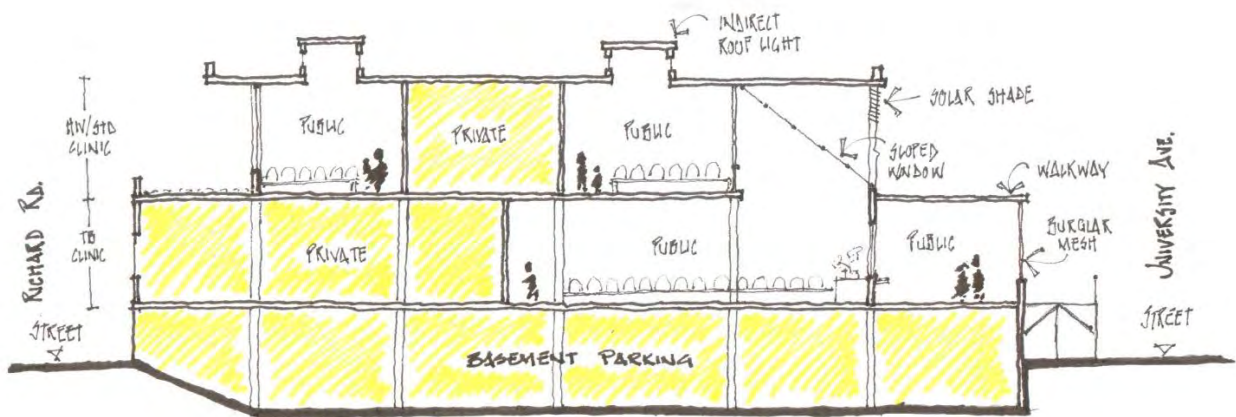
Figure 65: *Assumed cross-section.*

(Source: (Author, 2014))

134

Figure 66: *Front facade of building off University Avenue. A fence acts as a barrier and the building elevated from ground level.*

(Source: (Author, 2014))

Figure 67: *Entrance walkway and waiting area elevated from street level.*

(Source: (Author, 2014))

The facility provides comprehensive health services from trauma to sexually transmitted infections. Data shows that the Prince Cyril Zulu Communicable Disease Clinic is Durban's busiest treatment centre with over 18,000 patients being treated per month, 76% of these TB patients were HIV positive. An HIV/TB clinic opened in 2005 is located next to Communicable Disease Clinic and is run by the University of KwaZulu-Natal Centre for the AIDS Programme of Research in South Africa (CAPRISA) and the local municipality (PlusNews, 2005). This out-patient facility provides supervised treatment, post-test counselling, education and peer support. In addition, patients also receive drug adherence training and support, contraceptive advice and contraceptives as well as treatment of AIDS-related infections. The clinic also helps patients to access social services, such as disability grants. Head of CAPRISA, Professor Salim Abdool Karim, called upon researchers and urged that there should be an aim to seek new ways of treating patients, especially with multiple sicknesses (PlusNews, 2005).

The clinic is very convenient in its setting for thousands of commuters who come through each day by public transport though overcrowding has been a major problem and seems to be getting worse.

> *"Today, patients are no longer admitted after 10am. That was the exact time I arrived at Thokomala ARV Clinic. I started counting people waiting to be counselled, have their blood taken and receive their medication: 214. Some had been at the clinic as early as 6am, but found themselves turned away and told to return the following day."*

<div align="right">Ka-Manzi (2013)</div>

As an act of community service, a group of informal traders, Senzokwethu, started an initiative to cook and serve soup to a number of people they had noticed collapsing on the streets due to health-related issues. Six women started this programme in 2006 as they discovered most of the victims were people heading to the Centre for their routine check-ups and to acquire medication. The patients barely consumed enough food to minimise the side effects of medication and above all had to stand in long queues for long hours. The bread and soup served by Senzokwethu serves as a vital meal for over 350 patients a day. They utilise the walkway area to prepare the food. The group relies on donations to keep the work going as they already sacrifice trading time for this initiative (Schilfgaarde and Quazi, 2013). Scarcity of medication has also become a major concern with patients claiming that they now receive only

one month of supplies when they used to receive three before. Shortage of staff is also an issue (Ka-Manzi, 2013).

Upon entering the main entrance, the user has the option to access the TB clinic which is to the left on ground floor or walk up the ramp on the right to the STD clinic situated at the level above. Straight ahead passed the security guard and reception situated along each other are the cashiers. Inside the TB clinic waiting area are a row of PVC chairs secured on a steel structure. This is where the patients wait to be called over the intercom. This area is mechanically ventilated and kept very clean. It gives the space a clinical feel with the PVC flooring and light-painted walls. Ample natural light filters through from the windows to one side. This is a high volume space and half of it is double volume. The STD clinic waiting area upstairs this same space and connects to the chairs below. Pockets of natural light also filter from the ceiling above absolutely minimising artificial lighting in this space. Seating at the STD clinic is on the edges and the staff working areas to the centre of the space.

Figure 68*: A view to the outside from the TB clinic waiting area*

(Source: Author, 2014))

Figure 69: *A clinical finish to the institute walls and floors*

(Source: Author, 2014))

Figure 70: *Ramp access to the upper floor and glass bricks along facade to allow maximum natural light.*

(Source: (Author, 2014))
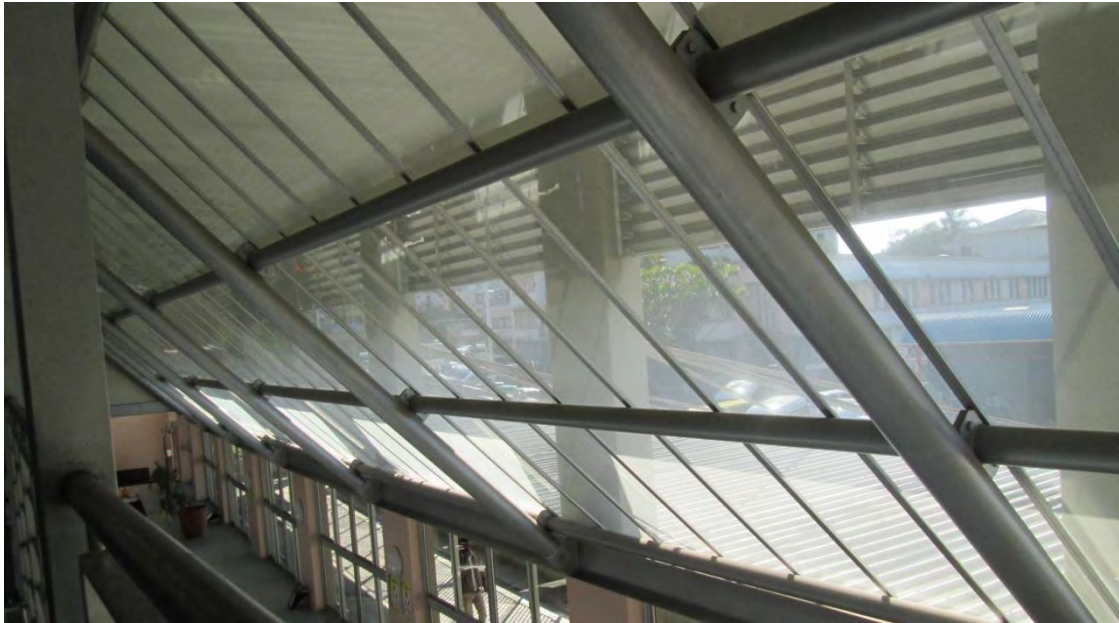
Figure 71: *Inclined windows above double volume space sheltered by slab above. View from the STD clinic above.*

(Source: Author, 2014))

Figure 72: *Rear facade of building.*

(Source: (Author, 2014))

Theories discussed in this dissertation could have been employed in this facility to resolve numerous issues:

Biophilia could have been used to create a place where users within the city, whether it is commuters, informal traders or patients, can escape from the hard edges of the built environment; busy and noisy city streets by create a more serene and less polluted environment; providing a better and safer place for patients to wait during their stay at the facility; introduction of greenery in this setting would humanize the environment and create a sense of place; using the biophilia hypothesis to assist users with healing and offer a sense of positive well-being; and create agriculture opportunities for the informal traders so they can maintain fresh vegetables close to their place of work.

A critical regionalist approach would encourage the local community of Warwick to become part of or an extension of the facility. The clinic could incorporate trading areas so that the informal traders, like Senzokwethu, would not have to abandon their work stations to offer their community service. A community maintained garden will also be beneficial to the informal traders in performing their work. The main entrance is off University Avenue, a reasonably quite street with hardly any vehicular traffic. It could have been treated with the biophilia hypothesis to soften the edges and minimize the segregation of the ambulance depot and taxi rank from the clinic. These external edges could have been utilised more efficiently to accommodate the overcrowding in the facility. More pedestrian activity would also attract more informal traders. This would have resulted in more community participation and created a place of social interaction which is also beneficial to health and well-being.

The Department of Graphic Design in the Faculty of Arts at the Durban University of Technology which is an educational institute situated within the Warwick Precinct hosts an initiative to address important issues with particular reference to HIV/AIDS. It recognised the importance of design in creating balanced, healthy community life. Siyazama, their flagship project, uses design to encourage an awareness of rights and other issues that threaten the stability of communities. Siyazama works with a small group of craftswomen who express their concerns about HIV and AIDS and all of its complexities through their work. They make beaded cloth dolls, tableaux, beaded jewellery and *imbenges* (decorative beaded bowls) (CRMD, 2005). This sort of initiative is one that could be incorporated well into the facility.

If treated as a community centre, Prince Cyril Zulu Communicable Disease Clinic would have addressed some of the vulnerability issues aforementioned. The centre would have offered accessible public showers and toilet facilities; secure storage areas for informal traders; water supply and an accessible unbiased facility.

5.2.4 Conclusion

The clinic addresses some of the most pertinent global issues in a very interesting and complex context. It has the potential to also address non-communicable disease as reviewed in the literature review associated with the effects of sprawl. The rejuvenation of Warwick Precinct would benefit immensely from an appropriate architectural typology of such a facility tackling issues of urbanisation. Architecturally, the building as a case study exposes lots of shortcomings in dealing with very real urban issues.

CHAPTER 6: ANALYSIS AND DISCUSSION

6.1   RESEARCH FINDINGS

We often think of nature as a unique discourse independent in its own right. When classified; trees, flowers, water, animals and sunlight are just a few examples of what is considered as/or belonging to nature. It is all too familiar among most people, often taken for granted with little knowledge of how nature affects humans and everything else in this world. The general consensus is that we know it is "good", whether we cannot specifically point it out nor fully understand what we are talking about as a layman, we know what we feel for nature is good enough.

But nature cannot be a singular element on its own as it is connected or interrelated to many fields of research. In particular, nature is a form of architecture and at the same time it is inseparable from place. Compared to nature, the built environment is far too inexperienced in the field and a lot can be learned from it.

> *"Nature is a closed harmonious unit that corrects imbalances and degenerations as soon as they appear and this process is done naturally, without instruction or time limits. It is this element of nature, in the way it adapts to itself, and changes according to what's around it, that allows nature to grow and develop into something stronger and longer-lasting."*

Moodliar (2011)

More-so the pertinent aspect would be to analyse the way in which nature contributes to liveability. This is where the biophilia concept has been discussed at length by protagonists and academics. With reference to the case studies and precedent studies in review; architects have, in some way, found relevance and employed this theory particularly in the healthcare sector. The end result has been buildings which are naturally humanistic, climate receptive and socially responsive. This *just* approach has seen the typologies of healthcare facilities change from the standard sterile and clinical design which represented healthcare, probably influenced by the misinterpretation of the close relationship between medical health and surgical/clinical environments (including white lab coats) from western regions which closed off the relationship the interior of a building has to the external environment particularly due to beliefs that by doing so meant alienating unwanted germs and diseases. This was a great

misconception, if nature is considered to be full of germs or hazardous to health, it cannot be possible that living organisms acquire better health by being exposed to nature; it cannot be possible that the best form of recovery is one which happens naturally; it cannot be possible that a great amount of well-being is being associated to nature. Nature in itself represents life.

6.2   ANALYSIS OF RESULTS

6.2.1   Introduction

This section will analyse and discuss the information obtained in the conducted research interviews and compare it to the literature reviewed. The discussion will only deal with the most important and relevant themes mentioned.

Questionnaire interviews were sent out as emails to 30 participants within the Durban region. The participants comprised of ordinary citizens who would have, at one point, made use of a healthcare facility; medical professions and professionals working in the built environment. The questionnaire comprised of 3 sections with each allocated to each category of participants. The selection was random over a network of affiliated connections and social media. The emails were sent out as Microsoft Word. The main intention of undertaking this questionnaire was to ascertain people's thoughts on healthcare and nature, the view of medical professions on issues of healthcare including nature and architecture and the mentality of built environment professionals regarding their influential role. The full questionnaire and can be found in appendix A.

A questionnaire survey was also conducted at each case study to 10 participants to determine how users felt about the building, how they used it and their thoughts on nature and well-being. The full questionnaire and can be found in appendix B.

6.2.2   Evaluation of Questionnaires

6.2.2.1 Questionnaire No.1

The questionnaire was structured and aimed at built environment professionals such as planners and designers, and specifically to architects who have worked on healthcare facilities; to determine their approach on design whether it considers any of the theories scripted in this dissertation or uses any other guiding principles.

The following analysis and discussion is based on an interview conducted with architects who have had over 15 years of experience in practice and had previously worked on projects to construct healthcare facilities. Extracts from the questionnaire of the requested information have been scripted in bold.

Briefly explain the cultural, historical and social setting of the project.

Different architects employ different principles when designing. Some architects tend to engage and focus more on the design of the building with little consideration to all other contributing factors which mould a holistic design. This firm however showed that it is critical in their approach in considering the cultural, historical and social issues of a region. Reflecting on one of their projects, they explain how the site is situated at the top of a main road with a large mosque and shops as neighbours on the Victoria Road edge of the site. This edge has a high degree of traffic, both vehicular and pedestrian. This short description illustrates the local context. A designer can conclude immediately how important the building will be to this intimate community. The main road is the artery of the town; this is where the life is.

How did the design incorporate these characteristics in a healing institute?

They state that existing elements, if one is observant enough, gives clues on the best way to solve a problem. This belief is in-line with the *critical regionalism* theory of conscious design. The main issues which were highlighted was how a public building of this nature can relate to people of different beliefs where on one end there is a mosque and directly opposite, a church, within vicinity. They found the solution was to reflect what was common and familiar to the people of the area, to use what they already relate with. The language of architecture becomes a universal idiom of regional identity.

Were there any significant theories for *therapeutic environments* employed in the design process? If yes, which theories were used, why and how were they implemented?

And

Do you think nature plays a pivotal role in aiding basic human health benefits and well-being? If yes, explain.

The consideration the architects placed on the local context as previously mentioned hint at a critical approach towards designing of the facility. This critical approach is beneficial in creating sustainable developments. The architects had also employed a theme of incorporating nature with the healthcare facility. This was caused by the intrinsic belief that nature is somehow at the very core of good basic health. Biophilia is based upon the same concept of bringing buildings to life thus indirectly bringing life to the people. Above incorporating nature into the design, the architects also adopted this principle in the structural design; building materials emulate natural materials. The columns used in the structure reflect tree-like forms.

Current basic healthcare facilities project themselves as places of healing rather than prevention. What do you think would constitute a place for disease prevention and promotion of healthy living?

The architects also believe that healthcare facilities shouldn't just be places for healing but have various activities and promote prevention of sickness or ill-health. The entire façade on the main road promotes social interaction among users of the facility and people walking past. There are places to sit and wait for public transport, and an entrance that acts as place to address the community.

In describing the project they have worked on, the following analysis can be made which indirectly answers the questionnaires. Employment of *good* and responsible design principles would subconsciously result in *good* architecture. A practice which considers all issues into the design with the intention to solve the problem regardless of the typology of building. A typology should always fulfil its primary function and also address secondary and tertiary functions of architecture as a discourse.

6.2.2.2 Questionnaire No.2

The questionnaire was structured and directed at practicing medical professionals. The aim was to determine a number of issues. The first was to recognise and compile a list of the most common sicknesses they encounter with patients. An analysis was then going to determine whether leading a healthy lifestyle including being surrounded by natural environments with their healing properties would have a positive influence on the patient. Secondly, the questionnaire aimed at extracting the consultant's opinion about their work environment. This

includes determining the image of current healthcare facilities and how they could be improved. Finally, the questionnaire aimed at finding out whether medical professionals were aware that nature had healing properties in all their years of studying; how vital natural remedies are to people; and to determine the possibility and success of alternative medicines as a primary treatment resolution.

Unfortunately, of all the questionnaires sent out, none were returned. Efforts were made to contact the participants and they understood what was required and pledged their participation yet the result was still the same. Similarly, the local Department of Health was contacted to set up an interview with one of the regional directors but this was unsuccessful after numerous correspondences.

6.2.2.3 Questionnaire No.3

This questionnaire was structured and aimed at the general public without many restrictions to it allowing persons of all races, age and gender to participate, only limited to persons within South Africa. The first part of the questionnaire is multiple-choice, it determines the past or current experiences the interviewee has had with healthcare facilities. This establishes the foundations and eases the participant into the second part as they are required to put some thought; reflect and explain in their own words.

Part 1:

Do you utilize basic healthcare facilities often, at least once a month?

Almost all of the participants believed they did not utilise basic healthcare often enough.

Did you find that your stay in a healthcare facility was pleasant experience?

Most of the participants found that their stay in a healthcare institute was not a pleasant one.

Would you say that the ward was in a state of good repair and clean?

Half of them concur that the state and condition of the facility was not so bad with the other half in disagreement.

From your observation would you say it is often full or acceptable?

Similarly, the same number of participants felt the facility was excessively occupied and the other found that it was reasonably okay and not worth the complaint.

Did you have easy access to an outdoor garden from the inside spaces?

However, not surprising to the assumptions based on current local healthcare facilities, none of the participants had visual or easy access to an outside garden or space of relaxation. This may be the result of poor design principles on most healthcare facilities.

Do you feel better or worse whenever you walk into a basic healthcare facility?

All participants felt worse off after entering the healthcare facility.

Did you feel safe during your stay at the healthcare facility?

Most of them also felt unsafe during their stay and use of the facility.

Part 2:

What is the fondest memory you have of being in nature? Briefly explain?

And

What effect if any did this encounter have on you?

When asked about their fondest memory of being in natural environments, the participants related this experience to the positive emotions nature aroused within many of them; acknowledging mostly the sheer beauty and the feeling of happiness it gives them. Most felt that nature offered relaxation and had calming properties. The biophilia concept aims to achieve this in architectural environments.

Do you feel experiences such as these are beneficial for human health; mentally and physically? How and why?

All participants share similar sentiments in that they feel nature is beneficial to human health and how they feel less stressed in these environments. Although they cannot scientifically explain this phenomenon but the participants are very sure of what they feel. These findings affirm the notion that there must be a strong positive biological connection with nature.

What is the most common challenge a person faces when accessing medical assistance? Which group / class of people would you say require medical assistance most?

The general consensus concurs that the biggest challenge in accessing healthcare services is due to inadequate or inefficient commuting methods, with half of respondents believing that elderly persons require medical assistance most. The author's initial assumption also included persons who are subject of poverty stricken communities.

Have you had any bad experiences of nature (violent storms, floods, fires, dangerous animals)?

Only a few respondents reported that they have had a bad experience with nature due to an encounter with a wild animal but that has never deterred them from experiencing nature.

Do you think nature experiences are in any way beneficial for people that live in city environments? How and why?

There is a similar belief amongst all participants that nature is a much welcomed experience in the city and one that is beneficial to city dwellers as well. The respondents concur that natural environments within cities offer much desired relief and escape from the busy, stressful, concrete jungle environment.

6.2.2.4 Questionnaire No.4

This questionnaire was used as a part of the case study materials. The purpose was to determine people's use of the facilities and their personal thoughts about it. Participants involved were above the age of 21; did not have medical aid; both men and women; and did not have to reside within a certain distance of the facility. This questionnaire is similar to that of questionnaire no.3 but specific to the case studies. Participants were often reluctant and uncomfortable to participate in the questionnaire; they felt this somehow placed them in a vulnerable situation at exposing the facility including staff of anything bad. Once assured their participation was confidential and no names were required and the research was for educational purposes, they felt at ease to participate. Another challenge was that the

questionnaire had to be conducted quickly as participants did not have time to waste as many waited on public transport. The questions were as follows:

Do you utilize basic healthcare facilities often, at least once a month?

Similar to respondents in question no.3, the users of both Umkhumbane Community Healthcare Centre and Prince Cyril Zulu Communicable Disease Centre did not believe they utilize the facilities on a regular basis. A consistent response was from respondents who fetched their treatment on a regulated interval, on average a monthly basis.

Did you find that your stay in a healthcare facility was pleasant experience?

Users of both facilities did not think much of their stay in the buildings. They felt it was okay.

Would you say that the ward was in a state of good repair and clean?

All participants thought the facilities were in a good clean state though a few complained about the dust which sometimes collects on the external covered waiting areas of both buildings though they did not have an issue with some of the birds which flew in.

From your observation would you say it is often full or acceptable?

All the participants expressed that the facilities were extremely full every time they used them. This was the biggest challenge among the users, complaining about the amount of time wasted waiting for service, on average 3-4 hours. Some of the patients were told to return the next day due to shortage of medication.

Did you have easy access to an outdoor garden from the inside spaces, physically or visually?

Users of Umkhumbane Community Healthcare Centre said that they did not have any access or connection to an outside garden especially whilst waiting to be assisted. One of the participant's expressed how pleasant it would be waiting within a natural environment appreciating the beauty. Users of Prince Cyril Zulu Communicable Disease Centre had plenty of visual connection to the external environment and connection with other people whilst escaping the noise and chaos instead of a garden. In conclusion, both facilities did not do enough to offer a garden experience to the users.

Also, briefly describe the ff.: Thermal comfort, ventilation and lighting?

Most of the participants did not think much about these three items and generally found them *normal* and acceptable. At Prince Cyril Zulu Communicable Disease Centre though, few of the users felt that the air-conditioning was a bit excessive making the inside space feel a bit cold. They also appreciated how much naturally lit the waiting areas were for an interior space of a building.

Finally, what is your overall opinion of the building?

At Umkhumbane Community Healthcare Centre, the users of the facility felt the building was well designed and looked aesthetically pleasing. They also conceded that one wouldn't say the building was a healthcare facility if they passed it for the first time. The participants appreciated in particular the use of colours and interesting forms. At Prince Cyril Zulu Communicable Disease Centre, the ease and practicality of circulation was more apparent. Not much of the external design could be experienced by users though, possibly due to the context; with neighbouring buildings and mini-bus taxis blocking off most of the structure.

6.3   A WORKING FRAMEWORK

This section of the study will revisit the key questions and hypothesis as structured by the author at the beginning of the research. The intention is to discuss and formulate a working design framework to fulfil the aim of this study; creating an architecturally responsive healthcare and community centre using biophilic design as a primary driving concept. Furthermore, implementation of this framework aims at encouraging people to recognize the importance of nature in sustaining a healthy lifestyle and also act as a tool to rehabilitate desolated urban environments thus contributing positively to the battered ecosystem. The working framework will become a guideline for architects, designers, planners and professionals alike; this is only a stepping stone for promoting positive health and well-being.

6.3.1   Design and Planning

The design of the healthcare community centre is eminent on how the building is perceived by users. This perception may determine the success or failure of the building. In the South

African context though, the way the building works may be divided into two categories which are in contrast to each other; social compromise versus architectural failure.

6.3.1.1 Social Compromise

The shortage of facilities, the continual increase in population and illness among the majority of South Africans means there is a national crisis in the health sector. Most people needing to utilise healthcare facilities do not have the choice or convenience of choosing a facility that is either in a better state; physically or practical, architecturally responsive and parallel to the theories discussed in this document and because of the limited resources. Healthcare facilities constructed in townships for example were done for the sole purpose of service delivery in the form of allowing people to access medical services which include medical examinations, treatments and medicines. The array of services is further limited to common health issues which may be an epidemic already such as flu, HIV/AIDS, STDs, TB, dentistry and antenatal services. These facilities spoke a similar language in whichever region of the country it was in, though they completely disregard local demographics but to the most part offer an invaluable service to the community. In this regard, the facility reaches a social compromise.

6.3.1.2 Architectural Failure

The same facility will be highly in demand and heavily used but this does not interpret as an architectural success. There is a need and the building satisfies the most basic element of this need. Architecturally the building fails. A holistic approach in design is needed, one which considers all elements involved for the benefit of human health and well-being.

A responsive approach would be a design which considers the overpopulated townships and allows for open and voluminous spaces which will in turn allow for the building to breathe on those early heavily congested mornings. People in townships are very much community based and socially involved, as this is evident on how much they rely on each other in daily life borrowing and lending of salt etc., coming together during cultural and ceremonial celebrations, and lead religiously orientated lives. A responsive design considers these elements of the community and as a public building; it will create spaces which promote social interaction as is beneficial for human well-being. Such a facility becomes a point of reference in a community; this extends the buildings use and heightens its importance. The building

becomes a precinct of communal activities which promote well-being. A standard healthcare facility may become a social fitness club, educational facility or economic hub.

A responsive design will consider how different regions consist of different people who act differently from other regions; it will consider the differences in identity, character and climate therefore there should be a significant difference in the design of the building from one region to another. Critical regionalism is one such concept which aims to aid design in achieving an appropriate contextual response. A design which considers the region may be site specific and orientated for optimum performance; as a public building under heavy utilisation, it will consider the use of tough industrial-performing materials though keeping in mind the importance of humanising the facility to promote human comfort and well-being.

The South African context is plagued by social issues; the design of the facility should have an aim to relieve these regional issues even if they are not directly related to the typology. A design which uses a lot of natural lighting and harvests solar energy will assist in alleviating the burdened power grid, it will also allow for some activities which do not require power to continue without disturbance. Rainwater harvesting will help with the water crisis, allowing for cheaper costs in building services and maintenance and create opportunity to start agricultural activities that could be maintained; this will assist in the economy sector with creating employment and also affordable food for impoverished communities.

6.3.2 Natural Elements

The observed healthcare facilities are now much more open to natural light rather than extensive use of artificial lighting as would be commonly found. This creates warmth the user is familiar with, aiding human comfort and psychological well-being. Natural light can be expressive and it can be controlled by shading devices for premium comfort. Sunlight has a way of making a person feel joyful, happy and hopeful; a valuable characteristic in promoting well-being.

Vegetation is another important aspect considered when designing using the biophilia hypothesis. Trees are often an inspirational source of design in the structure of the building and also offer great views which encourage mental relaxation and meditation. Trees also harbour wild life, from crawling insects to flying birds. This symbolizes life and gives people

hope. Open planning especially within social spaces allow much more breathing room and encourages for planting to be introduced inside of the building. Trees also give life in the literal sense; they are the primary source of clean oxygen. Vegetation extends to edible nutritional foods which are beneficial for human well-being. This concept is captured and celebrated at the Umkhumbane Community Healthcare Centre. Current markets offer unhealthy and unnatural products which often have negative long-term effects. Higher inflation rates in the economy also mean less people would be able to afford food.

These healthcare designs also consider the importance of water in buildings regardless of the fact that water is the single element which is commonly destructive to architectural environments. Success and failure of structure can be assessed on how well it handles water. The designs allow storm water to return to the soil and rainwater harvesting for daily use. Water has incredible healing properties as literature would suggest, practices such as hydrotherapy are based on the same concept. It is used extensively in meditating practices as it offers relaxation and positive aesthetics. Water can symbolise cleanliness and also a significantly organic element which can attain almost any form. Large windows allow visuals to these external natural properties; they create a connection and extension of the outdoors to interior spaces. The Duke Integrative Medicine utilises water in a more asserting way with water features and ponds used in sitting areas.

6.3.3 Materials

Positive natural properties can also be found in construction materials. Natural materials are a healthy and recyclable alternative technology which should be encouraged on a local context. The theory of critical regionalism aims to solve problems by searching for the solution within. The case and precedent studies have responded to context in similar fashion. Design influences can be traced from surrounding areas such as existing architectural languages and social issues, to climate responsive considerations and accessible sustainable materials that can be sourced not far from the facility. Natural materials used for finishes humanize what would else be harsh man-made environments. Recreational outdoor public spaces are vital for sustaining the connection between society and nature.

The use of natural materials reminds people of nature and offers a humanized and comforting feeling. Timber from trees for example can be used extensively as a structural element or for

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furniture and finishes from desks and seats to handrails and flooring. Masonry products are made from the earth, the more pure the finish (exclusion of plaster and paint), the more people perceive it as a part of the earth; sand. These products are also hardwearing and could be used for flooring as could be found in paved areas; they are sustainable and manufactured locally. Glass is another very important material in that it allows people to connect visually to the outside world; the people, objects, nature and the climate. Glass makes it possible for people to feel safe and secure in an enclosed environment whilst being connected to the external. Steel is becoming a prominent material in the construction of public buildings. The use of this material symbolises a paradigm shift and also showcases technological advancements in the building industry. It is a very flexible material which allows for easy manipulation by the designer creating larger open spaces to support larger populations and explicit expression of identity.

6.3.4   Quality of Space

Societies should encourage each other to plant and recycle to create beneficial spaces such as the case and precedent studies in review to the extent that it becomes a lifestyle to co-exist in such an ecosystem. Such community activities are the basis of unity creation and social interaction. Good social relationships contribute to positive health; in addition, a united community creates better living conditions especially for the young and elderly who require much support on a daily. Similar initiatives should be encouraged to bring people together for a good cause.

Similarly designers should be aware that creating a good quality of space requires a holistic contribution from different things. The design of the facility; the depth and degrees of openness, light, levels of interaction, movement of people, interrelation with natural elements and activities in the building all determine quality of space. In essence, such a space presents the opportunity to manifest a positive 'genius loci'.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 CONCLUSION

The dissertation investigated the relationships between architectural environments, benefits within nature and basic human health and well-being. The dissertation also studied negative influences associated to human health from a macro context such as dangers of globalism, urbanism including sprawl right down to the micro issues associated in an individualistic sense such as contributions to sickness, stress and negative well-being.

Based on the outcomes of the research, from the literature review which includes a review of theoretical framework, the case and precedent studies to the analysis and discussions of conducted field research from those who participated in questionnaires and interviews; the valuable contributions are a basis for the formulation of an architectural framework which aids professionals in sustainable planning or designing better buildings.

The issue of health is one which is broad and coexists in many fields as pointed out in the literature review. Planners are in such a position that it is vital for them to know a little about all fields hence architects. On any one project, an architect would have to consider the workings of various consultants; this requires the architect to know *enough* about another discipline to make good and responsible choices to achieve an end product which comprises multiple systems but working as single unit; a building.

7.2 RECOMMENDATIONS

Findings dictate that an approach to solve this issue would be an inverted pyramid method with the macro scale effects resulting in micro scale resolution. The change should start at a global or very regional level. Planners need to employ this architectural principle on a grand scale in the following manner:

7.2.1 Macro Context Planning

- Planning needs to consider issues of urbanism such as sprawl and its effects. When this phenomenon is considered at this level and provisions are set to deal with the problem when it arises, it reduces the impact of these negative effects.
- Literature and research often offers precedent on numerous methods to deal with such problems. Planners should invest in knowledge and remaining up-to-date with current

times thus familiarising themselves with current issues and also cutting edge solutions. Although not a recent study but the *Garden Cities* of Ebenezer Howard is one such example that could be employed in regional planning.

- Organized cities manifest organised, sustainable communities and impacting positively on the individuals amongst societies. A city which considers the communities needs such as the need of employment; services within reach of community members thus limiting the need to commute reducing air pollution; community-centred developments which create safer neighbourhoods; and sustainable, environmentally balanced and humanized living are good for well-being.

This collective effort will be echoed onto the micro scale where architects generally dictate at a significantly intimate level, the relationship between the people and their environment. This is where the user of a space will feel or encounter a substantial difference on how the environment impacts on their daily lives. There are a number of contributing factors which the architect has to deal with which is highly possible may affect the design, including the client's desires or brief, the local town planning regulations and financial constraints. It is the responsibility of the professional to consider all these factors when designing and also to inform, educate and advise the client on the benefits of critical design. Architectural consideration should be the following:

7.2.2 Design with Context

- Designers should consider the historical, cultural and social implications of that particular region. Identity is an important and sensitive aspect of people's lives.
- An alien language causes confusion, frustration and even failure whilst a common language is recognisable and understandable.
- People-orientated design should always remain the ultimate objective. This would result in more humanized environments such as softer street edges and stimulating social spaces.
- It is important to consider climatic and topographical response. This together with building materials may determine the success or failure of the building.

7.2.3 Sustainable Design

- Using low-cost, self-sustaining and local building materials

- Incorporating nature promotes the benefits which have been discussed under the literature review section and it also benefits the ecosystem as much damage has been done to it.

- Mixed use development provides opportunities for social interaction, economic development, positive livelihood and a pursuit of well-being in a holistic sense.

- Redefine the typology of healthcare facilities in a manner that has been displayed in the case and precedent study. As much as it is different from the cool, clinical and sterile character, people are still able to identify and relate to it.

7.2.4 Biophilia Hypothesis

- Natural ventilation allows fresh air to circulate the building.

- Cross-ventilation should be encouraged as it is a sustainable and efficient way to economically ventilate a building.

- Ventilation should be controlled by users as this would allow them to regulate comfort levels.

- Designers should understand the working dynamics of elements e.g. using air displacement and having air vents or chimneys for hot air to escape.

- Natural light in buildings provide warmth and an efficient power saving way to light up spaces.

- Considerations should be made for glare and heat gain in buildings. Careful planning would allow heat to be kept out in summer and filtered through in winter.

- Indirect / reflected lighting produces good visual comfort levels.

- Trees are a natural source of shade in the harsh sun and also produce clean oxygen in a world filled with vehicles; the primary cause of carbon dioxide.

- Creating green spaces encourages social interaction and recreation and is beneficial to human well-being.

- Greenery softens up hard edges especially in cities; they offer a place to escape the busy hustling and bustling urban life filled with demands.

- Introduce the outdoors into interior spaces.

- Wood creates warm and subtle interior environments. Considerations should be placed upon materials used for finishes.

- The use of water as features creates different atmospheres and appeals to different moods and feelings.

- Water has healing properties and offer a tranquil sense as it is used in meditation practices.

- Rainwater can be harvested to be used for maintenance purposes or other reasons such as sanitary or planting. This is also an economical and sustainable practice.

7.2.5 Schedule of Accommodation

Above all, the standard functions of a healthcare typology needs to be addressed. To think of healthcare and well-being in singularity as medicinal components would be too far shortcoming. Healthcare facilities need to be thought of as belonging to communities and not just the sickly members. Well-being needs to be adopted as a lifestyle if creating sustainable healthy futures is to materialize. Literature review, including case and precedent studies suggest that numerous activities and functions should be included in the schedule of accommodation of a community healthcare facility in light of the standard practices. Below is a suggested schedule of these activities:

Table 6*: Proposed activities to be included in Schedule of Accommodation.*

(Source: Author, 2014)

Community Economic Development
Urban farming – production of natural vegetables and fruits
Entrepreneurial opportunities – informal roadside trading
Incorporation of traditional local traditional healers
Small rental spaces for public use offers self-sustaining of the facility
Social Community Programmes
Multi-purpose use space – religious practices or community meetings can be held here
Community gym promotes healthy living; it can be run by a local community member

Community garden creates spaces which allow social interaction and meditation
Child care programmes for working parents
Alternative Treatment – Preventative Programmes
Learning Classes – Nutrition, diet and lifestyle
Library / Media research space

In conclusion, the environment has a tremendous impact on a person's well-being be it on a conscious or subconscious level. Together with architecture, these environments foster healthier medical care facilities which promote well-being as buildings are an integral part of health and human existence. Biophilia is a plausible theory to employ in designing healthcare, community architecture and the built environment as a whole. There is a need for a different, pro-active approach in designing healthcare facilities to replace the current dilapidated systems especially in a developing country like South Africa. This would mark an era of healing and rebuilding a healthier future.

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APPENDIX A

RESEARCH QUESTIONNAIRE

This research questionnaire form complies with the Code of Conduct for Research; Research Ethics Policy V; School Committee for Research Ethics under the Combined Proposal and Ethical Clearance (HSF.14).

(*)Please complete the relevant questionnaire between D, E or F

SECTIONS IN THIS FORM	
Section A: Researcher's Details	**Section B: Disclaimer**
Section C: Cover Letter	***Section D: Built Environment Professionals' Questionnaire**
***Section E: Medical Professionals' Questionnaire**	***Section F: General Questionnaire**

SECTION A

RESEARCHER'S DETAILS					
Title	Mr	**Surname**	Mngoma	**Name**	Talente Khayelihle
Researcher's email	tkmngoma@gmail.com		**Student no.**	206507552	
Degree	Master in Architecture		**Contact**	+27 78 115 1126	
Project	ARCHITECTURAL ENVIRONMENTS AS A TOOL FOR THE PROMOTION OF WELL-BEING: The Design of a Community Healthcare Facility for Durban				
Supervisor's Details					
Title	Mr	**Surname**	Ogunsanya	**Name**	Lawrence
Supervisor's email	Ogunsanya@ukzn.ac.za		**Contact**	+27 31 260 2050	
Qualifications	BSc Arch (OAU lfe)	BArch Adv. (UKZN)	MHousing (UKZN)		Pr.Arch (SACAP)

SECTION B

Disclaimer

The research herein may or may not be utilized or form part of the dissertation, ARCHITECTURAL ENVIRONMENTS AS A TOOL FOR THE PROMOTION OF WELL-BEING: The Design of a Community Healthcare Facility for Durban. Which will be submitted in fulfilment of the requirements for the degree of Master of Architecture, in the Graduate Programme in Architecture, University of KwaZulu-Natal, Durban, South Africa.

Confidentiality

The researcher:-
   a) shall treat all Confidential Information belonging to the other party as confidential and safeguard it accordingly; and
   b) shall not disclose any Confidential Information belonging to the other party to any other person without the prior written consent of the other party, except to such persons and to such extent as may be necessary for the performance of the Agreement or except where disclosure is otherwise expressly permitted by the provisions of the Agreement.

SECTION C

The School of Built Environment and Development
Studies Architecture Programme
University of KwaZulu-Natal
Durban, South Africa

1 May 2014

RE: Research for Masters of Architecture Dissertation

To Whom It May Concern,

I, Khayelihle Mngoma, a Master in Architecture (MArch) student at the University of KwaZulu-Natal, am undertaking a research project to determine how architectural environments can be used as a tool for the promotion of well-being with the ultimate objective of proposing a design of new healthcare institute for Durban.

Dissertation topic: ARCHITECTURAL ENVIRONMENTS AS A TOOL FOR THE PROMOTION OF WELL-BEING: The Design of a Community Healthcare Facility for Durban.

To this end I kindly request that you complete the following short questionnaire regarding your knowledge and experiences to the following questions. It should take no longer than 10 minutes of your time. Your response is of the utmost importance to the research.

Please do not enter your name or contact details on the questionnaire. It remains anonymous.

Kindly return the completed questionnaire via email by **9 May 2014**. Summary results of this research will be published for the Barrie Biermann Architecture Library in 2015.

Should you have any queries or comments regarding this survey, you are welcome to contact me telephonically at 078 115 1126 or e-mail me at tkmngoma@gmail.com.

Yours sincerely

Khayelihle Mngoma

SECTION D

BUILT ENVIRONMENT PROFESSIONALS' QUESTIONNAIRE

Answer all questions honestly in full to to the best of your ability. The reviewer will base their analysis and conclusions on the information provided on this questionnaire form. Incomplete questionnaires cannot be evaluated fairly. There is no right or wrong answer. All answers should be typed in bold.

SECTION 1				
Profession				
Qualifications & registry body				
Experience	0 – 5 years ☐	5 – 15 years ☐	15 – 25 years ☐	+25 years ☐

SECTION 2
2.1 Which project did you work on?
2.2 Briefly explain the cultural, historical and social setting of the project?
2.3 How did the design incorporate these characteristics in a healing institute?
2.4 Were there any significant theories for *therapeutic environments* employed in the design process? If yes, which theories were used, why and how were they implemented?

2.5 Do you think nature plays a pivotal role in aiding basic human health benefits and well-being? If yes, explain.	☐ Yes	☐ No

2.6 Current basic healthcare facilities project themselves as places of healing rather than prevention. What do you think would constitute a place for disease prevention and promotion of healthy living?

2014/1		Reference:	

SECTION E

MEDICAL PROFESSIONALS' QUESTIONNAIRE

Answer all questions honestly in full to to the best of your ability. The reviewer will base their analysis and conclusions on the information provided on this questionnaire form. Incomplete questionnaires cannot be evaluated fairly. There is no right or wrong answer. All answers should be typed in bold.

SECTION 1					
Profession					
Qualifications & registry body					
Experience	0 – 5 years ☐	5 – 15 years ☐	15 – 25 years ☐	+25 years ☐	

SECTION 2
1. What sicknesses do you commonly deal with or encounter on a daily basis?
2. Current healthcare facilities project themselves as places of healing rather than prevention. What do you think would constitute a place for disease prevention and promotion of healthy living?
3. As a medical professional, briefly explain how you would improve the typology of basic healthcare facilities having witnessed the success and failures of existing institutions?
4. What is the most common challenge a person faces when accessing medical assistance? Which group / class of people would you say require medical assistance most?

5. Do you think nature plays a pivotal role in aiding basic human health benefits and well-being? If yes, explain.	☐ Yes	☐ No

6. What natural characteristics have been incorporated in existing basic healthcare facilities you have encountered? List any you can remember. (Natural sunlight, ventilation, vegetation, water, in habitable spaces)

SECTION F

GENERAL QUESTIONNAIRE

Answer all questions honestly in full to to the best of your ability. The reviewer will base their analysis and conclusions on the information provided on this questionnaire form. Incomplete questionnaires cannot be evaluated fairly. There is no right or wrong answer. All answers should be typed in bold.

SECTION 1				
1. Do you utilize basic healthcare facilities often, at least once a month?	☐	Yes	☐	No
2. Did you find that your stay in a healthcare facility was pleasant experience?	☐	Yes	☐	No
3. Would you say that the ward was in a state of good repair and clean?	☐	Yes	☐	No
4. From your observation would you say it is often full or acceptable?	☐	Full	☐	Okay
5. Did you have easy access to an outdoor garden from the inside spaces?	☐	Yes	☐	No
6. Did you feel safe during your stay at the healthcare facility?	☐	Yes	☐	No
7. Do you feel better or worse whenever you walk into a basic healthcare facility?	☐	Better	☐	Worse

SECTION 2
8. What is the fondest memory you have of being in nature? Briefly explain?
9. What effect if any did this encounter have on you?
10. Do you feel experiences such as these are beneficial for human health; mentally and physically? In what way and why?
11. What is the most common challenge a person faces when accessing medical assistance? Which group / class of people would you say require medical assistance most?
12. Have you had any bad experiences of nature (violent storms, floods, fires, dangerous animals)?
13. Do you think nature experiences are in any way beneficial for people that live in city environments? In what way and why?

APPENDIX B

CASE STUDY RESEARCH

QUESTIONNAIRE

This research questionnaire form complies with the Code of Conduct for Research; Research Ethics Policy V; School Committee for Research Ethics under the Combined Proposal and Ethical Clearance (HSF.14).

SECTION A

PARTICIPANT'S DETAILS					
Date		Ref. No.		Age	
Local Resident	☐ Yes	☐ No	Medical Aid	☐ Yes	☐ No

SECTION B

Disclaimer

Answer all questions honestly in full to to the best of your ability. The reviewer will base their analysis and conclusions on the information provided on this questionnaire form. Incomplete questionnaires cannot be evaluated fairly. There is no right or wrong answer. Questionnaire will be conducted and all answers will be recorded on an electronic device.

The research herein may or may not be utilized or form part of the dissertation, ARCHITECTURAL ENVIRONMENTS AS A TOOL FOR THE PROMOTION OF WELL-BEING: The Design of a Community Healthcare Facility for Durban. Which will be submitted in fulfilment of the requirements for the degree of Master of Architecture, in the Graduate Programme in Architecture, University of KwaZulu-Natal, Durban, South Africa.

Confidentiality
The researcher:-
   c)   shall treat all Confidential Information belonging to the other party as confidential and safeguard it accordingly; and
   d)   shall not disclose any Confidential Information belonging to the other party to any other person without the prior written consent of the other party, except to such persons and to such extent as may be necessary for the performance of the Agreement or except where disclosure is otherwise expressly permitted by the provisions of the Agreement.

SECTION C

1. Do you utilize this basic healthcare facility often? Please approximate.

2. Did you find that your stay was a pleasant experience? Briefly explain.

3. Would you say that the ward was in a state of good repair and clean?

4. From your observation would you say it is often full or acceptable?

5. Did you have easy access to an outdoor garden from the inside spaces, physically or visually?

6. Also, briefly describe the ff.: Thermal comfort? Ventilation? Lighting?

7. Do you think nature is important? What is the relevance of nature to humans?

8. Do you think nature is beneficial for human health; mentally and physically? If yes, in what way and why?

9. Did you feel safe during your stay at the healthcare facility?

10. Do you feel better or worse whenever you walk into this facility?

11. What is the most common challenge a person faces when accessing medical assistance?

12. Finally, what is your overall opinion of the building?

Thank you for your cooperation☺.

Regards,

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