ABSTRACT

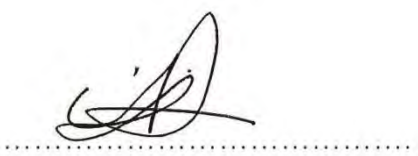
The purpose of this research document is to determine an appropriate architectural approach for the design of an UNAIDS Research Institute, in Valley of a Thousand Hills, Bothas Hill, KZN. Medical research is essential in the pursuit to discover new diagnostic procedures and treatment to advance the quality of people‘s lives. Biomedical research has always dominated the South African medical practice and pharmaceuticals although other medicinal systems such as traditional medicine practice existed first in the country (WHO 2001).

After being demoralized and being inferior to biomedicine for a long time, in 2008 10th of July, the Department of Health (DoH) presented a draft policy to institutionalize African traditional medicine in the healthcare system of the country (DoH 2008). Since then, the main challenge that is facing both traditional medicine and biomedicine practices has been the HIV/AIDS epidemic. Furthermore, up to 90% of people living with HIV/AIDS consult traditional health practitioners first before visiting biomedical practitioners (Morris 2001). The South African Medical Research Council (MRC SA)‘s concern regarding several uncertified traditional medicine products on the market has led them to propose the validation of the traditional medicines using sound scientific methods acceptable to international standards through their Indigenous Knowledge Systems of Health Lead Programme (IKS Lead Programme) (MRC SA 2013) .

Consequently, this research‘s aim is to study the processes and environment for traditional medicine and biomedicine research in order to integrate them in one built-form for further investigation. Additionally, this research investigates the design tools for suitable built-environment approaches through the exploration of the theories of Biophilia, Genius loci and Critical Regionalism with the aim of creating built-form that respects its environment, improves user‘s wellbeing and enhances the research of both traditional medicine and biomedicine. Furthermore this research studies the existing research facilities precedents based on chosen theories principles. Finally, this research studies the local case studies that facilitate traditional medicine preparation in non-scientific method: KwaZihlahla Zemithi Pharmacy, scientific traditional medicine research: UKZN Traditional Medicine Laboratory and strictly biomedical research K- Rith Tower Building.

DECLARATION

I declare that this dissertation is my own, unaided work and carried out exclusively by me under the supervision of J.T. Ojo-Aromokudu. It is being submitted for the degree of Master in Architecture in the University of KwaZulu-Natal. It has not been submitted before for any degree or examination in any other University.



Linda M P Danisa

30th of October 2014

DEDICATION

This thesis is dedicated to my late mother, Mrs Khethiwe Mildred Danisa who was passionately involved in HIV/AIDS research and information campaign in the early 90s. She taught me to persevere and prepared me to overcome obstacles with faith and humility. She will always be a constant source of inspiration in my life. Although she is not around to give me strength and support I always feel her presence that used to urge me to strive to achieve my goals in life.

I extend my dedication to the two late architects who encouraged me to keep pushing when I was on the edge of giving up: Mpho Selepe and Mohammed Seedat. It is of great sadness that you are not around to see the end of what we started together.

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I am deeply thankful to my supervisor J.T. Ojo-Aromokudu for her professional assistance. I express my most sincere gratitude for her time spent providing direction to this document.

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I owe also a great deal to my mentor Bonani Shange for his support in my career.

My warmest appreciation goes to my siblings Sane, Da, Zo and Mlu. You remain my inspiration to work harder. Special thanks to Mlu, Sane and Belle Lempe your financial help has assisted in overcoming the challenges throughout my studies. Therefore I am dedicating this dissertation to you.

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CONCEPTUAL DEFINITION

Inyanga	:	(In IsiZulu language) a traditional healer specializing in herbs. Also known as a traditional doctor or an herbalist. (Plural: izinyanga).
Isangoma	:	(In IsiZulu language) A spiritual diviner or psychic, also a diagnostician. (Plural: izangoma).
Materia medica	:	(In Latin) The body of remedial substances used in the practice of medicine.
Traditional medicine	:	(In this study) Health practices incorporating plant, animal and mineral-based medicines and other natural resources. Natural medicine. Zulu name : muthi
Ubuntu	:	(In IsiZulu language) A quality that includes the essential human virtues; compassion and humanity.
Biomedicine	:	(In this study) refers to the broad category of medical practice that is sometimes called Western medicine, scientific medicine or modern medicine.
Indigenous Knowledge Systems	:	(In this study) Complex set of traditional healing knowledge, skills and technologies existing and developed in South Africa.
Ukubhema	:	(In IsiZulu language) Inhalation of powdered medicine in its dry form.
Ukuchatha	:	(In IsiZulu language) The use of enemas to inject traditional medicine into a patient‘s stomach.
Ukugcaba	:	(In IsiZulu language) Incising followed by rubbing of traditional medication into the incision.
Ukugquma	:	Steaming, whereby a patient inhale traditional medicine mixed in boiling hot water covered with a blanket.

ABBREVIATIONS USED IN STUDY

AA	:	Architecture Australia
AIDS	:	Acquired immune deficiency syndrome
ARVS	:	Antiretrovirals
CSIR	:	Council for Scientific and Industrial Research
CAPRISA	:	Centre For The AIDS Programme of Research in South Africa
DoH	:	Department of Health in South Africa
DST	:	Department of Science and Technology
IKS	:	Indigenous Knowledge System
HIV	:	Human immunodeficiency virus
HSRC	:	Human Sciences Research Council
KZN		KwaZulu-Natal
MRC SA	:	Medical Research Council of South Africa
SATMRG	:	South African Traditional Medicines Research Group
TAC		Treatment Action Campaign
TM	:	Traditional Medicine
THPC	:	Traditional Health Practitioners' Council
THO	:	Traditional Healers Organization
WHO	:	World Health Organisation
UNAIDS	:	The Joint United Nations Programme on HIV and Aids
UKZN	:	University of KwaZulu-Natal

CHAPTER ONE

1.0 INTRODUCTION

"European solutions won't solve African problems, Africans need African solutions to African problems or back to slavery we go." – Dr. Henrik Clarke

The World Health Organization (WHO), UNAIDS, MRC SA and other writings indicate that 80% of South Africans utilize and rely on traditional medicine for their health care needs (Pretorius 1999; Morris 2001; Makhathini 2003; Gqaleni 2011; PCH 2009, WHO 2002 - 2005). WHO defines Traditional medicine as "the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement, or treatment of physical and mental illness" (WHO 2002).

South African traditional medicine is discovered from a rich plant biodiversity of indigenous plants (van Wyk, van Oudtshoorna & Gerucke 1997). Therefore development of traditional medicine implies utilizing the country's local resources. Furthermore it is estimated that 70% of South Africans consult one of the 200 000 Traditional Healers (*Izinyanga*) in the country (MRC 2007), however very few Traditional Healers' medicine have been appropriately investigated (DoH 2009). It is therefore impossible to know which ones have a potential of promoting health and what interactions they may have with other conventional medicines such as biomedical drugs (DoH 2009). For these reasons, the government has collaborated with MRC SA and the Council for Scientific and Industrial Research (CSIR) to evaluate traditional medicines (MRC SA 2012).

WHO and MRC SA's concern in regards to the use of traditional medicine is its serious patients' safety threats due to contaminated herbal products in the markets (WHO 2002). Although WHO and UNAIDS support and encourage the use of traditional medicine, they have however set objectives to ensure the safety, efficacy and quality of the traditional medicine (WHO 2002, UNAIDS 2012). In addition, it has also been observed that the majority of people use traditional medicine and biomedicine treatments simultaneously without knowing if these two different remedies complement each other (Gqaleni 2011).

Moreover a study released in 2005 revealed that two widely used traditional medicines –the African potato and the Sutherlandia plant decrease the efficacy of ARV medicines significantly, leading to possible treatment failure, viral resistance or drug toxicity" (Hassin, Heywood & Berger 2007). There is therefore a need for a scientific medical investigation on the impact of simultaneously consuming traditional medicine and biomedicine treatment together

In the journal –AIDS dependency crisis: Sourcing African solutions", UNAIDS raises its concerns regarding South Africa's dependency on foreign countries pharmaceuticals in destabilizing the AIDS impacts (UNAIDS 2012). Additionally South Africa has experienced a battle against all evidence-based medicine especially antiretroviral medicines (TAC 2010). The campaign's (Treatment Action Campaign v. Matthias Rath case) opinion was that all western medicines, including ARVs, are –part of a global conspiracy by multinational pharmaceutical companies to profit from ill health" (TAC 2010). South Africa ranks first in HIV incidence in the world and about two million out of 6.4 million people were on ARVs in 2012 (HSRC 2014). This demonstrates the amount of money the country spends on foreign pharmaceuticals companies importing drugs and the number will increase in future since HSRC's 2014 study shows that the number of new HIV infections is increasing (HSRC 2014). Increased research in traditional medicine alongside biomedicine will be the first step, in order to reduce importation of drugs and ensure safe use of local traditional medicine.

The resolution to finding keys that would initiate research into traditional medicine is firstly by studying the existing successful informal traditional medicine environments. These environments include traditional healers' spaces that accommodate traditional medicine and the environments where herbs are harvested. Secondly, studying the processes involved in discovering curative traditional medicine and their special requirements. Understanding the environments and processes involved in discovering traditional medicine mainly herbs would lead to understanding the appropriate spatial and tectonic contests of a formalized traditional medicine research built-form.

1.1 MOTIVATION/JUSTIFICATION OF THE STUDY

There is a need for joint investigation into traditional medicine and biomedicine research processes and their environments in order to incorporate the two into one built-form research facility. This would lead to the discovery of the remedies that complement each other since it has been observed that the majority of patients use both medicines simultaneously. The success in discovering and improving local herbs with curative potential would result in local production of drugs thus minimizing imports from international pharmaceutical companies.

1.2 DEFINITION OF THE PROBLEM, AIMS AND OBJECTIVES

1.2.1 Definition of the Research Problem

The research problem is how best to incorporate the two completely different medical research methods, namely traditional medicine and biomedicine into one built-form. Traditional medicine uses naturally sourced plants, minerals and animal based medicines. Its investigation and discovery takes place in natural environments such as forests, mountains and river banks. However biomedicine research takes place in controlled environments and requires equipment such as isolation units, special equipment stabilization, hazardous waste disposal, bio containment areas, security issues and high tech support systems (AIA 1990). An additional difference is the storage of research findings information, traditional medicine information is mostly disseminated orally while biomedicine information is passed on through recorded documents.

1.2.2 Aims

The aim of this research is to study the research processes and environments for both traditional medicine and biomedicine in order to incorporate their research in one built-form.

1.2.3 Objectives

- The objective of this research is to integrate natural (traditional medicine) and man-made (biomedicine) research environments.
- Incorporate tangible (biomedicine) and intangible (traditional medicine) aspects medical research elements.
- Encourage the utilization traditional medicine as a local natural resource.

1.3 SETTING OUT THE SCOPE

1.3.1 Delimitation of the Research Problem

This research recognizes the existence of traditional medicine and biomedicine in South Africa, however while traditional medicine methods are divided into two categories namely: diviner-diagnosticians (*izangoma*) and traditional doctors or herbalists (*izinyanga*), this research's focus is only on *izinyanga* (traditional doctors). Although the goal of this study is to integrate traditional medicine and biomedicine research, this investigation does not include interviewing consumers of these medicines.

1.3.2 Definition of Terms

• **Traditional medicine (TM)** – is a diversity of health practices, approaches, knowledge, and beliefs incorporating plant, animal, and/or mineral-based medicines; spiritual therapies; manual techniques; and exercises, applied singularly or in combination to maintain well-being, as well as to treat, diagnose, or prevent illness.

• **Biomedicine** – refers to the broad category of medical practice that is sometimes called Western medicine, biomedicine, scientific medicine, or modern medicine.

• **HIV (Human immunodeficiency virus)** – is a lentivirus (slowly replicating retrovirus) that causes acquired immunodeficiency syndrome (AIDS).

• **UNAIDS (The Joint United Nations Programme on HIV and Aids)** – the main advocated for accelerated, comprehensive and coordinated global action on the HIV/AIDS epidemic is located in Switzerland.

• **Muthi** – Zulu name for traditional medicine

• **CAPRISA (Centre for the AIDS Programme of Research in South Africa)** - is a designated UNAIDS Collaborating Centre for HIV Prevention Research located in Nelson R Mandela School of Medicine, University of KwaZulu-Natal.

• **Sustainable building** – refers to a structure and using process that is environmentally responsible and resource-efficient throughout a building's life-cycle.

• **Inyanga** – A Zulu name for a traditional healer specializing in herbs. Also known as a traditional doctor or an herbalist. (Plural: izinyanga).

1.3.3 Stating the Assumptions

It is assumed that traditional doctors, scientists and research doctors scheduled to be interviewed in this research will participate in the interviews and answer all questions in good conscience, furthermore it is assumed that the research will successfully collect materials important for this investigation such as photographs, drawings and sketches.

1.3.4 Hypothesis

Understanding the contradicting and comparable processes and environmental conditions involved in traditional medicine and biomedicine research will lead to their integration and enhance their research in one built-form.

1.3.5 Key Questions

How can traditional medicine and biomedicine research be integrated in one built-form?

- What are the particular environmental conditions suitable for traditional medicine research?
- What are the particular environmental conditions suitable for biomedicine research?
- How does traditional medicine research processes differ from biomedicine research processes?
- What are the similarities in traditional medicine and biomedicine research?

1.4 RESEARCH METHODOLOGY

During this 21st century a lot has been done in the development of traditional medicine and biomedical research in general. Both biomedicine and traditional medicine are facing new medical challenges that are different from the challenges that were faced by medical practitioners hundred years ago. New diseases, the change in environmental factors such as climate, economy and technology have transformed and affected both traditional medicine and biomedicine working environments and processes. The change in the economy and politics has led to great progress in both traditional medicine and biomedicine environments. There are now formal scientific built-forms that enable traditional medicine research and South Africa has state of the art research facilities. Legalization of traditional medicine has recently drawn professional scientists and research doctors‘ attention to traditional medicine. This study identified Professor Nceba Gqaleni who is a research scientist as a key informant in this investigation, due to his involvement with both traditional medicine and biomedicine sectors which are the main subjects in this document.

1.4.1 Research Materials

This study uses books, journals, databases and internet as research materials. Books on traditional medicine, traditional healing and biomedicine research facilities were identified and studied. The internet was used to search for the latest information on the state of traditional medicine and medical research locally and globally. The internet was the source of journals, databases and websites that discuss biomedical and traditional medicine research state, latest traditional medicine and biomedical research facilities, Indigenous Knowledge Policy and the state of HIV and AIDS research.

1.4.2 Case study

Existing biomedical research facilities around Durban were identified from the internet, books and journals. The case studies were selected around Durban due to easy access and furthermore they are in the same climate and economy as the proposed facility. Research facilities that meet the requirements for the employed concepts and theories were selected. The case studies that accommodate traditional medicine research were identified from an interview with Professor Gqaleni who is the key informant in this research.

Three case studies were selected: Kwazihlahla Zemithi Pharmacy in Umlazi, UKZN Traditional Medicine Laboratory in Howard Collage, Clarence Building and K-Rith Tower Building in UKZN School of Medicine. Each case study facilitates different medical researches that are important to this research namely: traditional medicine investigation, biomedical research and the traditional medicine research in a scientific environment. The attempts to find drawings of the K-Rith Building, a new international HIV/AIDS and TB research centre were unsuccessful since the management does not allow the public to have access to the building‘s drawings for security reasons.

KwaZihlahla Zemithi Pharmacy, Umlazi: This case study was chosen to address the research question on the environmental and processes required for traditional medicine research. This case study was identified by Professor Gqaleni as an appropriate building that facilitates traditional medicine activities.

UKZN Traditional Medicine Laboratory: This is the case study that Professor Gqaleni set up for academic purposes to facilitate research on the safety and efficacy of traditional medicine. This is also the first traditional medicine laboratory in KwaZulu Natal.

This facility brings traditional healers, scientists and research doctors together; therefore it was chosen to address the research question regarding the similarities and differences between traditional medicine and biomedicine research. Furthermore it was chosen to address traditional medicine scientific research processes and environments.

The K-Rith Tower Building: This building is located in UKZN Nelson R. Mandela School of Medicine. It accommodates world-class researches on HIV and TB. The building has been chosen to understand the required environments for a biomedical research facility.

1.4.3 Data collection methods

This study uses both primary and secondary data collection methods. The secondary data information from books and journals on traditional medicine and biomedicine research helped to identify the key informant in this study. Professor Gqaleni was identified as a key informant from his journals on Traditional medicine, Indigenous Knowledge Systems, Traditional healers and health care sectors collaboration against HIV and AIDS. An attempt to make an appointment to interview Professor Gqaleni was made via an email.

In order to address the research questions interviews from two disciplines had to be arranged: interview with traditional medicine knowledge custodians and interview with medical collect first-hand information on both traditional medicine and biomedical research environments and processes. This research outcome will shed the light on how traditional medicine and biomedicine research can be integrated in one built-form.

Primary Data

The first hand data collection focuses on traditional medicine and biomedicine research processes and environments. Tools used for primary data collections include a digital camera for photographs, pen and paper for sketching, observation, existing buildings‘ drawings and published journals for background information and interview sample questions

Secondary Data

Secondary data aims at identifying literature that deals with tradition medicine and biomedicine research in South Africa. This literature included various published texts, books, journals and electronic data.

Precedent study in this research establishes the current architectural trends in medical and scientific research environments. Furthermore, design tools applicable to theories such as biophilia, critical regionalism and semiology have determined precedent studies suitable for this research. The chosen precedent studies will explore the mentioned theories in depth.

1.4.4 Research limitations

This research has encountered limitations in getting access to the drawings for K-Rith building. The photographs showing the fire plan layout were used as an alternative.

1.4.5 Methods employed in the data analysis

Explanation and description will be provided to the methods employed in categorizing responses and the presentation, analyses and interpretation of data. This will be followed by an examination of the responses to the research questions. The hypothesis will be tested in order to achieve the results of the study.

CHAPTER TWO

CONCEPTS AND THEORIES

2.0 Introduction

This section deals with the literature review concerning the conservation of indigenous knowledge systems, architectural approaches that respect the proposed built-form‘s context and the principles for indoor spaces that have a harmonious relationship with nature. The four theories discussed below are Critical Regionalism, Biophilia, Semiology and Genius Loci and one concept Indigenous Knowledge Systems. This conceptual and theoretical framework investigation will inform the design of UNAIDS Research Institute.

2.1 Critical Regionalism

Critical regionalism refers to an architectural approach that pursues to offset the placelessness and absence of local meaning in Modern Architecture by utilizing environmental forces to project a sense of place and local significance. This theory has its philosophy rooted from the phenomenology of a German philosopher and a principal phenomenology founder Edmund Husserl. It was advanced by French theorist Paul Ricour and it has theoretical foundation of an architect Christian Norberg-Schulz‘s "Genius Loci” and –Phenomenology” (Tzonis/Lefaivre 1981).

Alexander Tzonis; a Greek born architect, researcher and author together with Liane Lefaivre; a Professor at the University of Applied Arts in Vienn came up with the term –eritical regionalism” in 1981 but it has been used more notably by Kenneth Frampton; a British architect, critic, historian and the Professor in 1983. Frampton came up with the term –eritical regionalism” to define modern architecture which could neither be known as internationalism nor as an ancient regional and architectural concept (Frampton 1983).

Critical regionalism primarily emphases on the building‘s relationship to its context in a sociological setting instead of dealing with a specific regional style (Frampton 1983). This implies that the proposed UNAIDS Research Institute will have to take consideration of the social setting and the context of the Valley of a 1000 Hills. Frampton, agrees with Tzonis and Lefaivre that architecture should be not be governed by the country‘s feelings of observing its region, history and tradition (Frampton 1983).

Frampton (1983) adds that Critical Regionalism is as a form of post-modern response in the developing countries, therefore this theory fit perfectly into The Valley of a Thousand Hills' context since this area is still under development and the formalized traditional medicine built-forms are nonexistence. Critical Regionalism facilitates the influence of worldwide civilization with features taken circuitously from the uniqueness of a specific space. Already the Valley of a Thousand Hills is currently attracting international tourists because of its landscape uniqueness. The proposed human-made structures need to have the same effect. This proposed research centre needs to favour the way a design deals with the physical landscape's irregularities instead of the way local culture is employed.

According to Frampton (1983), the architect should enter a dialectic relation with nature; furthermore architect should take clues from the topography and avoid flattening the site. This means that the architect would need to enter dialectic relation with the site's mountains, flowing rivers and the valley in the Valley of a Thousand Hills. Critical Regionalism does not need to draw directly from the context but slightly draw components that can be taken from the context and employed in the odd manner instead of familiar (Tzonis & Lefaivre 1981).

Christopher Day (1990) also emphasizes this harmonious relationship between the building and its context when he says that a building should not offend its surrounding. It should be in harmony with the environment, trees, earth and light. Light is important for psychological health, the pituitary gland and the soul. The physiological and aesthetic effects go hand in hand; each space needs to have aesthetics that are associated with their space function. (Day 1990)

Frampton (1983) adds that sometimes Critical Regionalism conserve and ignore employing vernacular style. Furthermore, it tries to find architectural customs that originate from the local environment, therefore bringing about a highly intelligent and appropriate architecture (Frampton 1983). In addition, the theory sensible observes the distinctiveness of the context when developing the proper characteristics of every design (Frampton 1983).

Good example of architecture that follows this theory is work of the Tichino School located in Switzerland, which consist of contemporary Spanish architects‘ refined urban insertions and the Japanese Tadoa Ando‘s work. His design method is contemporary but also depends on the local materials‘ organic unity, climate and traditional individualities to give a coherent finish work (Wu 2006). This is achieved through studying and appreciating local traditions. Regionalism after war years resulted in the design infused with thoughtfulness and sensitivilty to the particulars of local climates, materials, landscapes and building methods (Wu 2006).

Fig. 2.1.1 Tadao Ando‘s Recollection of Venice: Palladian Buildings Reflected in the Pond, Fabrica Benetton Research Centre, Treviso, Italy (1993-1996) http://www.tmja.org.il/Museum/UploadFiles/PGallery/8942306953_Big.jpg (accessed 2014/04/17)

Following Frampton in exploring Critical regionalism was a Finnish architect, teacher and a museum director Juhani Pallasmaa. Pallasmaa combined his great respect for the country of Finland design traditions with the international sophistication he gained from his world travels-(Mallgrave & Goodman 2011). This led him into questioning the contemporary loss of cultural authenticity and the possibility of maintaining a ~~“r~~egional architecture in ~~“p~~ost-modern society” (Pallasmaa 1988). Pallasmaa complained that few modern buildings have emotional appeal. He blamed this failure on the rationalist fixation on formalism in the previous decades (Mallgrave & Goodman 2011).

Like architects Martin Heidegger and Christian Norberg-Schulz, Pallasmaa embraced phenomenology as a way of seeking out a more ~~“a~~uthentic work of art”. This is because phenomenology investigates the deep structure of human reality and thus articulating the metaphors language that can be acknowledged with the society‘s existence. Phenomenology also emphasizes that architecture is predominantly a multisensory experience as it alerts the Valley of a Thousand Hills social‘s mental and physical responsiveness (Pallasmaa 1988). Pallasmaa (1988) pleaded for an architecture that is situational, emotional, relativistic and inclusive of regional sensibilities.

People‘s duty of architecture is not to redecorate or humanize the world but to unwrap a vision into humans‘ consciousness second dimension, images memories reality and dreams (Pallasmaa 1988).

The concept of ―Critical Regionalism" became the main subject in local and modern architecture debate in the 1990s (Peter & Stephanus 2007). Critical regionalism has also been a foundation of a theory to define contemporary architecture in developing worlds during a procedure of looking back at the local and the imported in modern architecture (Peter & Stephanus 2007).
In many countries, critical regionalism was used to re-think the country‘s traditions in process of searching for the values of its local architectural tradition, ideologies and national uniqueness. With this reason this theory will be thoroughly employed in search of an appropriate architectural tradition of the Valley of a Thousand Hills. Critical regionalism process had an influence on modern architecture. It started debates regarding the way in which local architecture should be generated without replicating past fragments (Peter & Stephanus 2007).

2.2 Biophilic Design

During this 21st century, architects are encouraged to join the green movement by using resources wisely and not denigrate the biology of the planet; this resulted in the green movement. One issue that has been missing from the green movement is how people respond to the green built environment. Related to the evidence-based design, the concept of biophilia fulfills the missing piece of puzzle (Mallgrave & Goodman 2011).

In the late 1960s, the fall of the late-modernist worldview also destroyed the belief that architects could improve the human situation in a meaningful way (Mallgrave & Goodman 2011). In the 1960s sociology, anthropology and psychology were not part of architect‘s program of study. But things have since changed in this current 21st century. The architects now have a plenty of new insights into the psychological and physiological nature of the human being (Mallgrave & Goodman 2011).

Studies such as evolutionary psychology and neuroscience are creating compelling evidence-based models of how human beings perceive and experience the world and the implications for architects are diverse (Mallgrave & Goodman 2011). The design interest of architects such as László Moholy-Nagy, Richard Neutra and Christopher Alexander is being supported with new biological findings (Mallgrave & Goodman 2011).

Biophilia is a new evidence-based design principle that has gained traction since the beginning of the new millennium (Mallgrave & Goodman 2011). Biophilia has grown out of the understandings of the evolutionary psychologists and biologists. It is recognizing that the genetic structure by which human beings respond to the world has been existing for million years, than the recent man-made environments. (Barkow, Cosmides & Tooby 1992, Wilson 1975). This is in line with traditional medicine healing that has also existed for million years. Human behavior is not just of will or training phenomenon; it is also of genetic tendencies and behaviors that have long been in place with hominid ancestors (Mallgrave & Goodman 2011).

Similarly to this realization is the increasing number of habitat-selection theories suggesting that human beings have a particular fondness for environmental conditions that in an evolutionary sense have favored human beings‘ biological survival (Appleton 1975, Orians- 1980). Developed countries are now looking at areas like the Valley of a Thousand Hills that are underdeveloped/developing African savannahs‘ special openness, visible ground texture, vegetation and water as an appropriate environment for human beings (Orians 1980).

In the 1980s these assumptions started undergoing testing. The results conveyed that human beings‘ exposure to natural landscape have a variety of notable health benefits. These benefits include stress reduction, blood pressure lowering, improvement in the ability to focus, and gives a brighter outdoor on life (Orians 1980). Creating biophilic working environments for the scientists would mean improving their health and productivity therefore improving the search of better treatment of HIV related infections and finally improving the lives of infected South Africans.

A medical research centre is a built-form that accommodates occupants who work day and nights to find ways of making people‘s health better. It is an appropriate approach to employ biophilic design principles in a design of such a building to ensure that the medical research centre occupants are also in an healthy wellbeing as they are researching for solutions to make other people‘s lives better.

2.3 Genius Loci

Norberg-Schulz says he has never changed his architectural investigations goal and approach but has only changes methods. In his 1963 book 'Intentions in Architecture‘, he says he used 'scientific' analysis, but after that realized that it was illuminating. In his 1971 book 'Existence, space and architecture', he discusses changing his analysis process to 'phenomenology'. This is when he used the philosophy of Heidegger as his point of departure. This is the same philosophy that Frampton used for Critical regionalism.
Christian Norberg-Schulz phenomenological understanding of architecture is based principles of Martin Heidegger (1889–1976) who was a German philosopher. His work is mostly associated with phenomenology and existentialism. He says ~~–t~~he philosophy of Heidegger has been the catalyst” (Norberg-Schulz, 1980, p. 2) in his books.

Norberg-Schulz founds an understanding of phenomenology with reference to architecture and discovering a phenomenology of architecture. He is inspired by Heidegger and this is seen through his usage of Heidegger's terminology for instance 'gathering', dwelling' and 'genius loci' (Norberg-Schulz, 1980, p.5)

Architecture signifies a means to provide humans an 'existential foothold'. Humans cannot achieve a foothold with only scientific understanding. Humans need symbols, in a form of art work. The intention of the work of art is to 'keep' and communicate significances which 'represent life-situations' (Norberg-Schulz, 1980)

The Valley of a Thousand Hills gets its character from the earthy mountains, the blue skies, the green trees, the clay sandy gravel roads and the fresh breeze from Inanda dam. All these things together define an 'environmental character' which is the spirit of place. A place is generally given its environmental character. The genius loci therefore indicate what a thing is or what it should be, the same way the Valley of a Thousand Hills context will determine what the proposed UNAIDS Institute should be. (Norberg-Schulz, 1980).

Christopher Day and Norberg-Schulz look at the place the same way. They come to an agreement that it gets its character from concrete things like material substances, shapes, textures and colour. Norberg-Schulz believes a place is ‗born' with its character. Its genius loci gives it its character. He says space can define a person's identity and that it is crucial that a space has objects that help human's orientate themselves.

Day referrers to what Norberg-Schulz calls ―space" as a ―place for living". He approves a ―space for living" is where life takes place. He then goes as far as explaining how different forms can affect people's behavior in a space. He makes an example of how one of his clients who wanted a restaurant asked him to design kitchen sinks in such a way that workers in the kitchen have a relationship with people sitting in a restaurant to break that wall that obstruct a relationship between customers and workers. However, Norberg-Schulz does not concentrate on the interior of a building. He really does not go as far as describing in details how an interior space should be.

It is understandable that the identity of humans is the product of places and things. Therefore it is important that humans' environment has a spatial configuration which enables orientation and more importantly to contain identification concrete objects (Norberg-Schulz, 1980, p. 45). 'Natural place' means sequences of environmental levels. These environmental levels include macro environmental levels such as continents and countries up to micro environmental levels such as under the trees, top of the mountains, breeze from Inanda dam and the valleys in The Valley of a Thousand Hills. These environmental levels are all determined by earth and sky's the solid properties (Norberg-Schulz, 1980, p. 48)

Man-made environments where humans live are not a consequence of random happenings. They have structures and they symbolize meanings. Furthermore these meanings and structures reflect humans‘ understandings of the natural environment and their general existential situation. Early civilizations architecture may thus be understood as a concretization of nature‘s understanding, defined as things, character, order, light and time. (Norberg-Schulz, 1980, p. 23-40)

Norberg-Schulz (1980) mentions that God-made spaces are natural places. From continents, to a shaded place under a tree. Norberg-Schulz claims man-made environments reflect human‘s understanding of a natural place. Obviously he wrote this book decade ago before urbanism and buildings‘ harm of an environment was less severe as it is today. That is when architects were still doing the right thing, by listening to a place‘s genius loci before they design. Christopher Day believes that a natural place heals. His book is about healing after all. He believes that being in contact with natural place can results in healing from within. The smell, the sound, the taste, the sight and the feeling of these natural elements free humans‘ spirits. ―The natural – given – world is based on conversation. Water is much more than oxygen and hydrogen, rich coastal ecology more than land and water. Few man-made things converse, however, most confront we tend to be better asserters than listeners.”(Day, 1990, p. 67). Day‘s views express all the bad things man-made places have done to the environment, the global warming, ozone layer harm, pollution and traffic etc.

2.4 Indigenous Knowledge Systems

Indigenous knowledge (IK) refers to a culture or society‘s unique indigenous knowledge. IK is different from the global knowledge system that is produced by institutions of higher education, institutions of research and private firms. It is the fundamental for indigenous people‘s resolutions making in farming, medical management, preparation of food, education and a lot other rural communities‘ activities (Warren 1991).

Correspondingly to Warren‘s definition, Department of Science and Technology defines IKS as the Indigenous Knowledge Systems established and preserved by South Africa‘s indigenous peoples encompassing the lives and the beliefs of a large population of a country.

This type of indigenous knowledge establishes itself in cultural, religious, agricultural and health areas (DST 2011). In South Africa, Department of Science and Technology is the organization responsible for implementing IKS policy. Their policy is discussed below.

During apartheid times, IKS in South Africa were suppressed and undermined with its people. This resulted in the misrepresentation of the social, economic and cultural growth of the high population of indigenous people. They would remain poor and disadvantaged if changes had not been implemented now to redress the on-going inequality. Within a community that has been oppressed for centuries exists an undeniable treasure of indigenous knowledge, this knowledge has persisted and grown contained by the defensive boundaries of African people (DST 2011). The protected indigenous knowledge systems include art, religion, theology, music, justice, agriculture and health. Health sector includes the use of traditional medicine (DST 2011).

Since IKS policy has been established in South Africa, it has involved a variety of Government Departments. One example is Department of Arts and Culture that has undertaken sectorial initiatives that inspect the advertising and copyright of indigenous arts and music. Department of Health has developed Traditional Health Practitioners legislation which has launched Traditional Health Practitioners Council regulatory body. Its duty is to regulate South African Traditional healers‘ undertakings. DST has also launched a programme that maintenances research on curative plants in South Africa (DST 2011).

According to DST, there is still a need for a bigger all-inclusive framework of indigenous knowledge systems policy. However an organizing mechanism has been launched already by means of IKS‘s Inter-Departmental Committee managed by DST. The purposes of the established policy framework include functions such as presenting advanced advice to the Government regarding indigenous knowledge matters (DST 2011).

IKS development functions such as research development, recordal system maintenance, networking structures between practitioners, legislature and administration capability to look after indigenous knowledge intellectual property, IKS Fund to assist in categorization and characterization of resources of biology, inventions, practices, skills and proper system for recording indigenous systems (DST 2011).

In South Africa, the Indigenous Knowledge Systems Policy assists structure to encourage and support the indigenous knowledge contribution to economic and social growth (DST 2011).

The main IKS Policy enthusiasms in South African include: encouraging an optimistic African identity by means of verification of African cultural principles within globalization, applied processes for developing services provided by IK holders and practitioners, supporting indigenous knowledge economy contribution by means of employment creation and by what this thesis is trying to accomplish that is integrating indigenous knowledge with modern biotechnology to raise innovation rate (DST 2011).

The IKS policy emphasizes the importance to set up information and research infrastructure for indigenous knowledge systems to get global approval. This must be done through establishing applicable regulating mechanisms that will advance the conduct procedures and codes in documenting and utilization of IKS resources. Indigenous knowledge systems such as traditional medicine need to be documented so that it can be kept in the appropriate cataloguing in the International Patent Classification database, so that it can researched, recovered and protected easily (DST 2011).

One of Indigenous Knowledge Systems policy‘s objections is to document IK information and erect research infrastructures. This would enable IK information to be easily accessible worldwide therefore enabling it to be researched in a broader scope. Documentation, information and research on indigenous knowledge can be achieved through proposing databases, museums, libraries, IK oral forms, centers and laboratories (DST 2011). These implementations are further discussed below.

IK database need to be coordinated with other international systems to enable cross-referencing in order to assist in providing and enhancing its innovation capacity.
Furthermore, the database would link indigenous and other knowledge systems which are widely scattered and thus made available from retrievable form (DST 2011).

Libraries are important for IK research. Constantly maintained and updated technical libraries would be an important source for research workers and technologists. Libraries promote an understanding of indigenous subjects, culture and IK issues. This can be done through proper displays, exhibitions and tours showcasing the IK.
A new library model is needed to facilitate indigenous and local community information; it would also create opportunities for indigenous people to record and also share their culture, history and indigenous knowledge with other cultures (DST 2011).

IK museums are required to fulfill investigation in the taxonomic and forensic sciences. Local museums can be useful in raising indigenous knowledge public awareness. Museums would also allow international people access into local IK research (DST 2011).

Department of Health has established a policy to be followed by researchers doing traditional medicine research. The policy encourages the researchers to respect communities‘ cultural and traditional values. DoH states that people involved in indigenous health systems investigations must get the same respect and harm protection as participants involved in scientific medical research. Research involving indigenous knowledge systems must also be presented to a certified health research ethics committee for ethics review. Toxic hazardousness of substances used on research participants must be sufficiently evaluated (DoH 2006).

CHAPTER THREE

LITERATURE REVIEW

3.0 INTRODUCTION

The purpose of this section is to elaborate on traditional medicine and biomedicine research points that were brought up in the first chapter. Additionally, it is to give emphasis on the current state of traditional medicine and biomedicine research. This chapter aims to review some of the relevant published material on the topic of traditional medicine and biomedicine research. The theories and concepts that were briefly discussed in the first chapter will be used as basis for these discussions. Therefore these discussions will be laid on these four pillars: Indigenous Knowledge Systems, environment, culture and biophilia.

3.1.0 TRADITIONAL MEDICINE AND CULTURAL PHILOSOPHY

Traditional medicine usage is traced back to the bible stories. ―…there will grow all kinds of trees for food…Their fruit will be food and their leaves for healing." (Ezekiel, 47.12) This enforces that the tradition of herbal medicine healing has been part of humankind way before the invention of scientific healing methods. In Ancient Egypt, Greece and Rome a well-developed system of agriculture, a healthy diet and physicians were used as an extensive herbal *meteria medica* (Currie 2007). Medicine has always been the wisdom of understanding the human body and the universe. Later is has been proven that the nature in the universe has a positive impacts in humans' wellbeing. This positive impact has lately been referred to as biophilic effect.

Different cultures have different philosophical approach to traditional medicine. In order to understand and analyze health and illness in a society, it is important to place each being's behaviors, interactions and social structures within a cultural context (Loustaunau & Sobo 1997). Countries like South Africa with diverse cultures have different philosophical approach to medicine and health. Traditional medicine is generally associated with African people in South Africa. However other South African cultures such as Indians and Chinese do use their own traditional medicine which is influenced by their own culture (Hassim, Heywood & Berger 2007). Department of Health (2008) states that African culture is grounded on the philosophy of the spirit of *Ubuntu*.

There have been researches and written documents on traditional medicine knowledge. Professor Robert Thornton (2009) a professor of Anthropology at the University of the Witwatersrand, Johannesburg has done some research and writings on traditional medicine. He manages field research on medical anthropology and traditional healers in eastern Mpumalanga Province, South Africa, (Thornton 2009).

Professor Thornton states that the users and practitioners of traditional medicine consist of all races, which means that the mentality of associating traditional medicine with certain races is flawed. Thornton (2009) adds that traditional medicine contains mixture of herbs such as such as leaves, bark, seeds, roots, bracts, and animals‘ body parts. Different types of *muthi* may be prepared from the same plant by harvesting that plant in different environments (night or day, wet or dry areas, hillsides or valleys) or in different growth stages. He adds that most of the time a healer would dream of which herb to use for treatment from a variety plants. Chavunduka (1994) agrees with him that an individual would visualize accurate medicine to cure a sick person and would be shown the place in the forest where he can pick up the medicine (Chavunduka 1994, Thornton 2009).

This implies that sometimes discovery processes of traditional medicine involve forces beyond humans‘ understanding and powers beyond the philosopher Martin Heidegger's existential phenomenology. Unlike biomedical research one can conclude that traditional medicine does not get researched but get discovered because the research processes take place where no human eye can see. It gets introduced to a traditional healer when it has already been proven to be curative by unseen forces that are ancestors. However traditional medicine still needs to be investigated for safely, efficacy and its interaction with other medicines in order for it to be recognized globally

People who have the knowledge for traditional medicine are *Izinyanga* (herbalists/traditional healers). They are ordinary people who develop a wide knowledge of magical skills and without possessing occult powers (Thornton 2009). They prescribe and diagnose traditional medicines for ailments and illnesses (Thornton 2009). Good memory is critical for traditional medicine, since traditional medicine preparations procedures are not documented; a traditional healers needs to remember their medicine dosage and preparations by heart.

Traditional medicine is kept in large collection of unlabeled bottles of *muthi* (Thornton 2009). The herbs _speak' to a genuine healer hence the labeling of *muthi* bottles is unnecessary to a true healer (Thornton 2009). It is possible that the traditional healers observe the colour and the thickness of the medicine mixture in order to tell if they have used the correct dose of herbs. Observation and concentration are also critical in the preparation of traditional medicine, once a tradition healer has been shown a herb in a dream, they have to remember it exactly as it was in that dream in order to go out and identify it in the bushes (Thornton 2009).

Thornton adds that *muthi* is not used as pharmacological agent; it is however used for steaming, smoke baths, inhaled, rubbed or worn as good luck charm. Additionally *muthi* can either be ingested by the use of mouth, vagina, anus via enemas, or through small skin cuts (Thornton 2009). The information on how traditional medicine is ingested is important for understanding suitable environments for trials in a built form accommodating traditional medicine. There are several treatment methods used by traditional doctors in the administration of herbal medications. Edwards (1986) identified following treatment methods:

- Sucking medication from fingertips – *ukuncinda.*
- Inhaling powdered medicine such as snuff – *ukubhema*.
- Vomiting – *ukuphalaza*.
- Rubbing medication into incisions – *ukugcaba*.
- Steaming a body – (*ukugquma)*.
- Use of enemas– *ukuchatha.*
- Use of fomenting medicine – *ukuthoba.*
- Burning of incense.
- Using of amulets manufactured from animal skin to protect against evil spirits.

Muthi is classified by colour, gender, plant's age during harvesting, time and conditions of collection (Thornton 2009). The time of the day, the humidity, the mood, human and natural environmental conditions of planting and harvesting herbs have a huge impact of the final product. Herbs are not prepared individually, but as combinations. Gender, colour and temperature balance, cleansing and wholeness are the treatment's goal, they are not organ or action specific (Thornton 2009).

It is important to bear in mind that while biomedical research involves cells, DNAs, tissues and other biological organisms, traditional medicine involves tangible and also intangible elements that cannot even be seen under a microscope. The ability to see and work with unseen forces is an indigenous skill that needs to be promoted and conserved.

Becoming a traditional healer frequently run in families but is also a person‘s choice. It is not a calling like becoming a *sangoma* (Karim, Arendse & Ziqubu-Page 1994). So anyone can become a traditional healer with applicable mentorship. Chevunduka (1994) explains the process of becoming a herbalist *(inyanga)* as follows, a herbalist in training is mentored into traditional healing by an experienced traditional doctor for a number of years. So traditional medicine knowledge transmission takes place under mentorship. Under this mentorship a novice‘s duty is to act as an herbalist‘s messenger by gathering herbs, carrying herbalist‘s medicine bags when they visit patients and other general work (Chavunduka 1994). Through participating in these services a novice observes and absorbs how an herbalist operates (Chavunduka 1994). This help a herbalist in training to learn how to mix herbs, identify the relevant herbs, plants and animal‘s parts (Chavunduka 1994).

As the time goes by the apprentice in training learns to undertake experienced herbalist‘s duties under supervision (Chavunduka 1994). After gaining enough experience, a novice starts assisting a herbalist in the administering the medicines. The apprentice is then given permission to treat patients the way he has been taught. After couple of years, the apprentice is familiarized with managing more severe illnesses. When a herbalist is confident with the apprentice, he allows his student to treat patients on his own (Chavunduka 1994).

These days traditional medicine teaching methods is still the same, however novices can now get training through traditional medicine schools (Karim et al 1994), furthermore herbalist don‘t just practice healing in their homes, they specialize in the retail of medicines and herbs in either their own shops or in the city markets for example in The *Muthi* Market in Warwick Junction, Durban.

3.1.2 Traditional medicine and Biophilia

Traditional medicine has a holistic approach, meaning that the body, mind, emotions and spirit, function together in influencing one‘s well-being. The components of well-being consist of the contact and relationship between nature, the universe and human beings.

Traditional medicine practitioners have in-depth knowledge of components of good or ill health; they understand nature‘s biophilic impacts on humans‘ health (Government gazette, 2008).

In addition to spirituality in traditional healing, the philosophy underlying traditional medicine is that a disease is seen as a mystical phenomenon ruled by a hierarchy of vital influences starting with the most powerful divinity followed by a less important spiritual entities, ancestral spirits, living persons, animals or plants (Setswe 1999). This means that the environment that accommodate traditional healing activities needs to be able to assist the traditional healer to interact with this spiritual world in order to identify the nature of the spirit he is dealing with, either good spirit or bad spirit.

3.1.3 Traditional medicine global state

WHO has recognized that traditional medicine is a broadly used and a rapidly growing health system. Africa followed by Asia, Latin America and China are the biggest consumers of traditional medicine (WHO 2002). According to WHO, the wide use of traditional medicine in developing countries is due to its convenience and affordability. The world‘s poorest countries are most in need of reasonably priced, effective treatments for communicable diseases such as HIV/AIDS. However, in order to take advantage of on traditional medicine‘s potential as a source of health care, traditional medicine policy, safety, efficacy, quality, accessibility and rational use must be tackled first. WHO‘s mission in vital drugs and medicines policy is to save lives and improve disadvantage people‘s health (WHO 2002).

In order to accomplish their mission WHO is proposing to encourage integrating traditional medicine into national health care systems. It plans to create strategies to stimulate research into traditional medicine, advocate the use and manage traditional medicine information (WHO 2002).

Unlike biomedicine, traditional medicine clinical trials are few, sample size and inadequately controlled. The lack of research into traditional medicine has led to a shortage of methodology information for evaluating the safety, efficacy and quality of these medicines (WHO 2002). Nevertheless there are indications that some commonly used herbal medicines can provide effective management for chronic disease.

WHO (2002) adds that in order to ensure traditional medicine‘s safety and quality at national level, the priority areas for its research should be: Its impacts traditional medicine has on each individual therapy, its effectiveness, safety and cost-effectiveness, its response with other therapies, its effectiveness of diagnostic methods employed and implementations and impacts of traditional medicine in particular health care settings (House of Lords 2000).

WHO recognized the importance and potential of traditional medicine for the achievement of poor people‘s health in the African Region; in addition they have recommended accelerated development to local produce traditional medicines. Therefore WHO has set up a number Collaborating Centres for Traditional Medicine worldwide. These centres promote their national traditional medicine through research and training programmes. In Africa there are 3 Collaborating Centres for Traditional Medicine, there is one in Ghana, Mali and Antananarivo (WHO 2002).

In South Africa, DST is still setting up Indigenous Knowledge policies and a legislative regulatory framework for both international and national use. This is to ensure that the benefits of ongoing innovation in traditional medicine develop and at the same time enhance socio-economic development.

3.2.0 SCIENTIFIC RESEARCH INTO TRADITIONAL MEDICINE

There are currently few research institutions that have been set up in South Africa to undertake research on traditional medicine. These institutions conduct numerous research into African traditional medicines and they include university departments, government departments and research institutions (DoH, MRC & CSIR 2005).

The aim of these research centres is to make sure that traditional medicine complies with WHO‘s objectives for traditional medicine policy namely: safety, efficacy and quality, access and rational use in order for it to be globalized and used in health care sectors. This study investigates the two current operating traditional medicine research facilities: Traditional Medicine Laboratory in UKZN and The Medical Research Council of South Africa‘s Indigenous Knowledge Systems of Health Lead Programme.

3.2.1 UKZN Traditional Medicine Laboratory

The Traditional Medicine Laboratory in UKZN is the first traditional medicine research laboratory in KwaZulu Natal. It was funded by the Department of Science and Technology in 2009 and it is administrated by the National Research Foundation. This facility does research on traditional medicine in order to develop scientifically proven African traditional medicine and to institutionalize African traditional health care systems (tradmed.ukzn.ac.za).

The laboratory has employed scientists and research medical doctors. The research facility undertakes to investigate numerous aspects of traditional medicine research including biodiversity, conservation, quality control and safety, traditional medicine and diabetes management, traditional medicine and breast cancer, but its main focus is traditional medicine and the immune system (tradmed.ukzn.ac.za).

This traditional medicine laboratory allows interaction between medicine students, scientists, research doctors and traditional healers. This traditional medicine facility is later discussed in details as a case study.

3.2.2 Indigenous Knowledge Systems of Health Lead Programme

The second traditional medicine research facility is the Indigenous Knowledge Systems [Health] (IKS) in Cape Town. Similar to the previously discussed Traditional Medicine Laboratory that functions alongside UKZN‘s Nelson Mandela School of Medicine this research facility functions alongside University of Cape Town and University of Western Cape. The MRC SA initiated the Indigenous Knowledge Systems of Health Lead Programme in 2007 with the mission to support and improve indigenous knowledge systems through research (MRC SA 2013)

Similar to UKZN‘s Traditional Medicine Laboratory, MRC-IKS Lead Programme promotes various research activities on traditional medicine. Within their activities they access public traditional medicines with medicinal potential through a standard procedure they call ―clinical trials for herbal medicines”. This procedure is essential to validate the safety of traditional medicine to the public health. This is after many claims were laid against the use of traditional medicines. Also there are many products on the market that have not been proven to be safe and efficiency (MRC SA 2013).

MRC states that Traditional (herbal) medicines have to go through safety and clinical evaluation to add value to traditional medicine intended to be used by the broader public. Traditional medicine proven to be safe and effective can be certified to be on a commercial market both local and international. Traditional medicine products need to meet the minimum requirements of safety, efficacy and quality to enter in the commercial market. Traditional medicine need to be validated using sound scientific methods acceptable to international standards (www.mrc.ac.za).

3.2.3 MRC-IKS Traditional medicine research processes

Traditional healers or anyone who may claim to have traditional medicine with curative potential may submit their herbs to MRC-IKS for them to be tested, validated, registered and be placed on the market. These are 14 steps to validating traditional medicine with estimated time frames for each procedure:

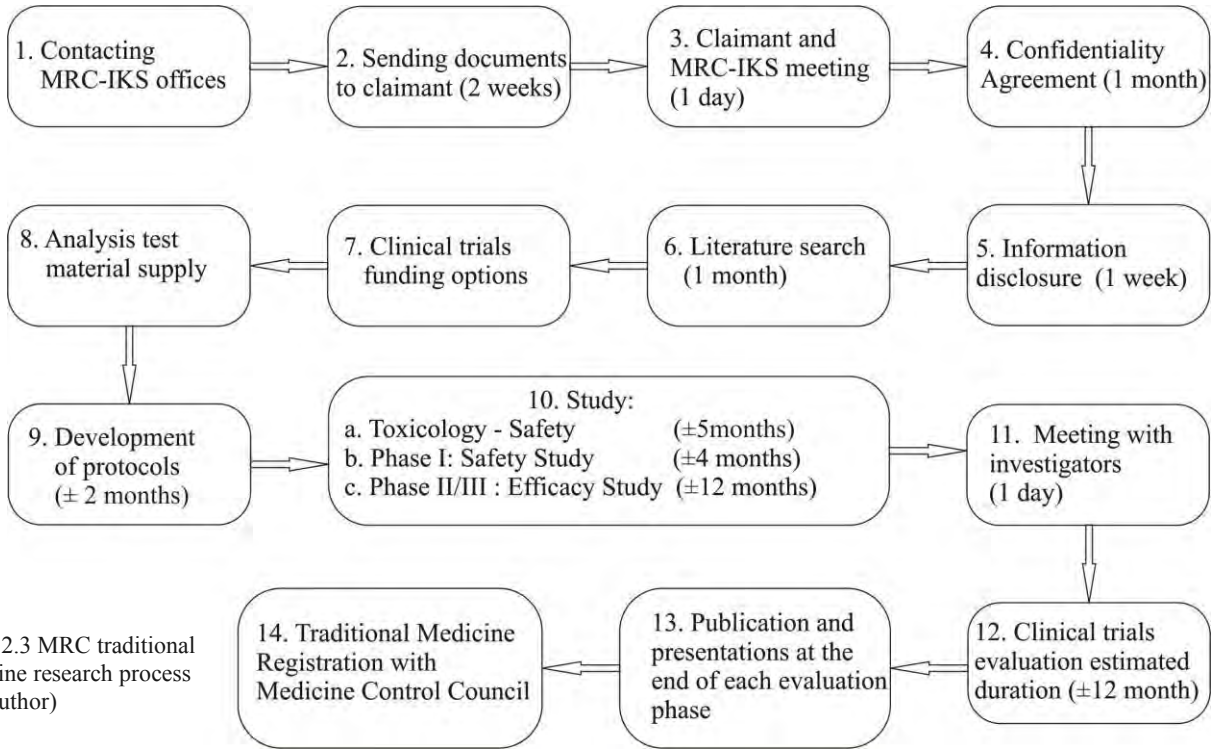

Fig. 2.2.3 MRC traditional medicine research process (By Author)

Step 8 analyses the test material in order to work out standardized human dosage of tablets, capsules, syrups and solutions. A claimant needs to provide the IKS with sufficient supply material for the research procedures in order to gain collection approvals from the relevant authorities (www.mrc.ac.za).

During Toxicology-safety testing (Step 10), the traditional medicine is tested in a non-human primate model. This study includes collecting, investigating the results and producing a full report. In b. Phase I - Safety Study, the safety study is conducted on healthy human volunteers; this study can be done only after the completion of the non-human primate‘s full report toxicology study. This phase‘s purpose is to determine the safety, the precise dosage and possible negative impacts of the traditional medicine.” (www.mrc.ac.za). The protocol is submitted to be peer reviewed and to the ethics committee for authorization, before the investigation begins (www.mrc.ac.za).

The aim of Phase III: Efficacy Study is to analyze the safety and effectiveness of the investigated traditional medicine. Phase I (safety study) full report is compulsory before conducting this study. The medicine being studies is tested on a larger sample size in this stage. The aim of this phase is to target individuals for which this medicine is for and they are encouraged to participate. The positive and the negative effects of the investigated traditional medicine are assessed thoroughly during this phase (www.mrc.ac.za).

When the claimant is meeting the investigators (Stage 11), he/she is allowed to be present during the testing, but his input is not required at this stage. During clinical trials (Stage 12), development of drugs takes place. Developing a drug from organic plants can be costly and roughly take 2 years. The IKS [Health] follows developed protocols of the highest acceptable scientific and ethical standards when developing drugs from total plant extracts. After discussing with a claimant (Stage 13), The next phase is Stage 14: publications and presentations which involve IKS conferences, presentations and publishing the outcomes of the traditional medicine‘s research (www.mrc.ac.za).

On the completion of clinical trials, that is if the investigated traditional medicine has tested safe, effective and meeting MCC requirements. The next phase is registration, licensing and for commercialization (www.mrc.ac.za).

3.2.4 MRC-IKS Information and Research Infrastructure

The MRC-IKS has followed IKS policy through establishing IKS Information and research infrastructure. They have created the following number of public databases namely: South African Traditional Medicines Research Group also known as TRAMEDIII, Monographs, Medicinal Plants, GIS Mapping of Traditional Health Practitioners (THP‘s), IKS Laboratories and resource centre and a Library (www.mrc.ac.za).

South African Traditional Medicines Research Group (SATMERG), previously known as TRAMED has a vast traditional medicines and medicinal plants database. SATMERG is a joint research group with University of the Western Cape (UWC)'s School of Pharmacy. It was established from a database of curative plants donated by a South African healthcare company Noristan Pharmaceuticals. The aim of this database includes services like traditional uses, pharmacology, chemistry and indications and it consists of student research work (www.mrc.ac.za).

Monographs have been developed by UWC. It is a continuous development on medicinal plant researched by the IKS Lead Programme. The aim is to develop a South African Pharmacopoeia. Monographs are accessed online and are housed at the IKS [Health] at the MRC. The DST is currently assisting UKZN to develop a digital Pharmacopoeia (www.mrc.ac.za).

The IKS [Health] has initiated approaches for managing claims for cures through clinical trials. Claims presented at the IKS [Health] Lead Programme are documented in a database. This database contains recent medications and traditional practices that are utilized. Additionally, the database documents all 14 clinical trial validation procedures of an investigated traditional medicine. That include the names of the claimants (traditional medicine owner), the place of origin, the name of source, how the source is prepared, its scientifically standardized and formulated dosages of source, the research outcomes as well as the source's registration with the Medicines Control Council (www.mrc.ac.za).

The IKS [Health] Lead Programme had developed a GPS mapping system of traditional health practitioners in the country and it was first implemented in KZN. This service is updated annually and it consists of documenting the location of traditional healers, validated and invalidated uses of plants by traditional healers their specialties, their proximity to schools, clinics, hospitals and the population in their area (www.mrc.ac.za).

The IKS Laboratories and resource centre in which information and knowledge is interchanged between healers and biomedicine personnel. Through this resource centre traditional healers are able to access to the vast information available through the Internet.

This resource centre successfully: provide formal and informal environment for healers and scientists to interact and develop policy and communication products, provide healers access to scientific infrastructure, provide an opportunity for well-thought-out health education and promotion and advance skills in herbal products growth, packaging, processing and marketing (www.mrc.ac.za).

The medicinal garden functions as an educational garden for school children. It also functions as plants botanical identification for communities and also as a plantlets‘ starting stock (www.mrc.ac.za). This MRC‘s research facility is a good example of how traditional medicine can be accommodated in a formalized and sterile environment. It also gives ideas of spaces that are appropriate for a design of a traditional medicine research environment.

Fig. 2.2.4.0 Herbs garden (http://www.mrc.ac.za/iks/herb2.gif (accessed 2014/05/09)

Fig. 2.2.4.1 Herbs garden education tour (//www.mrc.ac.za/iks/herb.gif (accessed 2014/05/09)

Traditional Health Practitioners (THP‘s) Training Program takes place at this resource centre. Traditional healers are involved during the design of their training program and it is designed to suit their needs. The Awareness Training Projects includes: TB DOT Supporters, HIV and AIDS, diabetes, herbal drug manufacturing training for traditional healers and communities, infection control, simple counseling in a traditional workplace and systems for traditional healing (www.mrc.ac.za).

Priest-physician had an extensive knowledge on anatomy and engaged in advanced medical practices such as obstetrics, surgery and orthopaedics. An extensive pharmacopoeia was employed to supplement both magical incantations and practical procedures. In Ancient times Egyptians had already started dispensing standardized prescriptions in the form of pills, ointments, inhalants and gargles (Currie 2007).

In the 1st dynasty a medical establishment called peri-ankh existed and it housed research, library and medical training. The period of Renaissance experienced major discoveries in the medical field including human anatomy research and opening of the first medical practice. Doctors started investigating infectious diseases and surgical procedures became modernized.

The great Leonardo da Vinci practiced anatomy investigation around this era (Currie 2007). Since the renaissance era medical facilities grew up as part of established universities and hospitals (Harrell 1974).

3.3.1 Biomedical research procedures

As said by the California Biomedical Research Association biomedical research involves the investigation of the methods and additionally the origins of maladies through cautious experimentation, observation, laboratory work, study and testing (www.ca-biomed.org). Medical specialty research‘s main aim is to discover methods to end ill-health, develop helpful medications, and procedures to treat infections and conditions that cause illness and humans‘ death. Biomedical research involves participation of pros from different backgrounds and of various skills. These analysis professionals embrace medical doctors, veterinarians, computer scientists, engineers, technicians, researchers and medical scientists (www.ca-biomed.org).

Below is that the list of methods that take place throughout medical science research. Medicine analysis consists of ―The Scientific Method" that involves observation, hypothesis, experimentation, and conclusion. Another methodology is ―Basic research" that's conducted to increase essential content (www.ca-biomed.org).

The opposite technique concerned in medicine analysis is ―Applied research". Applied analysis focuses on specific goals and discoveries, for example in the event of new medication, medical device, or a surgical procedure. Applied analysis consists of implementing existing information from basic analysis therefore developing it. ―The vitro analysis method" (from Latin which suggests ―in the glass") involves humans, cell, tissue, and organ cultures and it is conducted in laboratories (www.ca-biomed.org)

―Ex vivo research" methodology (from Latin that means that ―out of the living") involves investigation exhausted or on living cells or tissues taken out from organisms associated with humans. These living human cells perform as models of the total organism (www.ca-biomed.org).

―The vivo research" methodology is that the alternative of ―Ex vivo research" methodology. It is from Latin that means that ―in the living" that implies the experimentation takes place in or on the living tissue of the total body. The samples of vivo analysis methodology space unit pre-clinical trials and clinical trials (www.ca-biomed.org).

The ―Pre-clinical trials" strategies mentioned on top of involve non-human animal models. Pre-clinical trials facilitate researchers to advance their knowledge and in discovering easier methods for designation, treating, associated natural method diseases that have an impact on every humans and animals. Researchers use animals as models throughout additional advanced stages of medical science analysis for the reason that animals unit biologically nearly like humans and unit in danger of many of identical diseases and health problems as humans. The majority of study animals involve rats, mice, and completely different rodents bred specifically for laboratory analysis (www.ca-biomed.org). Researchers avoid victimization the animals in analysis the most quantity as potential by replacement animals with portable computer models, cell and tissues cultures (www.ca-biomed.org).

―Clinical trials" methods unit conducted in associate extremely hospital or clinics. They involve human volunteers to envision the protection and effectiveness of medication, procedures, or medical devices. Clinical trials can entirely happen once thorough studies and regulatory evaluations, alongside pre-clinical trials area unit conducted (www.ca-biomed.org).

Understanding the processes involved in biomedical research will assist in coming up with appropriate approach for a design of a traditional medicine research centre. The purpose of this study is not to force traditional medicine into a biomedicine research built-form but to take elements from the appropriate WHO approved medical research environments and manipulate them to accommodate traditional medicine.

Animals in Biomedical Research

The use of animals in some varieties of analysis is crucial to the event of recent and more practical strategies for diagnosis and treating diseases that have an effect on each humans and animals. Medical researchers have to be compelled to perceive health issues before they develop ways in which to treat them. Scientists use animals to find out a lot of concerning such issues, and to assure the security of recent medical treatments. Certain illnesses and health issues include processes that may solely be studied in living organisms. Animals area unit necessary to medical analysis as a result of it's impractical, illegal, and unethical to use humans in early phases of analysis (www.ca-biomed.org)

Animals observe analysis subjects for a spread of reasons. Animals area unit biologically like humans. They are at risk of several of constant health issues, and a few species, like mice and fish, typically have shorter life cycles in order that they will simply be studied throughout their whole lifetime or across many generations. Additionally, scientists will simply management the surroundings (diet, temperature and lighting) around animals which might be troublesome to try and do with individuals. Lastly, the main reason why animals‘ area unit used is that the majority individuals feel it might be wrong to deliberately expose persons to health risks so as to look at the course of a wellness (www.ca-biomed.org).

3.3.2 Biomedical research in the 21st century

Medical research has changed a lot in the recent years. The physicians of the ancient times succeeded in finding answers to health problems of that time. South Africa and the whole world are now facing new health challenges in a form of new infections. This implies that more investigations are still required in the quest to find new diagnostic procedures and treatment to improve the quality of life. The biomedicine research continues to address all the health priorities in the world. Biomedicine research results are translated into policies, practices, products and health promotions. The modern technology now allows researchers in worldwide to work together to find new solutions.

As mentioned before that since the renaissance era biomedical research focused on where medicine was best learned which was in the universities, hospitals, and clinics. John Michael Currie is a health buildings architect studied architecture and medicine with architecture being referred as the ―fourth factor" in medical research and discovery (Currie 2007).

Currie (2007) states that in 1964 United State passed the law for Regional Medical programs. Regional Medical program refers to a program of community health planning that includes all the medical resources available in a region that may be mobilized to meet a specific medical objective for example The United States' Heart Diseases, Cancer and Stroke medical program. This program suggested regional cooperative arrangements to allow the latest advances in the biomedical research to benefit the health of the Americans.

Furthermore, this medical program encourages and facilitates the regional cooperation amongst medical schools, research institutions, and research hospitals, training, continuous education and related demonstration of patient's care (Currie 2007).

3.4.0 UNAIDS HIV/AIDS RESEARCH

As previously mentioned that biomedicine is globally recognized and globally dominating meanwhile South Africa has majority of HIV infected people depending on traditional medicine for their health care need. Little research has been done on HIV and traditional medicine. Currently the research on an African health problem (HIV) is managed by foreign biomedical research institutions in an un-African manner; paying no attention to the African medical traditions.

Joint United Nations Programme on HIV/AIDS(UNAIDS) is ground-breaking organization of the United Nations organizations that brings together the hard work and assets of ten UN system organizations in the response to AIDS to support the world to prevent new HIV infections, care for HIV positive people, and reduce the epidemic impact (Knight 2008). UNAIDS headquarters are based in Geneva, Switzerland, however it works with more than 80 countries worldwide (Knight 2008). Every year UNAIDS holds conferences on Retroviruses and Opportunistic Infections (CROI), these conferences provide an opportunities for researchers around the world to share together the latest developments in HIV research.

The comprehension of the way UNAIDS main offices operate and their administration will help in coming up with spaces appropriate for the proposed first UNAIDS research institute in Africa and mainly South Africa.

3.5.0 BIOMEDICAL RESEARCH AND HIV/AIDS IN SOUTH AFRICA

South African biomedical research facilities are following in the steps of the research facilities mentioned in the previous topic. Similarly to developed countries‘ regional medical programs, South African medical research sectors have followed the same trend of collaborating medical facilities hence most medical research centers are based either in or at close proximity with a university or a hospital. This is seen in Nelson Mandela School of Medicine in UKZN with CAPRISA and K-RITH as research centers in the University premises and King Edward Hospital at a close proximity.

A similar arrangement is seen at The Drug Discovery and Development Research Unit which is located at the University of Cape Town‘s Institute of Infectious Disease and Molecular Medicine in the Medical School. This demonstrates that even though South Africa is regarded as a third world country, South Africa is keeping up with the latest systems and technology in the medical research system.

Established in 1970 as a national resource to support health and medical research in the country, the South African Medical Research Council has achieved a lot in the research according to their history. South African scientific research successes are traced back in 1864 when Dr John Harley discovered the ova of bilharzia in the urine of a patient (MRCSA 2013). This just shows that South African medical practices have a potential to research and discover their own treatment and minimize the import of foreign treatments like ARVs which is not economical for the country. MRC‘s Research with National collaborative research programmes and collaborative research groups are prioritizing in HIV and AIDS, Tuberculosis, Cancer and African Traditional Medicine and Drug Discovery.

Similarly to other research institutions like CSIR, HIV/AIDS remains the main concern in the MRC medical investigation. However through CSIR, South African succeeded in innovations such as electron crystallography, epigenetic therapy for blood cancers, the human heart transplant and the first barrier to STD transmission—including HIV—for women (CSIR 2013).

By means of medical research facilities like CAPRISA which are mainly dedicated to HIV/AIDS medical research, there is a possibility of more ground breaking discoveries in future.

3.5.1 CAPRISA

CAPRISA was set up in 2002 by University of KwaZulu-Natal, University of Cape Town, University of Western Cape, National Institute for Communicable Diseases and Columbia University in New York under the NIH-funded Comprehensive International Program of Research on AIDS (CIPRA). CAPRISA‘s objective is to take on worldwide applicable and locally responsive investigation that adds to understanding HIV pathogenesis through conducting study in HIV Pathogenesis and vaccines, HIV and TB treatment, Microbicides, and Prevention and Epidemiology (Caprisa 2013).

Research undertakings at CAPRISA are supported by administration, data management, biostatistics, laboratory, community, bioethics, pharmacy and information systems. CAPRISA‘s research expertise includes epidemiology, immunology, virology infectious disease medicine, statistics, bioinformatics, ethics and health policy. CAPRISA‘s ground breaking research discoveries include a Tenofovir gel that minimized the risk of HIV infection by 39% in females who applied it before and after sex. (Caprisa 2013).

Lastly, CAPRISA discovered that HIV-tuberculosis co-infected patients‘ mortality could be significantly reduced with integrating antiretroviral therapy and TB treatment. These findings led to the revision of the WHO, US Department of Health and Human Sciences and South African treatment of patients with TB-HIV co-infection guidelines.

This study has molded the worldwide approach to treatment of TB-HIV co-infected patients. The implementation of this approach to TB-HIV treatment in South Africa could prevent about 10 000 deaths annually (Caprisa 2013).

3.5.2 The Africa Centre for Health and Population Studies medical facility

The Africa Centre for Health and Population Studies medical facility is another well recognized research facility in KwaZulu Natal. The Centre conduct research on population and reproductive health questions affecting sub-Saharan Africa people. The Centre is based in Umkhanyakude district in KwaZulu-Natal. This area has a high rate of HIV infections. This research centre‘s headquarters are based at Somkhele in KwaZulu-Natal.

Its laboratories and offices are located at the University of KwaZulu Natal, School of Medicine in Durban (www.africacentre.ac.za).

The Centre has progressed from a Research Centre dedicated on description to a research centre dedicated on intervention and treatment. Located on the Africa Centre Demographic Information System along with the well-resourced Hlabisa Health Sub-District Anti-Retroviral Treatment (ART) programme makes the Africa Centre a unique facility that measures the continuing impact of a population by means of access to well-functioning and comprehensive ART in a poor rural setting (www.africacentre.ac.za).

3.5.3 HIV Pathogenesis Programme

HPP is located at the University of KwaZulu-Natal's Nelson R. Mandela School of Medicine Campus‘s Doris Duke Medical Research Institute. The HPP has laboratory based in the 1st and 2nd floors. The laboratory is designed to accommodate large equipment such as centrifuges, pipettes class 2 biosafety cabinets, plastic glassware, freezers and computers. (hpp.ukzn.ac.za). This laboratory‘s duty is to run tests on viral loads, diagnostic, CD4+ T cell counts, advanced flow cytometry, polymerase chain reaction assays, gene expression assays, processing of peripheral blood mononuclear cells (PBMCs), , tissue culture, and recombinant DNA technology procedures(hpp.ukzn.ac.za). These are the studies and environments that are applicable when researching traditional medicine in the proposed UNAIDS Research Institute.

3.5.4 Biomedicine and traditional medicine collaboration on HIV and AIDS

UNAIDS, WHO, DoH and MRC have observed that traditional medicine and traditional healers are a big influence in the lives of HIV positive patients since 90% of them consult traditional healers first before seeking biomedical assistance. Patients switch easily between traditional and biomedicine systems, however traditional healers are not familiar with the germ theory (Gqaleni 2011). An HIV origin is still determined by cultural beliefs in traditional healing (Gqaleni 2011).

Regardless of the regular contact with HIV positive patients, traditional healers‘ education regarding HIV and AIDS has been ignored not until recently when medical institutions proposed traditional healers and biomedicine practitioners‘ collaboration in the fight against HIV.

Nelson Mandela School of Medicine and MRC SA have initiated collaborations with traditional healers against HIV. It has been discussed previously that MRC IKS Health and UKZN offer Traditional Health Practitioners (THP‘s) Training Program that includes basic HIV and AIDS training (Gqaleni 2011).

In KwaZulu Natal a venture has been established between provincial and local authority clinics and traditional healers on the subject of HIV and AIDS illness. Training programmes have been developed to train traditional healers with expertise to manage HIV in their practices and in their communities. This is to bridge the gap between THPs and public health care workers. (Gqaleni 2011). However, these collaborations do not include investigating traditional healers‘ traditional medicines in relation to biomedicine.

3.6.0 CURRENT TRENDS IN RESEARCH ENVIRONMENTS

Modern medical research for both traditional medicine and biomedicine takes place in a scientific environment known as laboratories. The new laboratories‘ design produces lab environments that respond current needs but at the same time capable of accommodating future demands. Watch (2008) identifies these features as essential in the new lab design: Creating team-based research environments, meeting spaces, team-bases labs, "open" versus "closed" Labs, flexibility, sustainability and changing working environment.

Creating team-based research environments

According to Watch (2008), the most dynamic and effective scientists have knowledge of both the material and each other's work work hence modern science is an extremely social activity. He adds that an environment that encourages social interaction promotes the scientists to implement firsthand research methodologies and implements as soon as they become accessible. For that reason, science research works best when it is sustained by built-form that enables structured and casual interaction, flexible space usage and resources sharing (Watch, 2008).

Meeting Places

Relating to designing a working environment, Watch (2008) states that it is essential to create places where people can come together outside labs or offices to socialize. He adds that spaces such as stairways, atrium or built-in window seats have potential to provide chances for social meetings and ideas exchange (Watch, 2008).

Team-Based Labs

Watch says is essential to design laboratories with engineering services that can be altered to easily support diverse research team. In the collaborative research, teams of scientists with different skills are required to form interdisciplinary research units. When networks connect people and organizations, it makes it easy to exchange information between research teams (Watch, 2008).

Fig. 2.6.0 Flexible laboratory (Watch, 2008)

Fig. 2.6.1 Flexible laboratory (Watch, 2008)

"Open" Versus "Closed" Labs

Creating "open" labs that encourage team-based work is the increasing trend in research facility design. –Open" labs differ from the historical "closed" labs. Historical –closed" labs were designed to accommodate individual researcher while the modern open labs environment allows investigators to share the space, bench space, equipment and support staff (Watch, 2008). Open labs shared space enables interaction between scientists in addition it makes the lab versatile for future requirements. In modern labs design all labs spaces function as open labs (Watch, 2008).

Fig. 2.6.2

Fig. 2.6.3

Photos above show the open labs‘ offices with direct access to the labs and the lab support (Watch, 2008)

Multiple open labs encourage various teams to work on diverse research tasks. The architectural and engineering systems should be designed to easily provide accommodations for various floor plans that can easily be altered to accommodate each investigation teams' requirements (Watch, 2008).

Even though the open labs are encouraged in modern research facilities design, closed labs are still essential for particular natures of investigation or for specific equipment. Tissue culture labs, glass washing and darkrooms require to be accommodated in isolated and devoted spaces. Furthermore, for those researchers who may feel uncomfortable with working in open labs they have an option to work on an individual closed lab. An individual closed lab can be designed to have a direct access to a shared open lab. This gives a researcher a freedom to work in a separate closed lab to meet their individual requirements with an opportunity to work with team researchers in an open lab (Watch, 2008).

In order to minimize the cost of research equipment, bench space can be shared in an open lab. The glass walls between the open and closed labs allow the visual link between the researchers, despite the fact that they have individual spaces (Watch, 2008).

Flexibility

A research facility should be flexible; it should be able to easily expand, to willingly accommodate alterations and permit diverse functions. Engineering services should be designed to be flexible thus allowing equipment to be removed or else added. Flexible engineering services allow a lab space to be altered from a lab environment to an office vice versa (Watch, 2008).

Sustainability

Like all 21st century proposed built environments should be sustainable. Especially because a laboratory consumes more energy and water compared to a typical office building. Research laboratories demands more energy because of many reasons. One of the reasons is that laboratory services have such intensive ventilation requirements that add to energy use. Sustainable design of lab environments is essential to minimize energy consumption and improve productivity.

3.6.1 Conclusion

To sum up, from the discussion mentioned above in this section, current South African traditional medicine state has very much in common with the Ancient Egypt, Greece and Rome medical state of that time. The ancient medical practices and current South African traditional medicine both believe a humans‘ health has a lot to do with superpowers.

They both believe in the biophilic effect that natural environments have on a human being health and well-being. However, while biomedicine research has developed in years and is recognized globally, traditional medicine remains undeveloped and localized.

The healers of Ancient times believed that good health and bad health were caused by the gods and *izinyanga* believe they are caused by the ancestors. Ancient medicine relied a lot on nature, so as South African traditional medicine.

The 21st century medical facilities are now trying to go back to enforce the nature, human and health relationship through Biophilic design. In addition, studying the ancient ways of medical practice shows that while the medical practices of ancient times have improved, African medical practices remain where the ancient counties‘ biomedicine started. There is a lot that biomedicine research and architecture can learn from traditional healing philosophy. The saying that governs traditional healing *“umuntu ungumuntu ngabantu”* simple means that a person flourishes through other people. Treat people the way you want to be treated, if you help other people, you will also be helped by others. This also applies to architecture in the critical regionalism and biophilic principles. If humans have a healthy relationship with the environment, respect the environment, the environment will return the favor by improving human beings‘ wellbeing.

CHAPTER FOUR

PRECEDENT STUDIES

4.0 INTRODUCTION

Precedent studies included in this section study research institutes that investigate different types of biosciences. They include a biomedical and botany sciences research facilities. The proposed research facility involve investigative the phenomena related to living organisms (human body and animals) and plants that are used in traditional medicine healing. Each precedent is offering something unique to the design of the proposed research facility. The international buildings selected do not necessarily share a similar socio-political or topographical climate as the proposed research facility. Nonetheless, the purpose of these studies is to identify designs which illustrate certain aspects of the theories discussed earlier (Kaji-O'Grady 2010).

Fig. 4.1.1 Lowly Cancer Research Centre (AA 2010)

4.1 Lowy Cancer Research Centre

Architects: Lahznimmo Architects + Wilsons Architects

Location: Sydney, Australia

Date: 2009

Design Brief

The objective for this research centre was to create a ―flexible and evolving research facility" that is capable of adapting to developing research programming. This project is collaboration between the University of North South West and Australia's Children's Cancer Institute. The project draws together adult and childhood cancer investigation on the same premises. This facility's over eight levels accommodate over 400 investigators and support staff. The joint venture lead to significant cost savings in sharing expensive equipment and laboratories but this is only one motivation in co-locating research teams (Kaji-O'Grady 2010).

The interior strategies for treating these distinct spaces and activities reinforce the nature and activities occurring in them. The materials palette of the atrium draws on the landscape of the adjacent Michael Birt Gardens and in particular the large poplar tree the building wraps around (Kaji-O'Grady 2010).

Fig. 4.1.4 Views to established trees and gardens form an essential element of the Lowy Centre (AA 2010)

Fig. 4.1.5 The design of the Lowy Centre has been used to facilitate new links across the campus, including a major pedestrian entrance (AA 2010)

The materials used in the building bring Critical regionalism tactile perception. This palette includes timber paneling; a white recycled quartz carpet, face concrete and linoleum in browns and greens. The palette is punctuated with the warmer autumnal colours of the break out furniture used in these spaces. The effect is that of a –constructed landscape", which is juxtaposed with the backdrop of lush green of the trees beyond (AA 2010).

Working Environment

As the result of its function the building naturally splits into a formal and on the other hand flexible –Lab Box". This –Lab Box" comprises of laboratories and support spaces, it also comprises of a fluid –human strand" with write up areas and various break out and shared work areas. The challenge of getting around four hundred researchers, led by professors who are regularly out of the building and in the hospital, to intermingle is the key ambition of the project and it is in these attempts to sponsor conviviality that the building gets interesting (Kaji-O'Grady 2010).

Fig. 4.1.6 Looking across a laboratory space to the write-up areas, with garden views (AA 2010)

Fig. 4.1.7 Laboratories opening onto the atrium (AA 2010)

Firstly, the project substitutes monumental and complete form for a more porous and open-ended building that provide physical links and also allow views to on and off site buildings. The building form is literally and metaphorically concerned with connection and bridging.

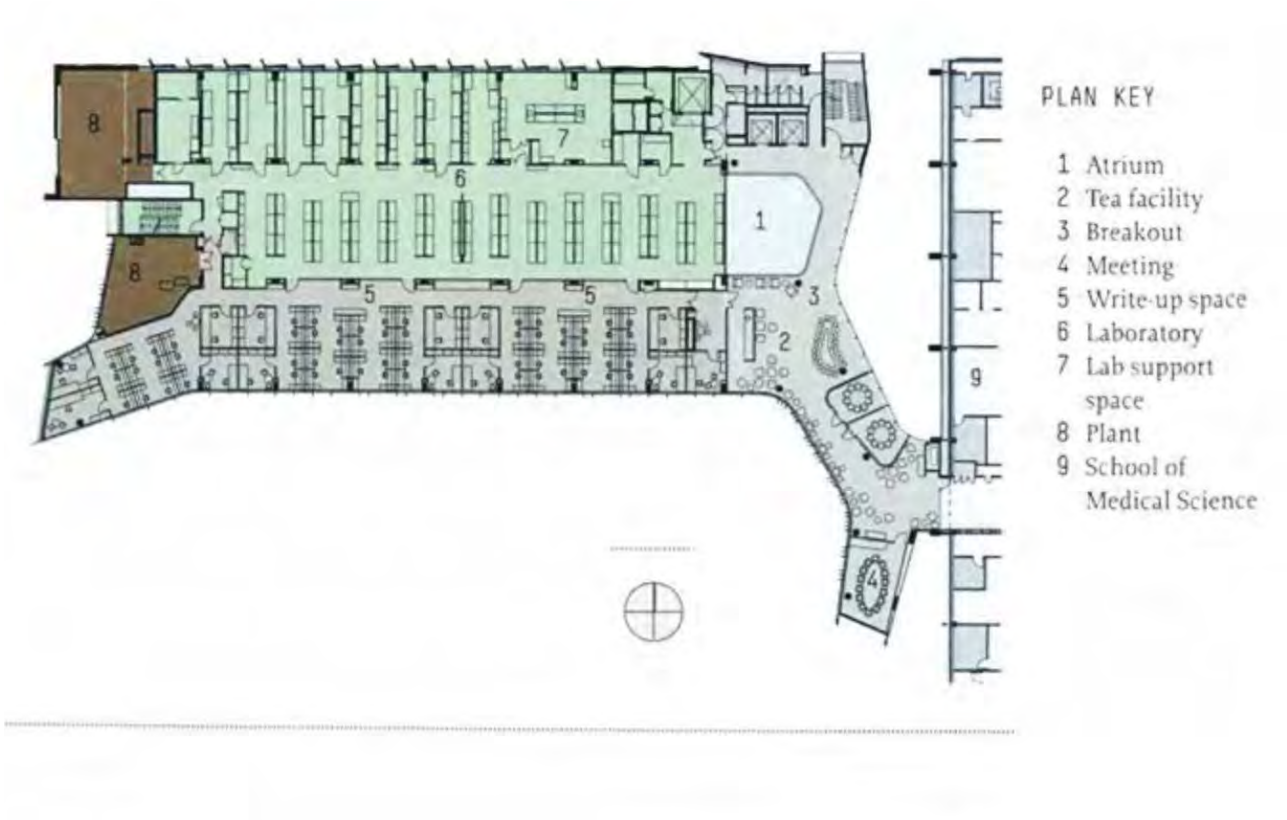

Fig. 4.1.8 Second Floor Plan (AA 2010)

Secondly, the project thickens and augments the corridor – the traditional space of academic socializing and gossip – using it to form a distributed network of informal kitchens and lounges, semi-open-plan work areas and programmed event spaces. The core of these informal social spaces bridges the upper levels of the new building with the old Wallace Wurth Medical Faculty and takes a diagonal path between the two that approximates a natural inclination for walking.

Forming an inhabited bridge, this is in turn used to frame what has become a major pedestrian entrance to this end of the campus, as well as to both buildings and the Michael Birt Gardens beyond. With its foyer and circulation located adjacent to the existing medical faculty (rather than at the west end as originally briefed), the project has been able to generate a positive experience of social exchange between new and old elements, but also in and out of the campus. The connection between UNSW and its context is more than symbolic, for the relationship between clinical and academic work is close (Kaji-O'Grady 2010).

Architecture and environment

An atrium space is the main social space and focal point of the building. The atrium employs the "science knowledge bank" as the metaphor in recognition of the idea that the strength of research organizations lies in the collective tacit knowledge of their people and the exchange of ideas between them. This space visually and spatially connects all six above-ground levels and provides an opportunity for views into and from the research activity on all laboratory floors (Kaji-O'Grady 2010).

The atrium brings together the rectilinear geometry of the "Lab Box" and the sinuous geometry of the "Human Strand". The "Human Strand" then wraps around the atrium grafting onto the "Box" and creating a series of concentric rings. To fulfill a laboratory classification, solar penetration is strictly eschewed in the designated spaces and the decision was made to keep the band of equipment to the north and write-up to the south of the laboratories. Consequently, researchers always have the relief of a pleasant view of a mature garden – a view enriched by stepping up the ceiling height to the south, making large full-height windows possible (Kaji-O'Grady 2010).

The southern facade is an attractive composition of glazing and vertical bands of green aluminium composite panel, while the northern facade, protecting the equipment rooms behind, is heavy and less visually satisfying. Unhelpfully, the project floor area increased by 30 percent during the design process, and this eliminated any potential for setting the northern facade further back from the street. Attempts to relieve the overall bulk with punched out rooms are further compromised by the incomplete state of the project. The foyer is an expanded space that reaches vertically through the six floors of the building, its perimeter shifting to introduce a dynamic of interpenetration (Kaji-O'Grady 2010).

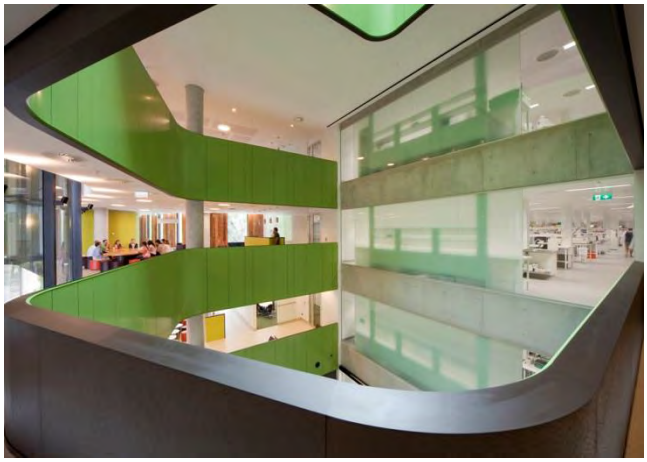

Fig. 4.1.9 The atrium (AA 2010)

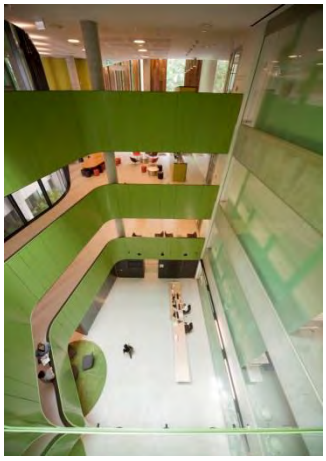

Fig. 4.1.10 The atrium for social interaction (AA 2010)

There is a lot of green, but it is balanced by planes of white, walls of timber, dark grey floors and furniture that introduces orange and brown. Indeed, there is a remarkable attention to delivering a tactile, colourful and carefully thought through interior of purpose-built cabinetry and flexibility (Kaji-O'Grady 2010).

The vibe is that of a bar and lounge, not an institution devoted to science and bench space, yet these are bars and lounges that can easily be reconfigured for presentations and meetings, and are equally comfortable for an individual who want to sit alone (Kaji-O'Grady 2010).

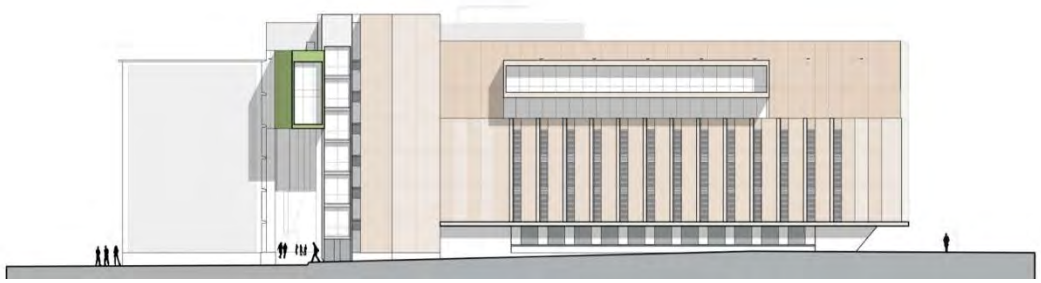

Fig. 4.1.11 North Elevation (AA 2010)

Fig. 4.1.12 West Elevation (AA 2010)

Fig. 4.1.13 North South Section (AA 2010)

Energy saving systems

Like all research facilities, the Lowy Cancer Research Centre is heavily serviced but utilizes all the possible available technology to reduce its ecological footprint. It uses site‘s bore water aquifer recharge system for roof and storm water collection. Gas fired cogeneration computers are positioned within 6m of natural light. This reduces excessive artificial lighting need. Waste heat produced by plant equipment is recycled to be used by the cogeneration plant through absorption chiller thus decreasing energy costs for cooling and heating (Kaji-O‘Grady 2010).

The latest energy saving technologies is used to reduce energy consumption maintenance by utilizing daylight harvesting dimming systems, energy efficient light fittings, motion detectors and a selective range of lamp types (Kaji-O‘Grady 2010).

Architectural Style

The successful incorporation of art relied upon combining a strong theme with the correct placement. It gives the building a distinctive architectural style and bold interior colour scheme. (Kaji-O‘Grady 2010).

Fig. 4.1.14 South façade (AA 2010)

Fig. 4.1.15 The west elevation and main entrance to the building (AA 2010)

Design Brief

The main idea behind the Bioscience Research project was to bring together the necessities of a modern laboratory research structure with a collaboration conceptual expression. The existing schools both already had an effective research and education programmes, however the challenge was bringing the existing programmes together in the same building yet preserving their different individualities but creating a new identity (Dezeen 2012). This precedent study is also appropriate for the proposed UNAIDS Research Institute since it brings together two different facilities into one built-form thus creating new identity. The same approach will be implemented in integrating biomedical and traditional medicine built-forms by creating a new identity.

The Site and Context

The building‘s site is located at the Australian National University‘s corner. This is a research dedicated University located in Canberra (Australia‘s capital city). The building‘s intention was to connect two research schools that were disparate previously into a one combined and shared location. The building‘s plan figure was developed within a whole premise‘s master-plan context and at that time some new buildings were still under construction. The plan‘s diagonal geometry expresses the main route for pedestrians through the middle of the university; furthermore it forms a courtyard area within the form of the building therefore inflecting outwards to the direction of the campus. An expressed staircase at the courtyard‘s end connects each bio-containment laboratory levels (Dezeen 2012).

Form and planning

A broad ‗X‘ stair joins the two laboratory wings together; this stair also creates the main building‘s approach. The two wings of the building offer different characters, even though the ―X‖ stair with meeting rooms brings them together. The function of the ―X‖ stair is to link the schools together across the building‘s three levels; it also architecturally expresses connectivity and collaboration (Dezeen 2012).

Architecture and environment

Within the building the ~~–X~~" stair figure functions as Watch (2008) had suggested in the current laboratory design guidelines, it forms collaborative and social space. The stair accommodates staff and research students‘ collaboration spaces at its lower levels, informal seating and a tea room are positioned in the middle of the X, spaces for researchers‘ shared work are found at the top of the stair. The stair icon uses timber shading devices cladding for shielding the late afternoon sun (Dezeen 2012). The use of natural materials like as timber is advised in Critical regionalism theory, it is suggested in Biophilia and it is appropriate for architecture in a rural area like the Valley of a Thousand Hills.

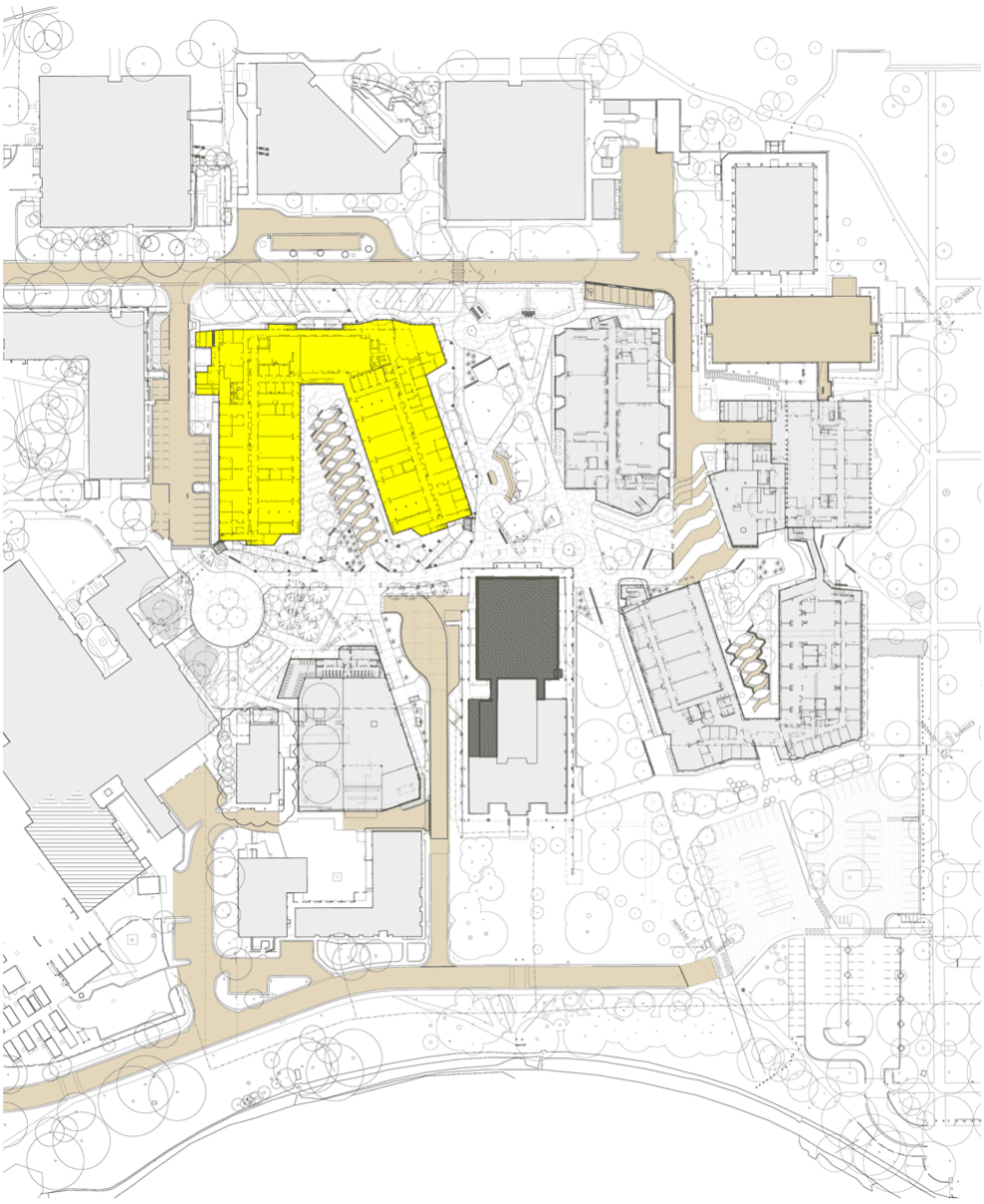

Fig. 4.2.1 The site plan (ArchDaily 2012)

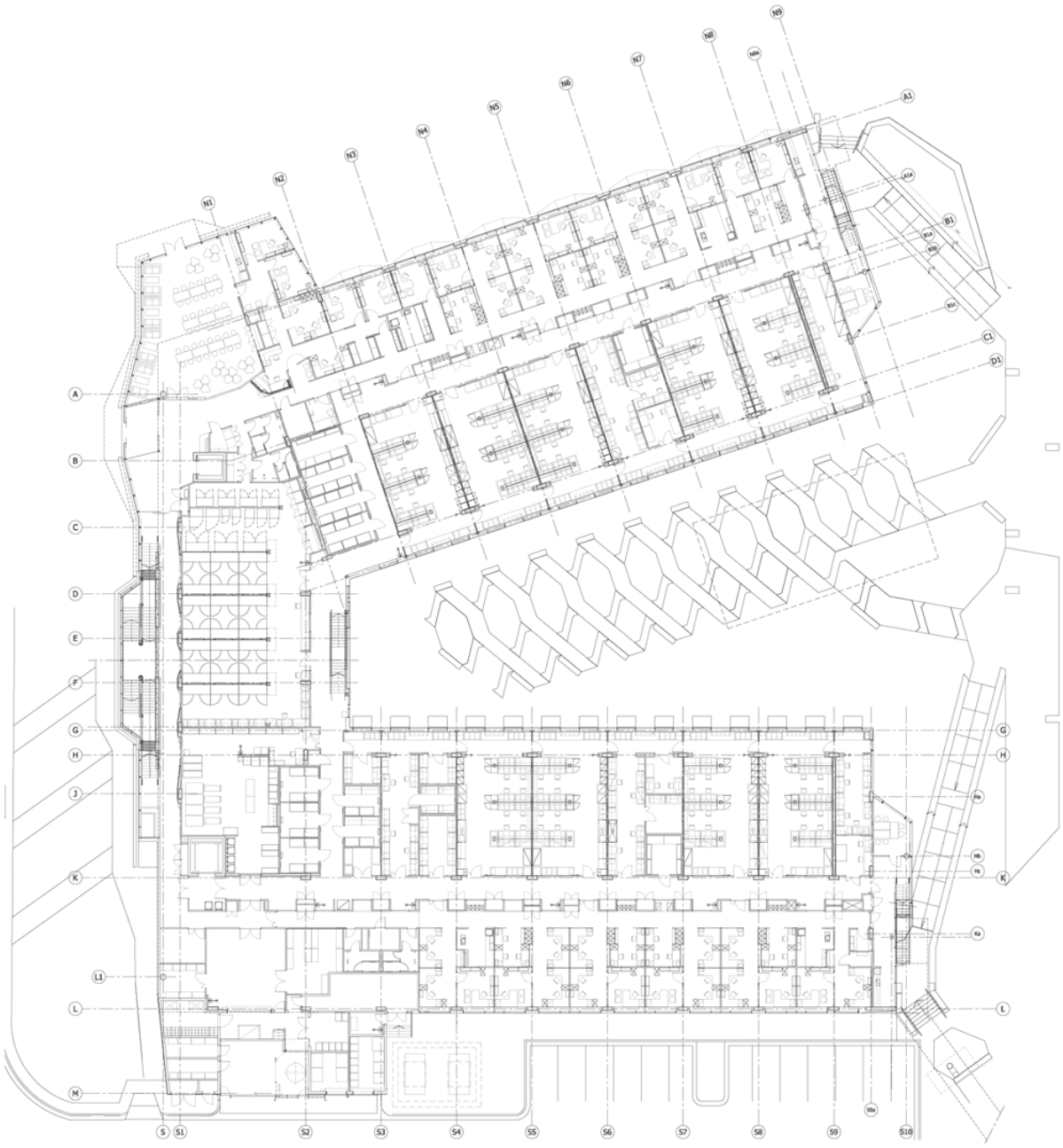

Fig. 4.2.2 The ground floor plan (ArchDaily 2012)

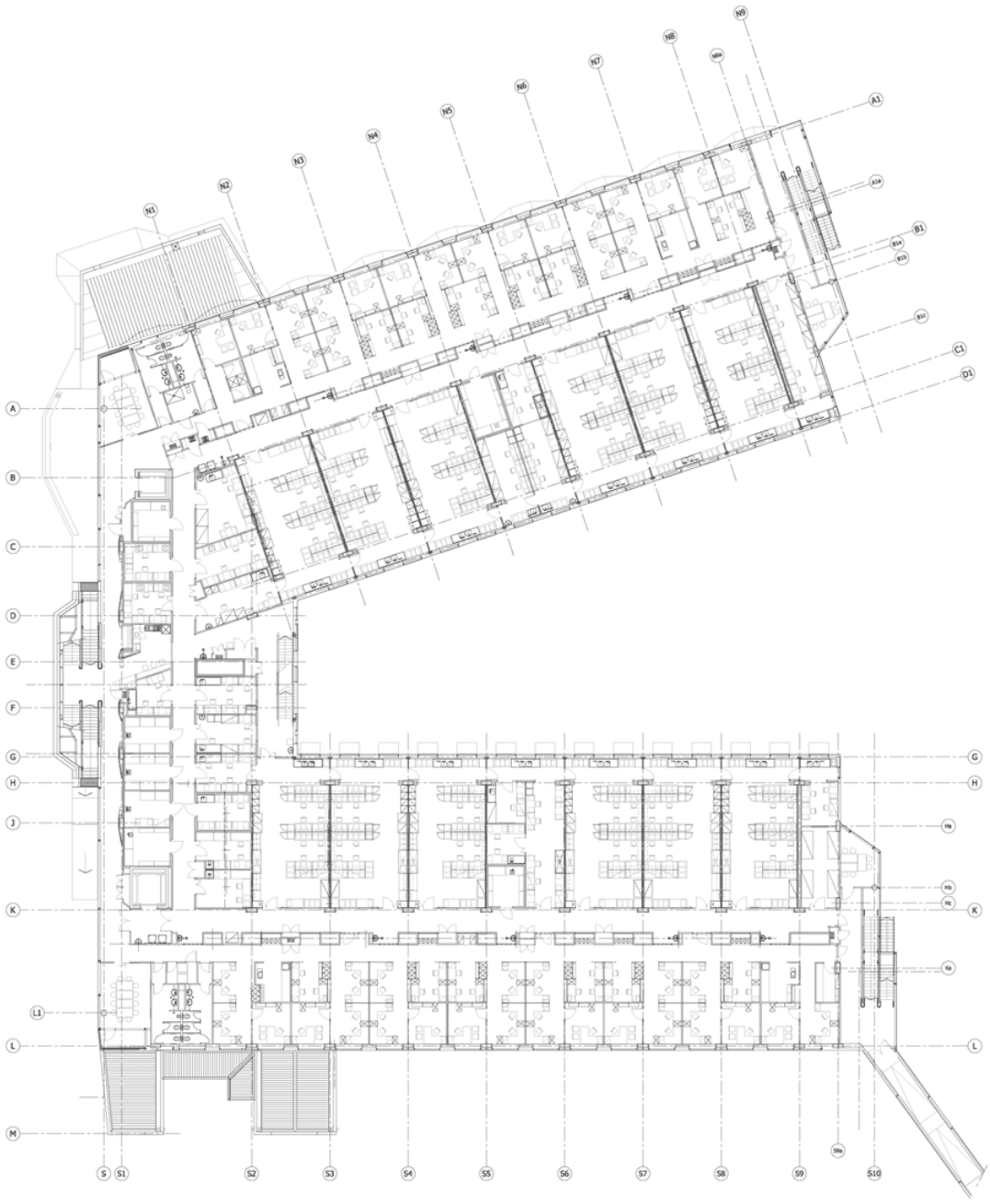

Fig. 4.2.3 The first floor plan (ArchDaily 2012)

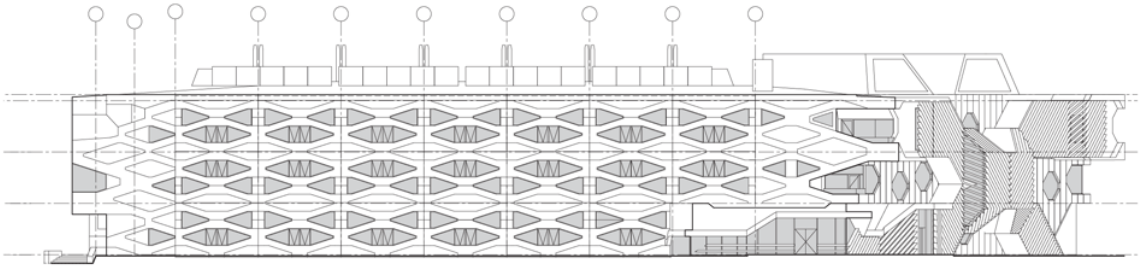

Fig. 4.2.4 North Elevation (ArchDaily 2012)

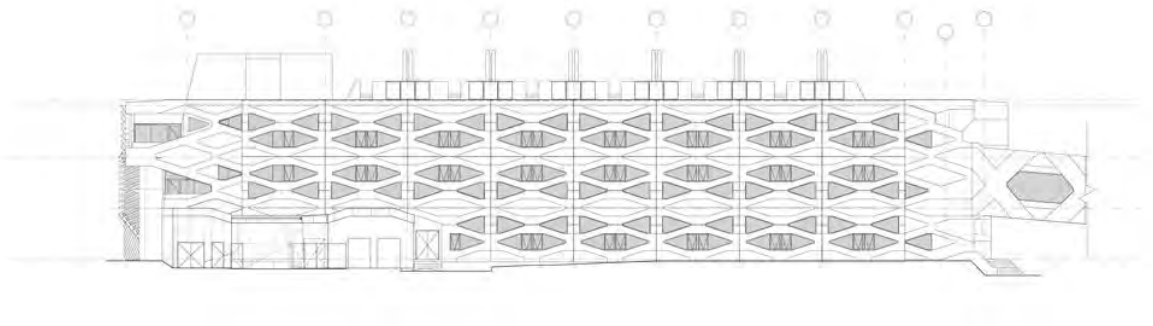

Fig. 4.2.5 South Elevation (ArchDaily 2012)

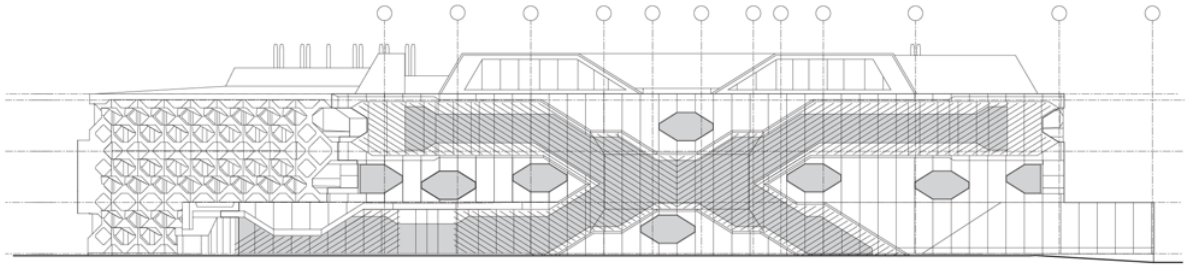

Fig. 4.2.6 West Elevation (ArchDaily 2012)

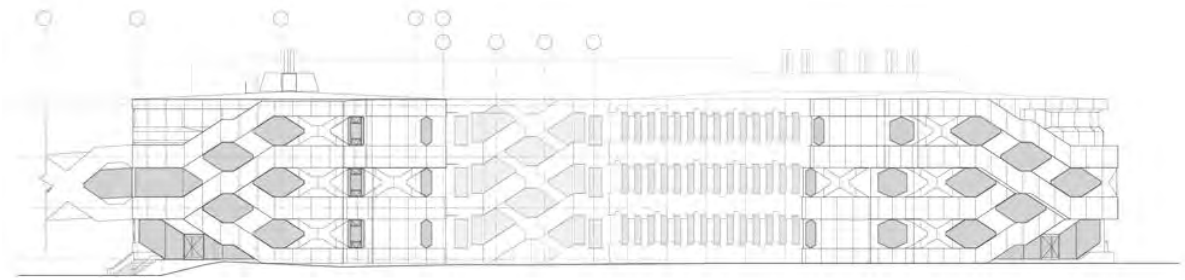

Fig. 4.2.7 East Elevation (ArchDaily 2012)

Working environment

The two laboratory wings encompass adaptable and high performance laboratory spaces that can be freely modified to meet fast altering research requirements. Laboratory fittings and equipment are modular permitting scientists to adjust their laboratory spaces to suit their present undertakings. Researchers work areas and offices are located next to the laboratories with high ceiling spaces functioning as fully naturally ventilated or air-conditioned spaces (Dezeen 2012).

Fig. 4.2.8 Flexible laboratory space (ArchDaily 2012)

Fig. 4.2.9 Flexible office space (ArchDaily 2012)

The scientists‘ spaces are confined within the envelope of a building constructed from a modular precast concrete method. This method forms windows _field‘ on the outside and on the inside of the building. The interior have two windows on each level, one window for views at the height of the desks and another window for bringing natural light into the work spaces at a higher level.

Fig. 4.2.10 A louvred wooden X-shape with staircases links the two laboratory (ArchDaily 2012)

Fig. 4.2.11 A louvred wooden X-shape with staircases night view (ArchDaily 2012)

Fig. 5.2.12 The scientific research centre_s courtyard (ArchDaily 2012)

Fig. 4.2.13 Natural light on circulation routes (ArchDaily 2012)

One of the main features of the California Academy of Sciences is the wavy 2.5 acre green roof with 1.7 million indigenous California plants. This makes it an appropriate precedent study for the proposed UNAIDS Research Institute as traditional medicine consist of herbs that can be grown on green roofs as well. This roof has seven _hills' imitating San Francisco's the seven hills. The roof structure contains curved steel beam sections grillage that supports a contoured concrete slab (Arch Daily 2008).

Fig. 4.3.2 The living roof (D + H 2011)

Fig. 4.3.3 The living roof (D + H 2011)

The piazza skylight

Located in the roof's center is a curved widespread skylight supported by steel tensile structure. This skylight is constructed from stainless steel rods two nets with grillages. The two nets are joined by a vertical steel pipe bars at the nodes. The nodes connections are constructed from a segmented cast stainless steel connector. Therefore permitting all connections with different geometry to be built with one connector type and allowing the desired rotation. A perimeter ring truss supports the tensile structure by transferring lateral forces into the adjoining roof structure (D + H 2011).

Fig. 4.3.4 The piazza skylight (D + H 2011)

Fig. 4.3.5 Natural light in an exhibition space (D + H 2011)

The skylight‘s glass panels are triangular with three-point support. These triangular panels forms faceted geometry therefore drastically reducing cost (D + H 2011).

Renewable energy

Lately architectural design education and profession emphasizes on energy saving buildings. This is an appropriate precedent study for a green building. It has 60,000 photovoltaic cells surrounding the perimeter of the roof. This system provides shelter and controls light for the building visitors; furthermore it provides energy more than 220KW annually which amount to 5% of the building‘s total energy. Tours through the building are offered to exhibit the way the building functions, conservation methods and construction materials used (D + H 2011).

Indoor environmental quality

Biophilic indoor environment is achieved through natural day lighting and ventilation including high-efficiency lighting which implies that this Academy utilizes 30% lesser energy amount than national and municipal requirements (D + H 2011).

Fig. 4.3.6 Exterior of a four-story rainforest dome (D + H 2011)

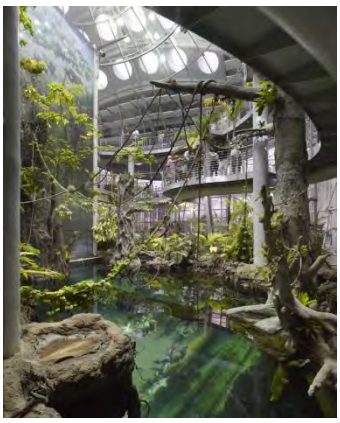

Fig. 4.3.7 Interior ofrainforest dome (D + H 2011)

The building‘s roof sections and transparent facades permit filtration of daylight into the research, office and exhibition space, thus assisting to minimize the use of energy and from electrical lighting heat gain. Thermal comfort, wellbeing and staff productivity is ensured by windows that are operable, natural light and views in frequently occupied working spaces. The public areas have maximum views and daylight. Lighting controls include dimming to ensure the minimum used of electricity lighting (D + H 2011).

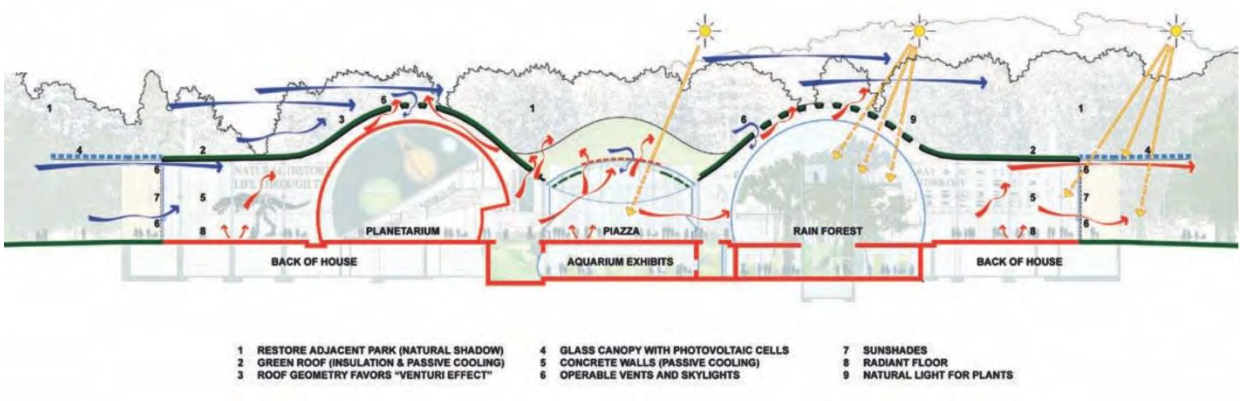

Fig. 4.3.8 Indoor air circulation (D + H 2011)

The exhibit area is naturally ventilated. The ~~h~~ills" shapes roof offers the height changes essential for stack effect ventilation during cool days. The roof hills create a negative pressure during windy weather, therefore resulting in airflow driving pressure. The form and materials of the building is a climatic filter, they minimize the solar heat gain. The building's occupants have control of their environment by means of windows that are easy to operate (D + H 2011).

Water

Utilization of low-flow plumbing fittings and recycled water implies that the Academy utilizes 20% reduced amount of water than code requirement; this cut down municipality water dependency by 85%. The building's plumbing is for the use of recycled water. Bathrooms and the aquarium life support systems used recycled water (D + H 2011)

Fig. 4.3.9 Front Elevation (D + H 2011)

Fig. 4.3.10 Section (D + H 2011)

Building resources

The majority of the materials from the demolished original Academy building were recycled. These materials include high recycled content renewable resources, long life span, low or no VOCs and low embodied energy were used in the Academy building construction (D + H 2011).

Fig. 4.3.11 Solar canopy (D + H 2011)

Fig. 4.3.12 Main entrance (D + H 2011)

Working environment

The two lower floors under the main exhibit floor level are directly adjacent to _back of house functions', such as the aquarium life support, the loading dock and workshops. The scientific library occupies the upper floor and the research departments most of the lower 4 floors, combined with Administrative functions (D + H 2011).

The whole scientific specimen collection is stored between research and administration spaces at the facade and the flexible exhibit floor. The Research and Administration facility are naturally ventilated and well-lit by windows that are operable and by sun blinds that automatic this balances the natural light in the workspaces (D + H 2011).

Sustainability

A holistic design approach involves a severe determination materials used choice and the old Academy materials recycling. The spaces arrangement regarding ventilation and day-light, the effective water and roof run-off usage and energy generation are important to the design of the building. Exhibition strategy includes sustainability. The public is able to learn and view sustainable design principles demonstrations (D + H 2011).

The Design

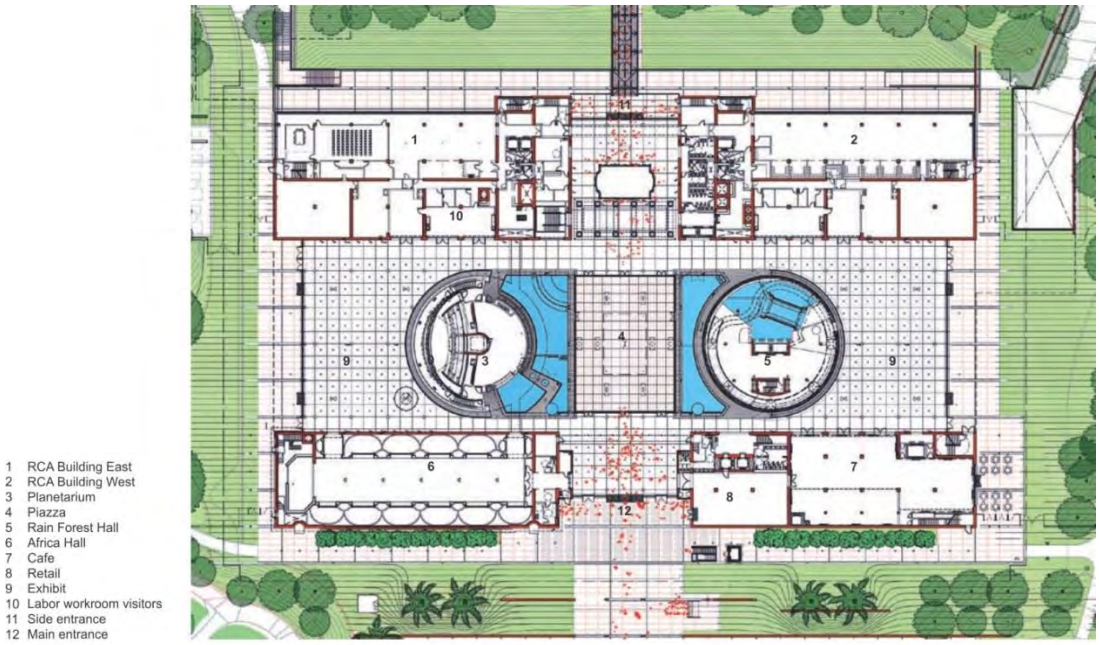

Fig. 4.3.13 Ground floor plan (D + H 2011)

The building preserves the former locality and orientation, and similar to the first Academy, the functions are structured around the Piazza. African Hall, Steinhart Aquarium entrance and North American Hall which are significant history features from the former Academy are preserved as memorial and a linkage to history. Two sphere-shaped exhibits, Steinhart Aquarium entrance, the Rainforest Biosphere and the Planetarium Dome next to the Piazza signify the Academy: Earth, Space and Ocean. Earth, Space and Ocean icons exert the upward force to the roof creating a ~~–s~~welling" roofs-cape. The roof is planted with drought resistant native plants (D + H 2011).

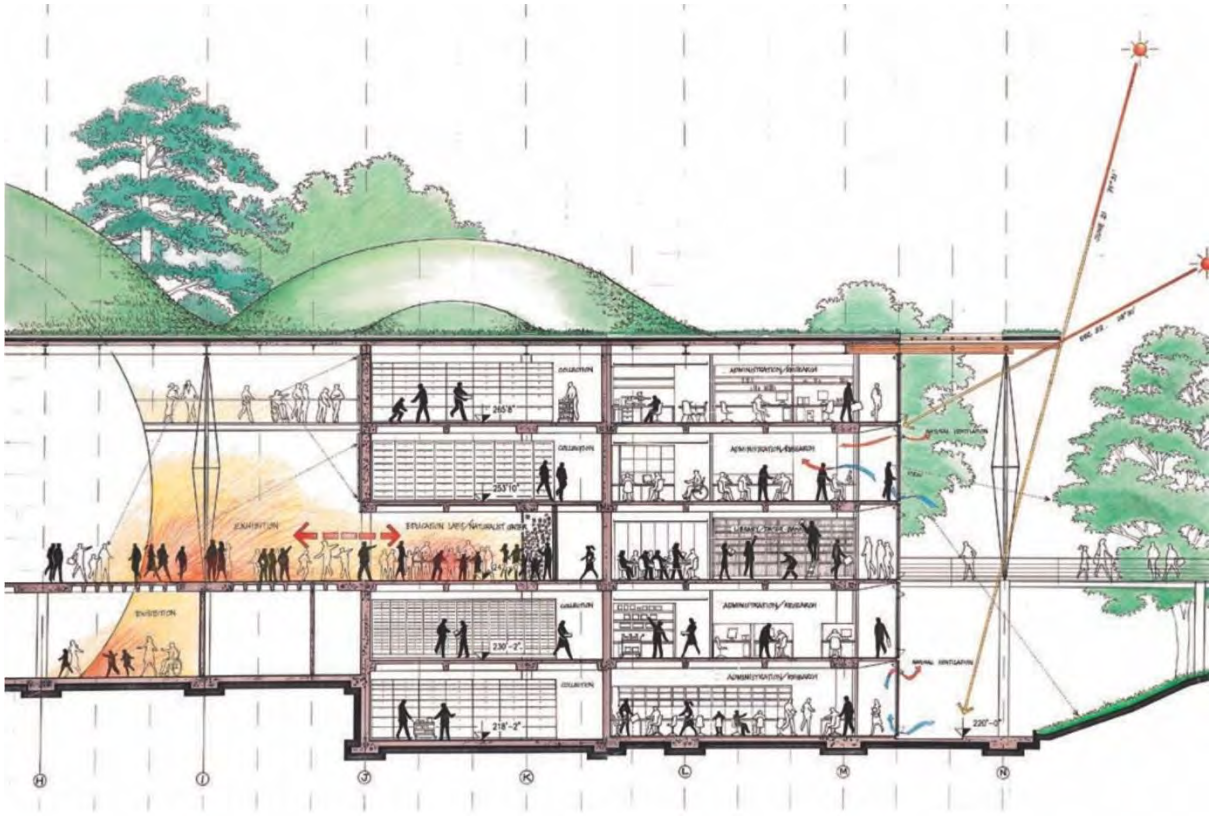

Fig. 4.3.15 The exhibition spaces (D + H 2011)

Materials

To emphasize the roof and the building as a whole, the materials used for the new Academy are minimal. The use of color is sporadic, (e.g. only to indicate circulation of visitors), leaving the spaces neutral in color intentionally. The material palette is ―frugal", not rich, to make the space strong and essential. Light gray architectural concrete is the main material for the walls and closed facades, apart from the restored the African Hall which features the original limestone. The formwork tie holes have been left visible and are used to fix exhibits. The floors are polished concrete and the exhibit hall soffit consists of a series of individual white acoustic panels, mounted horizontal under the undulated roof, thus creating a ―fish scaled" surface (D + H 2011).

The four glazed facades in between the more solid blocks are executed with extra white glass, to enhance their transparency and to improve the visual transition of the interior into the Golden Gate Park. The roof is a hybrid concrete\steel structure with vegetation on top, including a water ―storage" layer. The roof transforms towards the exterior into a light steel structure supporting glass panels with PV cells (D + H 2011).

Structural solutions

From the ground floor upward, the building seems as four four-sided structures signifying the old Academy planning. Concrete shear-walls and concrete flat plate floors on concrete columns on foot grid are the main buildings‘ structures (D + H 2011).

Conclusion

California Academy of Sciences followed critical regionalism principles by taking design ideas from the context. The roof form derives from the mountains in its contexts. The building also uses local and recycling materials. The building is definitely biophilic and it has gone an extra mile of literally bringing nature into the building.

These design tools will influence the design of the proposed UNAIDS Research institute, since traditional medicine philosophy and practice have a close relationship with natural environment.

K-RITH has open and closed-up laboratories. Laboratory floors are open with little designated laboratories (closed-up labs) for specific work. The laboratories are designed to accommodate certain equipment and some are designed to accommodate certain safety precautions (Roux 2014). This type of medical research environment arrangement is also encouraged by Watch (2008) in Chapter Three. This is the planning that will also be appropriate for the design of the proposed UNAIDS Research Institution.

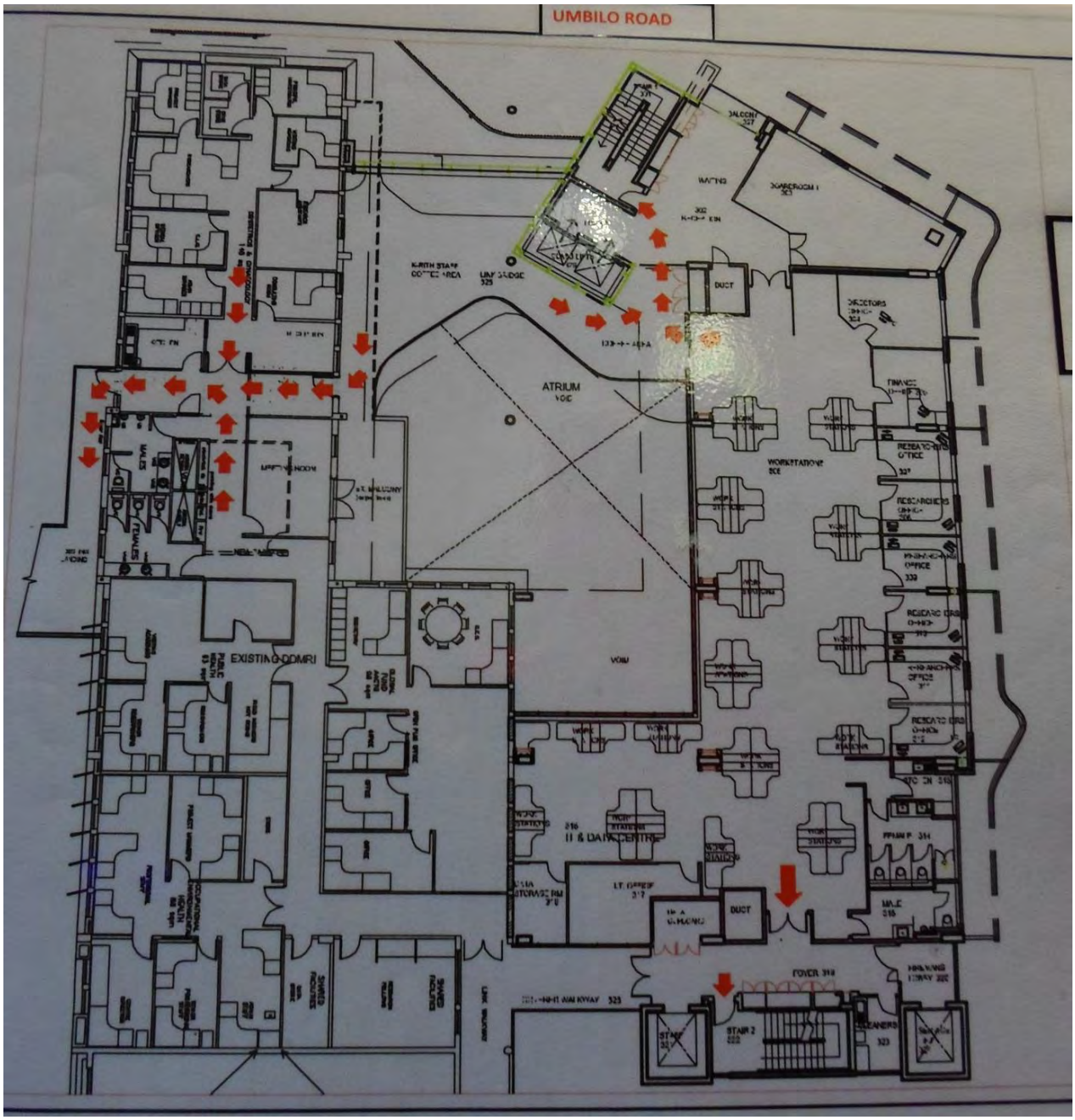

Fig. 5.1.3 Second Floor CAPRISA offices plan (By Author)

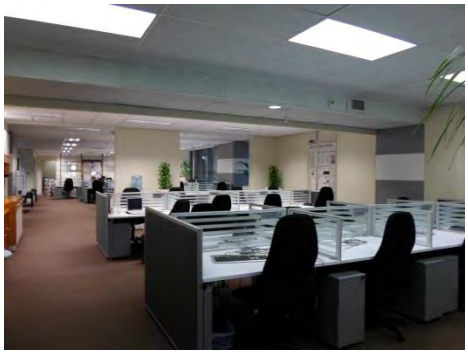

Fig. 5.1.4 CAPRISA offices (By Author)

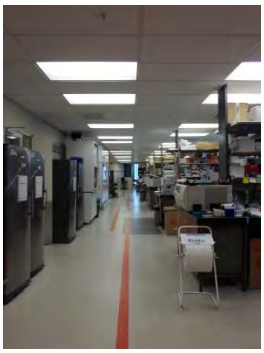

Fig. 5.1.5 4th Floor laboratories(By Author)

Fig. 5.1.6 4th floor reception (By Author)

The atrium links two existing buildings at 4 levels. The atrium also forms an enclosed circulation and networking coffee shop lounge which leads to four seminar rooms and public ablution. The atrium interior is treated by special acoustic timber finish walls that create a comfortable warm space. The timber floors finish under the atrium extends outside into the open deck creating a flow between the indoor and outdoor space that leads into a water feature. As stated by Watch (2008), this K-Rith building atrium proves that spaces such as atriums encourage social interaction as this is where students, visitors and scientists meet.

Fig. 5.1.7 Atrium (By Author)

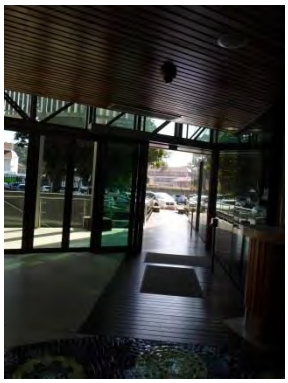

Fig. 5.1.8 Timber floor finish linking spaces (By Author)

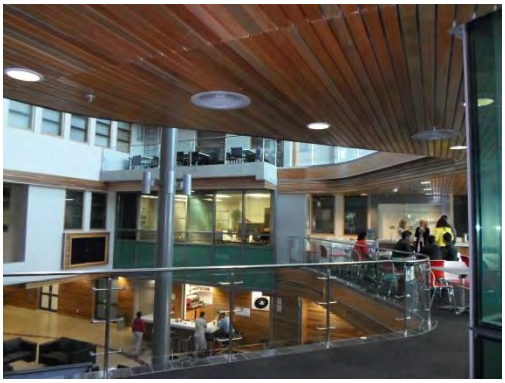

Fig. 5.1.9 Coffee shops around an atrium (By Author)

Furniture and Fittings

The laboratories have hand wash basins, eye washers and showers in every floor for use in the event a scientist get in contact with acid or any other dangerous substance. These laboratory safety design guidelines were not mentioned in environments that accommodate traditional medicine. The laboratories granite working tops are good for resisting chemicals. The room for weighing up chemicals and specimens has a solid worktop to keep equipment stable. Computer desks are situated at the end of every worktop row. The laboratories allow a lot of cupboard, freezers, chemicals store and working equipment spaces (Roux 2014).

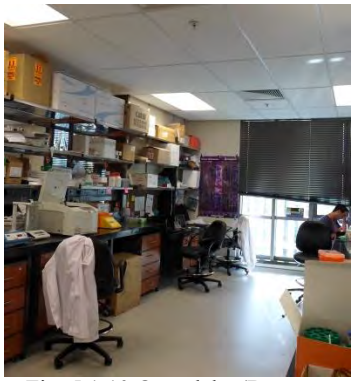

Fig. 5.1.10 Open labs (By Author)

Fig. 5.1.11 Weighing room granite worktop (By Author)

Fig. 5.1.12 Elbow action taps (By Author)

Fittings are designed to encourage infection control, eliminate contamination and increase hygiene. These are design principles that are not found in environments that accommodate traditional medicine. Basins use special taps that open or close with elbows. Kitchens and autoclaves are located in all laboratory floors for washing and sterilizing working equipment. Laboratories have double doors for bring huge equipment in (Roux 2014).

Each and every laboratory floor has fire horse reels and fire extinguishers that comply with fire regulations. The fittings include alarms that detect the change in interior negative pressure to keep the inside environment at a specific negative pressure and sterile. The building also has security controls in all levels and entrances for access control. Laboratories can only be accessed by CAPRISA or K-RITH staff through access cards (Roux 2014).

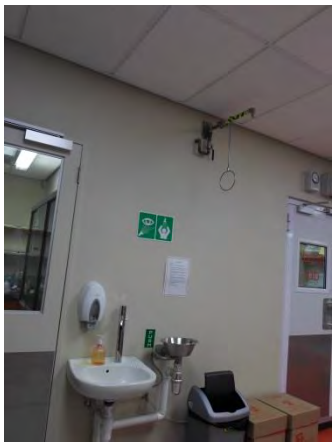

Fig. 5.1.13 Emergency shower, eye washer and basin (By Author)

Fig. 5.1.14 Access control in all lab entrances (By Author)

Fig. 5.1.15 Fire horse reel and fire extinguisher in all labs (By Author)

Special features

The research centre has an entire electrical, UPS and HVAC dismissal. This implies that in case of power failure all systems are completely recoverable and efficient. The BSL3 laboratory has triple glazed mechanically ventilated windows and double glazing therefore complying with green building guiding principle (Roux 2014).

The building specific excellent continuous air reticulation system flow to each laboratory and auxiliary rooms achieve pressure protocol that provide the suppression levels essential in the BSL3 laboratory (Roux 2014) .

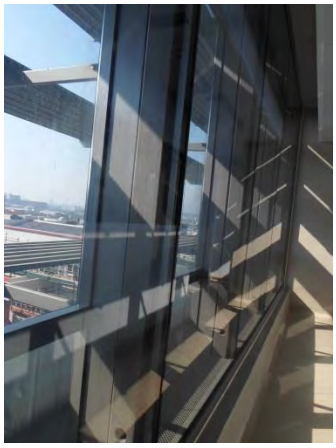

Fig. 5.1.16 Triple glazed windows (By Author)

Fig. 5.1.17 Negative pressure devices (By Author)

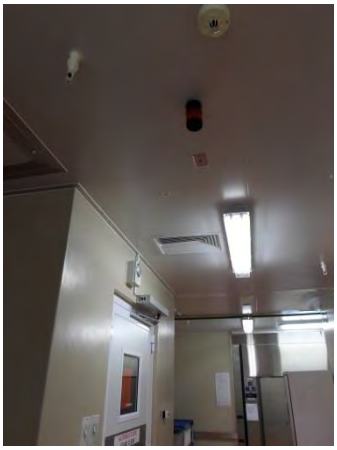

Fig. 5.1.18 Sealed ceiling and negative pressure monitors (By Author)

Biosafety Level 3(BSL3)

K-RITH meets the international standards for their Biosafety Level 3 laboratories. Due to scientists handling risky strains of HIV and extensive drugs resistant TB during research, the building has employed biosafety level 3 as the highest standard for all research work of micro-organisms that are bio hazardous. Therefore all rooms are under negative pressure; this means that there are fans sucking the air out and that the area is filtered out through high efficiency air-filtration systems that make the air sterile as it leaves the building. The biosafety level 3 laboratory achieves three tasks. 1. They protect the workers from dangerous infections, 2. They protect the public and the workers that use spaces outside the BSL3 laboratory from being affected by hazardous microbiology 3. Finally they ensure that everything that comes out of the BSL3 laboratories in completely safe for the public in general (Roux 2014)

Fig. 5.1.19 View to a TB BSL3 lab from a corridor (By Author)

Fig. 5.1.20 Sealed doors (By Author)

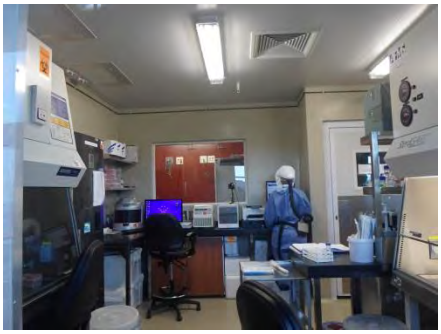

Fig. 5.1.21 View to a TB BSL3 lab from a corridor showing a scientist in a safety outfit (By Author)

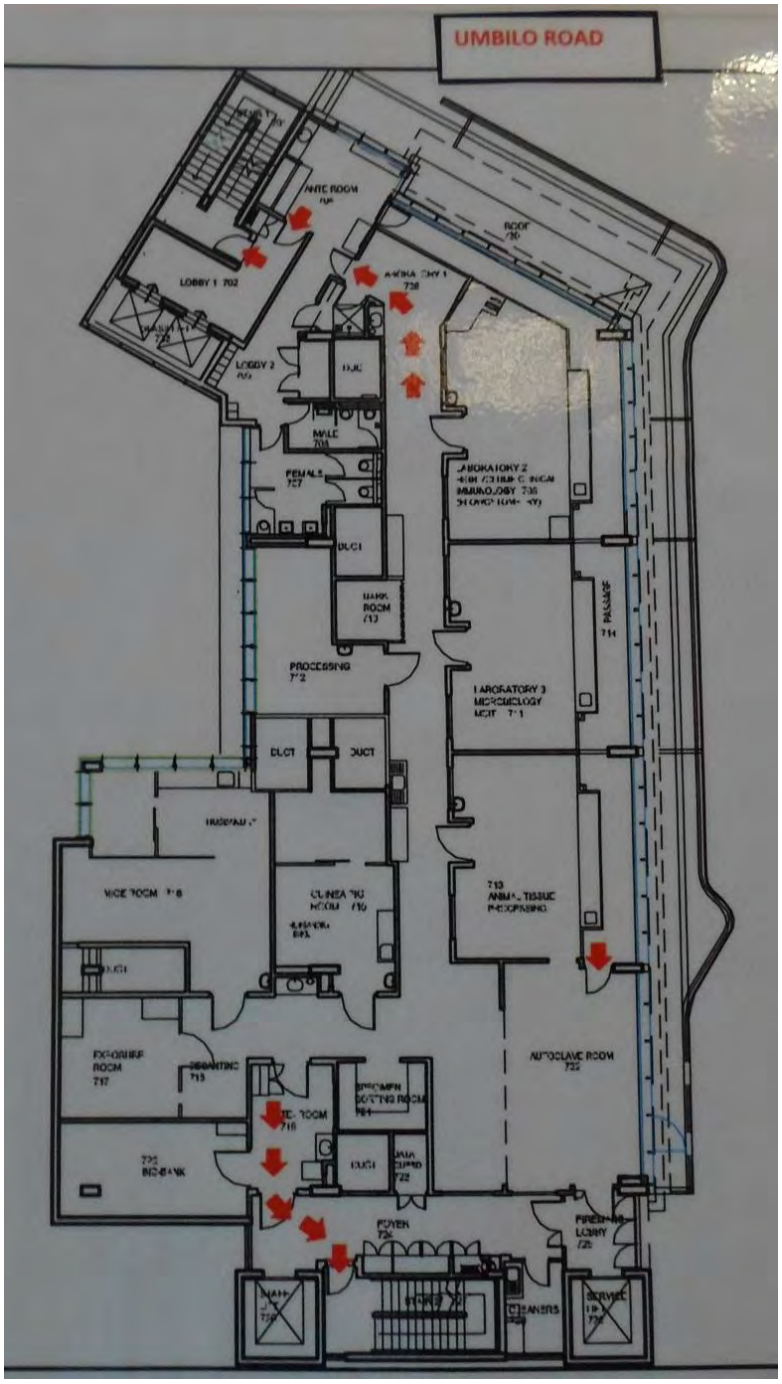

Fig. 5.1.22 7th Floor Plan BSL3 laboratory (By Author)

Unlike other laboratories floors, before you enter in the BSL3 laboratory you enter an ante-room first and scientists have to put on protective laboratory work outfits namely Tyvek suite to protect scientists clothing, N95 mask for respiratory, double pairs of gloves and shoes covers. Additionally different to other laboratories in floor levels 4, 5 and 6, the BSL3 laboratories in floor level 7 has sealed ceiling, doors, windows and even signs this is done to monitor air inside (Roux 2014).

Energy saving systems

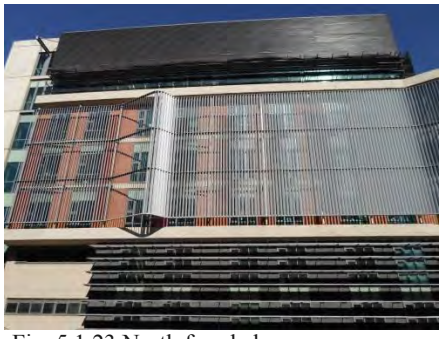

Fig. 5.1.23 North façade louvers (By Author)

Fig. 5.1.24 West façade louvers (By Author)

Fig. 5.1.25 West façade louvers (By Author)

The building has the –T5" lamp technology for Offices and Laboratory luminaires. This –T5" lamp technology guarantees effective light to power relationship output. Furthermore CAPRISA and K-RITH offices in level 2 and 3 are equipped with occupancy sensors therefore guaranteeing that lights are turned off when there is no one in the building and this minimizes energy consumption. The building's Building Management system monitors the lights in all floors. The building also has louvers on all north and west facing façade glazing (Roux 2014).

Artwork

An artist and an architect Jane du Rand's art selection follow Critical regionalism and biophilia principles. The mosaics designs take elements from South African context and natural patterns and forms. The mosaics designs draw from cells, viruses and indigenous medicinal plants. This is seen in a large surface of the wall with a double helix DNA ribbon. The art displayed in the building also follows IKS policies of sourcing local artists(Roux 2014).

Fig. 5.1.26 Indigenous plants mosaics (By Author)

Fig. 5.1.27 Indigenous plants mosaics and water feature leading into the main entrance

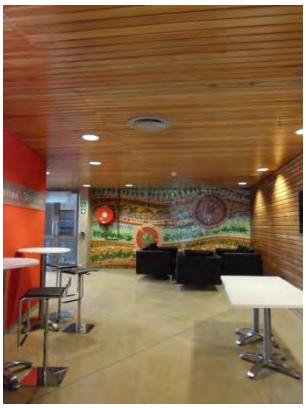

Fig. 5.1.28 Interior art (By Author)

Young participants involved were some recent art graduates as well as unskilled trainees who had no work prospects. A large number of the participants were people living with HIV/previous TB sufferers and the artwork project created jobs for a large number of young artists for a period of 12 months (Roux 2014).

5.2 KwaZihlahla Zemithi Pharmacy

Location: UMlazi, Section J, Durban

Date: 1977

Fig. 5.2.0 Street view (By Author)

Fig. 5.2.1 Map locating Umlazi (http://www.weather-forecast.com/)

Context and Overview

KwaZihlahla Zemithi pharmacy is located in Umlazi; a township situated south-west of Durban. Umlazi Township is within the eThekwini Municipality and is located approximately 17 kilometers South of Durban‘s Central Business District. KwaZihlahla Zemithi is situated in J-Section.

Planning

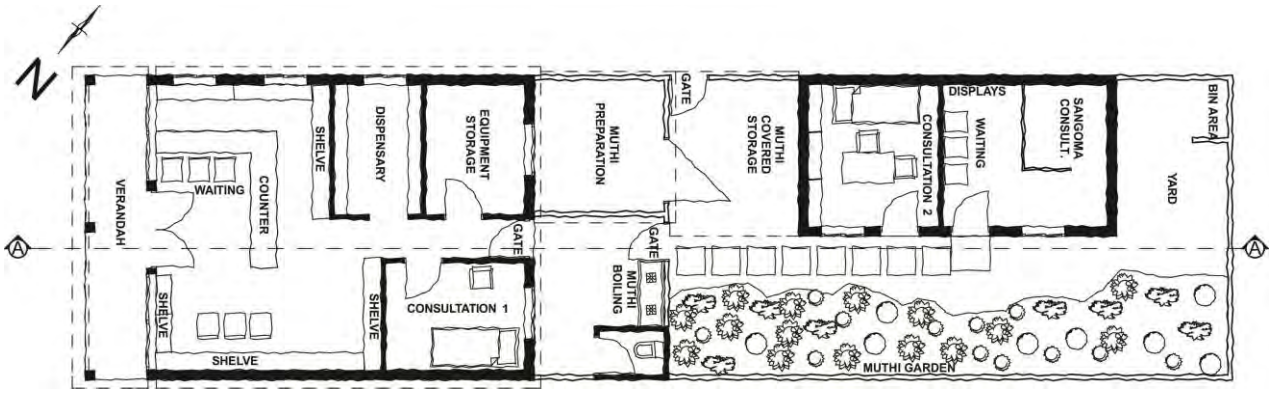

Fig. 5.2.4 Pharmacy layout (By Author)

The pharmacy has the following accommodation: a retail area, 3 consultation rooms including one for a *sangoma*, indoor equipment storage, outdoor *muthi* storage, dispensary, *muthi* preparation area, *muthi* boiling area and *muthi* garden. The pharmacy is facing a busy four way street for easy access. Large windows on the façade facing the street in the retail areas allow pedestrians and motorists‘ passing by a view of what is happening inside the shop.

Large windows also allow the employees inside pharmacy to have a view of the road and finally they permit natural light inside the shop. Inside the pharmacy, there is a waiting area for people who are either visiting Cele a *nyanga*, *isangoma* or people waiting to buy *muthi* over the counter.

The pharmacy has exhibitions of old animal parts that are not for sale, for example there is about 3m long python‘s skin that is about 50yrs old. The house is divided into 3 portions. The first part is a pharmacy, the middle part is where *muthi* preparation takes place and the further from the road are quiet consultation rooms, 1 for a traditional doctor and another one for a *sangoma*. The consultation rooms are facing herbs gardens.

Fig. 5.2.5 Herbs shelves in the pharmacy (By Author)

Fig. 5.2.6 Powder medicine shelve (By Author)

Muthi preparation area is where herbs get chopped and grinded into smaller pieces before they are boiled or before they are taken to the retail area. The preparation area is facing the boiling area and the outdoor *muthi* storage. Cele stated that the *muthi* is boiled for 24hrs to prevent it from expiring. Therefore the boiling area is isolated from the pharmacy and consultation rooms. (So that in the event of fire outbreak, fire does not spread to the rest of the house.) The boiling area is only attached to an outdoor toilet. There is no separation of clean and dirty environments. The outdoor *muthi* storage area has a gate from the street for delivery access.

Fig. 5.2.7 *Muthi* boiling area (By Author)

Fig. 5.2.8 *Muthi* preparation area (By Author)

The *sangoma* consultation room belongs to Mr. Cele‘s daughter who is a *sangoma*. Only clients that are there to see a *sangoma* are allowed inside a *sangoma*‘s consultation area. A visitor can only go as far as a waiting area. The consultation area is regarded as sacred because this is where ancestors live. The ancestors and bones help her diagnose a client who is visiting a *sangoma.*

The *muthi* garden has plants that are only suitable to grow under that shaded environment. Plants that grow on the rocks or river banks cannot be planted in these premises. The garden is positioned in a secured fenced private area. The consultation room 2 belongs to Cele. It has a bed for examining patients and a cupboard that is kept locked. This is where Cele keeps his private medicine ingredients book that his father left him. The consultation room also has a number of chairs to cater for group consultation.

Fig. 5.2.9 Consultation rooms
(By Author)

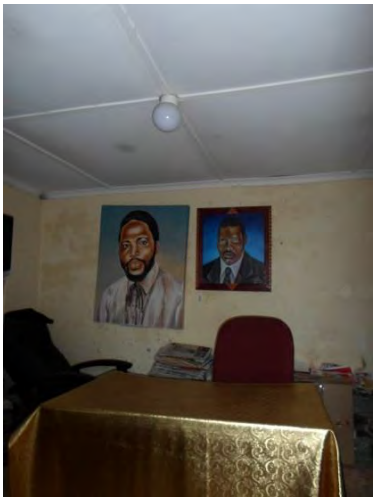

Fig. 5.2.10 *Inyanga*'s consultation Room (By Author)

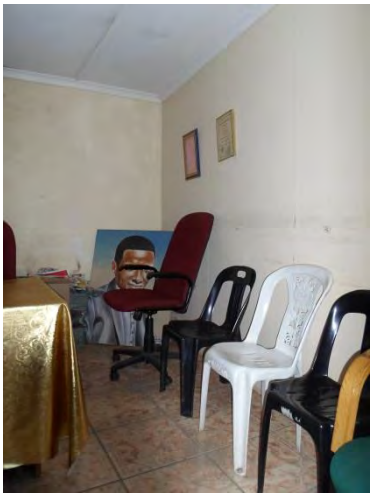

Fig. 5.2.11 Chairs for group consultation
(By Author)

Fig. 4.2.12 Isangoma waiting area with her qualifications certificates display (By Author)

Fig. 5.2.13 The sacred sangoma consultation area (By Author)

Fig. 5.2.14 Big windows for a view from inside to the road
(By Author)

Fig. 5.2.15 Herbs garden opposite consultation rooms
(By Author)

Response to climate

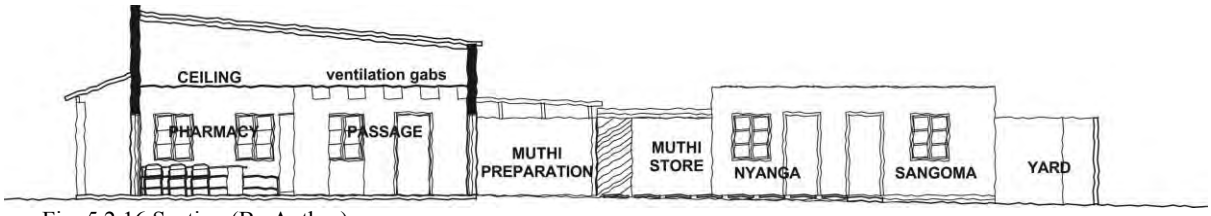

Fig. 5.2.16 Section (By Author)

All the internal walls either do not touch the ceiling or have spaces below the ceilings for cross-ventilation. This is to keep the interior at a particular temperature in order to maintain the medicine and herbs at a specific temperature in the dispensary. Cross-ventilation and natural light was crucial in the design of this centre. The *muthi* boiling place is well ventilated to keep the smoke and heat out of the premises. It only has a small overhang covering the gas stove in case of rain. The covered *muthi* storage is also well ventilated with spaces between roof sheeting and walls.

The *muthi* preparation area has about 1800m high wall with roughly 500mm spaces between the wall and the corrugated sheeting roof for cross-ventilation and natural light. The big windows in the retail area allow maximum light into the shop however they are shaded by a verandah to eliminate sun‘s heat and direct sun‘s rays.

Fig. 5.2.17 Gaps below ceiling for ventilation (By Author)

Fig. 5.2.18 A space between a wall and ceiling in the dispensary (By Author)

Fig. 5.2.19 *Muthi* preparation area (By Author)

Fig. 5.2.20 *Muthi* well ventilated outdoor storage with delivery gate. (By Author)

Fig. 5.2.21 Preparation area with grill blocks for ventilation (By Author)

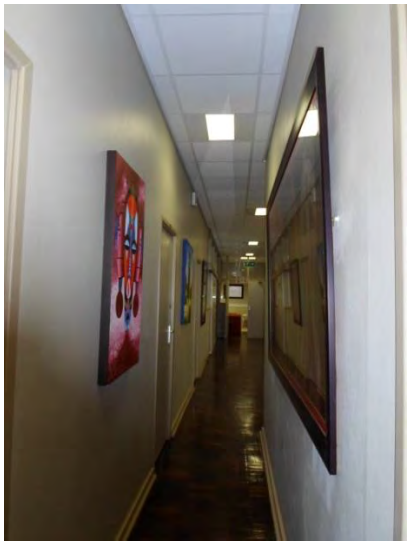

Fig. 5.3.2 Lab passage with earthy colours (By Author)

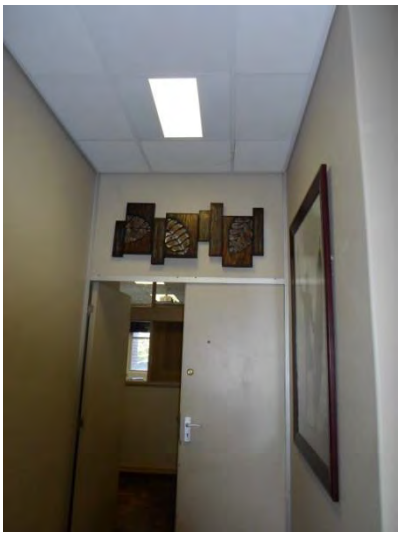

Fig. 5.3.3 Lab foyer with African art display (By Author)

The workshop was revamped for academic purposes. Its task was to investigate the safely and efficacy of traditional medicine and demonstration of traditional medicine and biomedicine consultation and research in one built form. Additionally, the aim for this facility was to encourage interaction between medicine students, scientists and indigenous custodians (*sangomas* and traditional healers) (Ndlovu 2014).

Planning

The new renovations proposed for offices, open plan areas, boardroom, consulting room and Traditional Hut mock up plus specialized laboratories and a BSL-2 air conditioning requirement for new laboratories. A lot had to be done to change the previously physics workshop‘s services to suit laboratory requirements.

The seminar room is positioned not far from the entrance for easy access; it is also adjacent to the kitchen for easy access to the refreshments. This seminar room hosts meetings for traditional healers, research doctors and other organizations interested in traditional medicine (Ndlovu 2014). Opposite the seminar room is an open plan office for the lab staff. The seminar room is adjacent to the staff‘s open plan office with glass on both rooms to allow visual interaction.

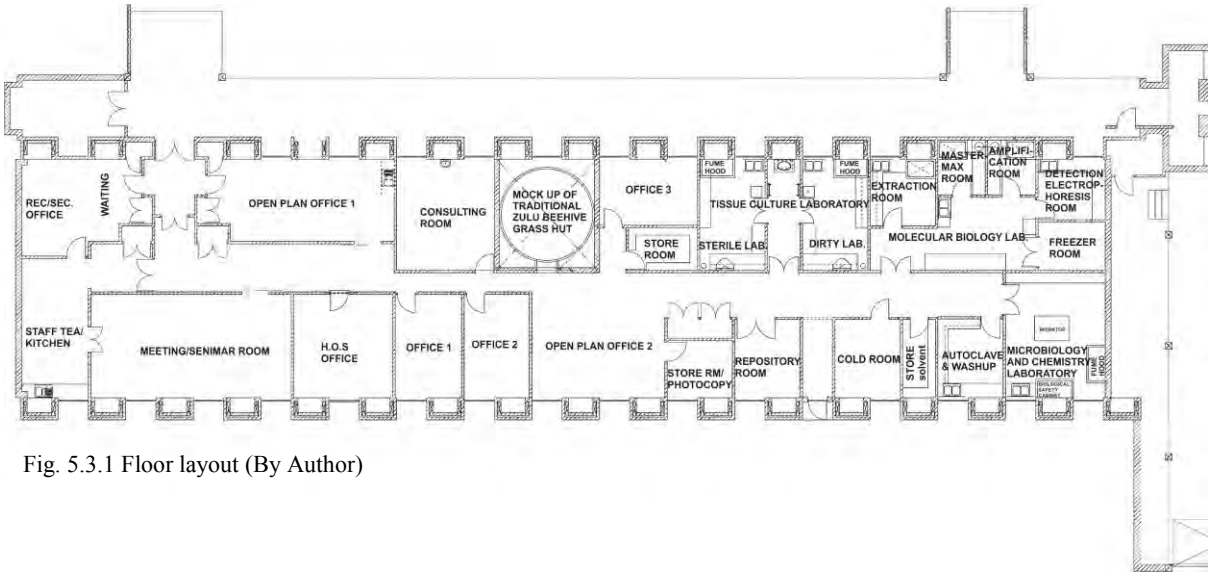

Fig. 5.3.1 Floor layout (By Author)

This open plan office is allocated for the lab staff that supervises trainings that takes place in the seminar room. The facility has two open plan offices; one office is allocated for the laboratory staff training the traditional healers as mentioned and the other office is for medical postgraduate students (Ndlovu 2014).

As previously stated that this facility was mainly put up for academic reasons, there are two consultation rooms which are used for academic demonstrations (Ndlovu 2014).

Fig. 5.3.4 Seminar room (By Author)

Fig. 5.3.5 Traditional Zulu hut (By Author)

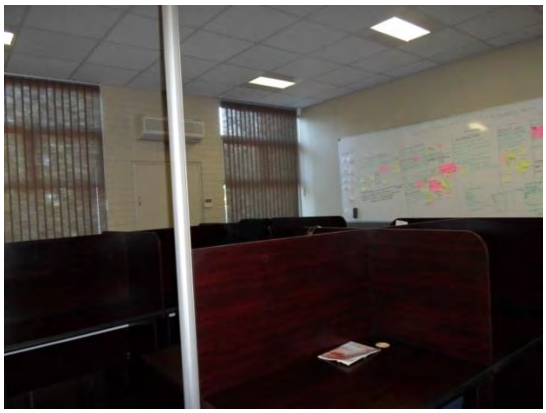

Fig. 5.3.6 Postgraduate students open plan office equipped with students‘ storages and working desks (By Author)

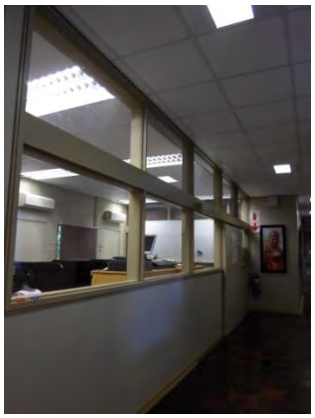

Fig. 5.3.7 Lab staff open plan office with glass for view towards the seminar room (By Author)

One consultation room is for demonstrating biomedical practices consultation on how a doctor meets a patient, enquires medical history and does checkups processes. The mock traditional Zulu beehive grass hut is for demonstrating how a traditional healer diagnoses a patient through throwing bones. The material for the traditional hut has been treated with a fire retardant agents. Furthermore the hut was also designed for traditional healers as a place for welcoming their herbs into the laboratory for investigation (Ndlovu 2014).

If a traditional healer is taking his herbs somewhere outside his house, he burns incense to let the herb know that he is taking it to the laboratory for investigation purposes. However, the laboratory currently limits the burning of herbs due to the installed fire systems. Therefore traditional healers a prohibited from burning herbs in the traditional medicine laboratory (Ndlovu 2014).

Fig. 5.3.8 Dirty lab (By Author)

Fig. 5.3.9 Sterile lab (By Author)

Fig. 5.3.10 Molecular biology lab (By Author)

Traditional healers and other people who claim to have herbs with curative potential are welcome to bring their herbs to the traditional medicine lab for investigation. The herb research on human tissues begins in the tissue culture lab, and then to the molecular biology lab followed by microbiology and chemistry lab it is then frozen for life in the repository (Ndlovu 2014).

In a tissue culture lab is where herb‘s efficacy is tested on cell lines. The tissue culture laboratory is divided into dirty lab and sterile lab. In the dirty lab that is where they prepare and process the research materials under a fume hood. The sterile laboratory is only for analysis and it is equipped with microscopes and fume hood to keep the laboratories sterile. A scientist is required to change lab coat for another coat when moving from a lab to another. All laboratories are highly sterile environments. Outside air is not permitted inside the labs, and the air inside the labs in frequently sucked out of the labs by air-conditioning. All laboratories do not have windows except in the microbiology/chemistry lab. This is because

the microbiology/chemistry lad does not accommodate cell lines. Laboratories doors are designed to prohibit air from outside the labs (Ndlovu 2014). The laboratories environments are kept sterile by fume hoods and BSL-2 air conditioning that is fitted with a suppression and extraction system (Ndlovu 2014).

Fig. 5.3.11 Microbiology/chemistry lab has windows. This is because here scientist work with infections not delicate body tissues and cell lines (By Author)

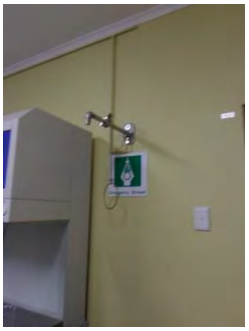

Fig. 5.3.12 In case of emergency shower in the Microbiology/ chemistry lab (By Author)

Fig. 5.3.13 Microbiology/ chemistry lab (By Author)

After the research processes in the tissue culture laboratory are done, the cell lines are taken to the molecular biology lab where genes are tested on how they have an impact on an herb‘s efficiency, from there to a mastermix, then an amplification room, and then detection/electrophoresis room where the scientist works with DNA, RNA and protein. The molecular biology lab has its own freezer. The freezer is closer to the laboratories to avoid contamination when moving the cells from the lab to the freezer (Ndlovu 2014).

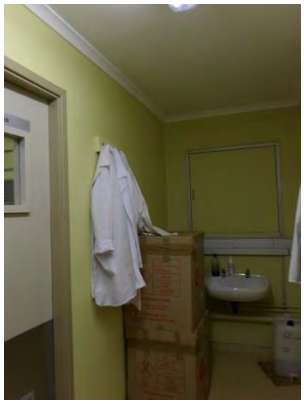

Fig. 5.3.14 Sterile lab coat (By Author)

Fig. 5.3.15 Fume hood (By Author)

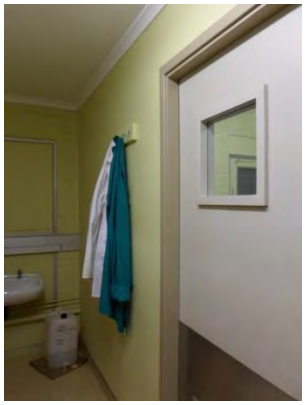

Fig. 5.3.16 Dirty lab coat (By Author)

Fig. 5.3.17 Step threshold in solvents store door to prevent liquid from leaking out (By Author)

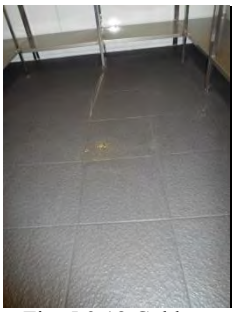

Fig. 5.3.18 Cold room drain (By Author)

Fig. 5.3.19 Cold room threshold (By Author)

Fig. 5.3.20 BSL-2 Plant in courtyard
(Thembelani facilities consultants)

Fig. 5.3.21 Generator
(Thembelani facilities consultants)

Fig. 5.3.22 Extraction & Suppression system Plant
(Thembelani facilities consultants)

Finishes

The laboratory follows critical regionalism through the usage of earthy colours that are found in traditional African art and architecture in the public areas. The warm timber is used in seminer room and passage windows, floors, skirtings and artwork.

The laboratories floors have vinyl sheeting with welded joints to prohibit dampness that can cause germs.

Conclusion

Traditional medicine laboratory demonstrates how traditional medicine can be research in a scientific environment.This is one of the sucessful Indigenous Knowledge Systems Policy initiatives. It empowers the use of traditional medicine through scientific investigation. Although this laboratory accommodates a small number of scientists but it gives an idea of the type of an environment that is essential for traditional medicine research in a laboratory. These spaces will then get improved in the proposed UNAIDS Research institute.

CHAPTER SIX

SUMMARY OF THE STUDY, ANALYSIS, DISCUSSION AND FINDINGS

6.0 Introduction

This section reviews this study's investigation on traditional medicine and biomedicine research processes, state and environments. Furthermore this section of the dissertation is based on the discussions in chapter 2, 3 and 4. The followings information has answered some of the research questions. The interview with Proffesor Gqaleni assisted in understanding the state and future plans of traditional medicine developments, with the traditional medicine laboratory as the first step. The interview with Saziso Ndlovu, a lab manager in the UKZN traditional medicine laboratory provided an insight into how traditional medicine research takes place in a scientific environment, Cele shed some light on how traditional medicine is discovered, searched, its preparation processes and its storage. An interview was held with Dr. Kogielem Naidoo a head of the Treatment Research Programme at CAPRISA on the 4th June 2014. Other meetings were held with Angela Carr-Hartley an office manager at CAPRISA, Natasha Samsunder a head of CAPRISA laboratory and Lynne Roux a Laboratory Compliance Manager at K-RITH on the 18th of June 2014 in K-RITH Tower Building. The aim of these interviews was to shed light on the processes and environmental requirements for biomedical research.

Professor Ggaleni was identified as a key informant for this research; a meeting was arranged in the UKZN Traditional Medicine Laboratory, Clarence Building, Howard College. The plan was to conduct interviews with the followings disciplines: the research organizations and the indigenous knowledge custodians. The research organizations consist of Professor Gqaleni's AIK Innovations, CAPRISA, UKZN and traditional medicine laboratory scientists. The indigenous knowledge custodians sector involves Cele the traditional healer.

Professor Nceba Gqaleni owns AIK Innovations Pty. Ltd. organization established February 2012. AIK Innovations specializes on African Indigenous Knowledge's research, growth and commercialization. AIK Innovations further provides HIV/AIDS training and traditional medicine research and policy development.

An interview was conducted with Gqaleni with the key questions to establish:

- The state of traditional medicine investigation.
- The future of traditional medicine.
- Challenges facing traditional medicine.
- Traditional medicine research processes and environments.
- Traditional doctors (izinyanga) involved in effective traditional medicine.

Another interview was conducted with Saziso Ndlovu a lab manager at UKZN traditional medicine laboratory on the 19th May 2014. Saziso holds a Bachelor of Science Degree in Biomolecular Technology from University of Natal (2001), with majors in Microbiology, Biochemistry and Genetics. He completed an Honour's Degree in Genetics from the University of Natal in 2002. He is responsible for all the research, teaching and administration activities in the lab (Ndlovu 2014). The intention for this interview was to get answers on scientific traditional medicine research processes and environments.

Additionally, the interview was telephonically arranged with a traditional doctor who works closely with Professor Gqaleni, Mkhuluwe Protas Cele. An interview took place in Cele‘s KwaZihlahla Zemithi pharmacy in Umlazi on the 25th of May 2014. Cele is well recognized by his community, biomedicine practitioners and tertiary institutions around Durban as a traditional doctor (inyanga), Mkhuluwe Protas Cele is an expert traditional healer with a specialized knowledge on pediatric remedies. He is actively involved in training of healers as well as academic research on the properties of various traditional remedies.

He is also involved in the conservation of indigenous plants used for traditional medicines. Cele is a 2013 Ethekwini municipality‘s Ethekwini Living Legend Award winner alongside Ladysmith Black Mambazo‘s Joseph Shabalala, Professor Malegapuru William Makgoba, Desmond Makhanya and Jackie Branfield just to name a few. Furthermore he has been involved in the writing of a book –Medicinal Plants Traded on South Africa‘s Eastern Seaboard” in 2003. He was very close to one of the writers for the books that have been used for this research; MV Gumede MD.

Further interviews were arranged with research doctors and scientists in K-Rith Tower Building in University of KwaZulu-Natal, Nelson R. Mandela School of Medicine.

K-Rith Tower Building was identified from the journals as Durban medical research centre with numerous successful medical research discoveries in the country. This case study has been selected because it is in Durban and it also accommodates CAPRISA, a designated UNAIDS Collaborating Centre for HIV Prevention Research. It took about a month for research doctors in CAPRISA to confirm the interview on the 4th of June 2014.

On the 4th of June 20, 2014, an interview was conducted with Dr. Kogielem Naidoo at CAPRISA. Dr. Naidoo is head of the Treatment Research Programme at CAPRISA and The International Union Against Tubercolosis and Lung disease, The Union 2013 Scientific Prize Award winner. The interview was conducted to address the research question on the processes of biomedicine research.

The last interviews were conducted on the 18th of June 2014 with Angela Carr-Hartley who is an office manager at CAPRISA and Lynne Roux who is a Laboratory Compliance Manager and K-RITH Biosafety Level 3 laboratory manager. Lynne has over fifteen years' practice in handling TB laboratories mainly MDR and XDR tuberculosis. Lynne is a microbiology specialist and medical technologist with University of Natal's Medical Sciences Bsc Honours degree.

Another interview was conducted with Ms Natasha Samsunder a head for CAPRISA laboratory the same day. These interviews were conducted to observe the case study K-Rith Tower Building and also to understand the environmental requirements and processes for biomedical research.

6.1 Traditional medicine discovery processes and environments

The majority of available literature on traditional medicine does not elaborate on the processes and environments suitable for traditional medicine discoveries. According to Professor Gqaleni the reason for the lack of accurate writings on traditional medicine processes is because IKS information is transferred by orally, if one wants to know something that is indigenous knowledge they have to experience it themselves. If one wants to know how someone becomes a *sangoma* or if one wants to know how a *nyanga* discovers or prepares their medicine they have to be there to observe. This is because traditional healers are discreet with their knowledge.

During development valuable indigenous plants are destroyed. This implies that the architects involved in those developments do not follow Critical Regionalism and Genius Loci principles of respecting the building‘s landscape. Cele adds that developers should do a research on plants that are available on green lands before they commence with site preparations.

Furthermore Cele states that traditional healers must look out for nature by not only trying to conserve it only for decorating the world, but for people‘s own health as well. He says if traditional healers do not fight for the conservation of indigenous plants, they will end up builders without tools.

Furthermore he encourages other traditional healers to cultivate their own indigenous gardens and plant nurseries for medical ingredients. Therefore he has established numerous nurseries for endangered species used for traditional healing. Cele encourages other healers to develop the professional standing of their medical practice by working together with university researchers in order to record and document the various ways in which traditional medicines are used.

Cele buys his herbs from other people or sometimes send his employees to go to the bushes, mountains or rivers to get the herbs for him. They obtain traditional medicine plants from all around the country including Ngwavuma, Eastern Cape and Ndwedwe. He has herbs garden; however he does not use the herbs in his garden, he is saving them for his grandchildren. His grandchildren will use the plants in his garden when the ones available in the market are longer reachable (Cele 2014).

Healing herbs grow in different environmental conditions. Some plants such as ugobho (River Pumpkin) grows in river banks, they need dampness. Some grow in the valleys and rocks. Some need dry areas such as impepho (helichrysum) and hypoxis. These plants cannot grow in a shaded place such as a forest. They need to face the sun. You don‘t build a structure for plants; they need natural environment (Cele 2014).

The healing herbs available in Cele‘s pharmacy treat and manage diverse diseases such as asthma. The pharmacy is busy with customers buying herbs and liquid medicines for different illnesses. For this reason the pharmacy opens until late at night. Similar to all medical doctors and traditional healers, Cele faces HIV positive patients on daily basis. The HIV started when Cele was already a practicing traditional healer.

Cele‘s pharmacy only sells herbs and medication; no healing processes take place in the premises. Furthermore Cele does not discover new herbs because that is risky. He rather asks for advice from other practicing traditional healers. A lot of people die from traditional healers experimenting with new herbs on people. In the 1990s masses of people died from a then new herb called natal mahogany. A lot of traditional healers that used natal mahogany on patients were arrested as well. It is safer to use herbs that have been proven to be curative without any negative side effects (Cele 2014).

In conclusion Cele‘s plan is obtain more knowledge from working with university professors, scientists and medical doctors and then convert his pharmacy into a surgery in the near future. Cele is also one of the traditional healers involved in the UKZN traditional medicine research. Even though Mr Cele is exposed to the UKZN Traditional Medicine Laboratory, his pharmacy and medicine preparation environment still lacks safety and hygiene guard lines like hand washing basins and ensuring that the preparation area is germs-free.

6.2 The current state in traditional medicine research

When interviewed on 07 May 2014, Professor Gqaleni stated that the future of traditional medicine looks promising. This is owed to the initiatives that have been taken by the government and the other health organizations to ensure that indigenous knowledge systems are recognized and conserved. Professor Gqaleni has been appointed by KZN Department of Economic Development and Tourism as a project manager for their agro processing division. His task is to setup a facility that manufactures traditional medicine, crops and red meat. The idea is to produce high-tech manufactured traditional medicine that is going to be marketed and sold locally and globally (Gqaleni 2014).

Professor Gqaleni‘s company AIK Innovations takes South African indigenous knowledge systems through an appropriate scientific process to a final product or an innovation for commercialization. For example the South African culture of circumcision and virginity testing that promotes abstinence and HIV prevention. These are South African knowledge systems that have been researched and proven to have a positive impact in public health (Gqaleni 2014).

Furthermore, Gqaleni is involved in integrating traditional healers in the general care of HIV positive patients. This is because patients listen to traditional healers as they are linked to them culturally; in addition they believe traditional healers are connected with their ancestors.

As much as the AIK Innovations is trying very hard to promote the usage of traditional medicine by patients, the biggest challenge is that there is lack of funding for traditional medicine research. There are traditional medicines with promising potential to suppress HIV but there is a shortage of the resources to take the traditional medicine research up to the final stage (Gqaleni 2014).

It is important to bear in mind that there is a difference between traditional medicine and herbalists. Traditional medicine involves tangible and intangible elements. In traditional medicine a traditional healer‘s ancestors would tell him what herbs to mix in order to have a medicinal medication. Being a traditional healer is therefore a gift. Like other IKS, traditional medicine is a gift that is passed on to the next generation through oral tradition. Although for years IKS have been passed on through oral tradition, in the current age it is possible to move oral information to digital without writing it down.

India is already moving oral information to digital to preserve their knowledge. South Africa is also following the same trend through the Department of Science and Technology in a system they call preservative documentation.

They record the information to make sure that when traditional medicine succeeds in trading globally, they can fight for the medicine‘s rights to come back to South Africa (Gqaleni).

The attempt to find literature on discovery processes for traditional medicine for this research has been quite a challenge. According to Professor Gqaleni, this is because IKS information is not passed through writings. To know an indigenous system, one has to experience or observe it live. Hence one of his company‘s duties is to observe traditional healers in order to validate them to be able to separate the sheep from a goat.

In order to do that he needs to be there and confirm traditional healer‘s duties. Gqaleni adds that a genuine traditional healer does not need to be validated since his patients speak for him (Gqaleni 2014).

The validation of traditional medicine and traditional healers takes place in the UKZN traditional medicine laboratory. The laboratory does not take traditional medicine and put it into western medicine research model so that it can be proven right. That is not the appropriate way of doing it because these two medicines use two different theories and philosophy.

Traditional medicine is still unfairly challenged for example biomedicine does not get questioned when it manages a disease and not cure it, but if it is a traditional medicine that does not cure a disease but manage it, it get questioned. One cannot use a biomedicine model to try and understand traditional medicine; however a Chinese medicine model can be used to interrogate traditional medicine because they both use the same philosophy (Gqaleni 2014).

Chinese medicine and South Africa traditional medicine use the same philosophy in handling medicine. For example, traditional medicine plants harvesting is very important in traditional healing process. One does not just chop off a plant, there are procedures that need to be followed first, because the process is more than just chopping off a plant, one is inviting it to be their partner in healing. Plants have dignity and persona. One needs to talk to a plant before harvesting it. The time of harvesting is really crucial.

Sometimes traditional healers perform rituals before harvesting a plant for example a traditional healer would place a silver coin next to a plant before harvesting it. Some plants only get harvested at night because sun‘s rays may destroy them as they get cut down.

Biomedicine may have dominated South Africa but they are realizing that there is a lot to be learnt from indigenous medicine and other IKS in general. For example it has been observed that western way of agricultural farming is not working so there are attempts to go back to organic farming (Gqaleni 2014).

6.3 Traditional Medicine research processes and environment

The importance for the research into traditional medicine has been emphasized by WHO, MRC SA and DoH. However the findings on traditional medicine research convey that traditional healers do not research their medicine the way biomedicine get researched.

Medicinal herbs are brought to traditional healers‘ attention by their elders or ancestors when they have already been proven to be curative. It can be concluded that the research processes in traditional medicine are intangible and they involve invisible powers.

However in order for traditional medicine to be verified, marketed and sold globally IKS policy and WHO emphasize it needs to be researched first. Additionally, WHO highlighted patients‘ safety as their priority, in order for traditional medicine to be permitted in healthcare sectors; it needs to go through the process of research.

6.4 Biomedicine research processes and environment

Dr. Naidoo stated that CAPRISA‘s research specializes in HIV treatment, behavioral research optimum optional treatment strategies to keep people alive, better clinical outcomes, technologies to prevent HIV acquisition e.g. vaccine, gels and drugs and microbicides. CAPRISA does not manufacture new drugs but get drugs once they have been researched by other pharmaceuticals and found to be effective and then they test them on HIV positive patients (Naidoo 2014).

CAPRISA works with two clinical research sites an urban and a rural site. Ethekweni Research site in Warwick (urban) and Vulindlela research site situated 150 km north-west of Durban. CAPRISA get patients‘ sample from their clinical research sites and the scientists work on them. Once the study is done the findings are submitted to a peer review scientific journal where editors decide whether the findings are worth publication or not (Naidoo 2014).

Dr. Naidoo added that when CAPRISA started 10yrs back HIV+ people were dying from TB mainly because health workers then did not know how to treat patients with both HIV and TB. Dr. Naidoo led the study that researched how best to treat people with both HIV and TB. That study‘s findings has led to the changes in the health guidelines in WHO, Department Health and Human services in America, South Africa and throughout the world. More than half of the world that has people with HIV and TB uses the treatment findings that were researched in CAPRISA (Naidoo 2014).

There are different types of biomedical research processes at CAPRISA. The first research aspect include 1. Enrolment of patients, 2. The clinical care of patients, 3. The collection of samples, 4. The collection of clinical information on which scientists perform search. A lot of these processes take place in the previously mentioned CAPRISA clinical research sites (Naidoo 2014).

The second research aspect is processing of specimens and the laboratory analysis. The two aspects for the laboratory analysis include: Firstly the screening of patients for safety and ensuring that the research does not compromise the patients‘s safety and the 2nd aspect is understanding the impact of the drugs on human‘s body parts cells, metabolism, antibodies or organism (Naidoo 2014).

The aspect of research that is implemented in CAPRISA K-RITH building is data management, statistics analysis, laboratory management and research rating where there is collection of data, analysis and interpretation of data and writing of papers. This is a long and a slow process that includes meetings, discussions, validation and quality control. Research rating requires no room for error; it must reflect exactly what happened in the patient during the research (Naidoo 2014).

CAPRISA laboratory research procedures

CAPRISA laboratories are HIV oriented. According to the laboratory manager Natasha Samsunder from the clinical research sites the specimens are received in a Specimen Processing Area. In CAPRISA laboratories the specimens and patients‘ records are identified by a special code and a patient‘s date of birth.

There is no display of patients‘ names or ID number. CAPRISA laboratories mainly do CD4, viral load, HIV resistance testing, PBMC processing and cytobrush processing. The laboratory also store samples in the freezers until they are requested. Similar to most laboratories the environment is also operated try air-conditioners (Samsunder 2014)

K-RITH laboratory research procedures

The architectural design for the K-RITH laboratory has was discussed under case studies. However Lynne Roux mentioned a lot of principles and guidelines that need to be followed when creating laboratory spaces. Firstly in her interview and the tour through the K-RITH laboratories she stated that there are different types of laboratories with different requirements. She added that K-RITH is a research laboratory which means that their research involves chemicals assessment as well as patients‘ specimens with certain conditions so that they can study them. Sometimes you get a laboratory that is attached to a hospital that does research for a hospital such as biochemistry, microbiology and they submit the results to a doctor. In K-RITH the results are not submitted to doctors but they are kept purely for research purposes. Some researchers are clinical and some are just pure research. Laboratories are designed to meet the need of the research, some spaces require light and some require darkness (Roux 2014).

The K-RITH laboratories allow visitors‘ tour and they also invite traditional healers in order to teach them about TB infection, how the infection looks like under microscope and TB drugs. Lynn mentioned how teaching traditional healers opened the new world to them about infections (Roux 2014).

Specimens need to be away from the public, public spaces and public entrances. Therefore specimens are delivered using designated service lifts. The specimens with dangerous bacteria can only be handled in closed up laboratories not in open laboratories.

The laboratories for researching TB have hazardous signs. Scientists have to dress up in safe outfits before accessing TB laboratories (Roux 2014). Lynn added that you get different forms of biosafety. Biosafety level 1 means that researchers are able to work in open.

In biosafety level 2, scientists work with bacteria but not with infections that get can be picked up by inhaling, so they take some precaution such as wearing gloves and lab coats. Biosafety level 3 means scientists are working with bacteria that can be inhaled and cause diseases like TB.

Therefore BSL3 laboratories need to have very negative pressure environments. If the negative pressure changes from the required negative pressure, the alarm rings and occupants are required to leave the building until the negative pressure is adjusted (Roux 2014).

6.5 Clinical research sites processes and environments

Ethekweni and Vulindlela clinical research site follows infection control majors when collecting specimens to ensure that the health workers and patients‘ safety is not compromised. The clinical research sites environments are safe, extremely clean, infection controlled from blood draws as well as environmental infection control from infectious diseases that are transferred through the air like TB. The staff needs to wear masks and lab coats all the time. There must be adequate spaces for patients to queue. There has to be confidential spaces in which the health workers can discuss studies process, obtain information from patients and for HIV testing (Naidoo & Carr-Hartley 2014).

Access to data and medical records need to be secured therefore the clinical research sites have a double lock systems where patients‘ files are kept. The electronic files on computers are password protected. The spaces need to be well-ventilated and well lit so all windows have to stay opened. There need to be negative pressure that sucks in the dirty air out into the filter especially in secured spaces where there is collection of spectrum especially the infectious spectrum.

The air-conditioner is always at 22 degrees with extraction fans that extract all the air through extraction pipes into the ceiling and get extracted out in the huge outlet pipes. The clinical research sites hire a ventilation specialist to test the sites‘ air pressure and flow and recommend the exact appropriate type of infection control ventilation that needs to be employed (Naidoo & Carr-Hartley 2014).

The access to the research facility is managed by finger prints Or ID scanners to make sure that they have the right patient linked to the medical records. The urban site is more TB oriented so when the patients walk in they are given masks. Patients with TB and HIV are not allowed to mix the unaffected patients. Patients use different spaces and different corridors. Patients need to see the counselor first if they are coming for the first time.

They are required to sit as a group with a counselor to be educated about the research process, followed by one on one counseling and HIV testing. They are also requested to go to the clinic to see a nurse for vital sign assessment they are then sent to a doctor for assessment if they are well enough to participate in a research ((Naidoo 2014).

The rural clinical research site in Vulindlela is ventilated differently from the urban Ethekweni research site. The Vulindlela research site patients‘ waiting area is opened all around with only a roof with no walls so there is no need for mechanical lighting and ventilation in the waiting area. If it is windy or too cold one or two canvas is brought down on the sides. The only spaces that have air-conditioner at 22 degrees and windows opened are consultation rooms because they need to be enclosed for confidentiality. From the two clinical research sites the patients‘ samples get laboratory couriered to K-RITH or CAPRISA for laboratory research (Carr-Hartley 2014).

Fig. 6.5.0 Vulindlela clinical research site
(www.caprisa.org accessed 2014/05/11)

Fig. 6.5.1 Vulindlela open waiting area
(www.caprisa.org accessed 2014/05/11)

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

The previous chapter‘s discussions and analysis convey that traditional medicine plays an important role in the majority of South Africans. In addition to that, from observing the large number of customers that flood into KwaZihlahla Zemithi pharmacy shows the demand for traditional medicine within African people. It justifies what Professor Gqaleni stated that a genuine traditional healer does not need to be scientifically verified; his patients speak for him, as hundreds of people would not be traveling distances to get medication from Cele‘s pharmacy if that medication was not effective. Mr Cele‘s skills and knowledge are part of the expertise that Indigenous Knowledge Systems policy is trying to concerve.

Looking at history of biomedicine, one can determine that South African traditional medicine is still trapped where biomedicine started in ancient Greek, Rome and Egypt. It is obvious that South African herbs have medicinal potential. This has been proven by scientists from foreign countries showing interest in South African traditional medicine; hence Cele has photos that show foreign scientists requesting to be shown medicinal herbs. Looking at South African political and economic state, it is easy to see that traditional medicine is not the only South African natural resource that is being underutilized. South Africa is well-known for its land rich with natural resources such gold, however these minerals get exported at a cheaper price and later get sold back to the country as expensive imports. Cele did mention that a number of South African herbs are being exported and brought back to the country as expensive biomedical drugs.

A built-form that is generated from Biophilia, Critical Regionalism and Indigenous Knowledge Systems Policy will be appropriate for accommodating medical research that improves the occupants‘(scientists, traditional healers, doctors) health through exposure to natural elements (water-Inanda Dam, trees and mountains) and also revive the South Africans well-beings through natural remedies (traditional medicine).

One cannot mention drugs imports in South Africa without mentioning HIV drugs. The TAC has shown disproval of foreign pharmaceuticals profiting from the ill people of South Africa. The majority of HIV treatments e.g. ARVs get imported. South Africa is globally leading in HIV infections which imply that the country is boosting other countries‘ economy through the imports of ARVs to keep its nation alive despite the fact that South African landscape has diverse unnoticed medicinal plants. Although UNAIDS is the main advocate for coordinating global action on the HIV/AIDS epidemic, they do raise their concern on Africa‘s inability to take action in monitoring their own country‘s health and treatment.

In an article ―Aids dependency crisis: Sourcing African solutions", UNAIDS raise 6 key messages on Africa and HIV research:

- HIV/AIDS problems require innovative African solutions that are forming an African Medicines Regulatory Agency and putting in motion local medicines production (UNAIDS 2012).
- Africa needs to stop depending on external sources and a foreign country in stabilizing the AIDS response.
- Africa needs to share drugs ownership with international drugs companies (UNAIDS 2012).
- Africa needs to reduce depending on pharmaceuticals imports and improve their own collective drug governing authority that will guarantee sustainable access to excellent lifesaving treatments. (UNAIDS 2012).

These points support the need for South Africans to conduct their own research on possible treatment for this epidemic. UNAIDS emphasizes that ―Enhancing African ownership of the AIDS response will further the health gains made in the past decade and will also further enhance economic growth."(UNAIDS 2012). Critical Regionalism also supports the local tradition of building, drawing inspiration from the context and using local materials. In the case, both the function and architecture of the building have the same goal of striving for Dr Hendrik Clarke recommendation that ―Africans need South African solutions to African problems …"

The latest statistics conducted by Human Research Council (HSRC) in partnership with MRC SA, National Institute Communicable Diseases and Global Clinical and Viral Laboratory released on the 2nd of April 2014, indicate that South Africa ranks first in HIV occurrence worldwide.

There are about two-million out of 6.4-million infected people accessing ARVs in 2012. This increasing number of new HIV infections implies the need to increase the HIV treatment imports. Africa imports the majority ARVs drugs it requires this implies that the employments created from these medication production benefits outside countries (UNAIDS, 2012). This is an African problem that needs African medical and architectural solution through proposing built-form that will fit into The Valley of a Thousand Hills context and improves the lives of the community economically, scientifically, socially and therapeutically.

South African biomedical research organizations have proven that South Africa is capable of discovering its own new health remedies. CAPRISA, MRC SA and CSIR have a lot of successful and ground breaking medical research discoveries that were conducted in South Africa by South Africans. Given a chance South African traditional medicine could have the same successful stories as biomedical sectors. WHO, UNAIDS, MRC SA, DoH and other biomedical disciplines cannot stop emphasizing that it is about time South Africa applies research into its own traditional medicine in a quest to improve the lives of its people. According to Gqaleni and the literature reviewed on traditional medicine, the big challenge facing the development of tradition medicine is funding to construct research infrastructures.

MRC SA and UKZN have shown that it is possible to have traditional medicine researched in a scientific environment to interrogate its efficacy and safety. WHO has also set up 3 African Collaborating Centres for traditional medicine in Ghana, Mali and Antananaviro. There is still an opportunity in South Africa to set up an internationally recognized research facility for traditional medicine. The proposed UNAIDS Research institute‘s would be to conduct high tech research, manufacturing and marketing on traditional medicine at an international level. Frampton was against the increasing industrialized use of building materials and construction systems which deserted local building traditions, this research also propose that South Africa neglect the global pharmaceuticals and research and develop South African region pharmaceuticals. South Africa can adopt modern global pharmaceuticals for its universal progressive qualities but then again also value responses particular to the requirements of medicine found in its context.

This study recommends the integration of biomedicine and traditional medicine in one built-form to enhance their research. One of IKS policy‘s objectives is collaborating indigenous knowledge systems into developed sectors to kick-start their growth.

Furthermore it has been observed by WHO and UNAIDS that patients use traditional medicine and biomedicine simultaneously.

This study discovered that traditional healers use processes that are different from scientists‘ processes in searching for new treatments. They also use two different environments with traditional medicine using natural environments (rivers and mountains) and biomedicine using sterile laboratory. The chosen precedent studies Lowy Cancer Research Centre and Biosciences Research Buildings collaborate two different functions in one built-form creating one new architectural identity and that is the approach that will be applied by the proposed UNAIDS Research Institute.

Therefore this research recommends that these two medicines get researched in one built-form in order to discover remedies that can complement each other or remedies that can be consumed as alternative medicine. Furthermore integrating biomedicine and traditional medicine research would encourage the exchange of ideas between the two medical methods. It would also enable investigating interactions they may have with each, both positive and negative. Integrating traditional medicine and biomedicine research would furthermore lead to further quests to find new diagnostic procedures and treatment to advance the quality of life in South Africans.

In any case, global architecture has moved back to indigenous approach. Integrating nature into built form has been proven to have positive impacts on human‘s well-being. Traditional medicine predominantly consists of natural components. These natural elements are what Currie (2007) is encouraging that they get integrated in modern medical research buildings.

Integrating traditional medicine‘s herbs and plants into a typical biomedical research scientific built form would be following Biophilic design principles. Finally integrating traditional medicine and biomedicine research would imply the development in South African pharmaceuticals and cutting down on drug imports.

APPENDIX A

Questions presented to Nceba Ggaleni (Research Scientist, Researcher in Indigenous Knowledge Systems)	
Question No.	**QUESTIONS**
1	**Where does traditional medicine research take place?**
2	**What are processes involved in your Traditional medicine laboratory?**
3	**What are environmental requirements for a traditional medicine laboratory?**
Questions presented to Bab'Cele (a Nyanga)	
Question No.	**QUESTIONS**
1	**Where does traditional medicine research take place?**

2	**What are the particular environmental conditions suitable for traditional medicine research?**
3	**What are the processes involved in traditional medicine research?**

Questions presented to Caprica research doctors and scientist.

Question No.	**QUESTIONS**
1	**Where does biomedicine research take place?**
2	**What are the particular environmental conditions suitable for biomedicine research?**
3	**What are the processes involved in biomedicine research?**

APPENDIX B

BEREA MAIL
Friday, 20 March 2009, p. 5

Prof Nceba Gqaleni, Prof Rashid Bhikha, director and chair of Ibn Sina Institute of Tibb, Bruno van Dyk, executive director of the UKZN Foundation and Prof Nelson Ijumba, DVC of research.

UKZN Muti lab a first

THE University of KwaZulu-Natal has received R2 million from the Ibn Sina Institute of Tibb for the construction of the first African Traditional Medicine Laboratory.

The initiative is led by UKZN's Prof Nceba Gqaleni, chair in Indigenous Health Care Systems, funded by the National Research Foundation. Over the next five years, the Institute has committed a further R5 million over a five year period to sustain the programme.

Prof Gqaleni, a leading scientist at the Nelson R Mandela School of Medicine and his team have conducted basic and applied research into traditional medicine and African health care systems.

In 2007, the Nelson R Mandela School of Medicine was awarded a research chair on Indigenous Health Care Systems from the Department of Science and Technology. The mission of the chair is to promote African Traditional Medicine through excellence in research and to become a centre of choice for traditional health practitioners, indigenous knowledge holders and scientists for research of African traditional medicine. Training will include short courses, bridging modules and undergraduate courses.

Since the awarding of the chair, several international and national collaborative projects have been initiated including the partnership with the International Collaborating Centre on Indigenous Phytotherapies (TICIPS).

Together, scientists, medical practitioners and traditional healers will study the medicinal properties, safety and effectiveness of several African plants in use today by traditional healers. South Africa is home to more than 200,000 traditional healers who care for more than 27 million people.

The Ibn Sina Institute of Tibb is a non-profit organization that was established in 1997 to promote the training and practice of Unani-Tibb in South Africa.

Unani-Tibb is a traditional system of medicine with its roots tracing back to Hippocrates, Galen and Ibn Sina which is currently extensively practiced in the Arabian and Indian sub-continent.

BOOKS

- AIA. 1990. *Guidelines for planning and design of biomedical research laboratory facility*. AIA Inc.
- Appleton, J. 1975. *The experience of landscape*. London. New York
- Bargblor, Z.E. 2003. *Africa's contribution to contemporary western civilization, The Perspective*. Atlanta, Georgia.
- Barkow, J. H., Cosmides, L. & Tooby, J. 1992. *The adapted mind: Evolutionary psychology and the generation of culture.* New York: Oxford University Press.
- Beatley, T. *Toward biophilic cities: strategies for integrating nature into urban design* in Kellert. S, Heerwagen. J.H. & Mador. M.L. 2008. *Biophilic design: The theory, science and practice of bringing buildings to life*. John Wiley & Sons Inc.
- Broadbent, G. 1980. *The Deep structures of Architecture* in Broadbent, G., Bunt, R. & Jencks *Signs, Symbols, and Architecture* .New York/London: Wiley, 1980.
- Currie, J. M. 2007. *The fourth factor. A historical perspective on architecture and medicine* .American Institute Of Architects, Academy of Architecture for health.
- Derricourt, R.M. 2011. *Inventing Africa: History, archaeology and ideas*. Pluto Press, New York.
- Edwards, S.D. 1986. *Traditional and modern medicine in South Africa, A Research Study, Social Science and Medicine* 22: 1273-1276.
- Emeagwali, G. 2003. *African indigenous knowledge systems (AIK): Implications for the curriculum* in T. Falola (ed.), *Ghana in Africa and the world: Essays in honour of AduBoahen* . Africa World Press, New Jersey.
- Felhaber, T.1997. *South African Traditional Healers': Primary Health Care Handbook*. Kagiso Publishers
- Frampton, K.1983. *Towards a Critical Regionalism: Six Points for an Architecture of Resistance.* Hal Foster, Bay Press, Seattle.
- Gumede, MV. 1990. *Traditional healers: A medical practitioner's perspective*. Cape Town: Blackshaws.
- Hufford, OJ. 1992. *Folk medicine in contemporary America in Herbal and magical medicine: Traditional healing today*, edited by J Kirkland et al, Durham: Duke University Press.
- Hassim, A., Heywood, M. & Berger, J. 2007. *Health & Democracy*. Siber Ink.

- Harrell, G. T. 1974. *Planning medical center facilities for education, research, and public Service*. The Pennsylvania State University Press.
- Hirst, M. 1997. *A river of metaphors: interpreting the Xhosa diviner's myth* in P. McAllister (ed*.). Culture and the Commonplace: anthropological essays in honour of David Hammond-Tooke*. Johannesburg: Witwatersrand University Press.
- Jameson, F. 1994. *The seeds of time.* New York Columbia University Press.
- Jencks, C. 1969. *Semiology and Architecture* in Jencks, C. & Baird, G. *Meaning in Architecture* London: Design Yearbook Limited.
- Jencks, C. 1984. *The Language of Post-Modern Architecture, 4th ed*. New York: Rizzoli
- Karim, S.S., Arendse, R. & Ziqubu-Page TT .1994. *Bridging the gap. Potential for a health care partnership between African Traditional Healers and biomedical personnel in South Africa*. South African Medical Journal, Pinelands: MASA.
- Kellert. S, Heerwagen. J.H. & Mador. M.L. 2008. *Biophilic design: The theory, science and practice of bringing buildings to life*. John Wiley & Sons Inc.
- Lang, J. 2004. *Creation of Architectural Theory*, translation Alireza objective oven, second edition, Tehran University, Tehran.
- Lockard, J.S. 1980. *The evolution of human social behavior*. New York: Elsevier.
- Loustaunau, M.O, & Sobo, J.S. 1997, The cultural context of health, illness, and medicine, Bergin & Garvey.
- Majedi, H. & Zarabady, Zahra Sadat S. 2010, *An Essay on urban semiotics*, Utopia, No. 4, Spring-Summer 89.
- Mallgrave, H.F. & Goodman, D. 2011. *An Introduction to Architectural Theory: 1968 to the Present.* Wiley-Blackwell.
- Norberg Schulz, C.1980. *Genius Loci: Towards A Phenomenology of Architecture.* London: Academy Editions.
- Norberg Schulz, C.1963. *Intentions in Architecture.* London Allen & Unwin.
- Pallasmaa, J. 2005. *The geometry of feeling encounters: Architectural essays*. Helsinki: Rakennusieto Oy.
- Pallasmaa, J. 1988. *Tradition and modernity: The feasibility of regional architecture in post-modern society.* Architectural review. 188:1095
- Peter, H & Stephanus, S. 2009. *Construction identity in contemporary architecture: Case studies from the south*. Transaction Publishers.

- Reynolds, P. 1986. *The training of traditional healers in Mashonaland, in The professionalisation of African medicine*, edited by M Lastand GL Chavunduka. Manchester: Manchester University Press.
- Ricoeur, P. 1965. *History and Truth*. Evanston Northwestern University Press
- Rykwert, J. 1960. *Meaning and Building* . Zadiac 6: *International Magazine of Contemporary Architecture*.
- Setswe G. 1999. *The Role of Traditional Healers and primary health care in South Africa.* Health SA Gesondheid.
- Tzonis, A. & Lefaivre, L. 1981. *The grid and the pathway. An introduction to the work of Dimitris and Suzana Antonakakis*. Architecture in Greece 15, Athens.
- Ulrich, R.S. 1983. *View through a window may influence recovery from surgery*. Science, New Series.
- Watch, D. 2008. *Building Type Basics for Research Laboratories*. 2nd Edition . New York, NY: John Wiley & Sons Inc.
- Wilson, E.O. Biophilia: 1984. *The human bond with other species*. Cambridge, MA: Harvard University Press.
- Van Wyk, B-E., Van Oudtshoorn, B. & Gericke, N. 1997. *Medicinal Plants of South Africa.* Briza Publications, Pretoria.

JOURNAL

- Architecture Australia – May 2010 (Vol 99 No 3)
- CAPRISA. 2013. *Celebrating 10 years of world class HIV, AIDS and TB research*.
- Chavunduka, G.L. 1994. *Traditional medicine in modern Zimbabwe*. Harare: University of Zimbabwe.
- Department of Science and Technology, 2011, Indigenous Knowledge Systems www.eifl.net/system/files/201101/sa_iks.pdf (accessed 01/04/2014)
- D+H. 2011. *Mechatronic* AG
- DoH, MRC & CSIR. 2009. *National reference centre for African traditional medicines:* A South African model.
- Donda, G.N. 1988. *The Contribution of izinyanga Towards the Enrichment of the Zulu Language*. Unpublished BA Honours Article, KwaDlangezwa: University of Zululand.

- Edwards, S.D. 1986. *Traditional and modern medicine in South Africa. A research study*. Social Science Medical Journal, 22(11), 1273-1276.
- Ethekwini Municipality. 2008. *Umlazi Local Economic Development Plan*
- Gqaleni, N., Moodley, I., Kruger, Ntuli, H. A. & McLeod, H. 2007. *Traditional and Complementary Medicine*. In: Harrison S, Bhana, R. & Ntuli, A. (eds): *South African Health Review* 2007. Durban: Health Systems Trust.
- Gqaleni, N., Hlongwane, T., Khondo, C., Mbhatha, M., Mhlongo, S., Ngcobo, M., Mkhize, V.T, Mtshali, N., Pakade, R. & Street, R.A. 2011. *Biomedical and traditional healing collaboration on HIV and AIDS in KwaZulu Natal, South Africa*. Universitas Foru. Vol. 2. No. 2
- Gqaleni, N., Mbatha, M.N., Ntuli, M.Q. *Partnerships with traditional healers*. AIK Innovations. 2013
- Goggin, K.M., Pinkston, Gqaleni, N., Puoane, T., Wilson, D., Berkley-Patton, J., & Martinez, D.A. 2009. *The Role of South African Traditional Health Practitioners in HIV/AIDS Prevention and Treatment*. In Pope, C., White & Malow, R. (eds): *HIV/AIDS Global Frontiers in Prevention/ Intervention*. New York: Routledge Taylor and Francis.
- House of Lords, United Kingdom. Select Committee on Science and Technology. Session 1999–2000. 6th Report. *Complementary and Alternative Medicine*. London, Stationery Office, 2000 (HL Paper 123).
- HSRC. 2014. *South African National HIV Prevalence, Incidence and Behaviour Survey*, *2012*. Published by HSRC Press. From http://www.hsrc.ac.za/en/media-briefs/hiv-aids-stis-and-tb/sabssm4-launch
- Knight, L. 2008. UNAIDS The First 10 Years, 1996-2006. WHO Library Cataloguing-in-PublicationData http://www.unaids.org/en/resources/presscentre/featurestories/2008/november/20081103tft/
- Morris, K. 2001. *Treating HIV in South Africa – A Tale of Two Systems*. Lancet 357, 9263: 1190.
- Pliska, S. 2005. *Biophilia, Selling the Love of Nature*. Available at http://www.planterra.com/research/article_biophilia.php (17 August 2010)
- Richter, M. 2003. *Traditional Medicines and Traditional Healers in South Africa*. http://healthlink.org.za/uploads/files/TAC_Law_Proj.pdf

- Warren, D. M. 1991. *The Role of Indigenous Knowledge in Facilitating the Agricultural Extension Process*. Paper presented at International Workshop on Agricultural Knowledge Systems and the Role of Extension. Bad Boll, Germany, May 21-24, 1991.
- WHO. 2000. *Promoting the Role of Traditional Medicine in Health Systems*: A Strategy for the African Region 2001-2010 From http://apps.who.int/ medicinedocs/en/d/Js2297e/11.html.
- WHO. 2001. *World Health Organization Welcomes OAU Declaration on Traditional Medicine.* From http://www.afro.who.int/press/2001/ pr20010820.html.
- WHO. 2002. *Traditional Medicine Strategy*. 2002-2005. From http://whqlibdoc.who. int/hq/2002/WHO_EDM_TRM_2002.1.pdf.
- WHO.2003. *Traditional Medicine*. From http://www.who.int/mediacentre/ factsheets/2003/fs134/en/.
- WHO. 2005. *National Policy on Traditional Medicine and Regulation of Herbal Medicines:* Report of a WHO Global Survey. From http:// www.correofarmaceutico.com/documentos/190905_plantas.pdf.
- WHO. 2003. *Factsheet 134: Traditional Medicine. Geneva*: World Health Organization. URL: http://www.who.int/mediacentre/factsheets/2003/fs134/en/
- Wu, X. 2006. *Concrete Resistance: Ando in the context of critical regionalism*. http://www.andrew.cmu.edu/user/gutschow/theory_course/Xiang%20Hua%20Ando% 20Paper.pdf
- Speech by Health Minister Manto Tshabalala-Msimang at African Traditional Medicine Day, 6 September 2007, Limpopo. Press release from National Department of Health. URL: http://www.doh.gov.za/docs/sp/sp0906-f.html
- UNAIDS. 2006. *Collaborating with Traditional Healers for HIV Prevention and Care in sub-Saharan Africa: suggestions for Programme Managers and Field Workers*
- UNAIDS. 2012. *Report on the global AIDS epidemic*.

WEB SITES

- http://www.dezeen.com/2012/10/31/biosciences-research-building-by-lyons/
- www.ca-biomed.org

- research.ukzn.ac.za/researchFocusArea/HIVAIDSTubercolusisandHealthPromotion.aspy
- www.mrc.ac.za
- www.tac.org.za
- http://www.ibn.dlo.nl/
- http://www.designboom.com/architecture/renzo-pianos-california-academy-of-science/
- http://tradmed.ukzn.ac.za
- http://www.greatbuildings.com/cgi-bin/gbi.cgi/Saynatsalo_Town_Hall.html/cid_1165869736_4_19.html
- (www.africacentre.ac.za).
- hpp.ukzn.ac.za

PART TWO

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CHAPTER ONE

1.0 INTRODUCTION

The proposal for the UNAIDS Research Institute is addressing the lack of formalized architecture for traditional medicine research and manufacturing. Part one of this document conveys the important role traditional medicine plays in South African people‘s lives yet it remains underdeveloped. In rural areas similar to The Valley of a Thousand Hills, the society only relies on traditional medicine for their healthcare needs because that is the only form of medicine that is available to them. The difference between the built-environments that accommodate traditional medicine and the one that accommodates biomedicine is tremendous.

The main differences that had a huge impact on the proposed UNAIDS Research Institute design were: research processes, infection control and contamination prevention approaches and access control. The findings show that unlike biomedicine research laboratories, traditional doctors‘ medicine environments do not have preventive measures against environmental contamination, there is no access control and the environments are not sterile.

1.1 Project description

The UNAIDS Research Institute integrates with The Valley of a Thousand Hills vibrant and diverse rural setting and creates space for synergy and collaboration, builds a seamless physical connection to the existing facilities. In its sculptural design, it reinforces South African progressive modern-architecture heritage and advances sustainable practices with green technology and design features that support environmental and personal health.

The building‘s form and exterior developed in response to various internal and external drivers, including the creation of laboratory neighbourhoods, educational facilities, public interaction spaces, access to daylight and Inanda Dam and mountain views as well as connecting to the existing Valley of a Thousand Hills community. The design creates a dynamic, collegial environment in which important scientific discoveries will take place through its flexible conferencing suites and break/lounge spaces, as well as collaborative spaces in the laboratories.

The proposed UNAIDS Research Institute design is to be grounded in the theoretical and conceptual framework established in part one of this document.

1.5 Schedule of Accommodation

Space	Quantity	Size	Total Area	Space Description
Social Amenities				
Coffee Shop	1	10	10	Close to the entrance for purchasing refreshments.
Coffee Shop Kitchen	1	20	20	Close to the store room for preparing refreshments.
Store	1	8	8	For storing unprepared food, close to the kitchen
Coffee Shop Indoor Seating Area	1	44	44	Close to the coffee shop and opens out to the outdoor seating area.
Coffee Shop Outdoor Seating Area				Outdoor seating area to be located in three different areas. 1. Within a public piazza next to a water feature 2. Facing north and Inanda Dam.
Reception Desk	1	6	6	Close to the entrance and lift lobby. Easily identifiable.
60 Seats Seminar Room	1	85	85	Easily accessible from the reception desk, opening out to a deck with the view of the river. Sound insulated.
80 Seats Seminar Room	1	140	140	Easily accessible from the reception desk, opening out to a deck with the view to the river. Sound insulated.
120 Seats Seminar Rooms Store	1	180	180	Easily accessible from the reception desk, opening out to a deck with the view to the river. Sound insulated.
Seminar Rooms Kitchen	1	24	24	
Conference Ablutions	1	90	90	Male, female and paraplegic ablutions to serve people using seminar rooms.
Circulation, Lifts and Lift Lobby	1	340	340	Double volume Seminar rooms wide walkway with indoor seats. Walkway to

				access to outdoor seats.
Piazza	1	290	290	Accessible to the public within the facility. With a skylight, a water feature, a view to the KwaNgcolosi community (mountains) and the view to Inanda Dam and can be used for holding functions.
Medicine Exhibition	2	165	330	Hard landscaped area situated next to an entrance point, with traditional medicine exhibition stands. Open to public without access control.
Herbs Garden			3230	Herbs garden for educational tours, with soft and hard landscape.
Taxi Drop Off and Pick up	1	560	560	To be close to an entrance point and the main entrance. With covered pedestrian walkways and taxi parking aisles.
Education and Information Facilities				
Library	1	240	240	Accessible to the public. Quiet and well lit. To be used by the public, professionals and traditional doctors to obtain information on traditional medicine, traditional doctors and the discoveries from the research laboratories.
Library balcony	1	30	30	Accessible to the public for outdoor reading purpose.
Museum Display Area	1	160	160	For displaying medicines. Allow public viewing.
Museum Store	1	9	9	Next to a service entrance for storing museum equipment and displays.
Museum, Library and Computer Database Ablutions	1	16	16	
Museum, Library and Computer Database Kitchenette	1	5	5	

Museum Office	1	10	10	
Computer Database	1	130	130	Accessible to the public to gain computer stored information on traditional medicine, HIV and AIDS, traditional doctors available in the area, discoveries from the research laboratory and connecting with other global traditional medicine research centres.
Retail				
Pharmacy Staff Room	1	32	32	
Staff Kitchenette	1	5	5	
Pharmacy Staff Toilet	1	3.5	3.5	Unisex paraplegic toilet.
Biomedicine medication store	1	12	12	Easily accessible from inside the pharmacy and from a loading parking bay.
Traditional Medicine Medication Store	1	14	14	Easily accessible from inside the pharmacy and from a loading parking bay. Well ventilated with grill blocks.
Pharmacy Office	1	10	10	
Laboratory Component				
Meeting Room	1	74	74	To be shared by both BSL2 and BSL3 users.
Lift Lobby	1	54	54	
Biosafety Level 2 Laboratory				
Offices	3	16	48	Individual offices for senior researchers.
Ablutions	1	22	22	
Cold Room	1	18	18	For keeping specimens frozen. To be kept at the required temperature all the time.
Equipment Store	1	44	44	
Dark Room	1	12	12	
Tissue Culture Lab	2	26	52	A sterile closed lab.
BSL 3 Anteroom	1	10	10	An entrance to a small closed and sterile Biosafety Level 3 lab in Biosafety Level

				2 Lab for handling research involving hazardous bacteria.
BSL 3 Wet lab	1	18	18	Biosafety Level 3 sterile lab for handling research involving hazardous bacteria.
BSL 3 Tissue Culture Lab	1	20	20	Biosafety Level 3 sterile lab for handling research involving hazardous bacteria.
Wash-up Autoclave room	1	40	40	For cleaning working equipment and outfit.
Research Offices	1	300	300	Open lab for scientists with computer worktops at the end of the lab working top and easy access to close labs.
Prep room	1	8	8	
BSL2 lab space /research offices	1	220	220	
Biosafety Level 3 Laboratory				
Anteroom 2	1	18	18	Entrance to the lab for changing into BSL3 lab working outfit.
Specimen store room	1	3	3	Close to anteroom and service lift.
Autoclave room	1	34	34	For cleaning working equipment and outfit. Close to the service lift.
Bio bank	1	17	17	Close to the service lift and anteroom.
Mice Room	1	37	37	Close to the anteroom for keeping mice used in research. With Necropsy Room.
Guinea Pig Room	1	13	13	Close to the anteroom for keeping pigs used in research.
Quarantine	1	12	12	
Exposure Room	1	18	18	
Traditional Medicine Animal Tissue Processing	1	34	34	For research involving animals‘ tissues and traditional medicine.
Biomedicine Animal Tissue Processing	1	34	34	Sterile lab for research involving animals‘ tissues and biomedicine.
Traditional Medicine Microbiology	1	34	34	

Biomedicine Microbiology	1	34	34	
TM Immunology	1	34	34	
Biomedicine Immunology	1	34	34	
Processing	1	24	24	
Dark Room	1	4	4	
Visitors viewing passage	1	54	54	Visitors labs viewing area
Tissue Culture Lab	1	34	34	
Repository Room	1	30	30	
Tea Room	1	30	30	
Lockers Room	1	12	12	
Students and Traditional Doctors Class	1	82	82	Working space equipped with computers for students and traditional doctors, close to lockers rooms, tea room and ablutions.
Ablutions	1	40	40	
Ante Room 1	1	32	32	Entrance to the lab for changing into BSL3 lab working outfit.
UNAIDS Offices				
Meeting Room	1	34	34	
Waiting Area	1	20	20	
Reception and Waiting Area	1	42	42	
Circulation and Lift Lobby	1	90	90	
Director‘s Offices	1	16	16	Close to the reception with a view to Inanda Dam.
Individual Offices	6	12.5	75	Vice-Directors, Senior Administrators and Finance individual offices with a view of Inanda Dam.
Open Plan Office	1	340	340	
Staff Room	1	20	20	
Balcony	1	13	13	Close to the staff room with a view of Inanda Dam.
I.T Support Room	1	15	15	
Ablutions	1	30	30	

Servicing				
Mechanical plant room	1	550	550	
Central stores	1	60	60	
External gas storage	1	20	20	
Computer sever room	1	20	20	
Emergency generator room	1	15	15	
Hazardous Waste store	1	30	30	
Clinic				
Entrance	1	20	20	Close to the help desk, with finger scanner for access control.
Help Desk	1	10	10	Close to the entrance with direct access to the records rooms.
Records	1	8	8	With strictly controlled access.
Medical Store	1	8	8	A cupboard for keeping medical groves, masks, gowns and other medical outfits.
Traditional Doctors‘ Consultations Rooms	5	22	110	With consultation rooms and private exam rooms. Some rooms to have traditional Zulu beehive hut interior for those traditional doctors who still operate in a traditional way.
Biomedicine Consultation Rooms	2	22	44	With consultation rooms and private exam rooms.
Main-Waiting Areas	1	64	64	Open area, facing North and Inanda Dam. Naturally cross-ventilated for infection control.
Sub-Waiting Areas		60	60	Between consultation rooms with a biophilic view to vegetation and uMngeni River
Ablutions	1	32	32	Close to an entrance
Staff Room	1	40	40	With biophilic view to North East‘s Inanda Dam.
Change Rooms	2	13	26	Female and Male change rooms for biomedical and traditional doctors close

				to the staff entrance.
Store	1	3	3	Close to the service entrance
Cleaner‘s store	1	3	3	Close to the service entrance
Bin Area	1	3	3	Close to the service entrance
Pharmaceutical factory				
Reception, Waiting Area, Kitchenette, Stores, Unisex paraplegic toilet, Lift Lobby	1	135	135	
Boardroom	1	60	60	For pharmaceutical factory meetings
Factory Staff Arrival	1	40	40	
Female Gowning 1	1	20	20	
Female Gowning 2	1	10	10	
Male Gowning 1	1	12	12	
Male Gowning 2	1	10	10	
Cleaner‘s Store	1	4	4	
Dirty Laundry Store	1	5	5	Where employees drop off their dirty uniform before leaving the factory.
Clean Laundry Store	1	5	5	Where employees collect clean and sterile working outfits.
Canteen	1	80	80	
Staff Check IN/OUT	1	42	42	With a turnstile for recording employees clocking in and clocking out time.
Personnel Aseptic Corridor	1	40	40	
Staff Training	1	20	20	
Quality Control Labs	3	8	24	To be located at the end of every process in the factory to ensure quality of every manufacturing step.
Granulation	1	40	40	
Stir-frying Processing	1	30	30	
Roasting Processing	1	40	40	
Forging Processing	1	30	30	
Stewing Processing	1	70	70	

Materials Aseptic Corridor/ Weighing Area	1	70	70	
Inspection Area	1	98	98	Checking the quality of each medication before it moves to being packaged.
Primary Packing	1	190	190	
Secondary Packing	1	110	110	
Labelling and Packaging	1	95	95	
Shipping	1	48	48	
Shipping Equipment Store	1	5	5	
Service/Delivery/Office/Service Lift	1	78	78	For delivery, recording and inspection of raw materials.
Lower Raw Materials store and Lower Preparation Area	1	168	168	
Upper Raw Materials store and Upper Preparation Area	1	168	168	
Parking				
As per NBR requirements for a population of up to 200				

1.6 Conclusion

The proposed UNAIDS Research Institute will take lessons on creating sterile research environments, access control, infection and contamination control from K-Rith Tower Building and UKZN Traditional medicine laboratory and integrate them with the knowledge of handling traditional medicine preparations from KwaZihlahla Zemithi pharmacy.

Furthermore the proposed Research Institute will take advantage of the vast unutilized agricultural land that belongs to the community around the proposed facility and used it for farming herbs that will be proven to be medicinal in the laboratories.

2.4 Description of existing selected site

Fig. 5 Site photo. Source: Google Maps

The Valley of a Thousand Hills is currently a tourists‘ destination due to its beautiful landscape and Zulu‘s colourful ceremonies and expressive, artistic culture that give the area its vibrant atmosphere and creative energy. The chosen site is currently underdeveloped with KwaNgcolosi community mud houses neighbourhood. It is accessed from the busy and developed Inanda Road. Even though the site is surrounded by mud houses, it is accessed by a tarred Mepho Road.

Fig. 6 Site access photo. Source: Google Maps

Context Photos

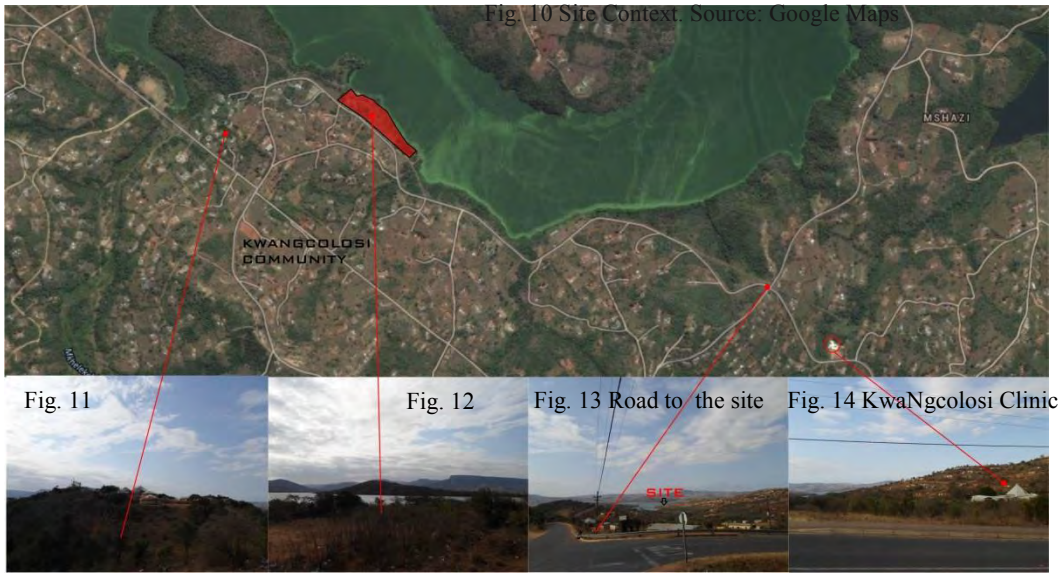


Fig. 10 Site Context. Source: Google Maps

Fig. 11

Fig. 12

Fig. 13 Road to the site

Fig. 14 KwaNgcolosi Clinic

Fig. 11 to 14 . Context photos. Source: Author

2.6 Conclusion

Site analysis done on this chapter conveys that few environmental issues need to be considered:

1. Run off since the land falls towards the proposed site.
2. Flood line covers the whole site. According to Ethekwini Municipality‘s Coastal Engineering Storm water Catchment Management Department, the last time Inanda Dam was flooded was 1987, which is recent. This implies that precautions need to be taken when designing on the proposed site.

The site‘s natural elements create a biophilic environment. The site is dominated by natural features over man-made features. Consequently the proposed structure will need to prioritize on natural features over man-made features.

CHAPTER THREE

DESIGN DEVELOPMENT AND RESOLUTIONS

3.0 Conceptual and Theoretical Issues

The UNAIDS Research Institute proposal builds on the theories and concepts discussed in the first part of the research document. The fundamental conceptual drivers influence the proposal and monitor the physical manipulation of space and materials.

Critical Regionalism and Genius Loci

The proposal has drawn on Critical Regionalism theory by respecting and retaining the KwaNgcolosi context's tradition of building. The proposed building will use contextual forces to project a sense of space and local meaning. The design approach will focus on the building's relationship to its site and location in KwaNgcolosi's sociological context instead of dealing broadly with Durban regional style.

Fig. 3.0 .KwaNgcolosi building tradition Source: Author

Fig. 3.0.1 KwaNgcolosi building tradition Source:

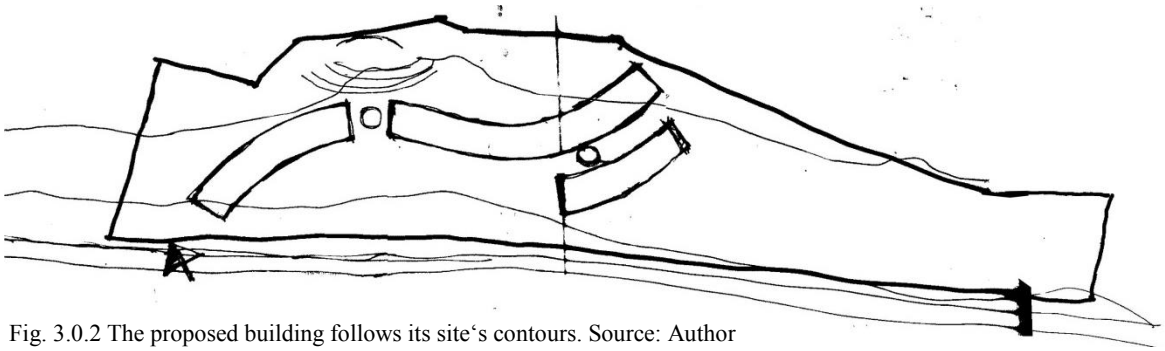


Fig. 3.0.2 The proposed building follows its site's contours. Source: Author

The proposal will give emphasis to the topography, climate, light and tectonic form discussed above in site analysis. The proposed building will be in harmony with the site's environment, trees, earth and light. Critical Regionalism has pointed the design of UNAIDS Research Institute to a modern method that depends on the organic unity of local materials, climate and cultural characteristics to give coherence to the final building.

Biophilia

As mentioned in the abstract, medical research is essential in the pursuit to discover new diagnostic procedures and treatment to advance the quality of people‘s lives. The biophilic approach in the design of a medical research centre implies that a built-form that accommodates scientists becomes part of the experiment as well.

The proposed biophilic research institute will be investigated if it really improves lives and productivity of its users. It will get studied if the exposure to its natural landscape of The Valley of a Thousand Hills will have notable health benefits on the scientists.

Semiology and Architectural Design Concept

Semiology has been employed in the concept of the proposed building. The proposed building‘s form and its relationship to its intended context have been derived from Semiology principles.

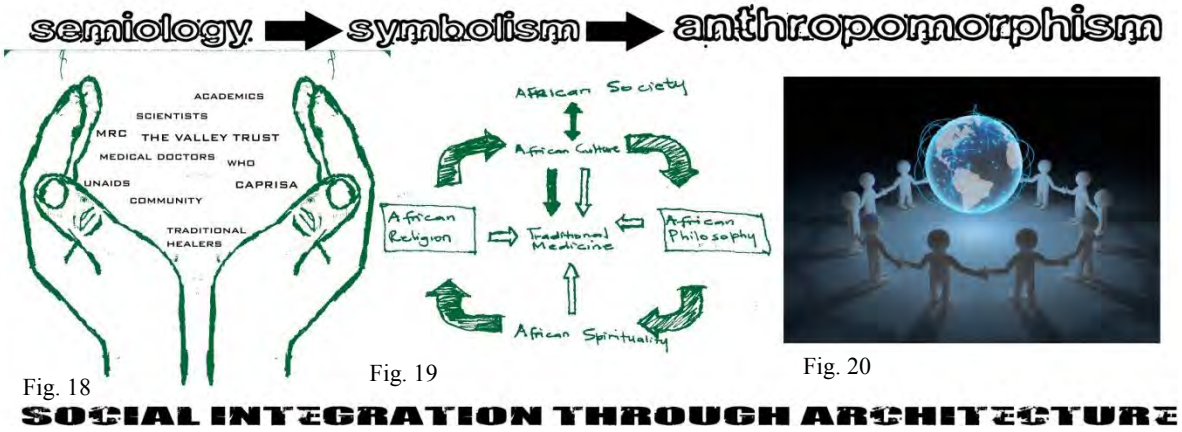


Fig. 18 Fig. 19 Fig. 20

Fig. 18 . Design Concept Source: Author, Fig. 19 Ubuntu concept of a circle (Gqaleni, Ntuli & Mbatha 2013), Fig. 20 Social integration. Source: www.sobelmedia.com

Indigenous Knowledge Systems

This concept assisted in spaces required to improve traditional medicine within the proposed Research Institute. Previously indigenous knowledge systems information has been passed on to the next generation through oral tradition. Indigenous knowledge systems concept recommends facilities such as libraries, museums, computer databases and a research centres with the intention of developing an indigenous knowledge system, in this case: traditional medicine. Provision of these facilities implies that information is documented in a modern way and can be easily accessible globally.

3.1 Design Elements

Tree of life

Different cultures and religions call the tree of life by different names; however they all have the same meaning which is the source of life. The tree of life comes from its symbolic aspects. The tree of life provides the breath of life. The leaves of the tree have been thought to be healing spiritually and emotionally. The tree connects the earth (soil) with its roots and the sun with its leaves. A tree symbolizes all natural elements that bring biophilic effect. It symbolises air, water, fire and earth. It has powers to heal rejuvenate and sustain. In Christianity it is said that if you eat from the tree of life you will live forever. That is because the tree of life represents the tree of knowledge that was eaten by Adam and Eve (www.universeofsymbolism.com).

In the African culture, children would gather under the shade of a tree and listen to stories told by the wise elders. In rural areas meetings are still held under trees. *Muthi*, a name for traditional medicine is a term derived from a Zulu word for tree. The proposed building uses the same concept of bringing people together to share and gain information under a UNAIDS Research Institute tree.

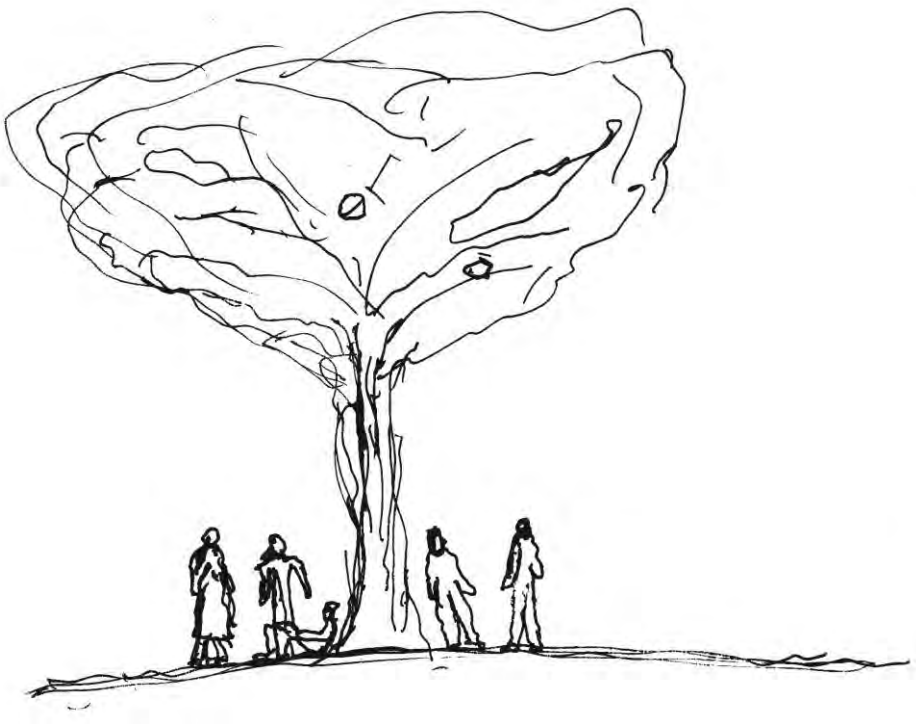


Fig. 3.1.0 Tree of life Source: Author

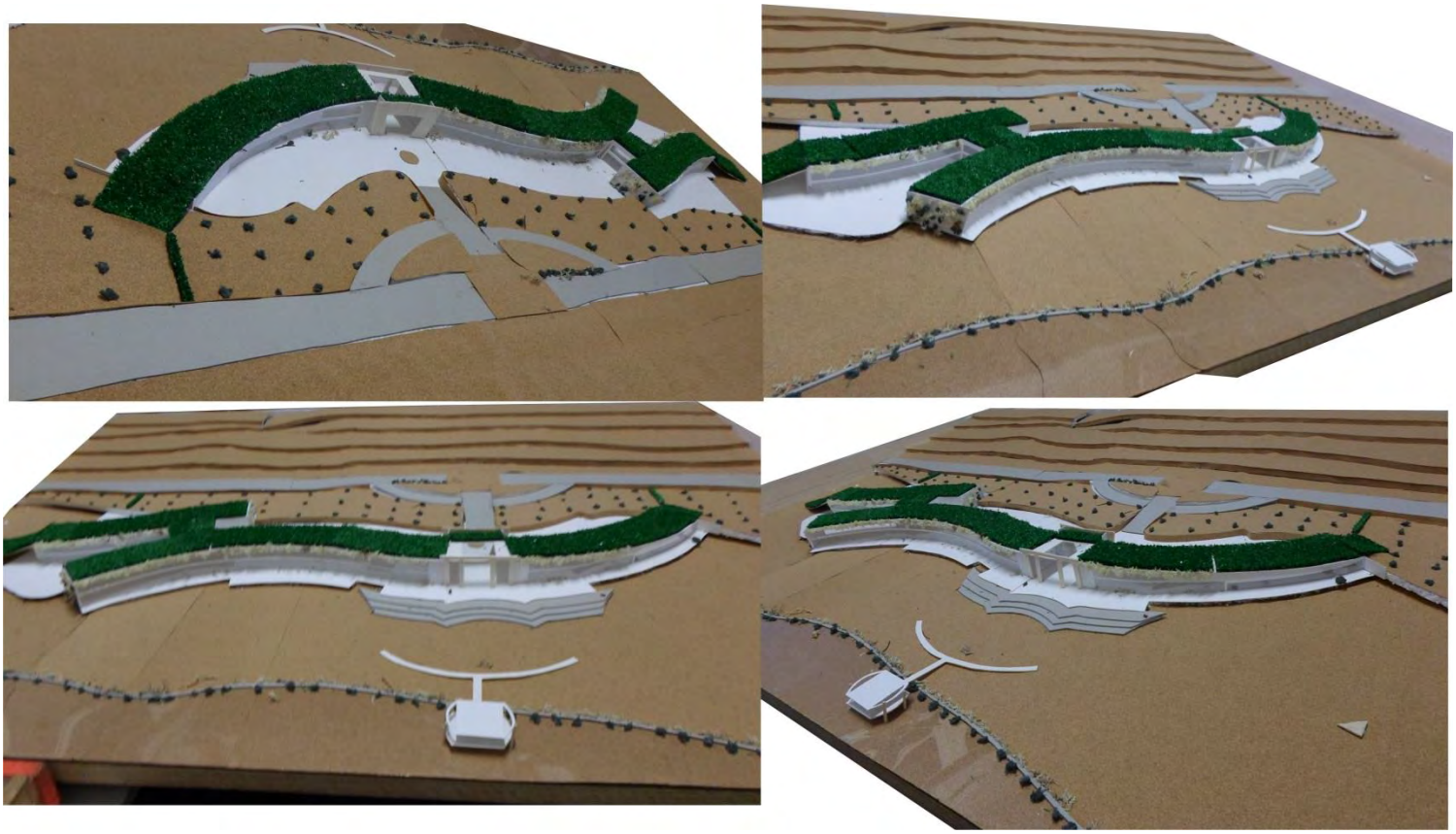
Sustainability

Along with passive cooling and heating design, the building‘s thermal mass reduces its reliance on mechanical systems. Thick concrete walls radiate heat back into the building, while large spaces outside maximize solar penetration for additional heat gain.

Geothermal Energy

Geothermal energy is the heat from the Earth. It is a clean and renewable resource because the heat originating from the core of the Earth is limitless. Geothermal Energy system currently provides energy in the U.S. and around the world. This energy system requires resources that are available in the proposed site namely: heat, permeability, and water.

3.2 Physical Model



BOOKS

- Frampton, K.1983. *Towards a Critical Regionalism: Six Points for an Architecture of Resistance.* Hal Foster, Bay Press, Seattle.
- Mallgrave, H.F. & Goodman, D. 2011. *An Introduction to Architectural Theory: 1968 to the Present.* Wiley-Blackwell.
- Wilson, E.O. Biophilia: 1984. *The human bond with other species*. Cambridge, MA: Harvard University Press.
- Norberg Schulz, C.1980. *Genius Loci: Towards A Phenomenology of Architecture.* London: Academy Editions.

WEBSITES

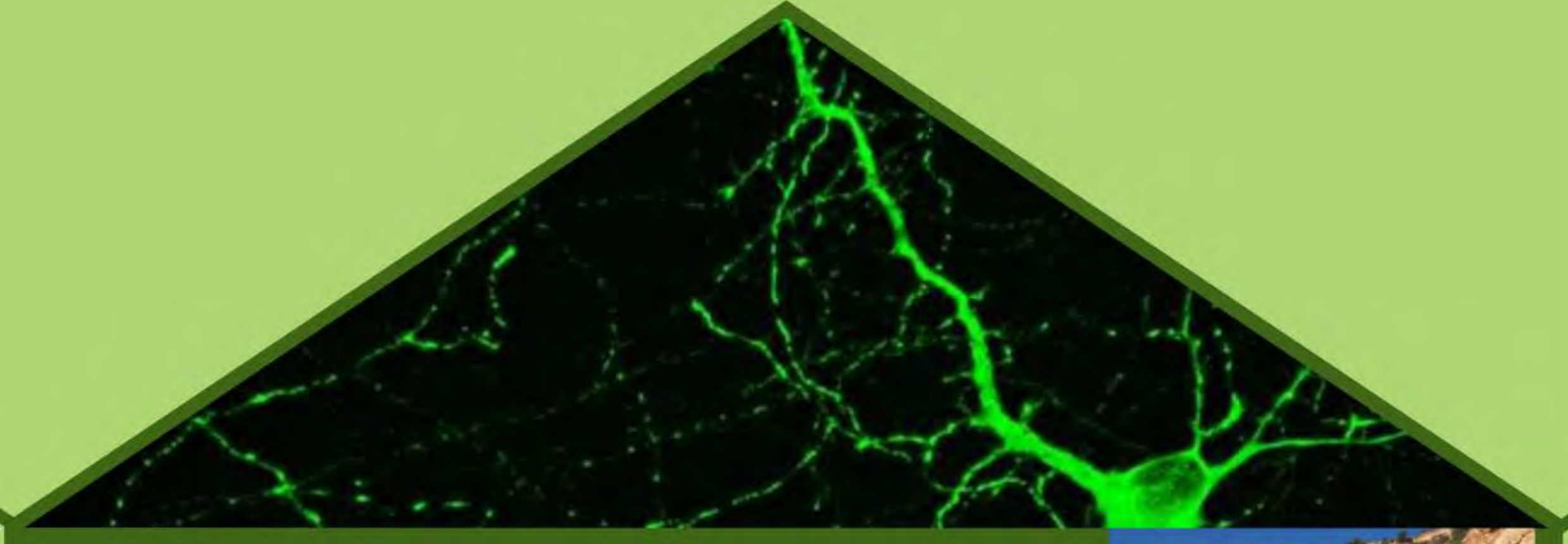
(www.universeofsymbolism.com).

"EUROPEAN SOLUTIONS WON'T SOLVE AFRICAN PROBLEMS AFRICANS NEED AFRICAN SOLUTIONS TO AFRICAN PROBLEMS OR BACK TO SLAVERY WE GO." – DR. HENRIK CLARKE

architectural approach that facilitates traditional medicine and biomedicine integration. a design for an unaids research institute the valley of a thousand hills bothas hill, kzn.

UNAIDS RESEARCH INSTITUTE
THE VALLEY OF A 1000 HILLS

LINDA DANISA
201302149



001 BACKGROUND RESEARCH

WHO, UNAIDS, MRC SA AND OTHER WRITINGS INDIC ATE THAT 80% OF SOUTH AFRICANS UTILIZE AND RELY ON TRADITIONAL MEDICINE FOR THEIR HEALTH CARE NEEDS (PRETORIUS 1999; MORRIS 2001; MAKHA THINI 2003; GQALENI 2011; PCH 2009, WHO 2002 - 2005).

THE MAJORITY OF PEOPLE USE TRADITIONAL MEDICINE AND BIOMEDICINE TREATMENTS SIMUL TANEOUSL Y WITHOUT KNOWLEDGE IF THESE TWO DIFFERENT REMEDIES COMPLEMENT EACH OTHER (GQALENI 2011).

A STUDY RELEASED IN 2005 REVEALED THAT TWO WIDELY USED TRADITIONAL MEDICINES "THE AFRICAN POTATO AND THE SUTHERLANDIA PLANT DECREASE THE EFFICACY OF ARV MEDICINES SIGNIFIC ANTLY, LEADING TO POSSIBLE TREATMENT FAILURE, VIRAL RESIST ANCE OR DRUG TOXICITY" (HASSIN, HEYWOOD & BERGER 2007) .

SOUTH AFRICAN TRADITIONAL MEDICINE IS DISCOVERED FROM A RICH PLANT BIODIVERSITY OF INDIGENOUS PLANTS (VAN WYK, VAN OUDTSHOORNA & GERUCKE 1997). THEREFORE DEVELOPMENT OF TRADITIONAL MEDICINE IMPLIES UTILIZING THE COUNTR Y'S LOCAL RESOURCES.

WHO AND MRC SA'S CONCERN IN REGARDS TO THE USE OF TRADITIONAL MEDICINE IS ITS SERIOUS PATIENTS' SAFETY THREATS DUE "TO COUNTERFEIT, POOR QUALITY, OR CONTAMINA TED HERBAL PRODUCTS IN THE MARKETS" (WHO 2002).

In the journal "AIDS dependenc y crisis: Sourcing Afric an sol utions", UNAIDS raises its concerns reg arding South Afric a's dependenc y on foreign countries pharmaceutic als in dest abilizing the AIDS impacts (UNAIDS 2012).

Additionall y South Afric a has experienced a battle against all evidence-based medicine especiall y antiretrovir al medicines (TAC 2010). The campaign's (Trea tment Action Campaign v. Matthias Rath case) opinion was tha t all western medicines, incl uding ARVs, are "part of a global conspir acy by multina tional pharmaceutic al companies to profit from ill heal th" (TAC 2010).

Critic al regionalism

AN APPROACH TO ARCHITECTURE THA T SEEKS TO OFFSET THE PLACELES SNES S AND LACK OF LOC AL SIGNIFIC ANCE IN MODERN ARCHITECTURE B Y USING CONTEX TUAL FORCES TO PROJECT A SENSE OF PLACE AND LOC AL MEANING. FOCUSES ON THE BUILDING'S RELA TIONSHIP TO ITS SITE AND LOC ATION IN A SOCIOLOGIC AL CONTEX T INSTEAD OF DEALING BROADL Y WITH THE REGION ITSELF AND A P ARTICULAR REGIONAL STYLE. GIVES EMPHASIS TO THE TOPOGR APHY, CLIMA TE, LIGHT, TECTONIC FORM INSTEAD OF SCENOGR APHY, IT ALSO EMPHASIZE ON THE TACTILE SENSE R ATHER THAN THE VISU AL.

biophilia

EVIDENCE SUGGEST THA T CONTACT WITH NA TURE C AN FOSTER HUMAN HEAL TH, PRODUCTIVITY AND WELL-BEING AND THA T HUMANS POS SESS A BASIC NEED FOR CONTACT WITH NA TURAL SYSTEMS AND PROCES SES(K ELLER T 2005). BUILDINGS AND CONSTRUCTED LANDSC APES THA T FOSTER A POSITIVE CONNECTION BETWEEN PEOPLE AND NA TURE IN PLACES OF CUL TURAL AND ECOLOGIC AL SIGNIFIC ANCE.

Genius L oci

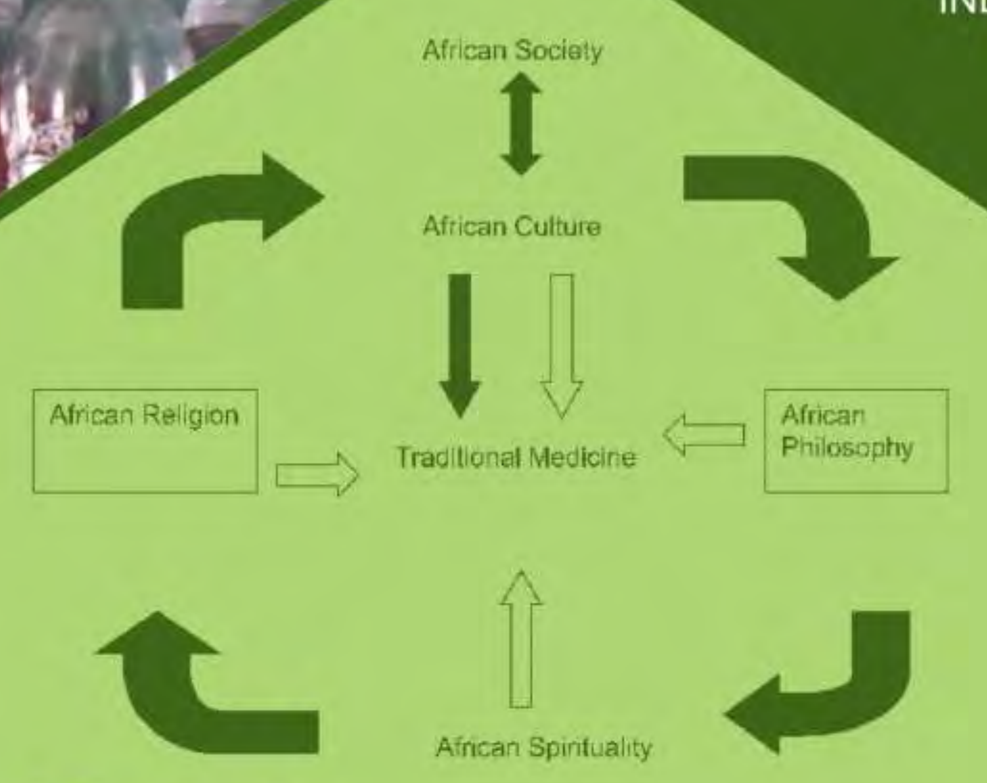
SPIRIT OF SP ACE. HUMAN CUL TURE IS VER Y STRONGL Y LINKED TO PLACES.
"Architecture is a thing of art, a phenomenon of the emotions, lying outside questions of construction and beyond them. The purpose of construction is to make things hold together; of architecture to move us. Architectural emotion exists when the work rings within us in tune with a universe whose laws we obey, recognize and respect. When certain harmonies have been attained, the work captures us. Architecture is a mater of "harmonies," it is a "pure creation of the spirit." LE CORBUSIER

SEMIOL OGY

THE SCIENCE OF SIGNS. IT CONSISTS OF A SIGNIFIER AND SIGNIFIED. THE SIGNIFIER REPRESENTS AN IDEA OR A THOUGHT THA T IS BEING SIGNIFIED. IN LANGU AGE, THE SOUND IS THE SIGNIFIER AND THE IDEA IS THE SIGNIFIED, WHILE IN ARCHITECTURE THE FORM IS A SIGNIFIER AND THE CONTENT THE SIGNIFIED. THE MEANING OF ARCHITECTURE BEY OND THE PHYSIC AL NEEDS OF MAN AND SOCIETY ARE INFL UENCED B Y CUL TURAL FACTORS

INDIGENOUS KNOWLEDGE SYSTEMS

INDIGENOUS KNOWLEDGE (IK) REFERS TO THE LOC AL KNOWLEDGE THA T IS UNIQUE TO A GIVEN CUL TURE OR SOCIETY . THE IKS POLIC Y EMPHASIZES THE IMPOR TANCE TO SET UP INFORMA TION AND RESEARCH INFR ASTRUCTURE FOR INDIGENOUS KNOWLEDGE SYSTEMS TO GET GLOBAL RECOGNITION AND APPROV AL.



traditional medicine global state

WHO RECOGNIZES THAT TRADITIONAL MEDICINE IS WIDELY USED AND A RAPIDL Y GROWING HEALTH SYSTEM AND ECONOMICALLY IMPORTANT HOWEVER IN ORDER TO CAPITALIZE ON TRADITIONAL MEDICINE'S POTENTIAL AS A SOURCE OF HEALTH CARE THE FOLLOWING ISSUES MUST FIRST BE TACKLED: TRADITIONAL MEDICINE POLIC Y, SAFETY, EFFICACY AND QUALITY, ACCES S AND RATIONAL USE (WHO 2002).

WHO IS PROPOSING TO: FACILIT ATING INTEGR ATION OF TRADITIONAL MEDICINE INTO NATIONAL HEALTH CARE SYSTEMS , PRODUCING GUIDELINES FOR STIMULATING STRATEGIC RESEARCH INTO TRADITIONAL MEDICINE, ADVOCATING THE RATIONAL USE OF TRADITIONAL MEDICINE AND MANAGING INFORMATION ON TRADITIONAL MEDICINE (WHO 2002).

WHO HAS SET UP A NUMBER COLLABOR ATING CENTRES FOR TRADITIONAL MEDICINE WORLDWID TO PROMOTE THEIR NATIONAL TRADITIONAL MEDICINE THROUGH RESEARCH AND TRAINING PROGRAMMES. IN AFRICA THERE ARE 3 COLLABORATING CENTRES FOR TRADITIONAL MEDICINE, IN GHANA, MALI AND ANTANANARIVO (WHO 2002).

In South Afric a, DEPARTMENT OF SCIENCE AND TECHNOLOGY is still setting up Indigenous Knowledge's polic y and legisla tive regula tor y framework both interna tional and national, to ensure tha t the benefits of ongoing innov ation in traditional medicine grow to its holders and practitioners and at the same time enhancing socio-economic development.

traditional medicine philosophy

"...THERE WILL GROW ALL KINDS OF TREES FOR FOOD...THEIR FRUIT WILL BE FOOD AND THEIR LEAVES FOR HEALING." (EZEKIEL, 47.12). T RADITION OF HERBAL MEDICINE HEALING HAS BEEN PART OF HUMANKIND WA Y BEFORE THE INVENTION OF SCIENTIFIC HEALING METHODS.

IN ORDER TO UNDERST AND AND ANAL YZE HEAL TH AND ILLNES S IN A SOCIETY, IT IS IMPOR TANT TO PLACE EACH BEING'S BEHA VIORS, INTER ACTIONS AND SOCIAL STRUCTURES WITHIN A CUL TURAL CONTEX T (LOUSTAUNAU & SOBO 1997).

TRADITIONAL MEDICINE IS GENER ALLY ASSOCIA TED WITH A FRICAN PEOPLE IN SOUTH A FRICA. HOWEVER OTHER CUL TURES SUCH AS INDIANS AND CHINESE DO USE THEIR OWN TR ADITIONAL MEDICINE WHICH IS INFL UENCED B Y THEIR OWN CUL TURE (HAS SIM, HEYWOOD & BERGER 2007)

AFRICAN PEOPLE ARE R AISED ON THE FOUND ATION OF UBUNTU . THE S AME SPIRIT OF UBUNTU PHILOSOPHY THA T GOVERNS A FRICAN PEOPLE'S INTER ACTION WITH OTHER PEOPLE IS THE FOUND ATION OF A FRICAN TR ADITIONAL MEDICINE.

UBUNTU IS THE INDIGENOUS A FRICAN WAY OF LIFE THA T IS BUIL T AROUND A CONCEPT OF A CIRCLE; SYMBOLIZING CONNECTEDNES S, BALANCE, AND AN APPROACH TO LIFE IN A HOLISTIC MANNER. THIS PHILOSOPHY IS EXPRES SED IN THE WELL-KNOWN ZUL U SAYING "UMUNTU UNGUMUNTU NG ABANTU" WHICH MEANS "HUMAN BEING IS A HUMAN BEING THROUGH OTHER HUMAN BEINGS" (GOVERNMENT G AZETTE 2008).

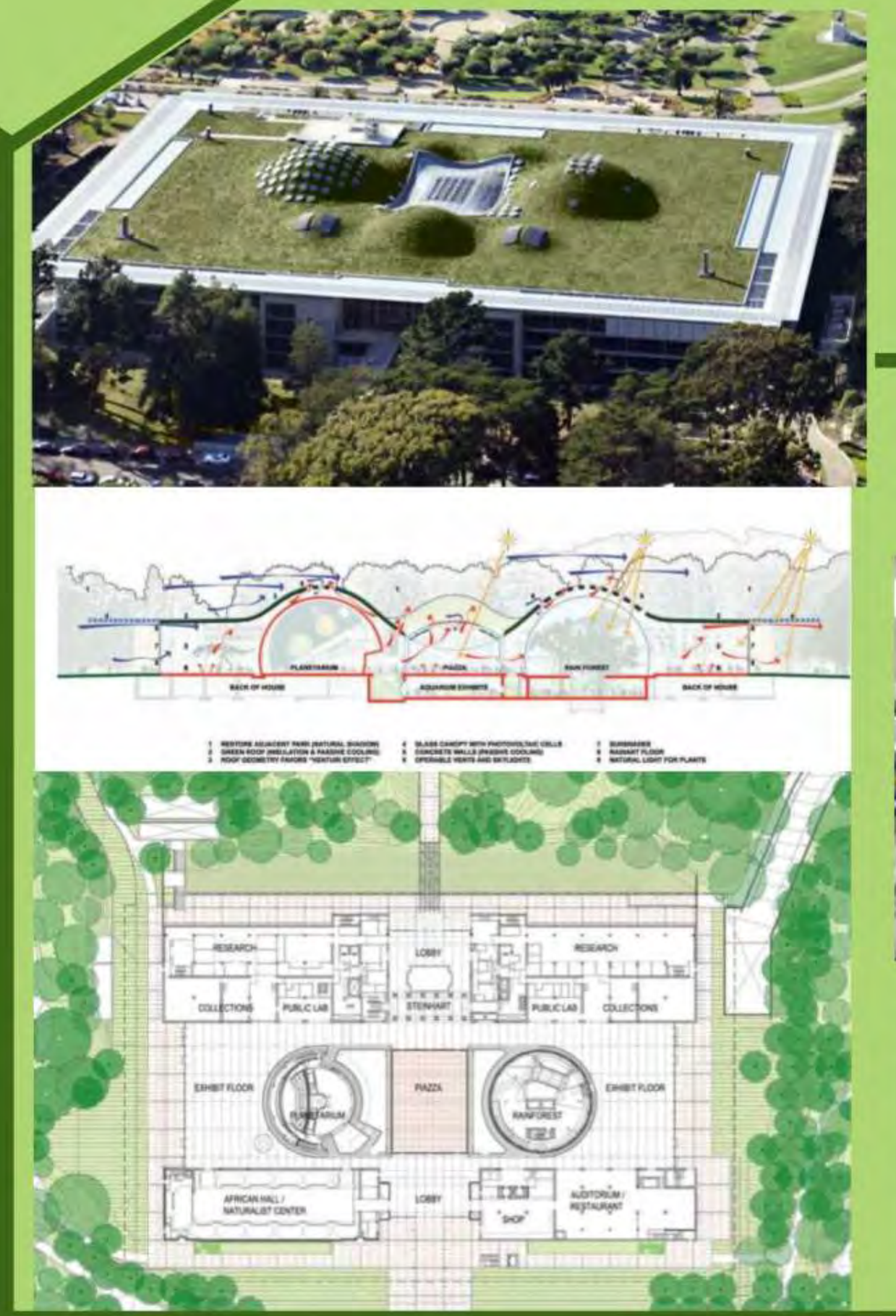
traditional medicine as an indigenous knowledge system

TRADITIONAL MEDICINE IS A BOD Y OF KNOWLEDGE (IDENTIFYING CUR ATIVE HERB S AND REMEDIES, EXAMINA TION P ATIENTS, DIAGNOSIS, THER APY, TREATMENT, PROMOTION AND REHABILIT ATION OF THE PHYSIC AL, MENT AL, SPIRITU AL AND SOCIAL WELL-BEING OF HUMANS) THAT HAS BEEN DEVELOPED AND G ATHERED B Y AFRICAN PEOPLE FOR HUNDREDS OF YEARS

LIKE OTHER A FRICAN PEOPLE'S SKILLS AND KNOWLEDGE , TR ADITIONAL MEDICINE SKILLS ARE PASSED ON TO THE NEX T GENER ATION OR THE NEX T PERSON B Y ORAL TRADITION (GOVERNMENT GAZETTE 2008). THIS IMPLIES THA T IT IS POS SIBLE THA T THE INFORMA TION GETS FORGOT TEN OR CHANGED AS IT BEING P ASSED ON FROM ONE PERSON TO ANOTHER.

kwazihlahla zemithi, umlazi, kzn

californica academy of sciences



003 PRECEDENT STUDIES

lowy cancer research centre australia

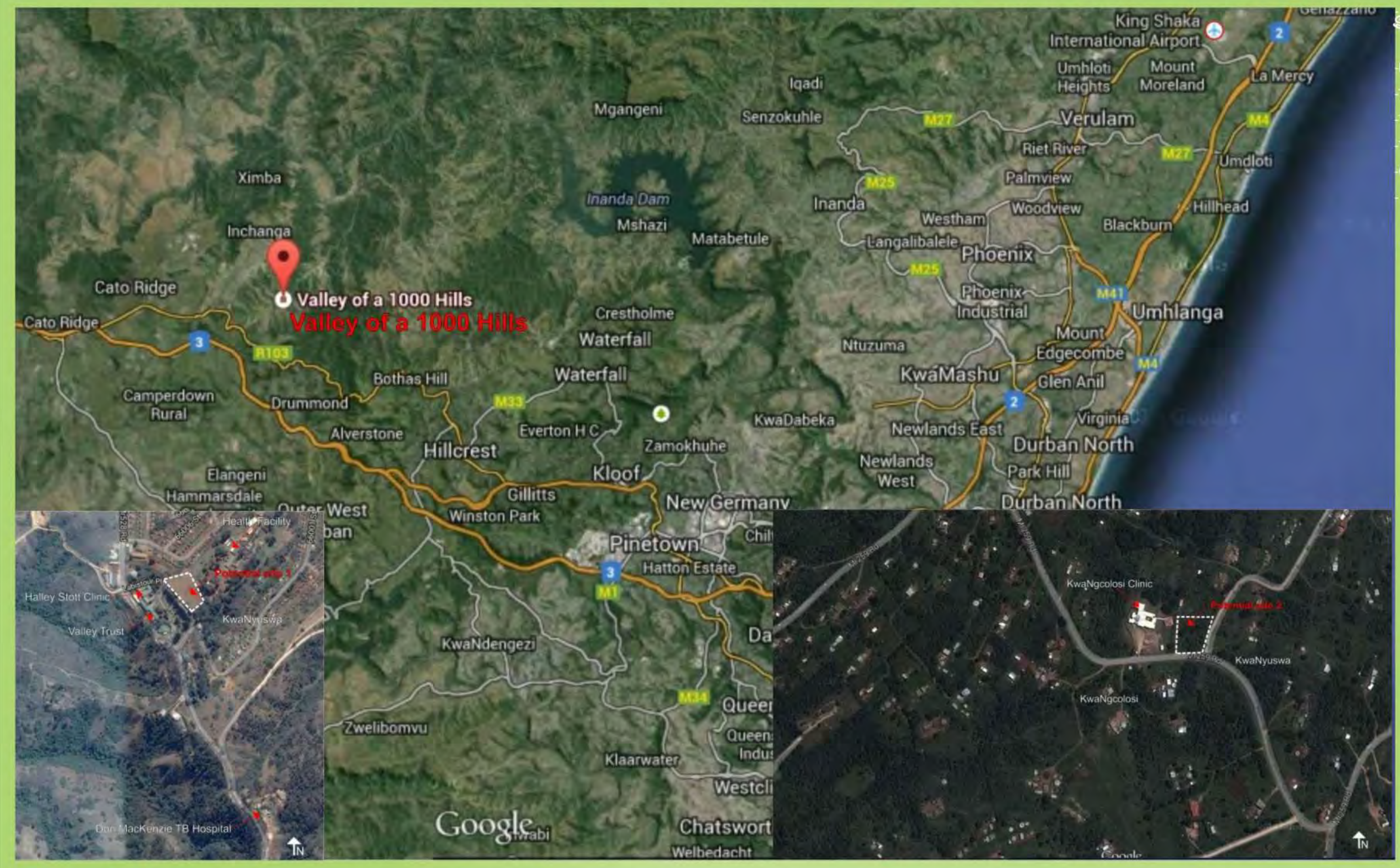
biosciences research building, australia

004 CASE STUDIES

traditional medicine laboratory, ukzn desmond clarence building

k-rith tower building ukzn medical school, sa

005 SITE SELECTION AND SITE ANALYSIS



site selection criteria

	SITE 1	SITE 2
-BIOPHILIC L ANDSC APE	2	3
-TRADITIONAL MEDICINE CUL TURED COMMUNITY	4	4
-THE PROXIMITY TO TERTIARY INSTITUTIONS	2	2
-THE AVAILABILITY OF A HIGHL Y EDUCATED WORKFORCE	3	3
-QUALITY OF LIFE OF THE NEAREST CITY	4	4
- THE ABILITY TO EXPAND AT THE SAME SITE	1	5

selected side

-BIOPHILIC L ANDSC APE UMNGENI RIVER

-TRADITIONAL MEDICINE CUL TURED COMMUNITY

-THE PROXIMITY TO UNIVERSITY OF K WAZUL U-NATAL (DBN AND PMB C AMPUS.

-THE AVAILABILITY OF A HIGHL Y EDUCATED WORKFORCE FROM HILLCREST AND BOTHA 'S HILL (HOSPIT ALS AND RESEARCH BA SED COMP ANIES IN THE AREA E.G V ALLEY TRUST).

-QUALITY OF LIFE OF THE NEAREST CITY- HILLCREST

- THE ABILITY TO EXPAND AT THE SAME SITE

site location

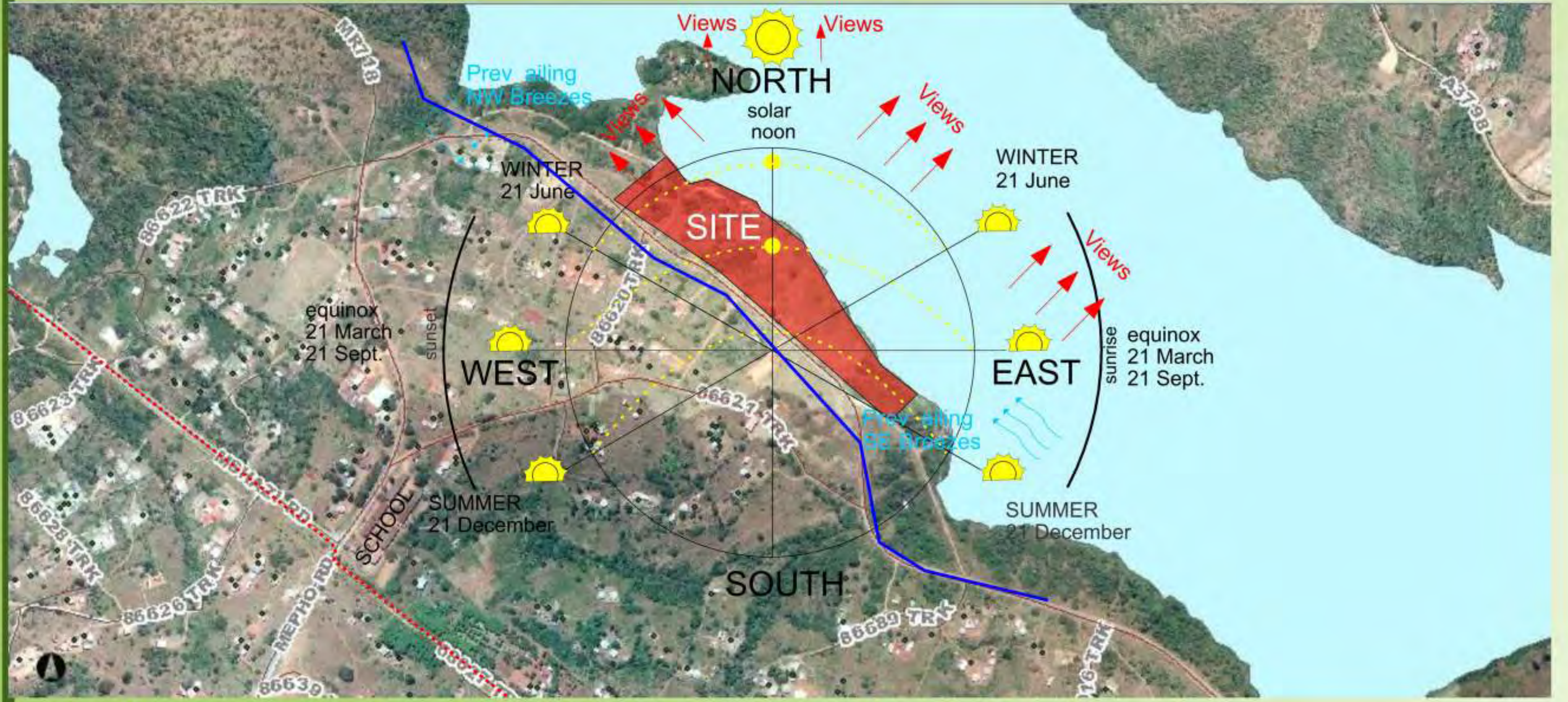
THE VALLEY OF A THOUS AND HILLS IS LOCATED BETWEEN PIETERMARITZBURG(45KM) AND DURBAN(35KM) WHERE UMGENI RIVER MEETS THE MSUNDU ZI RIVER. THIS LOCATION COMBINES THE LUXURY OF LAID -BACK COUNTR Y LIVING WITH AN ANCIENT INDIGENOUS ZULU CULTURE.

THE VALLEY OF 1000 HILLS IS NAMED AF TER THE MANY HILLS, CLIFFS AND V ALLEYS WHICH RISE UP FROM THE BANKS OF THE UMGENI RIVER AS IT FLOWS FROM THE DIST ANT DR AKENSBERG MOUNT AINS TO THE INDIAN OCEAN.

history and culture

WHEN EUROPEANS ARRIVED A T THE POR T OF NA TAL IN 1825, THE V ALLEY OF 1000 HILLS WAS AN ISOLA TED AREA TEEMING WITH G AME. W.S. FIELD WAS ONE OF THE FIRST EUROPEANS TO SET TLE IN 1851. FEW YEARS LA TER A WAGON ROUTE OPENED UP BETWEEN DURBAN AND THE INTERIOR, CLOSE TO WHA T IS NOW THE OLD MAIN R OAD. THE EST ABLISHMENT OF THE R AILWAY LINE LINKING THE GOLDFIELDS WITH THE POR T RAPIDL Y FOLLOWED THE DISCOVER Y OF GOLD IN THE T RANSVAAL IN THE 1880S, AND THE R AIL AND ROAD TR AFFIC THROUGH THE 1000 HILLS INCREASED.

THE EST ABLISHMENT OF EUROPEAN SET TLERS AND THE VIBR ANT ZUL U CUL TURE GIVE THE AREA ITS DISTINCTIVE IDENTITY, THE V ALLEY OF 1000 HILLS HAS A RICH HERIT AGE.MANY LOC AL ZUL U PEOPLE HA VE MAINT AINED A TR ADITIONAL LIFESTYLE IN THE UMGENI AND SHONGWENI V ALLEYS, GIVING THE AREA A POWERFUL SENSE OF HISTOR Y AND IDENTITY. THEIR COLOURFUL CEREMONIES AND EXPRES SIVE, AR TISTIC CUL TURE GIVE THIS AREA ITS VIBR ANTATMOSPHERE AND CREA TIVE ENERG Y.



mapping movement paths and solar movement and climatic factors

Low Vehicle Movement
100 YEARS FLOOD LINE
High Vehicle Movement
Pedestrian Movement

context photos

site cross section 1:1000

topographic factors

figure ground nts

european solutions won't solve african problems, africans need african solutions to african problems or back to slavery we go. dr. hanifi clarke

UNAIDS RESEARCH INSTITUTE
THE VALLEY OF A 1000 HILLS

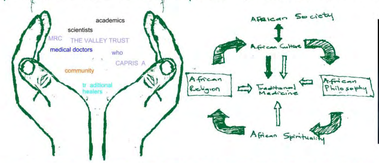
architectural approach that facilitates traditional medicine and biomedicine integration. a design for an unaids research institute the valley of a thousand hills bothas hill, kzn.

LINDA DANISA
201302149

DESIGN CONCEPT

006 DESIGN CONCEPT

semiology → symbolism → anthropomorphism



SOCIAL INTEGRATION THROUGH ARCHITECTURE

"UMUNTU UNGUMUNTU NG ABANTU"
(HUMAN IS A HUMAN THROUGH OTHER HUMAN BEINGS)

The Client

1.The Joint United Nations Progr amme on HIV and AIDS (UNAIDS)

2.Department of Science and Technolog y

3.National Department of Heal th

4.South Afric an Medic al Research Council

5.Wold Heal th Org anis ation

6.Institute of Traditional Medicine

The Brief

The driving idea is to bring a unique, iconic research centre to the existing community.The primar y goal for the proposed building is to collabor ate people from different heal th disciples in a safe, biophilic, modern and sterile facility with the aim to develop research on tr aditional medicine and biomedicine as well as developing and manuf acturing new drugs against HIV and HIV rela ted infections.

The Building requirements

Social Amenities
Clinic
Educ ation and Informa tion facilities
Retail
Taxi Rank
Labor ator y component
UNAIDS offices
Ser vicing
Pharmaceutic al factor y

The Building requirements

Social Amenities
Clinic
Educ ation and Informa tion facilities
Retail
Taxi Rank
Labor ator y component
UNAIDS offices
Ser vicing
Pharmaceutic al factor y

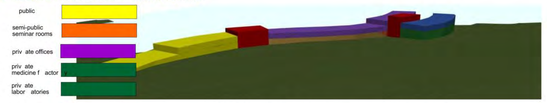
S C H E D U L E O F ACCOMMOD ATION

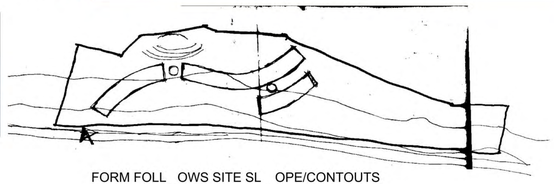
Social Amenities
Coffee Shop/Social sp ace
Coffee Shop Kit chen
Seminar R ooms
Seminar R ooms Kit chenet te
Seminar R ooms Store
Herb s Garden and exhibition area
Public Abl utions

Meeting R oom
Offices
Tissue cul ture
Cold R oom
Equipment Store/Dark R oom
Bsl 3 Anteroom
Bsl 3 W et lab/ T issue cul ture lab
Wash-up A utocla ve room
Prep room
BSL2 lab sp ace /research offices
Bios afety L evel 3 L abor ator y
Anteroom
Specimen store room
Autocla ve room
Bio bank
Mice R oom
Necropsy R oom
Guinea Pig R oom
Quarantine
Exposure R oom
Animal T issue Proces sing
Microbiolog y
Immunolog y
Proces sing
Dark R oom
Visitors viewing sp ace
Abl utions
UNAIDS Offices
Reception/W aiting Area
Board R oom
Social sp aces
Open plan
Director's Office
Researchers' offices
Finance
Stor age R oom
I.T Suppor t R oom
Kit chenet te
Abl utions
Ser vicing
Mechanic al plant room
Centr al stores
External g as stor age
Computer sever room
Emergenc y gener ator room
Hazardous W aste store
Clinic
Pharmaceutic al f actor y
Abl utions
Parking
As per NBR requirements for a pop ula tion of up to 200

Educ ation and Informa tion F acilities
Libr ary
Museum
Database
Retail
Pharmac y
Taxi r ank
Administr ation
Trading st alls
Labor ator y Component
Bios afety L evel 2 L abor ator y

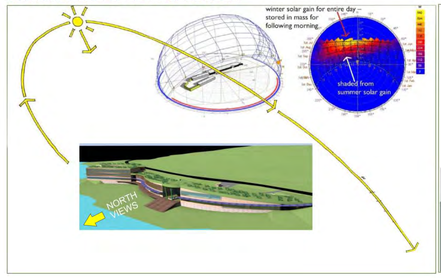
PRELIMINARY ZONING

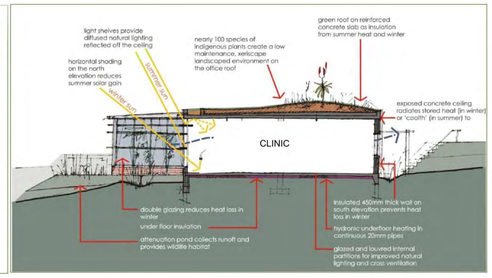




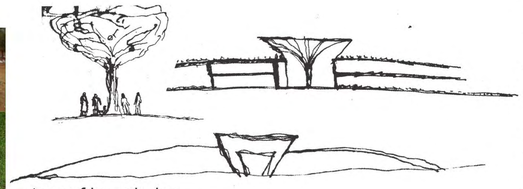
FORM FOLL OWS SITE SL OPE/CONTOUTS
LANDSC APE INTEGR ATION

FORM AND ORIENTATION





MATERIALS

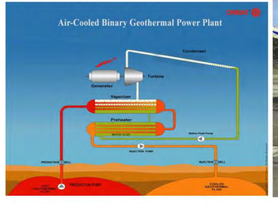


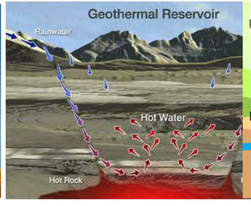
tree of knowledge
meetings under a tree AFRIC
tree of life

AN tr adition

Vast under utilized agricul tur al land

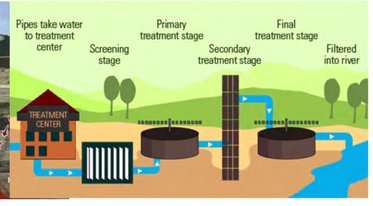
GEOTHERMAL ENERG Y

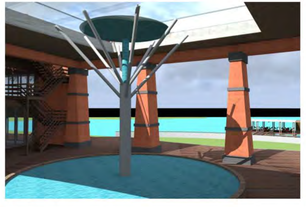




Geothermal energ y is hea t from the Ear th. It is a clean, renewable resource tha t provides energ y in the U.S. and around the world in a v ariety of applic ations and resources

LIQUID W ASTE TREA TMENT





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architectural approach that facilitates traditional medicine and biomedicine integration. a design for an unaids research institute the valley of a thousand hills bothas hill, kzn.

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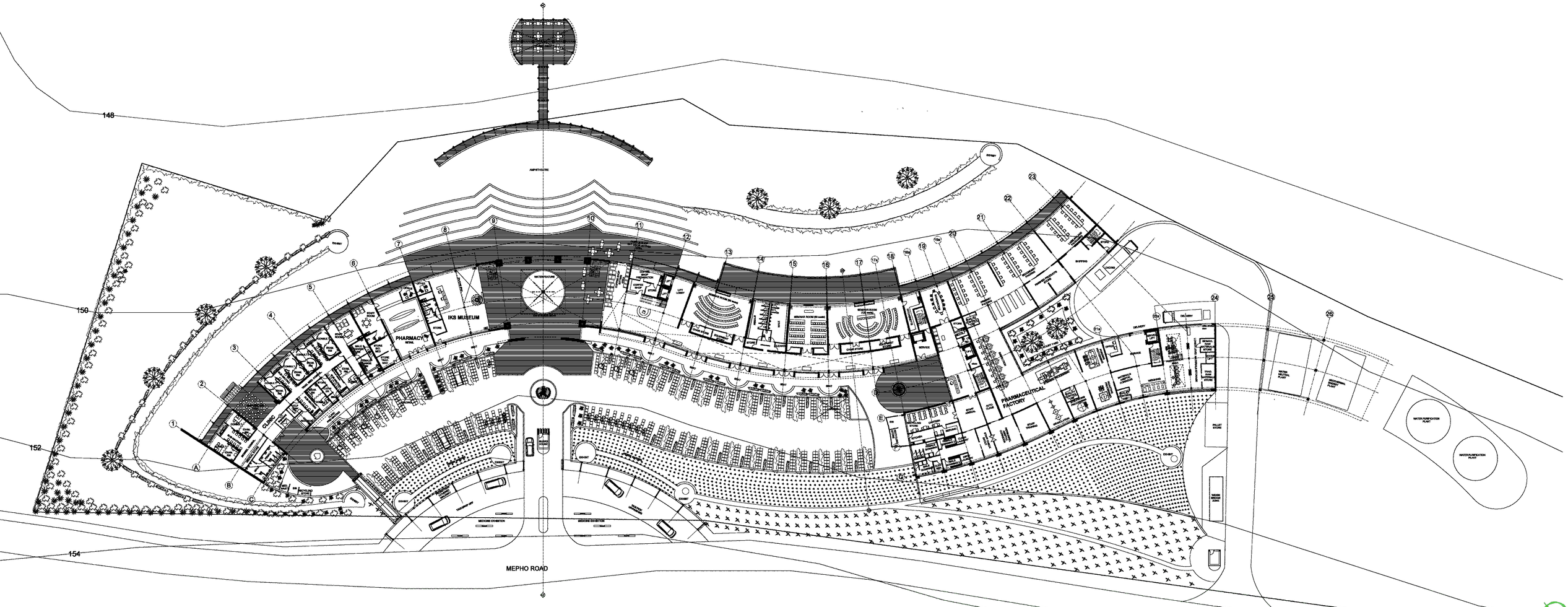

GROUND FLOOR PLAN 1:200

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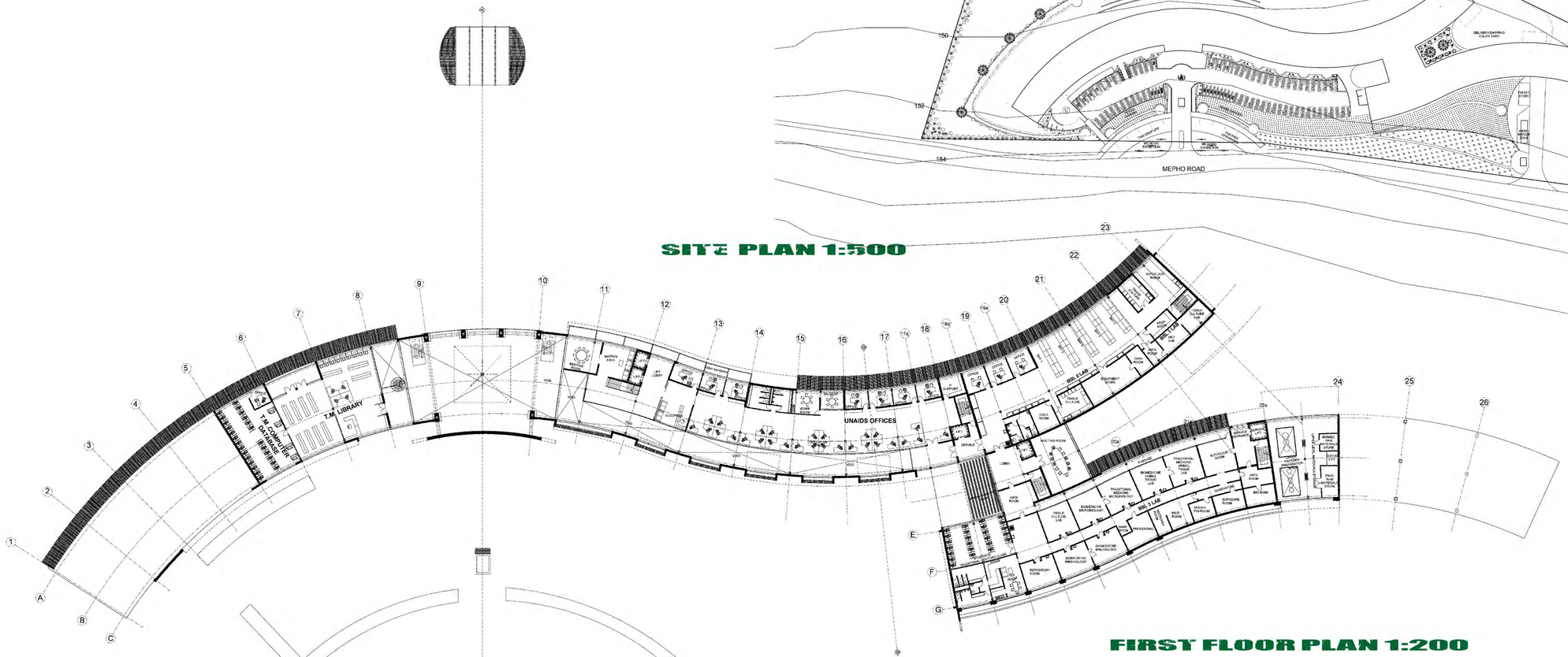
SITE PLAN 1:500



FIRST FLOOR PLAN 1:200

european solutions won't solve african problems, africans need african solutions to afrikan problems or back to slavery we go. dr. henri clarke

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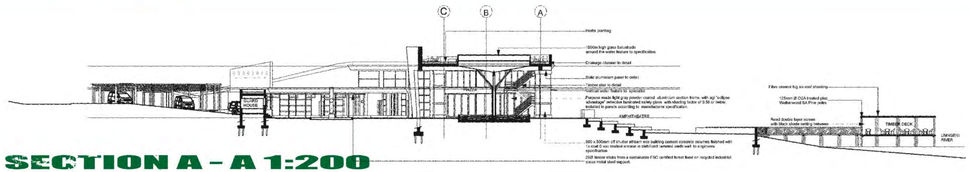
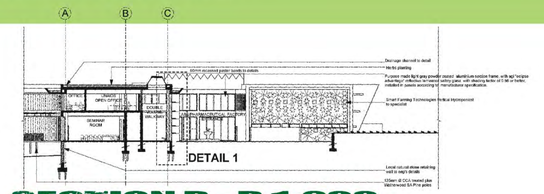
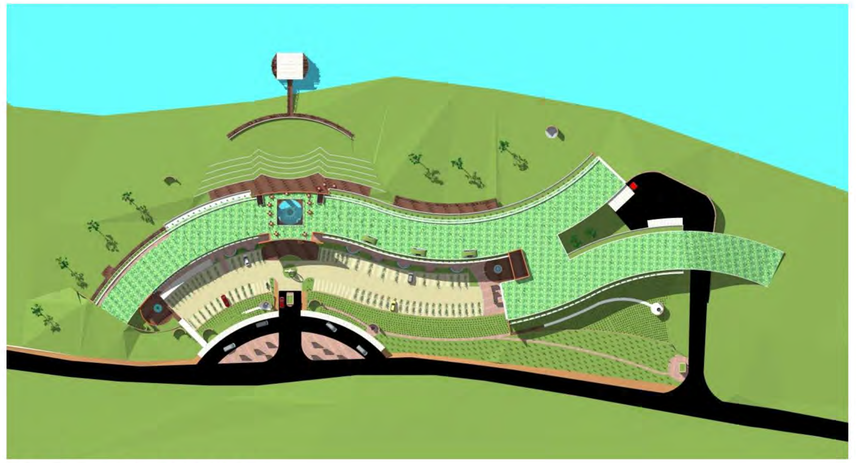


SECTION A – A 1:200

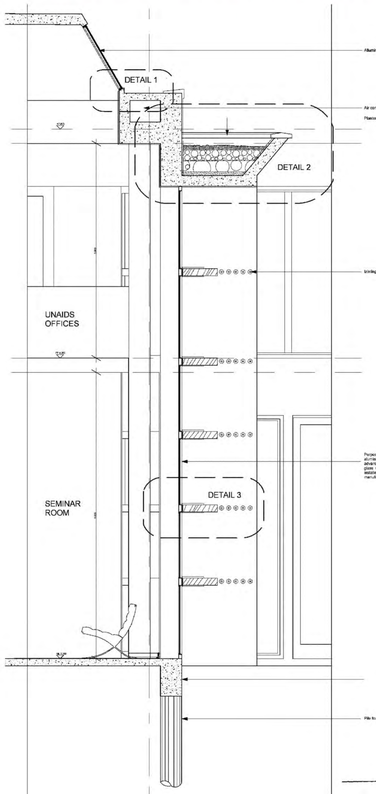


SECTION B – B 1:200

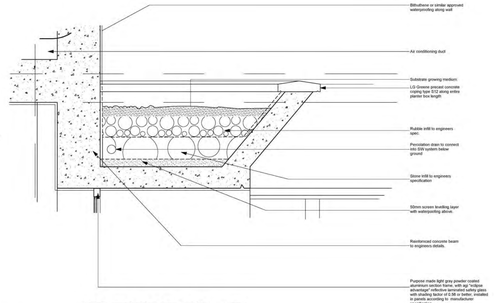
SOUTH EAST ELEVATION 1:200

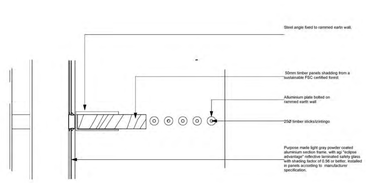


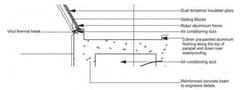
SITE LAYOUT



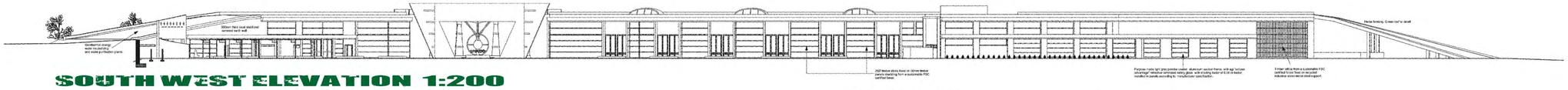
STRIP SECTION 1:20

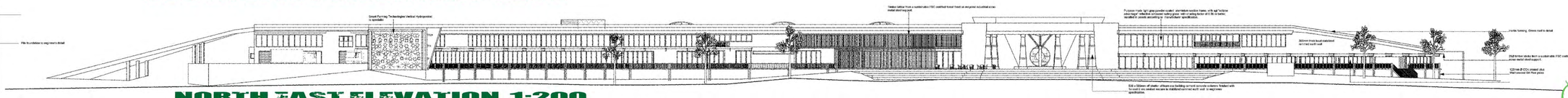






NORTH WEST ELEVATION 1:200





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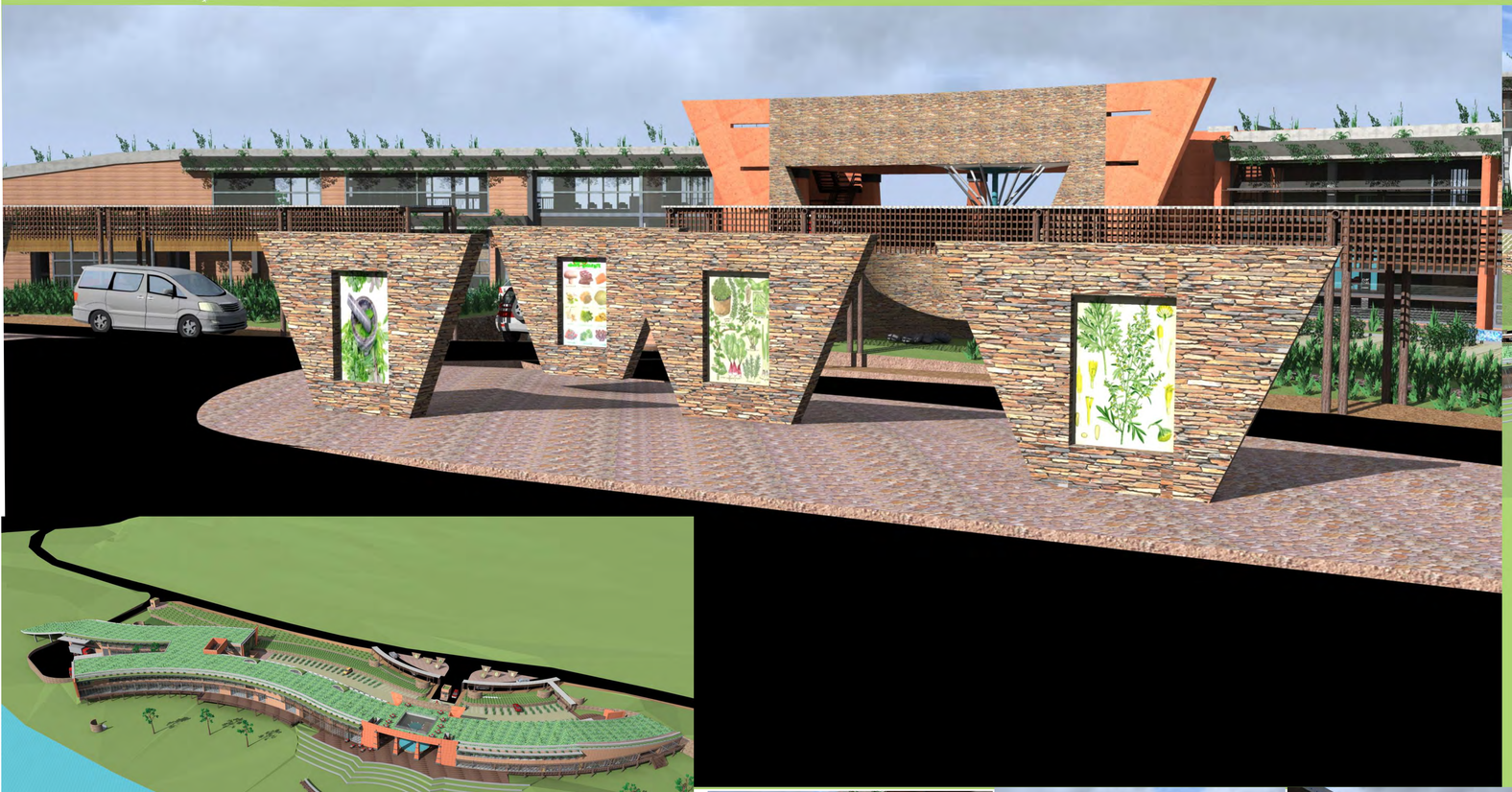
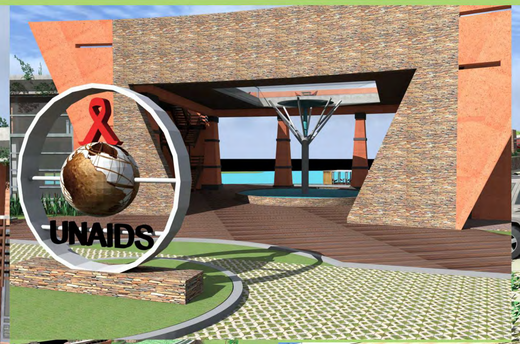
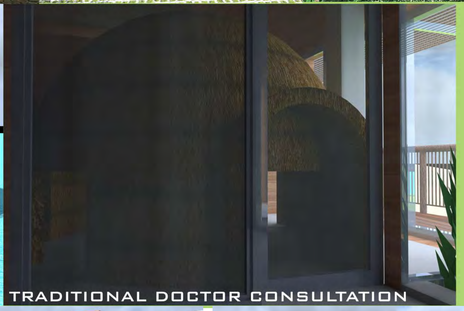




REED CANVAS FOR WEATHER PROTECTION



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