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Feng Shui : A Qualitative Approach To Healthcare Design

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FENG SHUI: A QUALITATIVE APPROACH TO HEALTHCARE DESIGN

by

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Abstract

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This thesis tests the effectiveness of Feng Shui to promote human health and well-being through the application of some of its key precepts to the design of an alternative Community Health Centre on Toronto Island, Toronto, Canada. Feng Shui is a traditional Chinese design methodology that was initially created to address many practical issues of site design. Over centuries it evolved to also address many of the same issues that contemporary design theories like Biophilia and Phenomenology seek to achieve, which is an architecture that is spiritually and emotionally engaging and integrated to its natural environment. This thesis uses the rules of Feng Shui to organize programme, site the buildings in its context, and address decisions related to scale, materiality, orientation, and geometry.

Feng Shui, Biophilia, and Phenomenology were researched as background preparation to the design thesis. The evolution of contemporary healthcare design was studied through a series of case studies of seminal hospital projects of the late nineteenth to twentieth century.

The results and experiences gained from this process are expected to be applicable to other types of buildings.

Acknowledgement

First and foremost, praise to God for making all things possible and blessing me with the ability to complete this project in pursuit of higher education. Much love to my family for their prayers and words of encouragement when I needed them most. Many thanks to my advisor, Professor Cheryl Atkinson, first for taking on the role of advising me throughout this daunting process and, second, for her guidance, knowledge and patience along the way. While she has taught me a great deal about the issues of architecture, she has also broadened my understanding of what research is and how it should be conducted at varying stages of a project. To Mr. Greg Colucci for agreeing to be my external examiner and for the opportunity to have rigorous discussions regarding healthcare issues, I am truly grateful. Special thanks to my editor, Ms. Judy Roberts. Finally, I acknowledge Mr. John Cirka for his feedback and my fellow classmates for their generous input.

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Executive Summary

"Health is a state of complete physical, mental and social well-being
and not merely the absence of disease or infirmity"
(The World Health Organization, 1946)

Feng Shui is an ecologically based-art dealing with natural phenomena, conservation, ecology, orientation, and spatial arrangement. It treats the environment as a protector against bad energy and an enhancer of good energy (Rossbach, 1983, and Too, 1996). It is a traditional body of knowledge held by the Chinese that has been passed from generation to generation for over 3000 years. The lore of Feng Shui is intended amongst other things to promote both a physical and psychological sense of wellness through a set of design rules to configure the built environment.

This thesis takes an in-depth look at the set of rules found in the lore of Feng Shui to show how they are instrumental in affecting human well-being. It will also demonstrate that many of the precepts of Feng Shui are actually analogous to contemporary theories of design like Biophilia and Phenomenology. The objective of these three constructs is the improvement of quality of life and a holistic wellness through the manipulation of one's environment as found. To achieve this objective, they also have a similar design methodology which emphasizes sensory perception, and human-environmental symbiosis.

Research on Feng Shui, Biophilia, and Phenomenology provided a critical background to the work of this thesis. The traditional wisdom of Feng Shui was compared to the theories of Biophilia and Phenomenology. Case studies of seminal healthcare buildings was undertaken investigate the affects of design on human well-being and to document the revolving philosophies of healthcare design and delivery in the modern period in North America. An analysis of the commonalities of the seemingly opposing precepts of the ancient Eastern cultural constructs of Feng Shui and the contemporary Western concepts of Biophilia and Phenomenology was conducted to show that these contemporary

philosophies are focused on similar methods and objectives, a more sensorial rich and environmentally integrated environment.

Several design principles were extracted to focus the design project. These were the effects of material choices and their disposition, programme relationships, cardinal orientation, and geometry, based on the Feng Shui principles of the Five Elements, the flow of Chi, as well as Yin and Yang. The primary goal of this study is to understand whether Feng Shui principles can create a harmonious and supportive environment that will affect a person's spiritual and physical well-being.

This thesis assumes that many of the principles and precepts of Feng Shui have the potentials to positively influence the human sense of wellness. The effectiveness of some of the lore of Feng Shui will be demonstrated through a design project for a Community Health Centre. Feng Shui claims that by properly applying its principles, that wealth, fame, relationships, health, fertility, knowledge, and career of an individual can be improved. Among those objectives, the objective of "wellness" has been chosen to be investigated since it is easier to measure as an observable condition. This study identifies a Community Health Centre on Toronto Island, Toronto, Canada as an appropriate vehicle to test the ability of Feng Shui to create a sense of wellness.

The results and experiences gained through this thesis show that the presence of nature is essential for a psychological and physical sense of wellness. The ideas of Feng Shui have lasted for centuries because at their core, they resonate with the human soul. The contemporary design philosophies of Biophilia and Phenomenology focus on the same objective, which is a holistic wellness through an authentic engagement with natural materials, geometrical balance, view, sunlight, wind, water, smells, sound, and so on, both in symbolic and in tactile manners.

Chapter 1. Introduction

The conceptual framework of this thesis is presented in Figure 1.01. The four thesis methodologies are: (1) Research of the vernacular Eastern lore of Feng Shui and its commonalities with contemporary theories of Biophila and Phenomenology, (2) The design application of Feng Shui, (3) The synthesis of objective or definable qualities from research and design components, and (4) Conclusion.

Feng Shui is an ancient Chinese wisdom dealing with natural phenomena, conservation, ecology, orientation, and spatial arrangement that treats the environment as a protector against bad energy and an enhancer of good energy (Rossbach, 1983, and Too, 1996). It originated in China over 3000 years ago (Field, 1998). Today, there are millions of people in the world practicing Feng Shui from regular ethnic Chinese in Asia to "rich and famous" people in North America. A number of the world's popular architects have also implemented this ancient wisdom of Feng Shui in their design. I.M. Pei and Sir Norman Forster used Feng Shui in Hong Kong's China Bank and Shanghai Bank respectively. With so many followers and having survived for thousands of years, I believe there are some valuable methods that can be extracted from this traditional wisdom.

The essence of the Five Elements and their cycle, the flow of energy or Chi, and the complementarities of Yin and Yang are some of the fundamental philosophical concepts of the traditional Chinese wisdom of Feng Shui. These principles if understood for their objectives rather than treated as prescriptive rules, can be effectively applied in contemporary architecture practice. Feng Shui claims that by properly applying its principles, that one's wealth, fame, relationships, health, fertility, knowledge, and career can be improved. Among these objectives, "wellness" has been selected as a potentially more measurable claim. The argument of this thesis will be developed through the design of a healthcare facility which is intended to foster the physical and spiritual wellness of its users.

Design has the potential to improve people's mood and to create a sense of well-being. It has been proven that design can affect people's happiness and health. Current studies in medicine and healthcare architecture show that mental, spiritual, psychological, intellectual, and social conditions of patients can support their healing process (Dilani (2008) in Sorana & Cucurnia, 2008). Unfortunately,

this potential has often been neglected by the architect. The application of Feng Shui principles in architectural design is expected to contribute to the improvement of the condition of the healthcare facility.

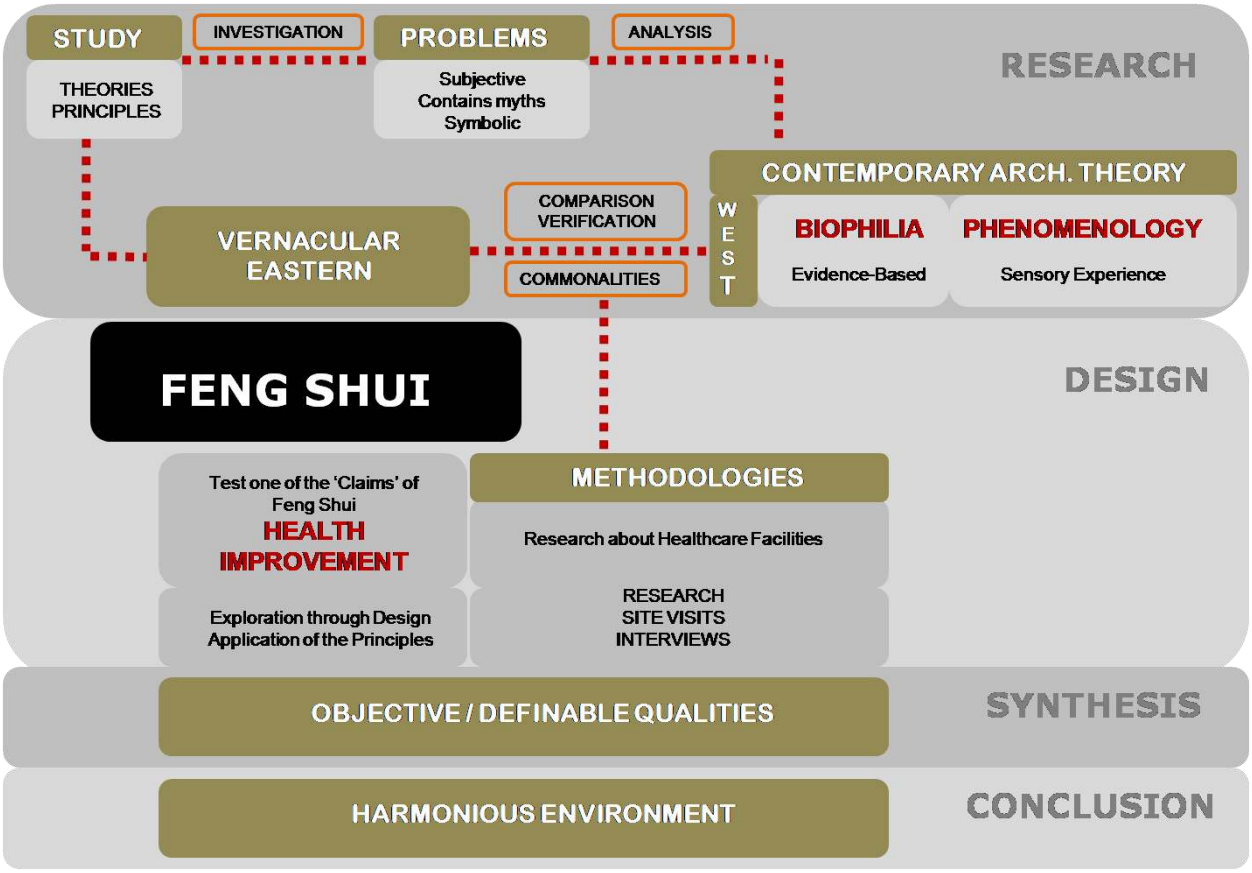


Figure 1.01. Conceptual Framework of Thesis

One of the concerns encountered in applying the vernacular Eastern wisdom of Feng Shui was its subjectivity. It is based on the personal interpretation of a Feng Shui "master". Most of the Feng Shui teachings have been transferred through oral tradition for thousands of years. The rules of Feng Shui are loose and its interpretation can vary from one person to another. There is almost no obvious right and wrong in Feng Shui. Even when a mistake is committed, there is always a remedy that can be used to counteract it. In addition, most of the literature on the subject of Feng Shui contains myth and the language used is often symbolic. The domain of Feng Shui is very broad. There is almost no end to the

exploration of Feng Shui. In order to put a limitation to the scope of this thesis and to be able to verify its principles, the contemporary architectural theories from the Western tradition were added.

As background to this thesis, I have researched other contemporary architectural theories that address the link between sensory perception in design and its effect on a person's spiritual and physical well-being. Upon recognizing a number of obvious similarities between the ancient wisdom of Feng Shui and the contemporary architectural theories of Phenomenology and Biophilia, these two theories were added in the research of this thesis. This thesis will provide a critical analysis of the traditional wisdom of Feng Shui in comparison to the theories of Phenomenology and Biophilia. The commonalities between the seemingly opposing precepts of the ancient Eastern cultural constructs of Feng Shui and the contemporary Western concepts of Biophilia and Phenomenology will supply contemporary architects with an alternative approach to the design of healthcare facilities that are conducive to the healing process. Feng Shui, Biophilic Design, and Phenomenology will be shown to have analogous strategies and methodologies that contribute to a more holistic understanding of the role of architecture in the improvement of the quality of life and in healing. These three theories agree that the presence of nature is essential for the wellness of a person; that certain materials and spatial configurations can have a positive influence on people; and lastly, that the unconscious human experience matters.

Further investigations of the state of healthcare condition in Canada and current practice on healthcare design were conducted. A number of hospitals, clinics, nursing homes and other health-related facilities were visited. The effects and affects of design in healthcare architecture were analyzed through case studies. Three categories of institutions were chosen: (1) buildings constructed prior to the extensive mechanical ventilation system, where nature was recognized as a source of healing, (2) buildings that are a highly dependent on mechanical system and that emphasize functionality, and (3) buildings that reflect the current focus on energy efficiency and connection to nature. This part of the thesis provides best practice strategies in the design of healthcare facilities.

The effectiveness of the traditional wisdom of Feng Shui through design was further examined. This study identifies a Community Healthcare Centre on Toronto Island, Toronto, Canada as an appropriate vehicle to test the ability of the traditional wisdom of Feng Shui to create a sense of wellness. The definable and objective qualities of healthcare design established from the research and case studies are then implemented in this proposed healthcare project. This design part of the thesis concentrated on the effects of materiality, programme relationship, orientation, and geometry, based

on the Feng Shui principles of the Five Elements, the flow of Chi, as well as the Yin and Yang. The primary goal of this study is to understand whether following Feng Shui principles in designing a healthcare facility results in a harmonious and supportive environment that will positively affect people's spiritual and physical well-being. The results and experiences gained through the examination of these strategies and methodologies are expected to be applicable to other types of buildings.

Architecture has the ability to create spaces and environments that are conducive to their occupants' well being. The shift toward sustainability in all aspects of human activity (McMinn & Polo, 2006) requires healthcare architects to find a new typology for the healthcare facility that is both energy efficient and economical, and that can enhance the quality of life of its occupants. No longer should a healthcare facility be designed to merely reflect its functional aspects. Instead, it should be a design with the kind of care and consideration applied to any museum, school, residential or spiritual building.

Chapter 2. Theoretical Discourse

2.1. Overview

This chapter begins with a review of the lore of Feng Shui and the contemporary architectural theories of Biophilia, and Phenomenology, followed by research on healthcare design. As background to this thesis, I have researched these contemporary theories because they address the link between sensory perception in design and their affect on a one's spiritual and physical well-being. It was discovered that there were many similarities in the design objectives of Feng Shui, Biophilia and Phenomenology.

This section of the thesis will provide a critical of Feng Shui in comparison to the theories of Phenomenology and Biophilia. The principles of Feng Shui, Biophilic Design, and Phenomenology can potentially complement each other and hopefully will contribute to a more holistic understanding of the role of architecture in the improvement of the quality of life and in human well-being. It is hypothesized that implementation of these principles can be an additional tool that helps contemporary architects understand the role of design in the improvement of health. Furthermore, the results gained through the examination of these strategies and methodologies will be applied in the design section of this thesis to test their effectiveness in a project.

2.2. Feng Shui

Feng Shui is literally translated as wind and water. This translation emphasizes the presence of wind and water that we can feel but cannot see or grasp (Lip, 1997). Feng Shui is an ancient Chinese tradition that deals with natural phenomena, conservation, ecology, orientation, and spatial arrangement and that treats the environment as a protector against bad energy and an enhancer of good energy (Rossbach, 1983; Too, 1996). Feng Shui originated in China over 3000 years ago. Today, there are millions of people in the world practicing Feng Shui from regular ethnic Chinese in Asia to "rich and famous" people in North America. A number of the world's popular architects have also implemented this lore of Feng Shui into their designs. I.M. Pei and Sir Norman Forster used Feng Shui in

Hong Kong's China Bank and Shanghai Bank respectively. With so many followers and having survived for thousands of years, I believe there are some valuable methods that can be extracted from this lore.

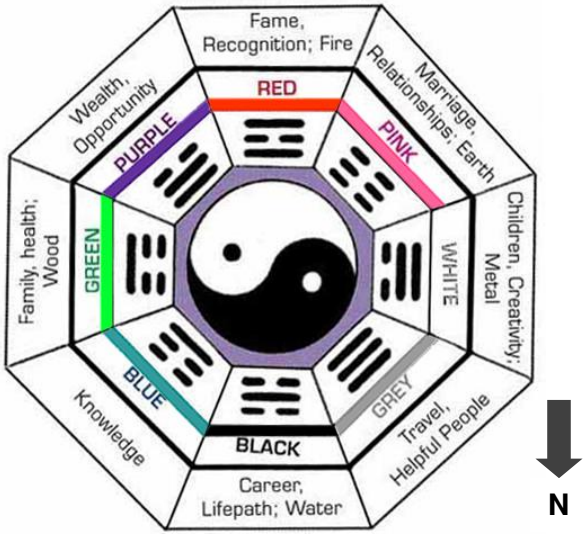
(www.hongkonghustle.com, 2008)

Figure 2.01. China Bank and Shanghai Bank

The basis of Feng Shui can be summarized by the following quote taken from the "Book of Burial" by Guo Pu from the fourth century: "Chi rides the Feng (wind) and scatters, but is retained when encountering Shui (water)" (Field, 1998). The earliest textual reference to Feng Shui comes from the "Book of Odes" of the Zhou Dynasty (1046 – 256 BC). The text read: "Liu was measuring the shadow of the gnomon (sundial) to determine the cardinal directions. Sunshine and shade are the original meanings of the … terms Yang and Yin. With this information, he could determine which side of the hills and vales received the most sunshine during the winter, as well as the proximity of these sunny dells to sources of water" (Field, 1998).

These archaeological records from the "Book of Burial" and the "Book of Odes" suggest that the prehistoric Chinese were able to interpret the natural phenomenon of their surrounding and use its potential for their benefit. This knowledge was essential because they depended on nature to provide them with food and shelter. The ancient Chinese built their house in protective sites, away from the

direction of the prevailing winds. Water from the rivers was essential to grow their crops. Furthermore, the direction of the flow and the orientation of the river banks were important to transport their crops. The natural phenomena of erosion by wind and water also fascinated them. They witnessed how these natural forces formed their surroundings (Hale, 2000). This observation was documented and evolved over time into this traditional Chinese art of placement known as Feng Shui.



(thecrabbynookgarden.com/fengshui/bagua-mapa.jpg)

Figure 2.02. Ba gua and its Life Objectives

The main objective of Feng Shui is to improve people's lives through ensuring a harmonious relationship between them and their environment. The premise of Feng Shui is that the natural environment can be utilized to complement man-made structures to improve the physical and spiritual wellness of its occupants (Too, 1999). The fundamental philosophies of the traditional Chinese wisdom of Feng Shui that are considered to be viable to be applied in the contemporary architecture practice are the following: the flow of energy or Chi, the complementarities of Yin and Yang, and the essence of the Five Elements and its cycle. As illustrated in the Ba gua principle or the Eight Symbols above (Figure 2.02), Feng Shui claims that a proper application of its principles will improve a person's wealth, fame, relationships, health, fertility, knowledge, and career.

2.2.1. Chi (Life-Force Energy)

Chi is believed to be possessed by everything on earth; it influences how a human thinks or acts, thus affecting how one functions and succeeds in life. The acknowledgement of the presence of this life-force energy is central in the study of Feng Shui. Nature, present in the form of Chi, is treated as a living being whose strength and direction of movement can help or harm people. The favourable one is called the Living Chi or "Sheng Chi", while the harmful one is called the Dead Chi or "Shar Chi". The characteristics of these energies are listed in Table 2.01. In designing any space, the flow of Chi should be the main consideration. Topography, layout, and the surrounding environment affect the Chi. The life enhancer Living Chi should be welcomed, accumulated, and allowed to flow freely to bring its good influence, whereas harmful Dead Chi should be avoided. According to Feng Shui, the Living Chi can be accumulated by a body of water, but it can be dispersed and washed away by fast or strong wind (Too, 1996).

	Mountain	***River***	***Soil***	***Vegetation***	***Air***
Living Chi	Smooth	Clean, Slow, Meander	Thick, Rich	Green, Flourish	Warm, Clean, Dry
Dead Chi	Steep	Turbid, Swift, Straight	Damp	Barren	Cold, Stale, Moist

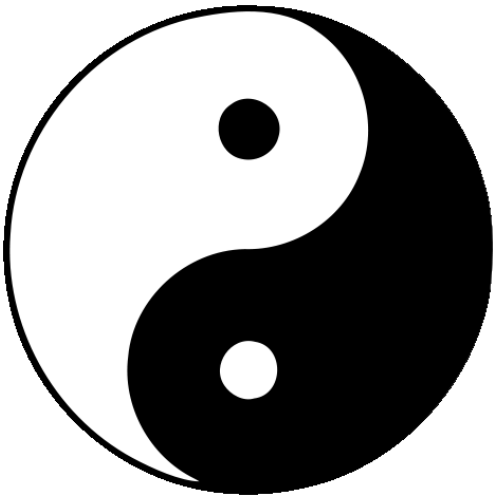
(Xu, 2003)

Table 2.01. Living Chi and Dead Chi Characteristics

2.2.2. Yin and Yang

The Yin and Yang Concept is symbolized by an unbroken curve line, with no beginning or ending, forming a circle and divided into two equal interconnected - interdependent parts in opposites such as dark and light or solid and void. As shown in Table 2.02, each side contains a small dot symbolizing that there is a tiny bit of the other opposite in it. When we analyze our world, we find that everything is created in pairs and although they seem to be in opposition, they are actually complementing each other in perfect harmony. Feng Shui seeks well balanced Yin and Yang forces to bring harmony and a more productive living environment (Too, 1996).

Yang	*Yin*
Sun, Light, Day	Dark, Shade, Moon, Night
Spring, Summer	Fall, Winter
East, South	West, North
Wood, Gold	Fire, Water
Mountains, Raised landforms	Valley, Flat
Tall buildings, Large structures	Countourless land, Streams, Water
Large, Powerful, Hard, Firm	Small, Weak, Soft
Heat, Warmth, Fiery, Dryness	Cold, coldness, Moisture
Left , High, Above, Back	Right, Low, Below, Front
Upward, Motion	Downward, Stillness
Destruction, Aggressiveness	Conservation, Responsiveness
Clarity, Expansion	Murkiness, Contraction
Even numbers	Odd numbers
Soul, Dragon	Body, Tiger

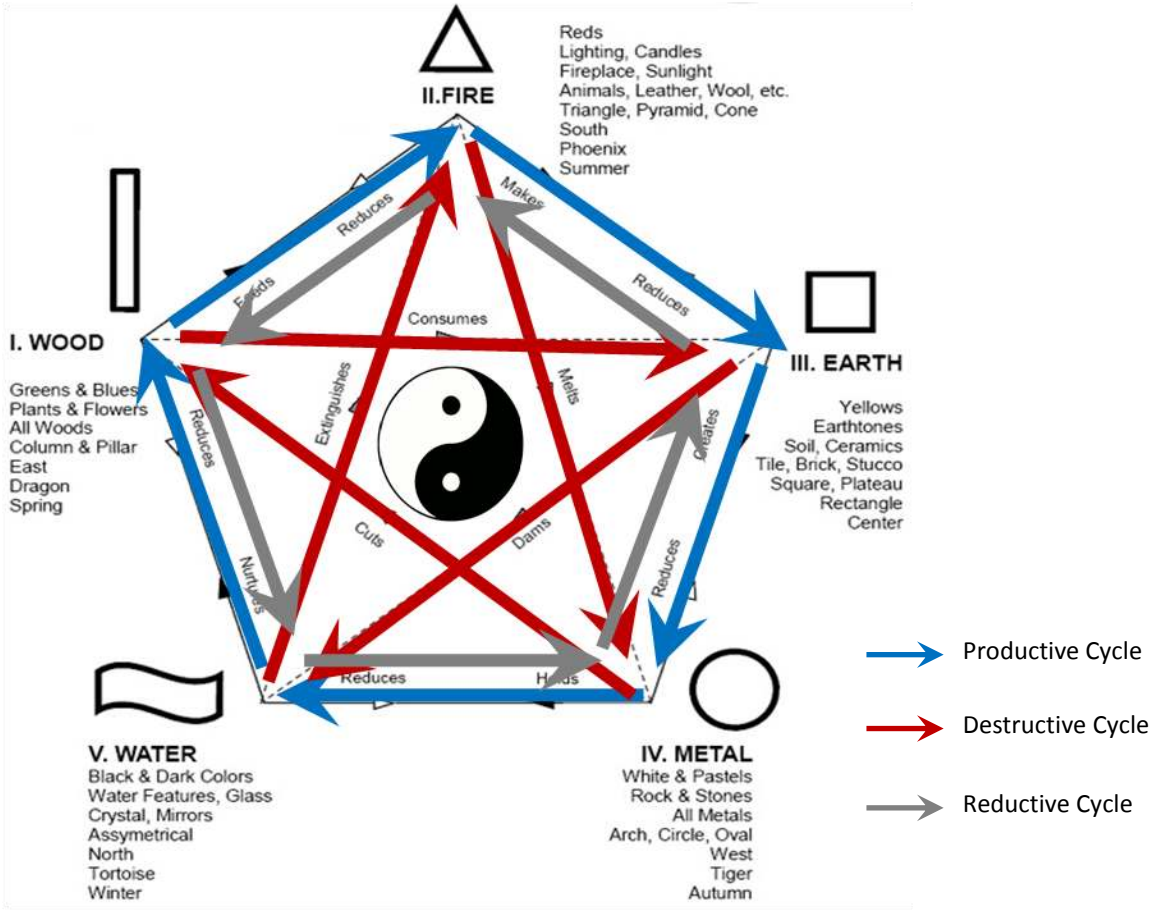


(Lip, 1997, Mainini, 2004, Too, 1996, Xu, 2003)

Table 2.02. Yin – Yang and their Attributes

2.2.3. Five Elements

The Five Elements are earth, wood, fire, metal, and water. Each represents the essence of material that is available on earth with its distinct characteristics of form, colour, and orientation. As illustrated in Figure 2.03, they are connected in the productive cycle, the destructive cycle, and in the reductive cycle. In the productive cycle fire burns producing ash or earth; metal is mined from the earth and melts like liquid; liquid or water grows tree or wood; and wood burns producing fire. In the destructive cycle, each element controls the next element after its product: wood or tree breaks through the earth; earth blocks the flow of water; water extinguishes fire; fire melts metal; and metal chops down wood (Lee, 1986). In the reductive cycle: earth reduces fire; fire burns wood, wood absorbs water; water corrodes metal; and metal moves earth (Moran, Yu & Biktashev, 2002).



(lovingfengshui.com/html/5_elements.html)

Figure 2.03. Five Elements and its Cycles

As listed in Table 2.03, each element in the concept of Five Elements represents different direction, colour, shape, season and characteristics. By understanding these traits, architects can effectively design any space according to the psychological effects they want to achieve. The wood element symbolizes energy growth and creation. It is effective in stimulating force or power, but too much wood element will make it easier for fire to burn. The element of fire stimulates warm feeling, passion, and affection, but fire must be handled carefully otherwise it can cause an inferno. Although the element of metal can stir up idleness into useful energy, too much causes exhaustion. The water element can bring tranquility, peace, and serenity, and sustenance, yet excessive water element will carry loneliness and self-possession. Lastly, the element of earth is the central element. It signifies focus, stability, and unity; however extreme focus will lead to addiction.

Element	Direction	Colour	Shape	Season	Condition	Force	Characteristics	
Wood 	East, Southeast	Green	Rectangle, Straight Line	Spring	Wind	Yin	Expansive, nurturing and versatile ***Symbolizes*** growth and life	
							Productive, creative (+) A walking stick	Overfertile, provoking (-) A spear
Fire 	South	Red, Purple, Orange, Pink	Triangle, Sharp Angle	Summer	Heat	Yang	Open (+) Bringing light, warmth and happiness	Overpowering (-) It can erupt, explode and destroy
Earth 	Central, Northeast, Southwest	Yellow, Brown	Square	Late Summer	Wet	Yang	It nurtures, supports and interacts with each of the other elements ***Symbolizes*** the nurturing environment, enabling seeds to grow	
							(+) Soothing, fluorishing	(-) Disruptive, stagnating
Metal 	West, Northwest	White, Silver, Gold	Round	Fall	Dry	Yang	It can contain objects and a conductor ***Symbolizes*** strength and solidity	
							Lively, tranquil (+) A beautiful and precious commodity	Dangerous, unpredictable (-) A blade
Water 	North	Blue, Black	Wavy, Curve	Winter	Cold	Yin	It suggests the inner self, art and beauty It touches everything	
							Nurturing (+) Gentle rain	Sleepy (-) A storm

(Hale, 2000; Jay, 1998; Moran, Yu & Biktashev, 2002; Lip, 1997; Xu, 2003)

Table 2.03. Five Elements and Their Representations

2.3. Biophilia

The term Biophilia was coined in 1965 by Erich Fromm, a German Social Psychologist, to describe humanity's inclination to "love life or living systems" (Davis, 2007). It was popularized by Edward O. Wilson, a Socio-Biologist from Harvard University. He argued that every human being is born with an inherent attraction to nature or other living creatures, both conscious and unconsciously (Wilson, 1984). Recent studies have also shown that the presence of natural elements, such as an outdoor view through a small window, can increase productivity, healing, learning, and emotional well

being (Kahn, 1999). The following section will discuss the importance of the connection between human and nature for a person's physical and spiritual well being.

The love for nature and other living beings is often buried deep inside our unconscious minds. For generations, human beings learned their survival skills by recognizing their place in the natural system and by observing the natural phenomena around them. As a species, men survived because they adapted to the conditions of nature to gather or hunt for their food and to find a safe refuge. This instinct to hunt and to gather food, as well as to find a safe refuge, has always remained with us, in spite of our diverse cultural and demographic backgrounds. Biophilia hypothesizes that the survival skills are passed on genetically through our DNA as a part of the natural selection process (Kellert & Wilson, 1993). However, as time progresses, people seemed to have been disconnected from nature and forgotten these basic survival skills. They do not feel the urgency to live close to nature to grow their food or to find a protected shelter. Since modern men live far apart from nature and lose their direct connection to the natural world, they no longer sense that they are a part of the overall ecosystem.

	Number of Pain Drug Doses (days 2-5 after surgery)		
Analgesic Strength	**Nature** View Patients	**Wall** View Patients	
Strong	0.96	2.48	Potent narcotics administered by injection
Moderate	1.74	3.65	
Weak	5.39	2.57	Oral doses of drugs such as acetaminophen

(Ulrich in Kellert, 2008)

Table 2.04. Pain Drug Intake of Patients with Window View of Nature versus Brick Wall

Although men's reliance on nature seems to have become less obvious, the instinct to always be connected with nature is inevitably ingrained in their souls. Scientific research confirms that when shown images of a natural setting and an urban environment, people of different backgrounds and age groups prefer the natural environment (Kahn, 1999; Ulrich in Kellert, 1993). Therefore, the benefit of natural presence in our daily life cannot be underestimated. The affiliation with nature and other living beings is important for our state of well being, both physically and spiritually. Professor Roger Ulrich from Texas A & M University observed patients recovering from abdominal surgery. The outcome of this study demonstrates that the patients who were occupying the room with a view to nature required less

pain medication, healed faster, were less agitated, and only experienced minor complications compare to those who were treated in rooms overlooking a brick wall (UIrich in Kellert, 2008). As shown in Table 2.04, this research verifies that the urge to always be connected to nature is ingrained in our genes whether we are conscious of it or not.

(http://www.pbs.org/wgbh/nova/eowilson/images/biop-02-l.jpg)
Figure 2.04. Savanna

If Biophilia means love of life or living systems, Biophobia is the opposite. It is a fear or phobia of nature or other living beings, such as snakes or spiders. Biophobia is necessary to the human species' survival. Biophobia was used by men's ancestors to avoid predators or dangerous situations. This sense of fear also relates to people's adaptive responses or mechanisms to cope with stressful situations (Kellert & Wilson, 1993). Moreover, people seem to be attracted to a particular arrangement of landscape. Studies show that the majority of the people prefer places that offer visually unobstructed environments. This type of landscape arrangement is identified as savanna (Kellert, 2008). The attraction to savanna-like landscape, similar to that illustrated in Figure 2.04, can be attributed to how early humans used their surroundings to survive. The openness of savanna allowed prehistoric men to observe their environment for incoming predators or enemies. The clusters of relatively short and broad layers of leaves, resembling canopy, provide an opportunity for a safe escape. On the contrary, certain types of natural conditions are not desirable. A study done on patients who underwent open–heart surgery at Uppsala University Hospital in Sweden shows that pictures of stormy water feature, enclosed

rain- forest and other configurations that suggest danger, do not contribute to lowering their anxiety level (Lunden & Ulrich in Kellert, 1993).

The realization that human beings are innately attracted to nature and other living beings leads to the conclusion that the presence of nature is essential to maintain a person's spiritual and physical well-being. The universal human attraction to particular types of settings, landscape arrangements, and natural conditions, helps architects to design spaces that are supportive to the wellness of its occupants.

2.4. Phenomenology

Western culture has regarded the sense of sight as the noblest of all senses (Palasmaa, 2005). Le Corbusier once said "I exist in life only if I can see" (cited from Palasmaa, 2005). The study of Phenomenology in architecture began as a response against the hegemony of vision. Architects have become too reliant on purely visual readings of architecture. The other four senses have been ignored in modern architecture. Architecture and space can actually be appreciated in much deeper ways with the collaboration of all the senses. As summarized by Merleau-Ponty, human perception is not a sum of visual, tactile and audible stimuli, but it is the totality of the whole being (in Palasmaa, 2005). Therefore, the task of architecture is to design for the whole human experience, treating the body and the mind as a totality of senses and existence.

The term Phenomenology was initially defined by Edmund Husserl as a systematic investigation of consciousness and its properties (Flew in Nesbitt, 1996). Phenomenology refers to a method that urges a return to the material composition of the architecture object itself as opposed to merely abstractions and mental constructions. The materiality and tectonics of an architecture object is instrumental in experiencing its characters as a whole. The application of Phenomenology in architecture has the potential to transform any space into a meaningful environment that will enrich people's experience. Phenomenology can be manifested through any symbolic or tactile way that a person can see, hear, touch, smell, taste, feel, intuit, know, understand, or live through (Nesbitt, 1996; Seamon, 2002). The encounter with natural elements, such as sunlight, wind, water, materials, smells, view, and sound can enrich one's feeling in experiencing architecture. Thus, architects are able to modify people's mood and experience through the manipulation of human senses. By understanding human sensory perception, any space can be designed to invoke certain spiritual and physical qualities.

Architects have the power to improve the quality of life and well being of people through the space they create. The sensuous and tectonic qualities of materials, light, and colour contribute to the poetic quality of a space which is advantageous for human well-being. The absence of the sensuous experience and an imbalance in the human sensory system contribute to the inhumanity of contemporary architecture (Palasmaa, 2005). Therefore, human senses can potentially be used as the mediation between people and nature. Moreover, architecture has the capacity to connect humanity back with nature.

2.5. Summary

The ideas of Feng Shui have lasted for centuries because at their core, they resonate with the human soul. The contemporary philosophies of design of Biophilia and Phenomenology are essentially trying to achieve the same objective, which is a holistic wellness through an authentic engagement with natural materials, geometrical balance, view, sunlight, wind, water, smells, sound, and so on, both in symbolic and in tactile manners.

Contacts with the natural environment are critical to ensure a person's physical and spiritual well-being of a person. Research in the subject of Biophilia confirms that a view of nature in hospital rooms reduces pain and expedites healing among patients (Ulrich, 2008; Ulrich & Zimring (2004) in Guenther & Zimring, 2008). Phenomenology further explains that the absence of nature in architecture contributes to the degradation of human spiritual and physical well-being (Heidegger in Nesbitt, 1996; Palasmaa, 2005). The basis of vernacular wisdom of Feng Shui is nature. Feng Shui offers guidance to arrange a dwelling to benefit the occupants by dealing with the environment through a holistic understanding of natural systems and phenomena. All three principles agree that the connection with nature is essential to maintain personal physical and spiritual well-being.

Although exposure to natural elements is beneficial for people's well-being, some configurations are futile or even harmful. This statement can be considered as one of Feng Shui's main arguments. Studies in Biophilia show that some natural configurations, particularly those that suggest risks or dangers, have a negative impact on patients (Ulrich (1983); Lang & Greenwald (1987) in Kellert & Wilson, 1993; Lunden & Ulrich in Kellert, 1993). In conformity with Feng Shui and Biophilia, Phenomenology suggests that spatial arrangements which engage with sensory experience are crucial to any human dwelling (Heidegger in Nesbitt, 1996). Feng Shui, Phenomenology, and Biophilia agree that

certain spatial configurations have either a positive or negative influence on people. However, through the principle of Five Elements, Feng Shui provides a more thorough interpretation of the characteristics of every material substance that exists in the world. The contemporary theories of Phenomenology and Biophilia only indicate that generally natural features are beneficial for human wellness, without any detailed explanation about each feature's psychological effect on people.

VERNACULAR	CONTEMPORARY	
FENG SHUI	**BIOPHILIA**	**PHENOMENOLOGY**
DEFINITION		
An organizational systems based on the natural phenomena that treats the environment as a protector against bad energy & enhancer of good energy flow	An innate urge to affiliate with other forms of life	An awareness that the environment can be experienced not only by the sense of sight alone, but also by all of the other human senses
PRINCIPLES		
- Chi - Yin – Yang - Five Elements	- Savanna - Hunter Gatherer - Biophobia	- Sensory Experiences - The sense of place
DOMAIN		
- Cultural – Historical - Environmental Psychology	- Biology - Environmental Psychology	- Architecture - Psychology
COMMONALITIES		
- The importance of nature for the well being of a person - Certain materials and spatial configurations can have positive influence on people - The human unconscious experience matters		

Table 2.05. Comparison among Feng Shui, Biophilia and Phenomenology

The principles of Feng Shui, Biophilic Design, and Phenomenology are shown to have analogous strategies and methodologies that contribute to a more holistic understanding of the role of architecture in the improvement of the quality of life and in a more holistic wellness. As shown in Table 2.05, the analysis from these principles can be summarized as: nature is important for a person's well being; certain materials and spatial configurations can have positive influence on people; and the human unconscious experience matters. These commonalities can be implemented in the design of healthcare facilities to improve human physical and spiritual wellness.

Chapter 3. Research Methodology

"To deprive the sick of pure air is nothing but manslaughter under the garb of benevolence"

(Florence Nightingale in Guenther & Vittori, 2008)

3.1. Overview

For most people, a visit to a healthcare facility, such as a hospital, can be very stressful and fearful. Hospitals are often associated with unpleasant smells, germs, illnesses, or even death. The stigma attached to hospitals makes them undesirable destinations. Most modern healthcare facilities are usually not designed to help reduce patients' physical and psychological stress or anxiety. The lack of fresh air and natural light causes discomfort among patients and staff. In addition, hospital buildings seldom give an impression of being inviting places. It is more like a 'drive- through' institution where patients get inside the building, get to the right department for their treatment, and then exit as fast as they entered. Illnesses are seen as an independent problem in the body of a person that needs to be fixed, while the other aspects of the human person are neglected (Farrow, 2008). Current studies in medical and healthcare architecture show that mental, spiritual, psychological, intellectual, and social conditions of patients can support their healing process (Dilani (2008) in Sorana & Cucurnia, 2008). A healthcare facility that foster its occupants' spiritual, physical, mental, and social well being, may help to retain staff, expedite healing, as well as generate a more positive image for itself.

3.2. The History of Hospitals in Canada

From the 17th century until about the 20th century, hospitals in Canada were unspecialized, multi-purpose institutions for the sick poor. The earliest urban institutions intended for healing are called Hôtel-Dieu. They were established throughout the 17th century by nursing orders of nuns in temporary wooden buildings. The first urban general hospitals were constructed in the 19th century. Until the early part of the 20th century, hospitals were still generally devoted to the treatment of the poor, who suffered in particular from infectious and nutritional diseases, such as influenza, pneumonia, tuberculosis, and scurvy. During this time, public sanitation and personal hygiene were not practiced.

The most prosperous citizens who were able to pay doctors preferred to be treated at home to avoid the filthy and overcrowded hospitals. This situation persisted throughout the early 1900's when tuberculosis hospitals were established to isolate the "incurables" from the general public (Adams, 2009; Martin, 2009).

By 1880, the introduction of safe anaesthesia and improved surgical techniques led to the increased use of hospital facilities. Hospitals became centres for curative therapy, teaching and medical research. The large institutionalized hospitals were constructed in the early 20th century. By this time, hospitals were increasingly specialized and intended to attract paying patients. After World War II, the construction of hospitals in Canada increased significantly. Modern hospitals are often built freestanding and high-rise, surrounded by parking facilities (Adams, 2009; Martin, 2009). The current healthcare crisis in Canada has resulted in the rise of patient-focused care. Patients are treated at home or in a home-like setting, rather than at a large hospital. The trend of shorter hospital stays has meant that the need for outpatient units has increase (Adams, 2009).

3.3. Case Studies

In this section, an investigation of current practice on healthcare design was conducted. A number of hospitals, clinics, nursing homes and other health-related facilities were visited. The effects and affects of design in healthcare architecture were analyzed through the following four case studies. Three categories of institutions were chosen: (1) buildings constructed prior to the extensive mechanical ventilation system, where nature was recognized as a source of healing, (2) buildings that are a highly dependent on mechanical system and that emphasize functionality, and (3) buildings that reflect the current focus on energy efficiency and connection to nature. The case studies discussed here are: Royal Victoria Hospital, Venice Hospital, McMaster Hospital, and Apotex Centre – Baycrest Centre for Geriatric Care. This part of the thesis provides as best practice strategies in the design of healthcare facilities.

3.3.1 . Royal Victoria Hospital

This section of the thesis reports on Royal Victoria Hospital (RVH) to gain some insights and understanding about how architects used nature to deal with the local climate and to promote healing at a time when mechanized air conditioning, artificial lighting and elevators were not widely available.

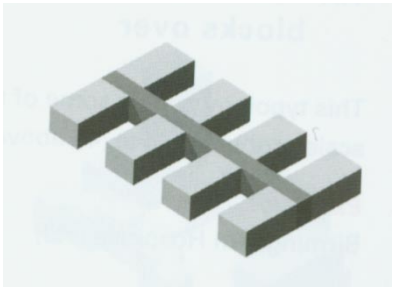
The reason for examining this type of building is that current research shows that significant health benefits can be reaped from the exposure to the natural elements and views, which was actually practiced before mechanical and electrical systems were available. Furthermore, the global issue of climate change and sustainability makes it even more relevant to study this example.

(http://digital.library.mcgill.ca/hospitals/biotxt/biopics/PL006606.jpg)

Figure 3.01. Royal Victoria Hospital, Montreal (1893)

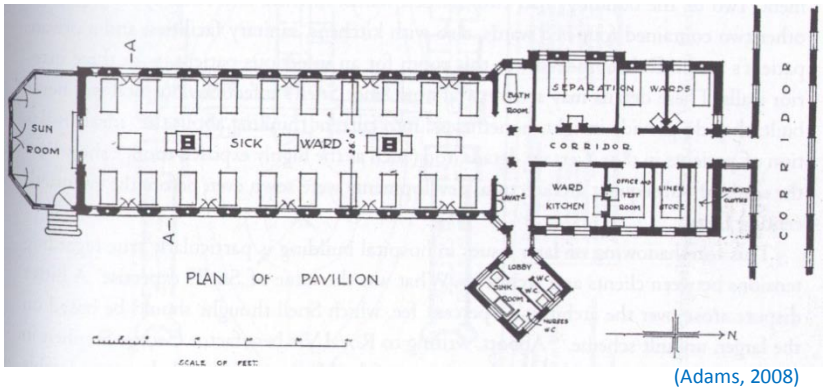
Royal Victoria Hospital (Figure 3.01) was established in 1893 on the foot of Mount Royal close to the city of Montreal overlooking the St. Lawrence River. The architect of this hospital is Henry Saxon Snell. Royal Victoria Hospital (RVH) was located away from the noise and pollution of the industrial part of the city. The elevated location of the hospital made RVH highly visible as a monument and served as a landmark for the city. RVH was an urban hospital founded as a charitable institution for the poor that received generous financial supports from Canada's wealthiest businessmen of the time. The high elevation of the site allows Royal Victoria Hospital to receive abundant fresh air and daylight, which its architect believed to be beneficial in improving patients' health, as well as functioning as a civic monument symbolizing the status of a highly sophisticated city. At this time, hospitals not only served as institution to heal patients but they also functioned as tourist attractions. RVH was one of the first

modern hospitals not affiliated with any religion. At the beginning of the twentieth century, RVH was a more popular tourist attraction than religious- affiliated hospitals in Montreal (Adams, 2008a).



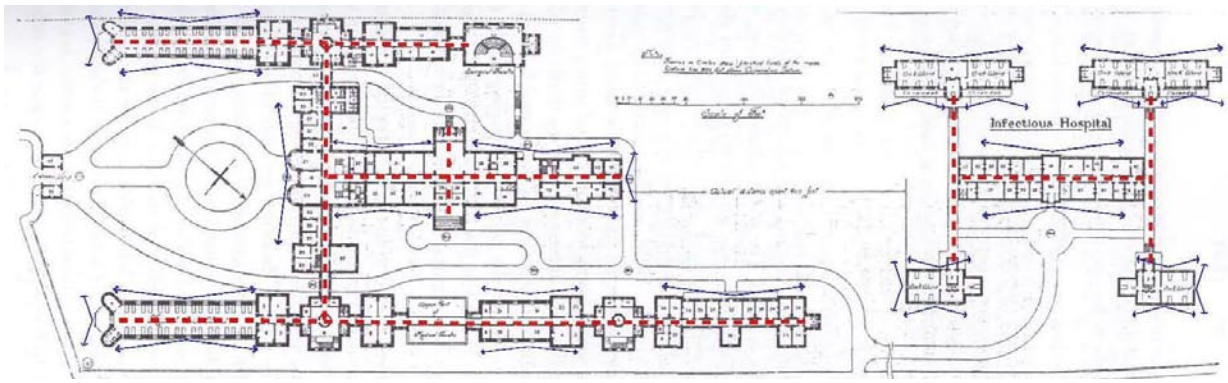
(Prasad, 2008)

Figure 3.02.Pavilion Typology



(Adams, 2008)

Figure 3.03.Royal Victoria Hospital – Plan



(Adams, 2008)

Figure 3.04. Royal Victoria Hospital – Original Site Plan

Following the trend of the large hospital designs of the day, the RVH was designed according to the pavilion plan or "Nightingale Ward". In a 1859 hospital building document called Notes on Hospitals, Florence Nightingale prescribed design features such as the size of windows and ward dimensions, to allow abundant daylight and fresh air to enter in. The idea behind this long and narrow hospital bay arrangement was to maximize patient exposure to natural light and to encourage passive cross ventilation. In the wards, every bed was positioned beside a large window with a view to the courtyards or gardens to allow abundant natural light and fresh air to penetrate to the ward. Socialization between patients was also encouraged in the sunrooms, verandas, and in the large lounge areas. The circulation system in the hospital was clear and straight forward with some corridors running beside the courtyard so that the monotony of long corridors was broken with nice views. The design also gave nurses access

to fresh air and natural light so that their Circadian Cycle was maintained. Most corridors end with a view to the outside through a window or a sunroom. The location of the hospital as well as the arrangement of the interior and exterior of the hospital gave an impression of a trip outside the city to attract wealthy patients to get treatment in the hospital instead of getting a doctor to come to their house, which was the most common practice of the time for those who can afford it (Adams, 2008a).

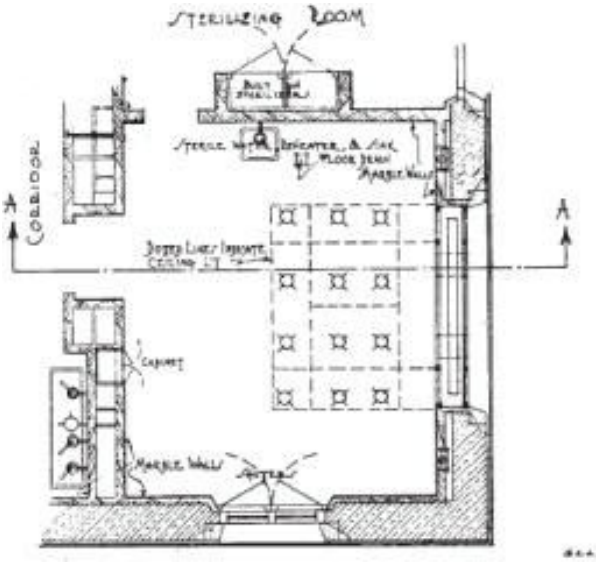
(http://www.essential-architecture.com/TYPE/HOSPITAR.jpg)

Figure 3.05. Interior, Royal Victoria Hospital, Montreal

In 1916, the Ross Memorial Pavilion was added to RVH to accommodate the growing demand for surgeries. This addition was designed by architect Edward Fletcher Stevens. In order to maximize comfort in the interior space, but still allow natural light and fresh air to enter the room, a special ventilation and lighting system was implemented. The envelope of the surgery pavilion was layered with a radiator sandwiched between the outside window and the interior glass wall to provide access for fresh air and daylight to enter in. The Ross Pavilion also had a sophisticated indirect lighting system to reduce glare in its surgery room.

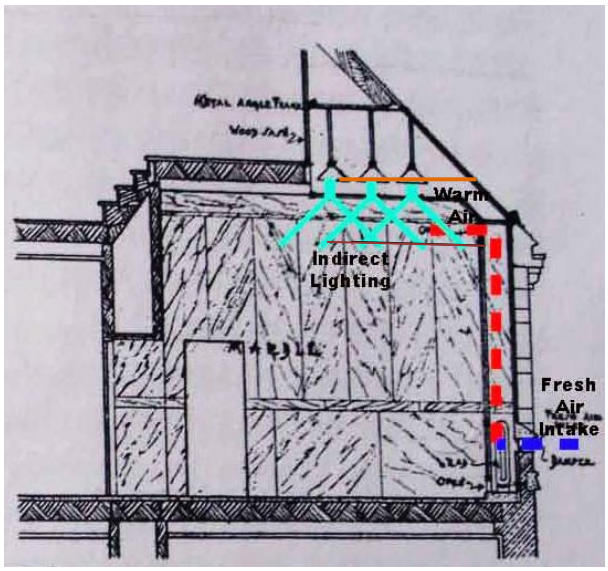
Standardization and flexibility were also part of the architect's initial concept. Stevens provided each room with standardized hospital equipment, such as a night-light beside a patient's bed to allow illumination without the need to turn on the ceiling lights. However, he was completely opposed to the

idea of standardized hospital plans which did not consider the unique conditions and circumstances of each site.



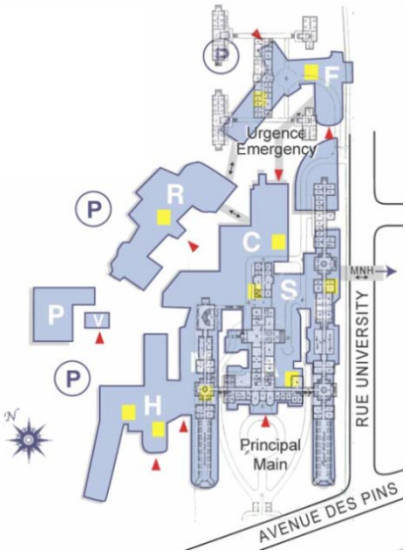
(Adams, 2008)

Figure 3.06. Surgery Room – Plan



(Adams, 2008)

Fig. 3.07. Ventilation and Illumination System



(muhc.ca/pfv/rvh/directions/map_hosp/)

Figure 3.08. RVH – Map

(http://www.mcgill.ca/endocrinology/adult/clinical/)

Figure 3.09. Current Condition

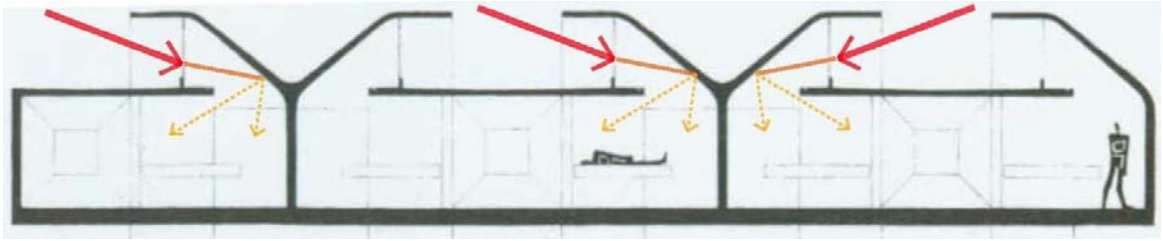
After more than a century since it was first opened in 1893, RVH still exists and functions as a McGill University teaching hospital. Throughout the years, after several new additions and demolitions to the original building, a trip to RVH can no longer be seen as a "leisure" trip outside the city. New buildings and parking lots are crowding a hospital compound that was once bounded by beautiful English Gardens and framed by Mount Royal in the background. Traces of the old pavilion buildings are diminishing, overwhelmed by the presence of new additions. Access to natural light, fresh air, and a view of Mount Royal has become very limited.

In recent years, there is much ongoing debates about the future of this hospital. Some people are concerned that the aging hospital can no longer accommodate new technologies and other demands to deliver care for growing numbers of patients, as well as its ability to provide good working condition for its staff (Pinker, 2003). The current government plan is to convert RVH into luxury condominiums. This plan is strongly opposed by McGill Architecture professor, Ann Marie Adams. She argued that the architecture and medical history embodied in this hospital is too valuable to be trashed. The fact that this hospital is funded by generous donations from the people of Montreal makes it even more unacceptable to transfer the ownership to a private corporation (Adams in Chester, 1998). To this day, the future of RVH building is uncertain (Adams, 2008b), but its entire facility will be relocated to the new "super–hospital" building as part of McGill University Health Centre on a different site (Baker, 2008).

3.3.2 . Venice Hospital

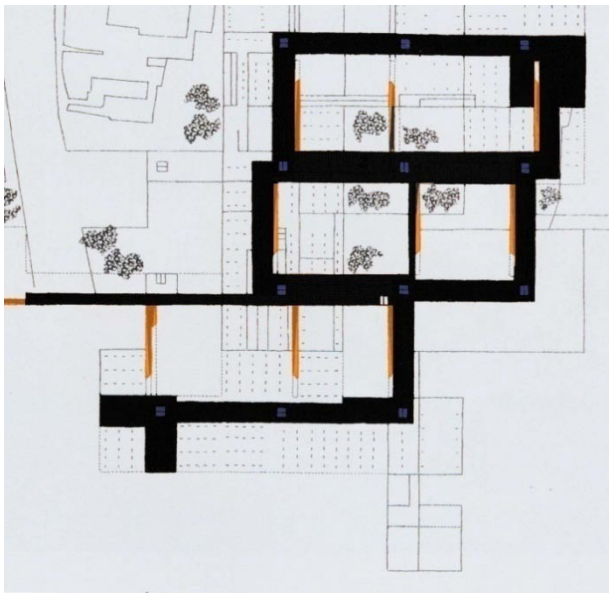
Venice Hospital was an un-built project of Le Corbusier for the city of Venice, Italy. The hospital was planned in 1964 to be built at the edge of the city of Venice extending into the lagoon. The main concept of this hospital originated from the idea of a hospital as a "house for man" that can expand to its surrounding area via an osmosis process. Therefore urban elements such as streets, squares, and hanging gardens were also incorporated in its design proposal. The interior spaces of the hospital were organized around a series of courtyards connected by corridors. The building itself is a three – story, low – rise structure, elevated on pilotis colonnades which give a lighter impression to the building, that would otherwise appeared massive in scale. Major activities were compartmentalized within the building on a floor-by-floor basis. The ground level was occupied by non – medical related services, such as administration, utility, and other service rooms, while doctors' offices, surgery rooms, pharmacy, and

other medical services were concentrated on the second floor. Ramps that wrap around the building provide a vertical circulation system that links the second floor and third floor with mezzanines in central areas for equal access to elevators and sterilization stations in all directions. The ramps were effective in encouraging patients' physical fitness through walking and in reducing demand for elevators (Figure 3.11).



(Sarkis, 2001)

Figure 3.10. Section – Filtered Daylight



(Sarkis, 2001)

Fig. 3.11. Mezzanine, Ramps btw. 2nd and 3rd Floor

(Sarkis, 2001)

Fig. 3.12. Plan Level 3 – Units and Component

Patients' rooms were located on the top floor, separating patients from the stress and noise of the city, allowing access to filtered daylight from the skylight. As shown in Figure 3.10, the skylight system performs as a control mechanism to determine the amount of light which will enter the room as

well as its color and intensity. As described in Figure 3.12, one bay of 6 x 18 meter could be divided into individual unit of 3 X 3 meter space, two beds', four beds' or any other room arrangements, if necessary, with a removable panel system. Two rows of six patient beds from adjacent bays were connected by a double loaded corridor. There were also four rooms, taking up one and a half 3 X 3 meter modules, for patients who needed more privacy and isolation. Bathrooms and toilets were located at the end of the bays, in proximity to other rooms that served more public functions, including pantry, storage, and nurses' station. These functions occupied a more public area and were located on the path of the main circulation system. Twenty – eight beds, four rows of six beds plus four individual isolation rooms, with bathrooms, toilets, pantry, and nurses' station made one complete rectangular patients' care unit. A rectangular unit could be assigned as an interior space to house a patient care unit or as an exterior space, such as a courtyard or garden. Figure 43.13. shows that four of these rectangle units form a larger square. This configuration was duplicated as many times as needed to form the next square components. Squares were connected to the building's main circulation systems. Hence, the shape of the building was determined by the intertwining of all the above elements.

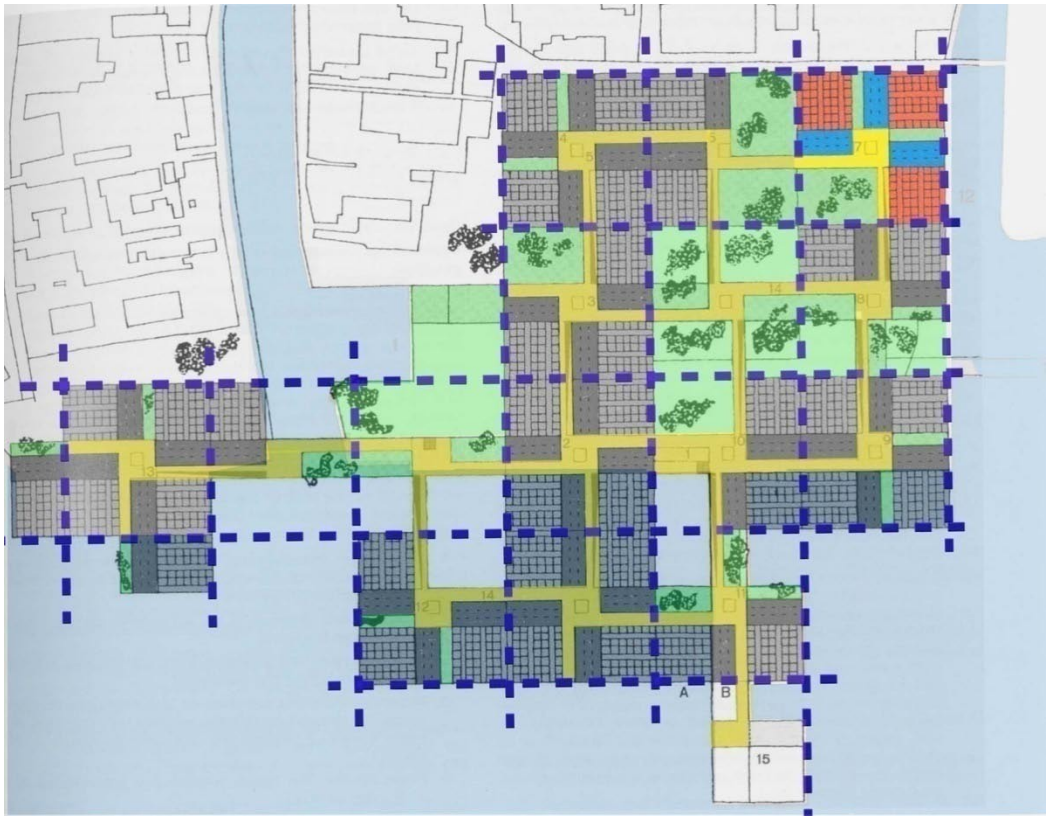


Figure 3.13. Venice Hospital – Plan Level 3, Mat Building Typology (Sarkis, 2001)

From a planning point of view, Venice Hospital was comprehensively organized from micro to macro scale and vice versa, forming an integrated flexible system to accommodate future expansion or change of usage. There were a lot of similarities in the design of Venice Hospital and urban design, thus it can be viewed as a city within a city. The form of the hospital can be defined as a union of square clusters, which can be expanded indefinitely, providing enough space for horizontal growth. One square unit is divided into four smaller units by a radial circulation pattern originating from its centre, forming a network of spaces connected by continuous webs of circulation paths like city streets. The same pattern can be repeated over and over again, allowing continuous growth in four directions, similar to growth in city blocks (Sarkis, 2001).

Venice Hospital was designed based on Mat Building Typology which emerged in the 1950's to the 1960's. Mat building type is usually described as a systematic repetition of architectural elements, linked homogenously to form a low–rise, high density layout (Hyde & Smithson in Sarkis, 2001). Contrary to the assumption that large buildings tend to submerge human scale, this typology can offer intimate spaces that are not too overwhelming. The repetitive characteristics of Mat building can become a contradicting factor in terms of its benefits. On the positive note, standardized modules or parts can be prefabricated for a more precise and faster construction. Adversely, the uniformity of the building tends to set rather impersonal feelings, especially on a larger site. Getting lost and disoriented are some of the consequences of the lack of individual identity in Mat building typology. In assigning this typology to a healthcare facility, it is crucial to consider the proportion and scale of the building. It seems that a Mat building arrangement is most suitable for buildings on small sites with narrow floor plates to reduce complication in design, especially in planning for circulation and access to natural light and fresh air. However, it is also necessary to think about the issues of adjacency, the size of the courtyard, and the treatments to the openings to maintain privacy and comfort.

3.3.3 . McMaster Hospital

McMaster Hospital is a part of McMaster University Health Sciences Centre (MUHSC), located in Hamilton, designed by Zeidler Partnership Architects. Besides delivering healthcare, this centre also accommodates education and research. Like RVH, the design and scale of this hospital informs its iconic identity. By the time it was opened in 1972, the building was not completely done, however the architect deliberately designed this hospital "never to be finished" (Zeidler, 1974). Another principal

factor that shapes this hospital is the ambition to design a facility which can also accommodate changes in the future.

Convinced that a hospital building must be able to accommodate future changes, Zeidler introduced an integrated mechanical, electrical, and structural system called “Servo System”. He envisioned a “plug – in machine” which provides infrastructures that allowed functions to interchange at any time (Zeidler, 1974). As shown in Figure 3.14, every alternating floor in McMaster Hospital is an interstitial space which houses all utilities, structures, as well as other mechanical and electrical equipment to allow a simpler mechanism to modify the floor above. Expansions in both horizontal and vertical directions were planned at the time of its conception. Vertically, elevator and stair shafts are extended to the yet-to be-built fifth floor (Figure 3.16). As illustrated in Figure 3.15, horizontally, exterior cladding systems are made of removable precast concrete panels that can be removed outwardly to its new position when expansion takes place without disturbing the main structural system, (AIA, 2004).

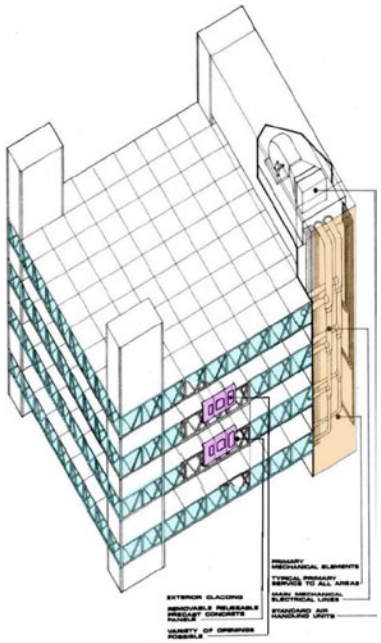
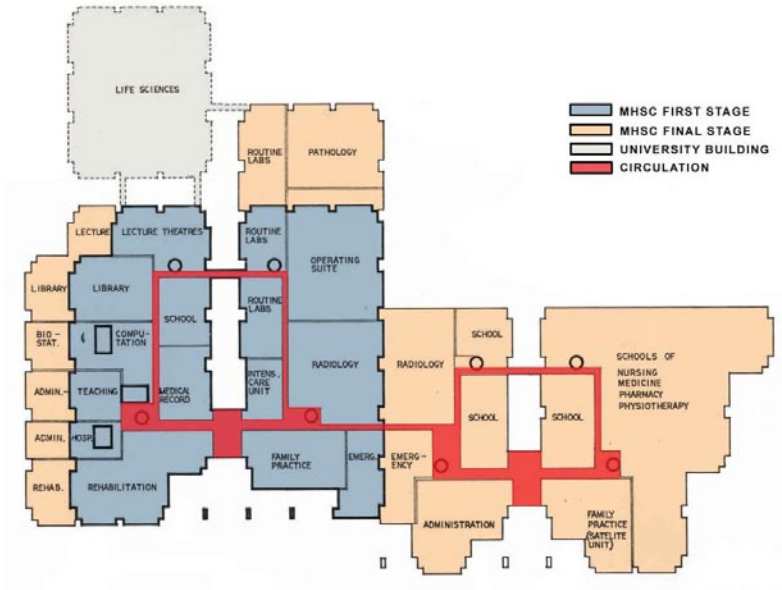


Fig. 3.14. Servo System



(http://www.aia.org/SiteObjects/files/aah_jrnl_Pilosof_Figure-3.pdf)

Figure 3.15. McMaster Hospital – Proposed Expansion Plan

Despite Zeidler’s efforts to design in advance for future expansion, McMaster University Health and Science Centre has not expanded as he envisioned in 1972. This McMaster case study shows that

there are a lot of other factors beyond architects' control which can change the fate of the building in the future. These changes may come from causes outside of the medical and architectural professions, namely hospital administration, political, and economic. In this McMaster Hospital example, changes in Ontario's education system were the main deciding factor in the construction of the McMaster University Medical Centre which was finished in 2005. The university needed to use the land to build new education facilities in anticipation of enrolment increases especially over the next four years after the Ontario education system created a so-called "double-cohort" generation in 2003 (McMaster University Campus Master Plan, 2002).

(http://www.aia.org/SiteObjects/files/aah_jrnl_Pilosof_Figure-3.pdf)

Figure 3.16. McMaster Hospital – Elevation, Showing Infrastructures for 5th Floor Expansion

Entering its fortieth year of service, McMaster Hospital has gone through several changes that can be classified into completion, renovation, expansion, addition, and relocation (AIA, 2004). The completion phase ended in 1985, thirteen years after it first opened in 1972; most of the work was done in the seventies. Minimum relocation projects have occurred, implying that functions in the McMaster Hospital have remained in their initially assigned places. Renovation works are the most often procedure done to the building compared to any other types of work. Renovations were mostly done between the 1981 and 1999. The operating suites were renovated four times between 1972 and 2004: i.e., they had to be retrofitted, on average, every eight years. In the 1980's, following the trends in healthcare, McMaster Hospital added more short stay or outpatient units and other functions to serve the public such as a cafeteria, coffee shop, pharmacy, and gift shop. In the 1990's, works was done to improve

Hospital's public or common spaces and other social areas, particularly the main courtyard, and information service. The newest change in McMaster Hospital was the 2005's addition of McMaster University Medical Centre.

(Zeidler. 1974)

Figure 3.17. McMaster Hospital - Plan Level 2

(Zeidler. 1974)

Figure 3.18. McMaster Hospital - Plan Level 4

Figure 3.19. Main Entrance

Figure 3.20. Lobby

Figure 3.21. Corridor

As illustrated in Figures 3.17, circulation and way-finding in McMaster Hospital is rather complicated and confusing, thus color-coding and signage are everywhere to help orient people. A typically journey in McMaster Hospital is started at the main entrance which is elevated from the street level, with no separate path for pedestrian and motorized- vehicles, which makes access from the street harder for pedestrians (Figure 3.19). Directly after the main entrance, is the lobby. As shown in Figure

3.20, this lobby area is relatively small, has a low ceiling, with no designated waiting space, even in the coffee shop, suggesting that people are expected to pass through quickly from here to get to the right section: yellow, blue, red, or purple. Once they get to the right section, they are then expected to follow signage to find a specific unit they intend to visit. Almost all corridors have the same width and some of them are also very long feeling; colour and texture are the only indication in the main corridor (Figure 3.21). Some of the paths leading to a large section of hospital are also very narrow, which makes the function in that particular place hidden and hard to find. As illustrated in Figure 3.18, all units/departments within the Hospital are separated and in complete isolation from each other.

Fig. 3.22. Esplanade

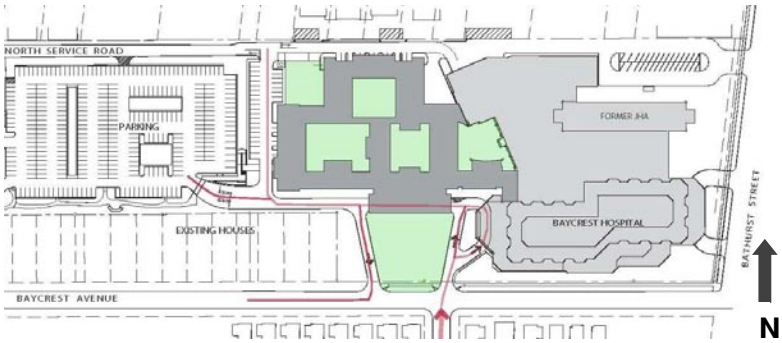
Figure. 3.23. Corridor

Figure. 3.24. Courtyard

The esplanade on the second/main level is connects the three different activities in MUHSC: teaching, research and patient care. The main lobby area separates Hospital's drop off area and this esplanade; this positioning prevents street noise from entering. The esplanade was an attempt to provide a social space for patients, staff, students, and researchers to inter-mingle. As shown in Figure 3.22, the proportion of this space seems to be too overwhelming. The space is narrow and dark, shadowed by the adjacent buildings in addition to noise and pollution coming from openings to the parking garage below. There are very few benches and some greenery. As a result this space is mostly used to cross from one side of the building to the other and not as much for other recreational purposes. Other courtyards suffer from a similar problem. As shown in Figure 3.24, some chairs in the waiting area are actually facing away from the courtyard space. Another example of the poor use of the courtyard was found: i.e., in a space next to a large window looking into the courtyard where a piece of hospital equipment was parked there (Figure 3.23).

3.3.4 . Apotex Centre

Apotex Centre – Baycrest Centre for Geriatric Care is located in Toronto's Bathurst Street Jewish Neighbourhood. Completed in 2000 as part of Baycrest Geriatric Health Care System, Apotex serves as a long – term care / nursing home for seniors living with Alzheimers. These seniors are well enough that they do not require hospitalization but their condition does not permit them to live safely on their own (Franklin, 2000). As illustrated in Figures 8.25. and 8.26, Apotex Centre is a seven – storey, modified Mat building with two courtyards, an atrium or Winter Garden, one courtyard connected to Baycrest Hospital and two exterior gardens. Gardens and courtyards at Apotex were especially designed with different themes. The north garden is dominated by orthogonal shapes (Figure 3.27), while the west garden is mostly in organic forms (Figure 3.28). As seen in Figure 3.29, the courtyard connecting the Apotex Centre and the Baycrest Hospital is a fruit garden. In addition to these courtyards, Apotex also has a sky lit – atrium space, which not only functions as a year – round interior garden but also helps to orient people in the space (Figure 3.30).



(Courtesy of Diamond + Schmitt Architects Inc.)

Figure 3.25. Apotex Centre – Site Plan

(Courtesy of Diamond + Schmitt Architects Inc.)

Figure. 3.26. Aerial View

The circulation system is organized around the courtyards and atrium spaces. It is clear and straight forward, reduces confusion or disorientation for whoever enter the building. This arrangement is effective in cuing different areas or wings in the building. Seniors, who are cognitively impaired, and visitors, even those who are visiting for the first time, can easily find their way around. In contrast to the narrow, long, dark corridors in other healthcare settings, the Apotex Centre take advantage of their locations adjacent to courtyards and the atrium; there are many places for light to penetrate so the corridors are bright. As shown in Figure 3.32, there are almost no dead–end corridors. Each corridor has a window looking to an outdoor space. This fact also adds natural light and view to the building and

reduces the monotonous feeling in long corridors, as well as giving a sense of distant visual perspective. People, especially those who easily forget, feel safe because they can see what is ahead and know where they are going.

Figure. 3.27. Orthogonal North Courtyard

Figure. 3.28. Organic West Courtyard

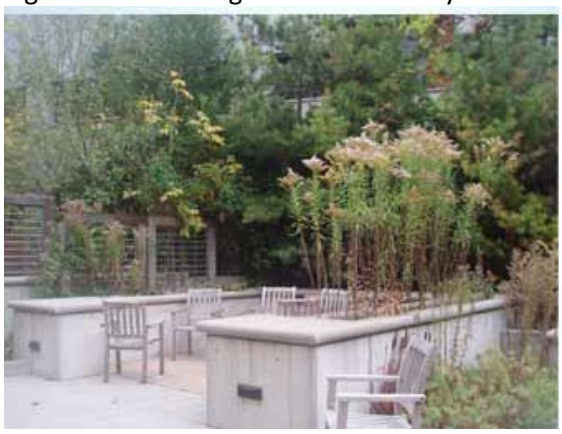


Figure. 3.29. Fruit Tree - Garden

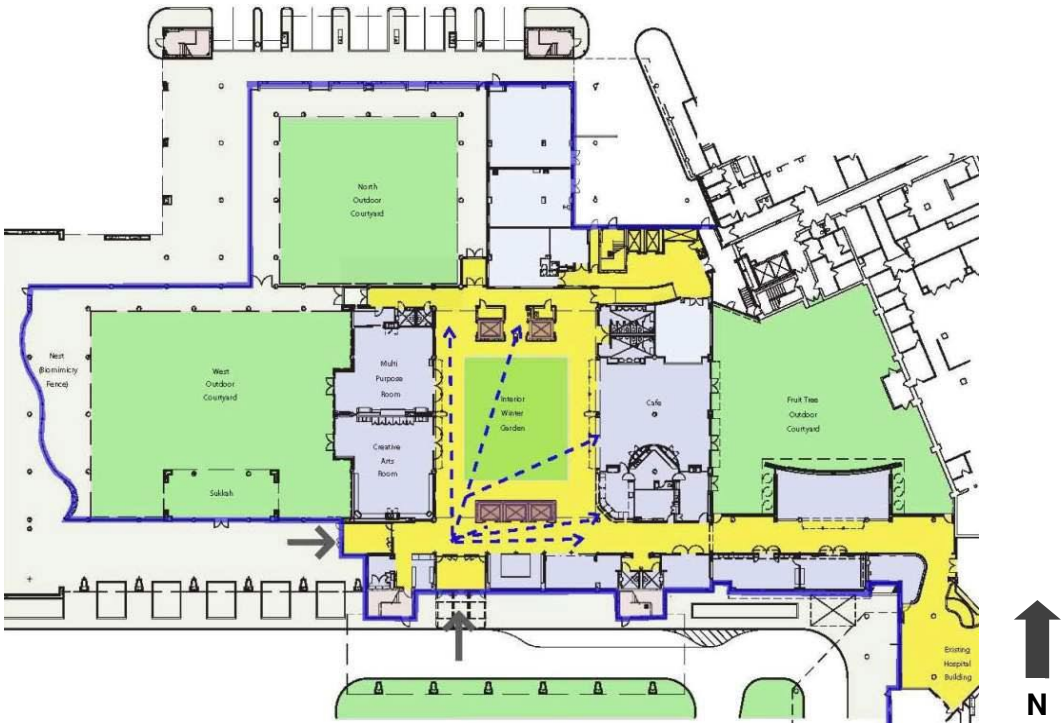
(Courtesy of Diamond + Schmitt Architects Inc.)

Figure. 3.30. Atrium

Fig. 3.31. Corridor adjacent to a Courtyard

(Courtesy of Diamond + Schmitt Architects Inc.)

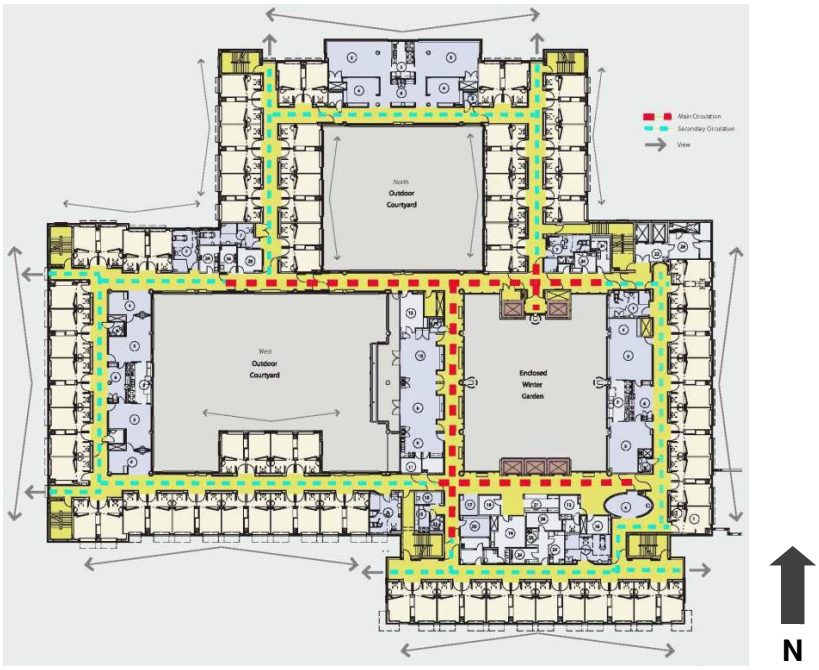
Fig. 3.32. Corridor with a Window at the end



(Courtesy of Diamond + Schmitt Architects Inc.)

Figure 3.33. Apotex Centre – Main Floor, Circulation and Orientation

The integration of landscape and circulation in the design of the Apotex Centre will be shown to be effective and efficient from the economic perspective. By having elements responding to at least two needs; for example a courtyard functions as a base for circulation pattern and as a means to admit natural light and view. So instead of creating one thing for one purpose, the architect created one thing for many purposes. This complete integration also adds to the aesthetic quality of the building. As illustrated in Figure 3.33, immediately after a person enters the Apotex Centre, the locations of all major public functions are visible, whether this person wants to go to different floors, to cafeteria, to a waiting room where a senior may be waiting to be picked up, or to the next building. A “tree – branches” steel structure in the atrium also serves as an interesting sculptural piece adding to the aesthetic quality of the space. The steel beams connecting these “tree – like” columns have a structural purpose, and also serve as a window washing platform for the skylight. Atrium space takes on a multi – functioned task, it is a spacious lobby, a pleasant gathering space, an orientation device, a winter garden, as well as a tool to admit and to transmit natural light from the skylight above to the building.



(Courtesy of Diamond + Schmitt Architects Inc.)

Figure 3.34. Apotex Centre – Typical Floor Plan

Deliberate choices of materials, colors, shapes, hierarchical system, and architectural details combined with access to natural light results in an overall interesting space that is also responsive to the need of occupants, especially those seniors who have special conditions and limited abilities. To reduce discomfort resulting from direct light, light fixtures and the ceiling configuration are designed to work together to minimize painful effects for seniors' sensitive eyesight. Direct lighting throughout the building is specially treated or is filter. Different treatments in the building also operate as "cueing devices", to make life easier for seniors whose memory is deteriorating.

The main philosophical idea behind the conception of the Apotex Centre is to create a "home – like" setting for residents to live in (Figure 3.36). Each floor is divided into six comfortable living quarters with facilities found in any regular home setting like a balcony, sitting room (Figure 3.35), dining room, living room, and kitchenette. One living quarter consists of 12 – 14 bedrooms (Figure 3.34). Other less – domestic functions such as nurses' and bathing stations are shared between two living quarters. On every floor, there is a multi – purpose room to accommodate activities that need a larger space .The Apotex Centre is designed in both a micro and macro scale. A resident can be viewed as an individual living in his/her own room and as a member of a living quarter, in a wing of a specific floor in the

building called the Apotex Centre. Just as a member of any other community, where a citizen is a member of a household, a neighbourhood, a community, a city, a country, and so on. Recognizing these different levels of community life, each living arrangement is designed to correspond to its specific activity, while still maintaining its maximum level of comfort and sense of belonging.

(Courtesy of Diamond + Schmitt Architects Inc.)

Figure 3.35. The Apotex Centre – Seating Area

(Courtesy of Diamond + Schmitt Architects Inc.)

Figure 3.36. Bedroom

It is also necessary to note the importance of volunteers who participate in the life of the Apotex Centre. On the first floor in the Apotex Centre, a space is dedicated as a volunteers' room. Volunteers are valuable resources that can help to offset some of the cost involved in hiring health care professionals. Good, inviting design can be an instrument to attract and to maintain their involvement. Design that is easily accessible and navigable will make everybody feel welcomed and less intimidated.

3.3.5 . Summary

As mentioned by Greg Colluci from Diamond + Schmitt Architects healthcare architecture can be a good, high quality, aesthetically pleasing architecture like any other type of architecture. Design excellence will help to de-stigmatize the image of healthcare facilities. This view will affect architects' attitude in designing a healthcare facility. Architectural quality in healthcare facilities should not be compromised or sacrificed to satisfy the demands of healthcare's programming which is already complicated (G. Colucci, personal communication, October 30 and November 7, 2008). Common architectural elements such as access to natural elements, landscape, and circulation patterns can be an

effective tool to ease some of the complications in healthcare programming (Table 3.01). They can ultimately assist architects in the planning process and future building users by making it architecturally easier for patients, staff, and visitors to navigate in the space.

	RVH (Original)	Venice Hospital	McMaster	Apotex Centre
Project Information				
Completion	1893	1964 (unbuilt)	1972	2000
Specialization	Minimum	Multiple	Multiple	Geriatric, Long term
Bed per Room	Multiple	Up to 6	1, 2, 4	Mostly single, couple
Typology	Pavilion	Mat/multi-courtyard	Monoblock	Mat, atrium
Stories	4	3 on Pilotis + Mezzanine	4 + 4 Interstitial space	7
Access to Natural Elements				
Openings	Operable windows	Skylight in patient's room	Fixed windows	Operable windows
Natural Light	Plenty	Some, indirect	Limited	Plenty
Ventilation	Natural, fireplaces	Mechanical	Mechanical	Mechanical, natural
View	Through Large Windows	no data	Limited	In each patient's room
Landscape				
Landscape	Outside gardens	Courtyards, Venice Lagoon	Courtyards, esplanade	Courtyards, atrium
Circulation Paths				
Circulation	Linear	Radial, circular, unclear	Circular, unclear	Circular
Vertical Circulation	Stairs	Ramps, elevators, stairs	Elevators, stairs	Elevators, stairs

Table 3.01. Comparative Study – RVH, Venice Hospital, McMaster Hospital, Apotex Centre

To design a good healthcare architecture that fulfills all of the technical requirements of healthcare facility and at the same time is sensitive to the personal needs of building users, a holistic approach must be taken from the beginning of the design process. The acknowledgement of the holistic aspect of a person in design can have dual functions of physical and spiritual healing. For a person, mental well being is as important as physical well-being, which then leads to the subject of quality of life. Improvement in a person's quality of life will result in a life that is more meaningful, enjoyable, and happier (University of Toronto, n.d.).

Much of the criticisms of hospitals as inhumane or impersonal institutions can be attributed to how they were designed. The major design issues affecting most contemporary North American hospitals are navigation, inflexible frameworks to accommodate rapid changes in medical technology,

energy inefficiency, unsustainability and lack of access to natural light, fresh air and view. It is ironic that a place where healing is supposed to take place is actually detrimental to human health, their sense of wellbeing, and to the environment. Lessons learned from the case studies above indicate that design can be instrumental to improving occupants' health and well being. Some of the important design considerations for future healthcare facilities' designs are access to natural elements, circulation, materiality, texture, orientation and systems' integration. An important lesson from the Apotex Centre case study is that by integrating several functions of a design element, an architect can simplify the complication which comes with the design of healthcare facility in general.

Access to natural elements, particularly access to daylight, fresh air, and natural views are beneficial. As evidence by the study of Biophilia in Chapter 2, there have been a lot of studies conducted to show the therapeutic and healing benefits of natural light, fresh air, and views (Ulrich in Kellert, 1993; Ulrich in Kellert, 2008). Most hospital buildings are not designed to incorporate these elements. Tall hospital buildings combined with deep floor plan proportion, such as McMaster Hospital, are hard to be penetrated by daylight and fresh air. These types of buildings also have small contact surface areas to the outdoor relative to the size of the floor plan. As a result only a handful of indoor spaces actually have access to daylight, fresh air, or view. In the high-rise hospital, the effort to bring natural light to the lower spaces can be challenging; as a result the bottom levels of tall buildings are usually darker and shadowed at different times during the day. These types of building must rely heavily on their HVAC System. A smaller floor plan with a large contact surface area to the outside world would allow more natural elements to enter the building.

The more a hospital relies on mechanical systems, the more it loses its connection to s nature. When a building's ventilation and lighting are artificially controlled by an HVAC system, any connection with nature is reduced or even eliminated. A sealed environment has become the preferred configuration for mechanically controlled buildings to avoid leakage that can reduce the efficiency of the mechanical equipment. Compared to the Royal Victoria Hospital which was designed prior to the extensive mechanical ventilation system, contemporary hospitals such as Toronto General Hospital have larger floor plates and more compact corridors. As hospitals get bigger, large parts of the hospital lose access to natural air, light and view (Figures 3.37 and 3.38).

(http://www.uhn.ca/Patients_&_Visitors/getting_to_the_hospital/)

Fig. 3.37. Toronto General Hospital–Plan Level 1

(http://glasssteelandstone.com/BuildingDetail/3517.php/)

Figure 3.38. TGH, before Atrium addition

Not only did the RVH rely on nature for daylight and fresh air, but it also recognized nature as a source of healing, particularly for tuberculosis patients (Ehrström, Jetsonen, Lindh, Schalin & Schalin, 2005). For some years, this recognition of nature as a source of healing has been dismissed. However, recent studies show that mental, spiritual, psychological, intellectual, and social conditions of patients are important for their sense of wellness (Dilani (2008) in Sorana & Cucurnia, 2008). In some large hospitals, people find it difficult to navigate and to orient themselves. Long and narrow corridors composed of short segments and many changes in direction and confusing circulation paths intensify patients' stress and fear, which can affect their physical health. The presence nature in the form of courtyard, for example, can be a visual cue that helps people to move in the space. A view of nature also helps people maintain their Circadian Cycle and thus improves their holistic well-being.

Although courtyards can bring natural air and light, as well as view in large hospitals, sometimes they are not effective. The amount of exposure to these natural elements depends on the proportion, size, number and configuration of courtyards relative to the whole building. McMaster Hospital, Venice Hospital and Apotex Centre have courtyards in their design, but McMaster Hospital receives the least exposure to daylight, fresh air and view. Although there are several courtyards in McMaster Hospital, they are too small compared to the overall size of the building. Apotex Centre receives the most natural exposure not only because it has large courtyards, but because it has the smallest floor plate ratio, compared to McMaster and Venice Hospitals. A series of interconnected buildings with courtyards, known as "Mat building typology", as introduced in Venice Hospital, can disorient people when a building becomes too large in size. There are too many uniformed-size courtyards with a similar design,

which makes it hard to distinguish them. Apotex Centre has a similar building layout as Venice Hospital, but there are only three large courtyards with different designs which make it easy to differentiate and to navigate.

The presence of landscape, both in the interior and exterior, can be very refreshing for everybody. Some landscape designs can challenge intellectual aspect of a person through explorations and discoveries (Joye, 2007). The opportunity to wander around and to relax in a garden can inspire people. In addition, some new medicines came from natural sources or are inspired by natural systems. A landscape setting can be an ideal place where people can intermingle, exchange ideas, and socialize with each other, hence improving their spiritual well-being. There is also an economic possibility of growing fruits and vegetables for food consumption.

Most people feel that a visit to a healthcare facility is very stressful and fearful. The thought of getting lost will increase the level of anxiety and worry among patients. Clear, easy to navigate circulation paths with a welcoming entrance and other public spaces in healthcare facilities will help patients or other visitors to orient themselves. The presence of volunteers who assist the operation of healthcare facilities on a regular basis makes hospital buildings more open for the general public. Welcoming and easy to navigate spaces in hospitals can help to attract new volunteers.

Lastly, there is a growing trend of dedicating more and more space for commercial and personal services in healthcare buildings. Some of the common ones are a coffee shop, food court, florist, and beauty salon. Interestingly, most of the four healthcare facilities visited during the data collection process (i.e., McMaster Hospital, the Apotex Centre, Credit Valley Hospital, and Wellesley Central Place) have a beauty salon on-site. The idea of health and beauty as a unified entity for a person's well being is implied through the presence of these services. The presence of these services also implies that patients need a mental as well as physical health.

3.4. Trends in The Future Healthcare Facilities

Through his research Eberhard Zeidler predicted that the rapid advancement in the medical field requires alteration to the building as often as every 5 to 10 years (1974). This fact is still valid today and architects need to aware of it. The followings are some of the very likely changes to happen in the medical that needs to be accommodated in design. Three changes that are highly likely to occur in medicine that need to be accommodated in design include: the use of Information Technology; the

growing need for Community Health Centres; and the shift to sustainability in every aspect of human life.

Information Technology revolutionizes the way healthcare is delivered to public. The connection to the world-wide web accelerates the speed of information exchange among those who are involved in the medical field, including their patients. The already fast pace of medical advancement is expected to be even more rapid in the next few years. Architects should anticipate a shorter duration for updates in the future, considering the amount of information available and the high speed of information exchange between researchers around the world, which will significantly increase the momentum for new advancements in medical technology. In recent years, improvement in the anaesthesia has resulted in more and more patient being discharged on the same day as their surgery day, which eliminates their need to stay in the in-patient unit. The new technology and equipment may require a specific design configuration, which architects need to be aware of. As illustrated in Figure 3.39, access to the internet and a tele-conference room are some of the possible requirements for the new healthcare facility.

(http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/Ehealth/$file/Incentives+for+Transformation.pdf)

Figure 3.39. Remote Consultation

The enormous amount of medical-related information on the internet is available for everyone to access, including the patients. As a result, patients can gain more information and knowledge regarding their illness. When a patient, living with a chronic disease, has the confidence to assume the central role in the management of their symptoms, they are called an “Expert Patient” (Shaw & Baker, 2004). The term “Expert Patient” was introduced by the Department of Health of England in 1999 (Department of Health, 2008). The intellectual and psychological state of a patient has a capacity to alter

the outcome of his/her own health. It is a well – known fact that people fear the unknown. Thus well – informed patients will be less afraid. They will understand the nature and consequences of their illness and be able to take charge of their own lives, by adjusting their life-style accordingly. Moreover, a survey conducted by Lorig et.al. at Stanford University shows a significant reduction of 42 – 44 % in doctor's visits because patients are well prepared and able to effectively use their visit to the healthcare professionals (Shaw, 2004). Hence, the expert patients can be beneficial for the overall healthcare system as well. A local neighbourhood clinic staffed by family physicians is more effective than to a large hospital in providing personal care and on-going treatment to patients.

With the assistance of technology, healthcare personnel can exchange information among different departments and institutions effectively and efficiently. Through an Electronic Patient Record (EPR), a healthcare professional can remotely access and manage the necessary information of the patients. Electronic files reduce the need for paper record, therefore the need paper file room can be reduced in size or eliminated. If previous hospital mergers were driven by the need to reduce administrative spending, such mergers might be avoided in the future because hospitals at different locations might be served by only one administrator.

The government of Ontario is currently promoting a new type of healthcare delivery system. This movement includes the introduction of a smaller, community-based healthcare facility, called the Community Health Centres (CHCs). Their purpose is to provide a holistic and personal level of healthcare to individuals and families that includes health promotion. According to the Ontario Ministry of Health and Long Term Care, Community Health Centres (CHCs) have the potential to improve the quality of healthcare at a lower cost, therefore ensuring its sustainability for years to come (2002). CHCs' main goal is to contribute to the development of healthy communities, through both primary health and health promotion or prevention for individuals and families at the community level (Ontario Ministry of Health and Long Term Care, 2002). They are actively taking initiatives to work together with the community to promote healthy life style and preventative measures. A preventative approach is always better and cheaper than healing a disease. Henceforth, the CHC can be a feasible alternative in creating a healthier society, which potentially can reduce the high cost of public healthcare.

The CHCs are established and governed by a community-elected board of directors. Therefore, this type of healthcare facility is expected to engage members of the community to be more actively involved in the maintenance of their wellness. The presence of a CHC can invoke a sense of community

which has become much more individualistic in our society (Abelshon, Bray, Elliott, & Vakil, 2005). The lack of social interaction can bring depression, loneliness, and the feeling of being unwanted, all of which can have a detrimental effect in a person. This then will affect their mental and physical well being. A neighbourhood CHC can function as a place where people can meet with other members of their community through education, meeting, fund-raising or other volunteer opportunities.

Sustainability and energy conservation in healthcare design is as crucial as in any other project today. The changing attitude toward the sustainability subject is the biggest shift affecting healthcare design now and in the future. The operational cost and energy consumption have become the main concern of today's sustainability movement. Hospital buildings consume more energy per unit area than any other type of building in the commercial or institutional sectors (Taskforce on Energy Management in Hancock, 2001). Not only will natural ventilation and daylight lower the need for mechanical systems, but also it will improve people's wellness. Studies confirm that Vitamin D from sunlight is beneficial for health. It is especially effective in easing depression (healthyontario.com, 2008), and maintaining people's Circadian Cycle. Allowing daylight to enter the interior space through a window or skylight and using an effective glazing system will reduce the amount of artificial lighting required to illuminate the building. However, proper shading devices like fins or light-shelves will be necessary to avoid glare and excessive heat radiation. Operable windows can be installed to allow outside breezes to enter, which will decrease the cooling load on the HVAC system, as well as flush out the contaminated indoor air. Sustainable design considerations will influence healthcare architecture typologies in the future. Healthcare architecture is expected to be more responsive to the local climate as well as to the need of the community it serves.

3.5. Summary

Rapid advancement in medical technology demands healthcare architecture be flexible to accommodate these changes over time. Although it is impossible to know exactly what the demands of the future are, the trends discussed above can help today's architect to design a more responsive and lasting architecture. While it is crucial to fulfill these technical requirements, the psychological and spiritual quality of healthcare facility design should be considered. A person's spiritual wellness is as important, if not more important, than the physical one. Design has the potential to affect people's mood and to create a sense of well-being. Architecture has the ability to transform spaces and to create

an environment conducive to its occupants' well-being. It has been proven that design can affect people's happiness and health. This is consistent with the evidence found in the study of Biophilia in Chapter 2. Current studies in medical and healthcare architecture show that mental, spiritual, psychological, intellectual, and social conditions of patients can support their healing process (Dilani (2008) in Sorana & Cucurnia, 2008). Therefore, the qualitative aspects of the space should be considered more carefully, as this quality is universal in nature and more resistant to changes.

The shift toward sustainability in all aspects of human activity (McMinn & Polo, 2006) requires healthcare architects to find a new typology of healthcare facility that is both energy efficient, and economical that can enhance the quality of life of its occupants. No longer should a healthcare facility be designed to merely reflect its functional aspects. Instead, it should be a design with the kind of care and consideration applied to any museum, school, residential or spiritual building. The presence of nature, through natural materials, daylight, fresh air, view, and so on is crucial in the creation of such spaces.

The need has been identified for a small, holistic and community-based facility, called a Community Health Centres. In the coming years, we should see more of this type of healthcare facility in demand. Thus, it is feasible to design this function as a practical application to examine the knowledge and observation that has been gained through this research so far.

Chapter 4. Design Project

4.1. Overview

As Feng Shui begins to gain a wider acceptance in the world as an alternative design tool for architects and planners, a critical stance in adopting its principles must be taken. Although it seemingly contains an intuitive design approach, the ancient wisdom of Feng Shui has a potential role to play in engaging human senses. Through qualitative aspects of the space and materials, people can sense the connection between them and their surroundings. The ancient wisdom of Feng Shui aspires toward a balanced state between environment and its occupants through the manipulation of vital energies existing in a specific space or material.

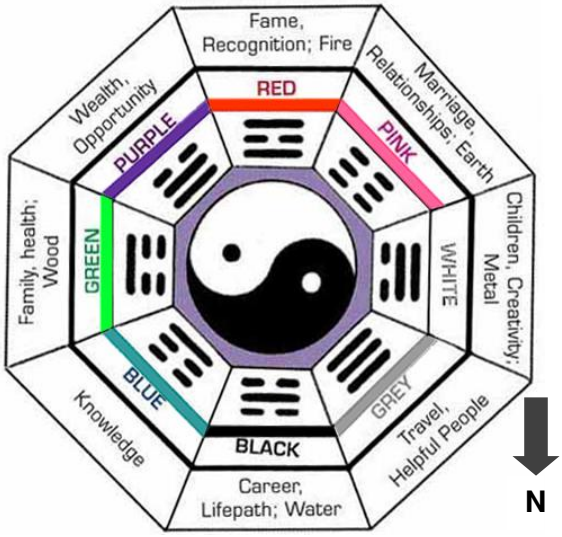
The ancient wisdom of Feng Shui incorporated into contemporary architectural design can potentially create a uniquely designed architecture. Feng Shui principles are governed by a set of rules based on a profound understanding of nature and its processes. Since individual acts of creativity have no boundaries, contemporary architects are often engaged in a complex and intuitive design process that depends on their subjective sensitivity. The principles of the flow of Chi, the complementarities of Yin - Yang, and the cycles of change of the Five Elements provide an alternative set of guidance to help architects design a better building. By approaching the design process with Feng Shui principles, architects can be informed by the site's advantages and restrictions based on its orientation, surrounding features, as well as the compatibility of various materials applied in the architectural construct. In order to integrate Feng Shui principles into architecture projects, the following guidelines should be implemented:

1. **Designing from the macro scale to micro scale.** In Feng Shui, the larger scale always takes precedence over the smaller scale. When incorporating Feng Shui principles into an architectural project, it helps to divide the process into four levels of analysis: (1) the natural features of the site, (2) the building's external layout including its enclosure and the landscaping, (3) the interior space and the materials to be used within it, and (4) the arrangement of furniture and decoration. To accomplish an overall harmonious design, all four components above must be re-evaluated to ensure their compatibility.

2. **Harnessing the life-force energy or Chi.** Chi is believed to be possessed by everything on earth; it influences how a human thinks or acts, thus affecting how one functions and succeeds in life. Nature, present in the form of Chi, is treated as a living being whose strength and direction of movement can help or harm people. The life enhancer Living Chi should be welcomed, accumulated, and allowed to flow freely to bring its good influence, whereas harmful Dead Chi should be avoided.
3. **Achieving harmony through the concept of Yin and Yang.** The Chinese believe that everything is created in pairs and although they seem to be in opposition, they are actually complementing each other in perfect harmony. The Yin and Yang Concept is symbolized by an unbroken curve line, with no beginning or ending, forming a circle and divided into two equal interconnected - interdependent parts in opposites such as dark and light or solid and void. Feng Shui seeks well balanced Yin and Yang forces to bring harmony and a productive living environment (Too, 1996).
4. **Understanding the essence of the Five Elements and its processes.** Natural elements present in nature are manifested in the concepts of Five Elements. The ancient Chinese chose the Five Elements to characterize the behaviour of all objects and phenomena in nature. Each element interacts with the other in predictable cycles of production, destruction, and reduction. Unlike the Greek materials of Earth, Wind, Fire, and Water that symbolize substances, the Five Elements represent the essences of all materials present in the universe. By understanding these traits, architects can effectively design any space according to the psychological effects they want to achieve.
5. **Conceptualization with symbolic terminology.** Designing with Feng Shui principles in mind requires an intense sense of imagination in order to translate Feng Shui symbols into the design process. When the symbolic meaning of Feng Shui is appreciated, Feng Shui can be a powerful alternative design tool to assist contemporary architects in creating a sensible and harmonious built environment. In addition, the use of Feng Shui symbols generate creative narrations to enhance spatial experiences.

The design portion of this thesis is an extension of earlier research that explored the applicability of the above design guidelines in a contemporary architecture practice. In this section, the selected site will be evaluated based on these guidelines, and then a design proposal will be developed that demonstrates the application of Feng Shui principles. This design project is focused on bringing Feng Shui sensibility to the design by effectively channelling the life-force energy (Chi) to the site, as well as using the Five Elements and their cycles to achieve a balance environment.

4.2. Community Healthcare Centre Facility – Functional Analysis



(thecrabbynookgarden.com/fengshui/bagua-mapa.jpg)

Figure 4.01. Bagua and its Life Objectives

As illustrated in the Ba gua principle in Figure 4.01, Feng Shui claims that a proper application of its principles will improve a person's wealth, fame, relationships, health, fertility, knowledge, and career. Among those objectives, the objective of wellness seems to be the most appropriate to be investigated in this thesis to show the effectiveness of this lore since it is easier to measure in terms of its architectural spatial quality. The results and experiences gained through the examination of these strategies and methodologies are expected to be applicable to other types of buildings.

The argument of this thesis will be developed through the design of a healthcare facility which is intended to foster the physical and spiritual wellness of its users. Considering the evidence presented from the previous chapters, a smaller, community – based healthcare facility is desirable. In Ontario, this type of facility is known as Community Health Centres (CHCs). They offer a holistic and personal treatment, as well as health promotion and prevention for individuals and families. According to the Ontario Ministry of Health and Long Term Care, Community Health Centres (CHCs) have the potential to improve the quality of healthcare at a lower cost compare to a conventional hospital, therefore ensuring its sustainability for years to come (2002).

To test the validity of Feng Shui theories to the design of healthcare buildings, a large scale application of their principles needs to be examined in detail. However, to ensure the transferability of findings from this study to future projects, the chosen function should not be too specific. For these reasons, a healthcare facility that contains the functions of Maternity, Family Practice, and Palliative Care has been selected. It is chosen because the living of life, beginning of life, and the end of life are all natural processes that touch everybody's life. It is also a way to put into practice the complementary concepts of the Yin and Yang. In this case, the three healthcare functions are put together in the same place. The functions mentioned above do not require elaborate equipment and complicated spatial requirements, which are not which are not appropriate to a qualitative study such as this one

The proposed Community Healthcare Centre serves as a vehicle to test the principles of Feng Shui in terms of the choice of materials, orientation, and geometry that have been analyzed in Chapter 2. In the following design exercise, the Healthcare facility will be a building that is designed to provide a refuge for its clients during major life events as well as a healthy and comfortable setting for its personnel's activity. The primary goal of this study is to achieve a natural harmony and supportive environment based on the Feng Shui principles to improve the experience of its occupants through the spatial and aesthetic qualities of the building.

4.2.1. Primary Healthcare

In the Canadian Healthcare system, Primary Healthcare serves a dual function of providing direct first-contact services and ensuring continuity of movement across the healthcare system for patients who require more specialized services. Primary Healthcare services often include prevention along with treatment of common diseases and injuries, basic emergency services, referrals, health promotion, mental health care, maternity care, palliative care, and rehabilitation services (Ontario Ministry of Health and Long Term Care, 2002).

Although Primary Healthcare can be delivered by a variety of healthcare professionals, such as nurses, pharmacists, psychologists and social workers, at the moment primary care is delivered chiefly by family physicians and general medical practitioners (Health Canada, 2006). In the future, this condition will change due to the Primary Healthcare Reform. In this reform, Nurse Practitioners are expected to take on more responsibility. Much of the low – risk medical procedures will be assigned to Registered Nurses or Midwives. In addition, they will take the role of "health public relations" who provides health – related information and advice to the public (Stamler & Yiu, 2005). Nurse Practitioners require a shorter training period compared to Medical Doctors. Therefore, they can help to solve the problem of Healthcare professional shortage in Canada, as well as help to maintain Canada's Healthcare system sustainability.

4.2.2. Maternity Care

Maternity Care refers to the care of a woman and her baby throughout the pregnancy, during the process of birth and in the early weeks after the birth (Women and Healthcare Reform, 2007). Although recently viewed as a pathological event, childbirth is actually a natural process of life. It is a part of nature, not an illness. Until the early twentieth century, homebirth with the aid of a midwife was

the norm. However, as profit-making hospitals emerged in the nineteenth century, women were drawn to give birth in the hospital (Feldhusen, 2000). Wealthy women were promised a relaxing setting in the countryside, away from the responsibility of caring for their other children (Adams, 2008a). After the introduction of Obstetric – anaesthesia in the early 1900's, most women became interested in giving birth in hospitals because hospitals could offer painless birth, which was not available in homebirths. By the year 1920, doctors believed that "normal" deliveries were so rare that interventions should be made during every child – labour (Feldhusen, 2000). In the early 1970s, various women's groups developed a movement to "deinstitutionalize" and "demedicalize" critical life events, such as childbirth and dying. The interest in hospices and homebirths was partly motivated by a desire to escape professional dominance as well as to avoid the desensitizing environment of the hospital (Feldhusen, 2000).

As mentioned above, most normal deliveries do not require hospitalization and the supervision of a physician. In recent years, this fact is becoming more known and desired by the general population as the number of new birthing centres increases in Canada. Patients in these centres are not dependent on obstetricians but can be well cared for by Midwives, Registered Nurses, and Doulas.

4.2.3. Palliative Care

Palliative Care is defined as an active compassionate care directed toward improving the quality of life of those with life-threatening illness, and their families, as they are living, dying, or bereaved (Hospice Association of Ontario, n.d.). A hospice provides care for patients whose disease is not responsive to any curative treatment. The focus of the hospice is to provide its patient, including his or her family, with the fulfilment of their physical, emotional, social, and spiritual needs. The projected life span of a hospice patient is between six to eight weeks. During that time, the hospice strives to provide a meaningful experience that enhances personal and spiritual growth. When a sense of normalcy, control, and security is given to the patients, hospice palliative care has been shown to be capable of improving the quality of life of patients (Crooks, 2005).

4.3. Toronto Islands – Site Location and Analysis

Since the focus of this research is the application of Feng Shui principles, a site with a variety of landscape features will be ideal. Moreover, the function of a Community Healthcare facility requires a specific type of site with positive energy conducive to healing. Considering the healing attribute attached to the element of water, as well as the capability of water to bring Chi (Hale, 2000; & Too, 1998), a site with bodies of water is preferred. To serve these purposes, a location at the Toronto Island was selected. Toronto Islands lie in Lake Ontario, just offshore from the downtown city of Toronto. As pointed out in Figure 4.02, the site chosen is located between Ward's Island and Algonquin Island. People visit the islands mostly for leisure and sight-seeing, although there are a number of people who actually live there. There is currently no medical facility on the islands. The residents of Toronto Islands must take a ferry to reach mainland Toronto to receive any medical attention. Therefore, it is reasonable to propose a healthcare facility here.

(Google Earth, 2007)

Figure 4.02. Aerial Map – Toronto Island, Toronto, Canada

4.3.1. The Site and its Surrounding Area

Figure 4.03. The Surrounding Area of the Site (Google Earth, 2007)

Figure 4.04. The Site

Figure 4.05.View overlooking Toronto

As illustrated in Figure 4.03, the selected site is surrounded by bodies of water on the west and east sides, as well as by the Island Canoe Club and a few houses on the south and north sides, respectively. Figure 4.04. shows that the site is currently an empty lot, measuring about 95 metres long and 55 metres wide. It overlooks nice views of downtown Toronto, shown in Figure 4.05, and Lake

Ontario with its sandy-beach (Figure 4.06). Two communities exist in this part of Toronto Island. They are situated on the Ward's Island and Algonquin Island. As illustrated in Figure 4.07, the existing buildings on Ward's Island and Algonquin Island are cottage – style. They are relatively small and low – rise.

Figure 4.06. Lake Ontario Beach

Figure 4.07. Cottage-style Buildings

(Google Earth, 2009)

Figure 4.08. The Map of the Site

Figure 4.09. Boardwalk

As shown in Figure 4.08, Cibola Avenue is the main vehicular road that connects Ward's Island to the rest of Toronto Islands. Along the shore of Lake Ontario lies a scenic boardwalk (Figure 4.09, that turns into Lakeshore Avenue. Approaching Centre Island Amusement Park, Cibola Avenue merges with Lakeshore Avenue.

4.4. Design

The first step in the design process is the initial assessment of the site's natural environments of the site. The water dominates the site. Although the water element is favourable in terms of providing tranquility, peace, and serenity, too much water can cause loneliness (Hale, 2000). To re-establish balance of energy, other elements that can reduce the negative consequence of water element should be added. In the Cycle of Balance, the earth element is regarded as having the capacity to absorb the water element (Figure 4.10). Furthermore, the earth element is associated with the characteristics of stability, nourishment, and dynamism (Hale, 2000), all of which suit the function of the Community Health Centre. In this design project, the earth element, represented by the geometry of square, is taken as the overall shape of the building.

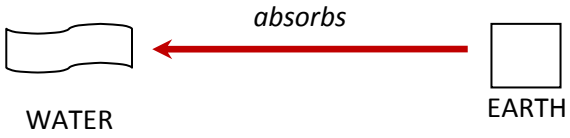


Figure 4.10. The Destructive Cycle of the Elements of Water and Earth

Vernacular Chinese architecture was included as a precedent for this design process. Some of the important characteristics are the inward orientation of the courtyard, shown in Figure 4.11, the balance between solid and void or Yin and Yang, the framed view or the usage of the screening element, shown in Figure 4.12, the privacy, the indirect approach, and the structure of an entry portal or a gate.

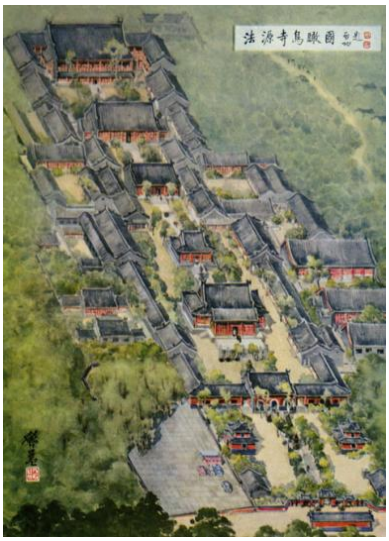
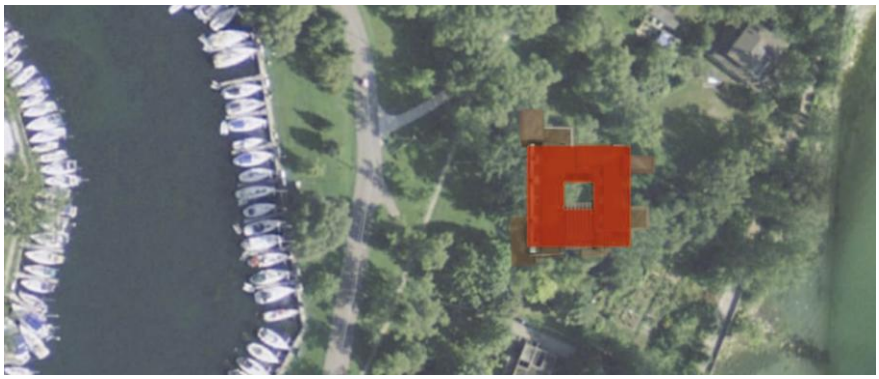


Figure 4.11. The Courtyard Structure

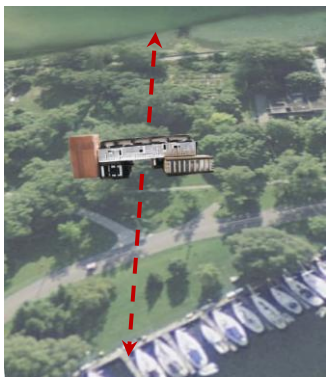
Figure 4.12. The Framed-View

As illustrated in Figure 4.13, the overall design of this building has been decided to be a square to represent the earth element. The courtyard in the middle is taken from the structure of vernacular Chinese architecture. As noted in Chapter 3, a shallow floor plate with courtyards is the preferred configuration for a healthcare facility. In addition, according to the concept of Yin and Yang, the presence of a courtyard is believed to bring a balance of solid and void. In addition to the void in the horizontal direction, there is also another void in the vertical direction. As shown in Figure 4.14 below, an opening is made to provide a continuous path for Chi to flow from the Canal to Lake Ontario.



(Google Earth, 2009)

Figure 4.13. Building Geometry – Courtyard



(Google Earth, 2007)

Fig. 4.14. Unobstructed Chi

4.4.1. Organization

Each function inhabits its designated section of the building. Their placement is governed by the nature of the elements that best suit the function. The building is divided into smaller components depending on their function and according to their best possible orientation. Since the building is designed to be a healing place, wood is the appropriate choice. As shown in Figure 4.15, according to Feng Shui, the wood element has healing properties. Therefore, all components are taking the geometry of wood, which is rectangle (Figure 4.17). As shown in Figure 4.15, the wood element is also capable of reducing the negative influence of the water element.

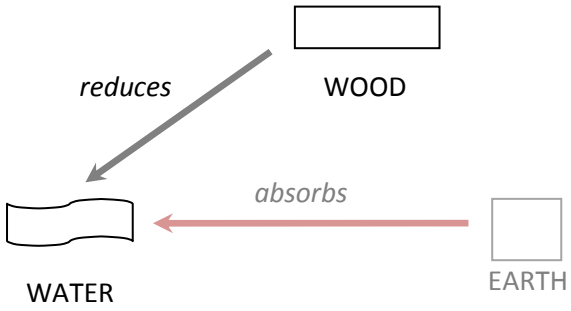


Figure 4.15. The Reductive Cycle, The Element of Wood reduces Water

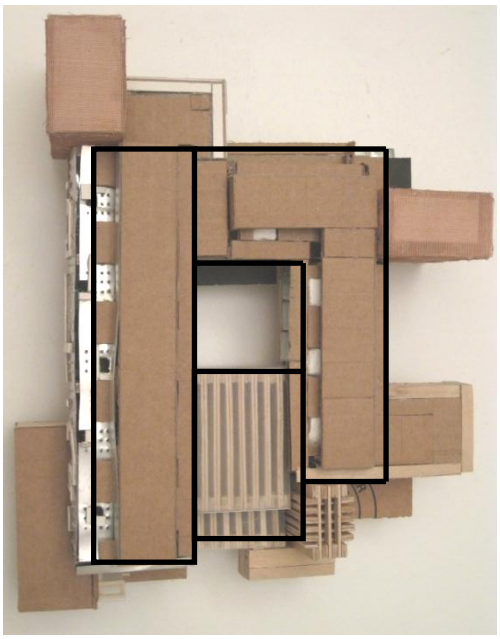


Fig. 4.16. The Rectangular Geometry of the Components

Fig.4.17. Aerial Perspective Showing the Geometry of the Building

Physical models were used extensively as tools to express ideas in a tangible form. A series of models, such as that shown in Figure 4.17, were made of materials representing the Five Elements. The placement of each material is corresponds to their cardinal orientation. They are arranged in a way that the wood element is placed on the east, fire on the south, earth in the centre, metal on the west, and water on the north. Figures 4.18. to 4.21 show the overall look of the study model.

Figure 4.18. View from the Canal (South West)

Figure 4.19.View from the Lake (South East)

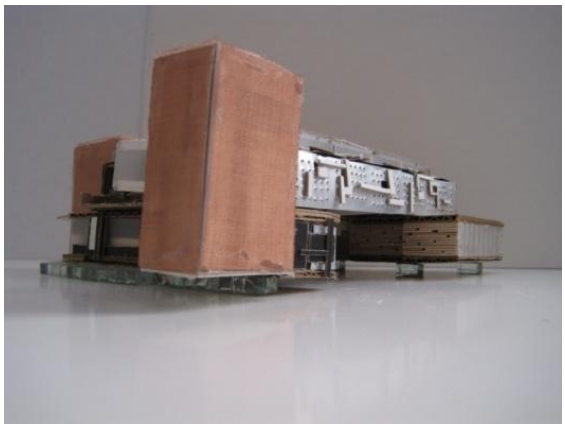


Figure 4.20. View from the Canal (North West)

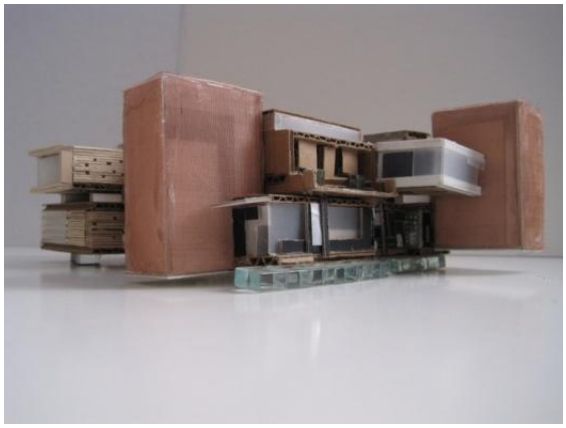


Figure 4.21.View from the Lake (North East)

The program components of the Community Healthcare Centre are divided into five categories. Each component is associated with one of the Five Elements. The classification of the program components is based on similar activities and objectives. This determines which one of the Five Elements each program is associated with. The process of relating the program to the Five Elements is based on the compatibility of each function with the characteristics of the element. These characteristics will decide the materiality, placement, and orientation of each program component. Table 4.01 lists each program's element, its interior location and characteristic as well as any associated landscape feature.

LEMENT	INTERIOR SPACE	LANDSCAPE
WOOD	**NURTURING LIFE** - Doctor's Office - Classroom - Nursery - Cafe	 - Medicinal Garden (Natural Remedies) - Wood Decking Boardwalk
FIRE	**RELATIONSHIP WITH OTHERS** - Lobby / Atrium - Waiting Room - Living Room	 - Fire Roof Garden - Ensure maximum Sunlight penetration
EARTH	**CONTEMPLATION AND SPIRITUAL GROWTH** - Chapel	 - Zen Garden - Earth Garden - Artificial Beach
METAL	**END OF LIFE, SUPPORT AND SERVICE SPACES** - Palliative Care Units - Service Spaces and Support Structure	 - Metal Sculpture Garden - Metal Roof Garden
WATER	**START OF LIFE, ACTIVITIES REQUIRING WATER** - Birthing Rooms, Water Birth - Hot Tub	 - Reflecting Pool

Table 4.01. Program Space and Landscape Planning according to their Corresponding Element

4.4.2. Landscape Organization

Table 4.01. is used in deciding the configuration of the landscape. As illustrated in Figure 4.22, the landscape is organized according to the element that leads in one particular direction. The intention behind this arrangement is to harness as much benefit brought by that governing element as possible.

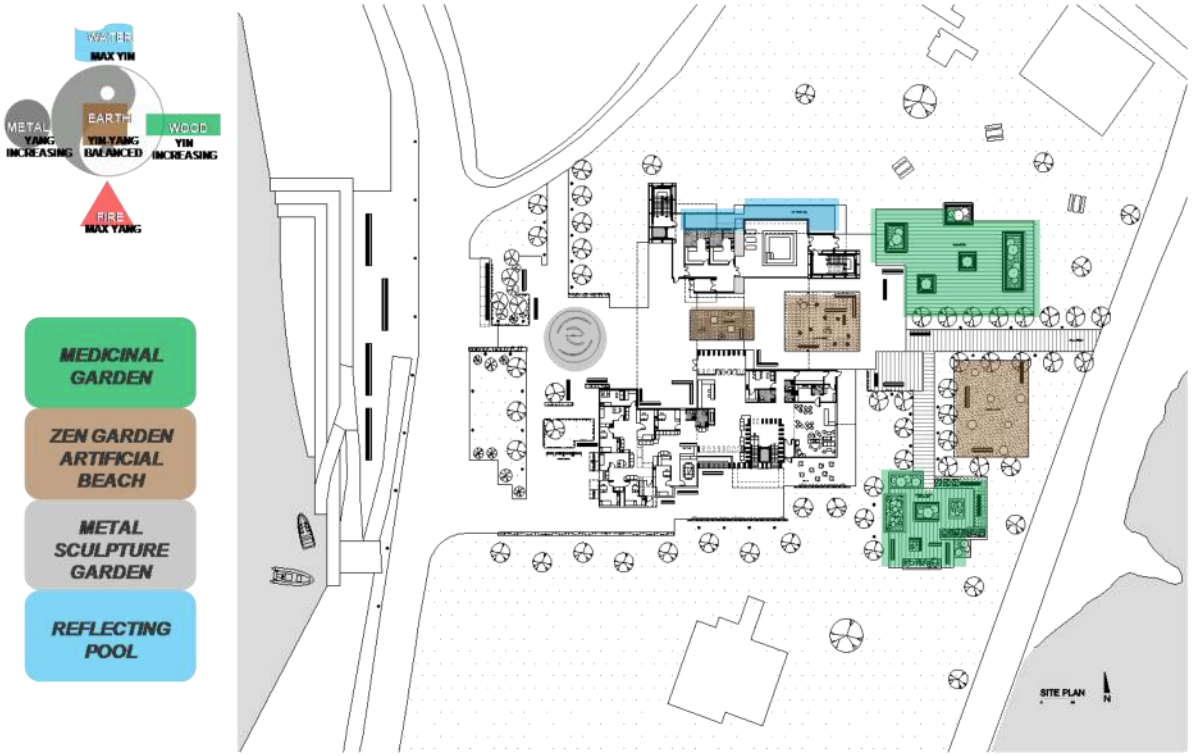


Figure 4.22. Site Plan – Designed according to the Five Elements

As shown in Figure 4.23, each section of the site is designed with its corresponding element in mind. Most of the south section of the site is to remain open, with minimal vegetation or other landscape materials, to allow as much sunlight to penetrate the interior space of the building as possible. Light and shadow dominate this part of the site. A Reflecting Pool is placed on the north. This pool catches drops of water falling from the Second Floor of the building. An Earth Garden, Zen Garden, and artificial beach in the centre area of the site provide a peaceful place for spiritual examination and contemplation.

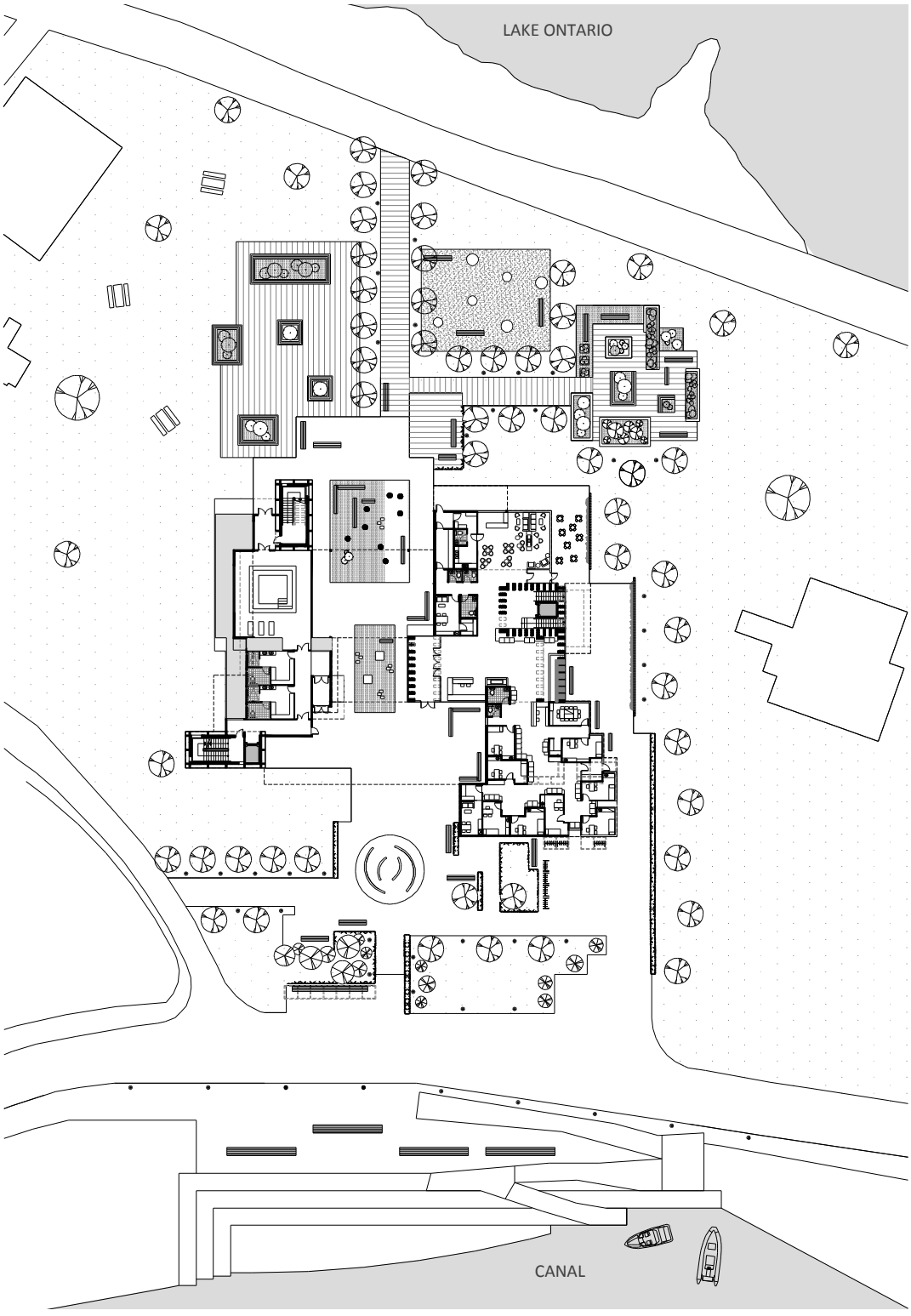


Figure 4.23. Site Plan

As illustrated in Figure 4.24, on the west side, a metal sculpture is constructed in a way that it will slow down the flow of Chi from the Canal. The basis of this sculpture is the Yin and Yang symbol. The placement of this sculpture is exactly in the centre axis of the opening in the middle of the building. Lastly, on the east, wood is the dominant element. As shown in Figure 4.25, this section of the site is designed with plenty of wood and other plant materials. A Medicinal garden and wood decking boardwalk that is connected to the Island's existing boardwalk are located here. To take the healing advantage of the wood element, natural remedies and herbs are grown in this direction too.

Figure 4.24. View from the Canal (West)

Figure 4.25. View from Lake Ontario (East)

In addition to exterior gardens on the site, there are two green roofs on this building. They are intended to provide a connection between people and nature. As illustrated in Figure 4.26, these rooftop gardens are located on the west and south side of the building, overlooking the nice views of downtown Toronto and the Canal, respectively (Figures 4.27 and 4.28). The location of the west – side garden is secluded. It is intended for the Palliative Care Unit patients. The theme of this garden is metal, based on its orientation. The design of this garden is dominated by circles, which is the geometry of metal. The other rooftop garden is oriented to the south. The main purpose of this garden is to provide an exterior walking space for expectant mothers. Fire is the theme of this garden. The design of this garden is based on the geometry of triangles.

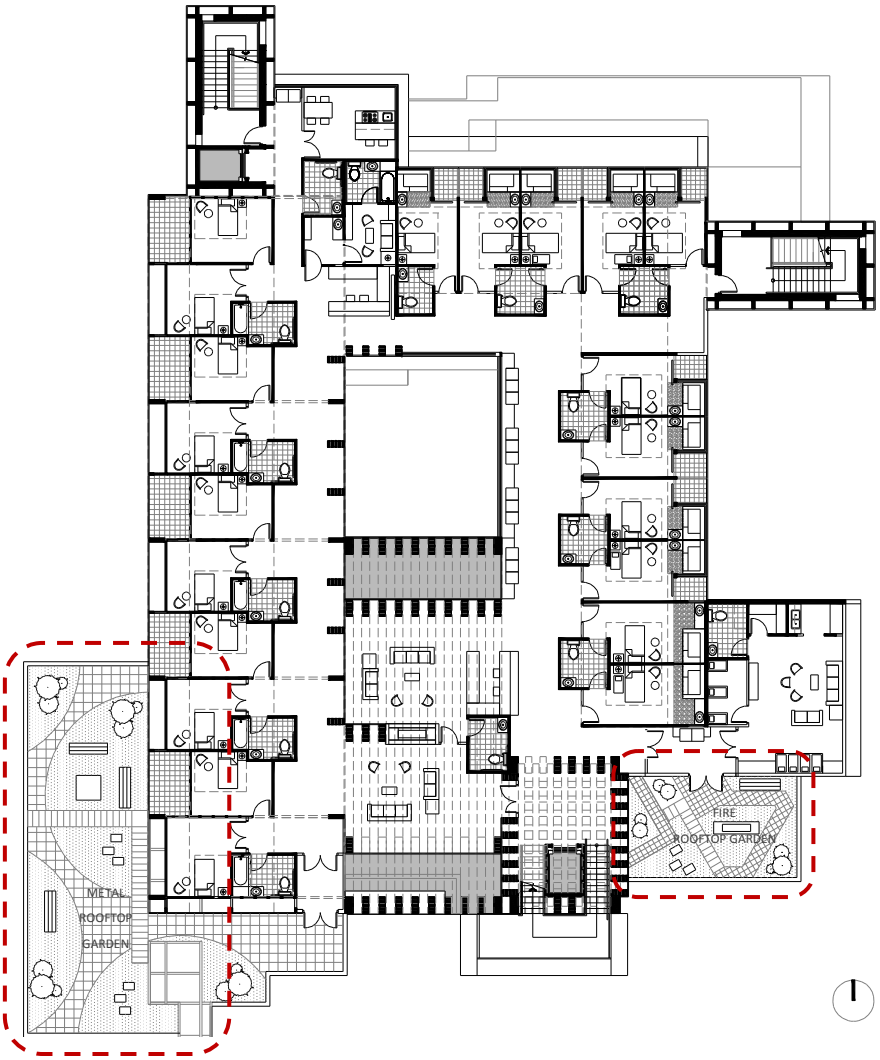


Figure 4. 26. Plan Level 2 – Metal Rooftop Garden and Fire Rooftop Garden

Fig. 4. 27. Metal Rooftop – Overlooking Toronto

Fig. 4.28. Metal Rooftop – Overlooking Lake Ontario

4.4.3. Interior Space Organization

The arrangement of the interior space of this Community Healthcare Centre facility is based on the compatibility between the characteristics of activities contained in a specific program component and the qualitative properties associated with each of the Five Elements. As discussed in Tables 2.01 and 4.01, each of the elements transmits different kinds of energy. This specific energy is used to enhance the spatial quality of the interior spaces. The interior space can be seen in the building plans shown in Figures 4.29 to 4.32.

Wood energy is nurturing and expanding (Jay, 1998). It fits for spaces that are intended to maintain human life like Doctor's offices, Classrooms, the Café, and the Nursery Room. Wood is the outside cladding of the east-facing side of the building. The east is also associated with the start of the day and with spring. Therefore, it is suitable to enter the building from that direction. Immediately after entering the building, a person will face south, which is deemed to be auspicious in Feng Shui (Too, 1996). The condition of the wood element according to Feng Shui is windy or airy (Hale, 2000). To represent this property, a Living Wall is constructed in this part of the building. This feature will improve the indoor air quality of the building.

Fire is believed to be capable of bringing warmth and happiness (Jay, 1998). The fire element is located in the south. The Lobby, Waiting Room, and Living Room are placed here. The section of the building representing fire is highly transparent to maximize penetration of daylight into the space.

The quality of energy emitted from the earth element is soothing and flourishing (Jay, 1998). It is suitable for the Chapel, where contemplation, reflection, and introspection are going to take place. The Chapel is constructed of concrete material. It is solid and heavy. Based on the orientation of the earth element in the Five Elements theory, the Chapel is placed in the centre of the building. To achieve a more dramatic quality to the space, the Chapel is sunk into the ground. Therefore, it is placed in the basement.

The metal element brings strength and solidity (Jay, 1998), perfect for the Palliative Care Unit, supportive structure and service spaces. Metal is associated with the west orientation. Perforated metal cladding is incorporated in the Palliative Care Unit to filter daylight that comes in.

The Maternity Care Unit and a hot tub are located on the north side of the building. The energy coming from the element of water is calm and serene (Hale, 2000), suitable for the expectant mothers and their newborn babies.

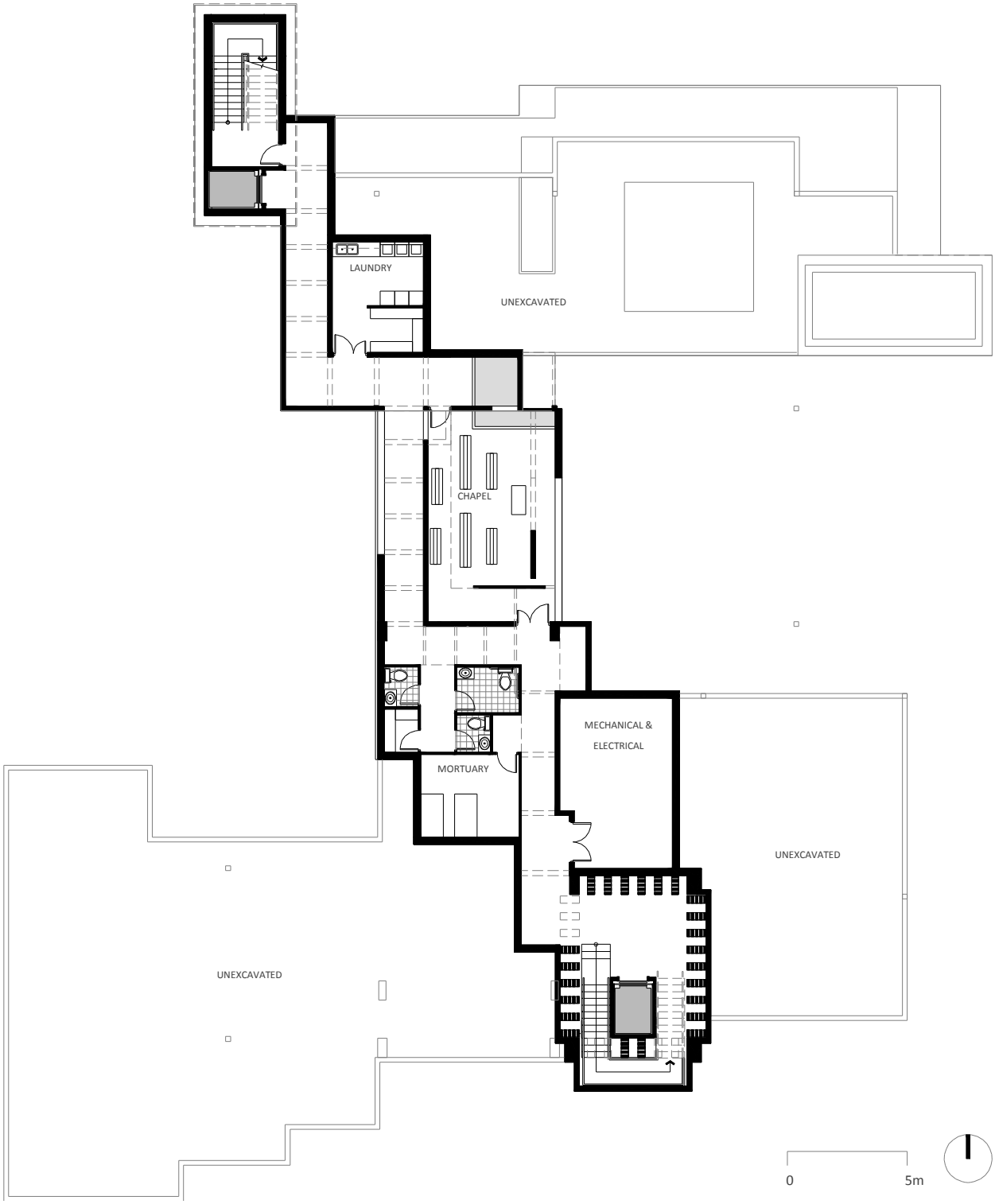


Figure 4.29. Basement Floor Plan – Chapel (represented by the element of Earth) is located in the Centre

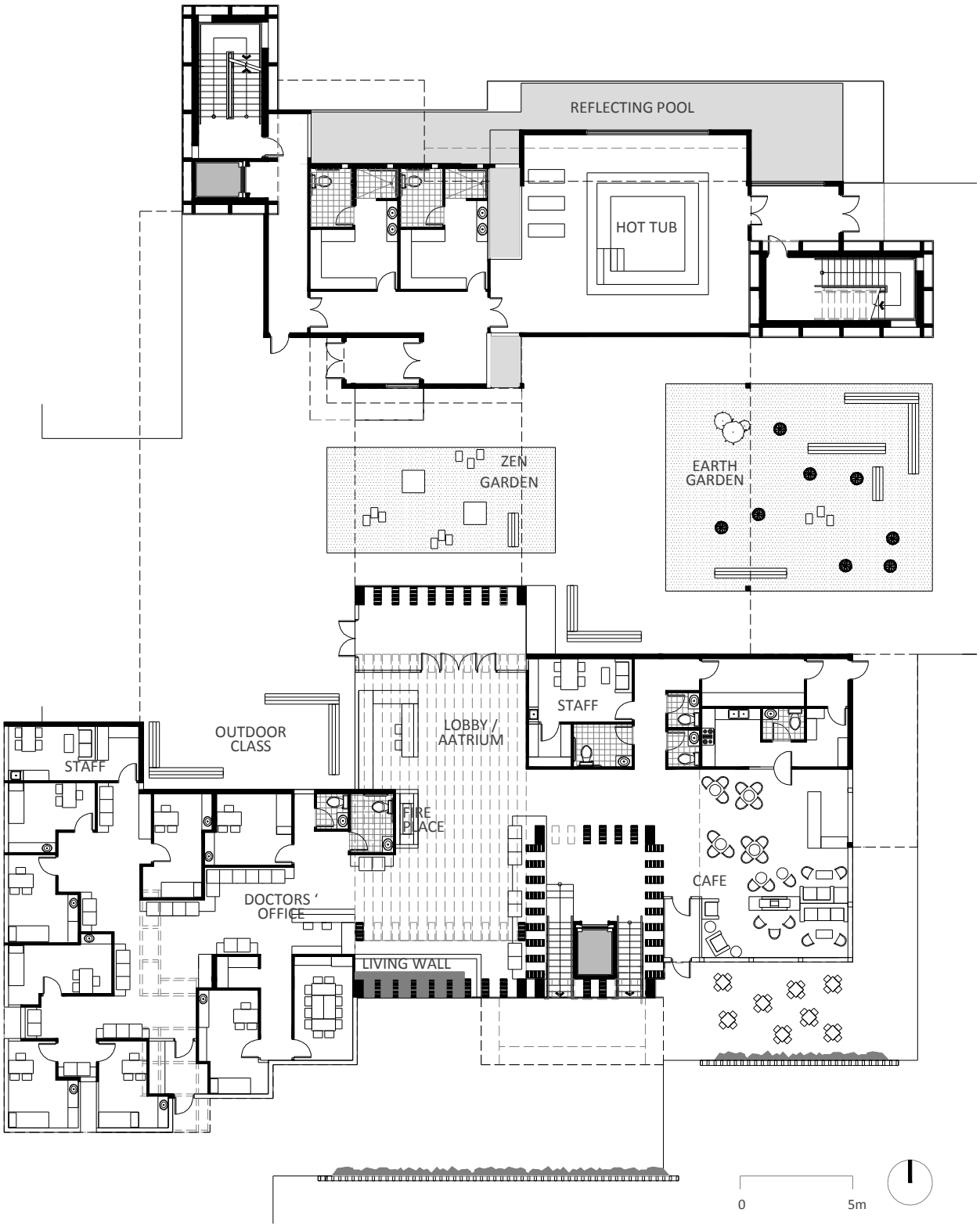


Figure 4.31. First Floor Plan – Showing: Hot Tub (Water Element); Doctor's Office, Café, and Living Wall (Wood); Lobby / Atrium, and Fireplace (Fire)

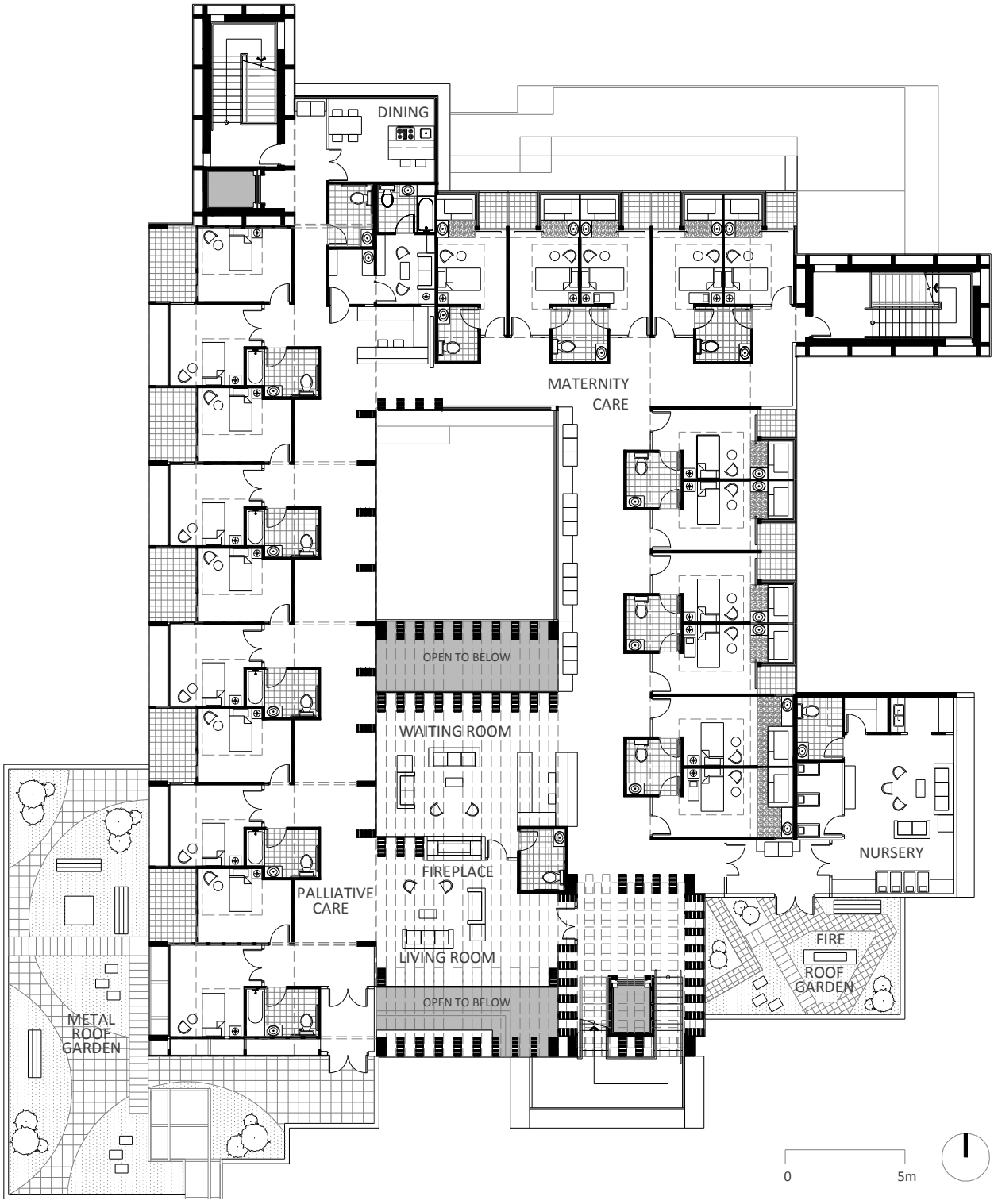


Figure 4.32. Second Floor Plan – Showing Maternity Care (Water Element); Palliative Care Unit (Metal); Nursery (Wood); Waiting Room, Living Room, and Fireplace (Fire)

4.5. Materiality

4.5.1. Wood

The component of wood in the building is located on the east. The programs that belong to the wood element are: Nursery Room on the Second Floor, as well as Doctor's Office, Classroom and Café on the First Floor. In this part, wood is used extensively as a structural element, flooring, shading device, and cladding material. As illustrated in Figures 4.32 to 4.34, different degrees of opening are implemented according to the direction each wall is facing. The north side is the densest to minimize heat loss, while the south is the most open to allow the maximum amount of daylight to enter the building.

Figure 4.32. East facing Nursery Room, overlooking Lake Ontario

Figure 4.33. Café Windows facing South and East

Figure 4.34.West facing Examination Room

4.5.2. Fire

The fire component is located on the east, superimposed on the component of wood. This arrangement is based on the Productive Cycle of wood producing fire. The fire element is present in the Atrium / Lobby on the First Floor, as well as the Living Room for the Palliative Care and Waiting Room for the Maternity Care on the Second Floor. The existence of fire element in this area is strengthened by the presence of a fireplace. As shown in Figure 4.35, the fireplace is constructed of natural stones, which belong to the element of earth. In the Cycle of Balance, the element of earth reduces fire. The role of the earth element here is as a protector against the negative influence of excessive fire element.

Figure 4.35. Fireplace at First Floor Lobby / Atrium

On the second floor, the Maternity Waiting Room and Palliative Care Living Room are both divided and united by the element of fire. As shown in Figure 4.36, they are both located under the same opaque ceiling glass, but separated by a double – sided fireplace (Figure 4.37). This is the hearth of the building. Here, the two opposites, the beginning and the end of life, are meet. Although they seem to be in opposition, they actually complement each other, as summarized by the concept of Yin and Yang. The Chinese view life and death as a continuous cycle. Reincarnation is a part of the teaching of Buddhism, which is the most popular religion in China. They believe that their ancestors have a very important role in the life of their descendents living on earth. The placement of their ancestors' burial place shows the high regard in which ancestors are held (Bruun, 2008).

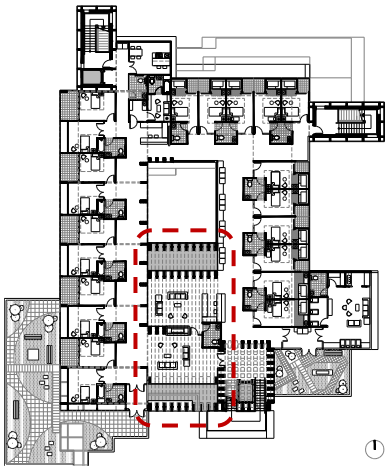


Fig 4.36. Plan L. 2 - Public Spaces

Fig. 4.37. Maternity Waiting Rm. adjacent to Palliative Care Living Rm.

As noted in Chapter 2's analysis of Biophobia, the fear of death is actually beneficial for human species' survival process. Fear can be a reminder of an adaptive, instinctive response to coping with stress. It serves as the natural instincts of the adaptive fear responses that relates to the mechanism of coping with stressful situations. In addition, the awareness of the birth of the newborn babies in the facility may reduce the level of anxiety of the Palliative-care patients by giving them hope as they relate to their own experiences to be born into the next life.

As illustrated in Figure 4.38, the light property of fire is utilized in the natural daylighting of the building. Both sky – lighting and side – lighting are used in the interior space. Furthermore, daylight is brought to the building directly, reflected, or filtered. Natural light is proven to be essential for

maintaining people's Circadian Cycle, especially for healthcare workers who are mostly working in long – shifts.

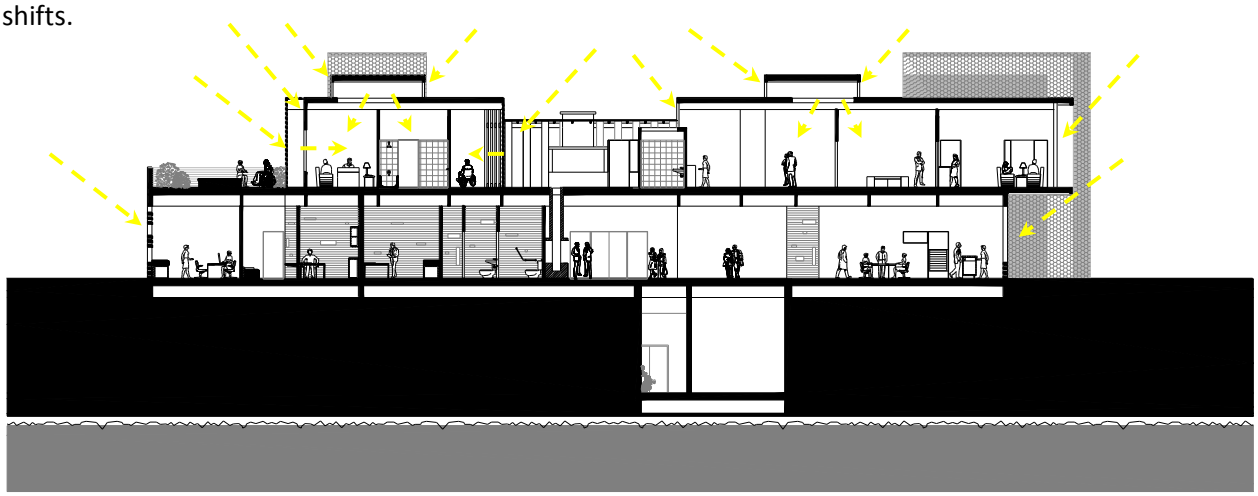


Figure 4.38. Fire Element – Daylighting

4.5.3. Earth

The earth component of the building, which is the Chapel, is located in the centre and in the Basement. It is located in the Basement so that visitors can experience the element of earth by actually going into it. Leaving the First Floor open maintains a continuous flow of Chi on the site, as well as providing an unobstructed view from the Lake Ontario to the Canal.

As shown in Figure 4.39, the basement is made of thick concrete that also functions as thermal mass. The thickness and solidness of the concrete make it possible to create a more dramatic light effect, similar to that in old Gothic churches (Figure 4.40).

Figure 4.39. Earth Element – Thermal Mass

Figure 4.40. The Dramatic Light in the Basement Chapel

4.5.4. Metal

The component of metal is located in the Palliative Care Unit. Metal corresponds to the west orientation. In this particular site, the west coincides with the nice view of the Canal and downtown Toronto. The Palliative Care patients occupy this section. Some of them may be suffering tremendous pain that affects every one of their senses. Bright light and noise can aggravate their agony. As shown in Figure 4.41, various applications of metal are tried in the physical model made for this project. The layered screening device, a common feature of Chinese architecture, is a visible solution to reconcile these contradictory interests. Perforated metal cladding, similar to that shown in Figure 4.42, provides a softer light and seclusion, while allowing patients to enjoy the outside view. The rendering of the interior space of the room can be seen in Figure 4.44. In addition, as illustrated in Figure 4.45, this metal treatment will emit light from the inside at night. As this building brightens its surroundings, it can potentially be the landmark of this area.

Aside from being used as a screening device, metal is also applied as a reflective cladding material on the exterior walls of the Hot Tub Room (Figure 4.43). Reflective cladding is useful to brighten the space under the Second Floor.

The supportive and strength property of metal is represented by the steel structure, which is used as the main structure of the Palliative Care Unit (Figure 4.46). Steel structure enables a long span of the Second Floor to be constructed with fewer columns on the ground floor.

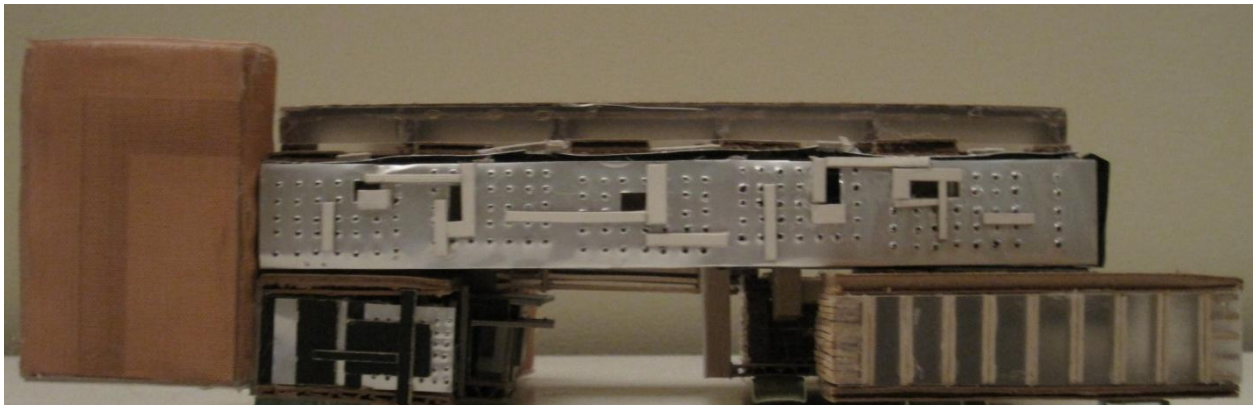


Figure 4.41. West Elevation – Facing the Canal

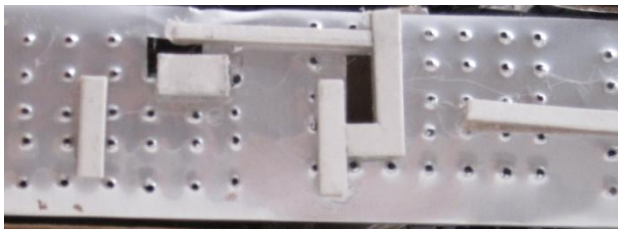


Figure 4.42. Perforated Metal Cladding

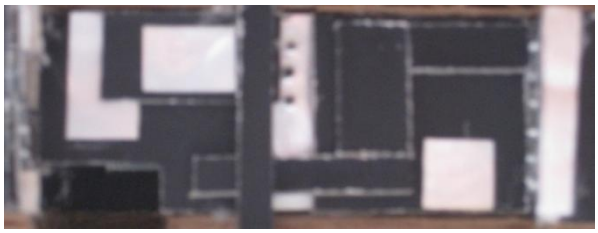


Figure 4.43. Reflective Metal Face

Figure 4.44. Palliative Care Unit with Perforated Metal Screening Device

Figure 4.45. The Perforated Metal Cladding glows at Night

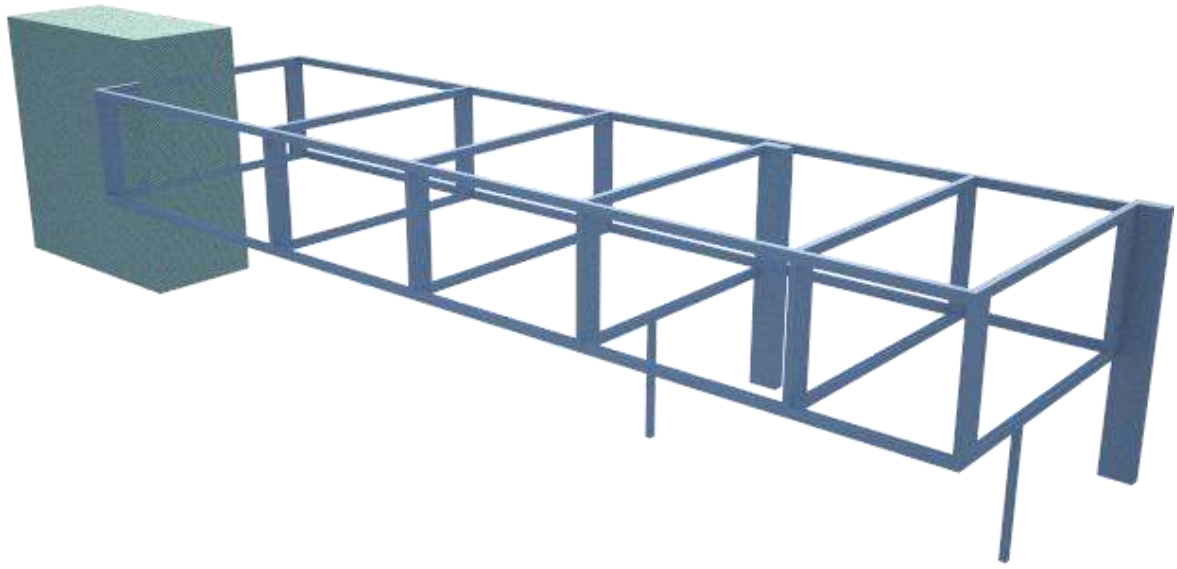


Figure 4.46. Steel Structure for the Palliative Care Unit

4.5.5. Water

As illustrated in Figure 4.47, every room in the Maternity Unit is equipped with a birthing pool that can also be used as a bathtub. Water birth has been the preferred method as it minimizes the impact on mothers and their babies (Harper, 1994). One of the reasons for this is that the warmth of the water temperature can help to alleviate pains.

Grey water generated from the Second Floor is mechanically filtered before cascading into the Reflecting Pool (Figure 4.49). These drops of falling water provide a natural screening device for the Hot Tub Room below (Figure 4.50).

Figure 4.47. Maternity Room with a Birthing Pool

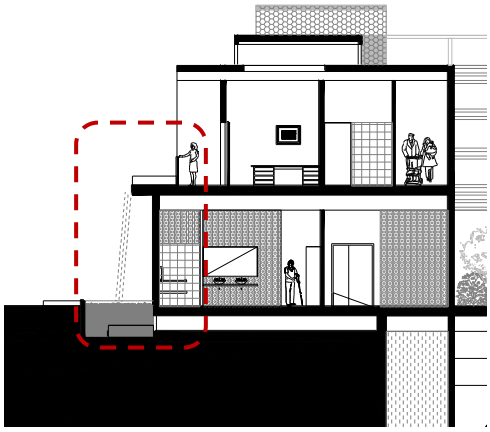


Figure 4.48.Cascading Water

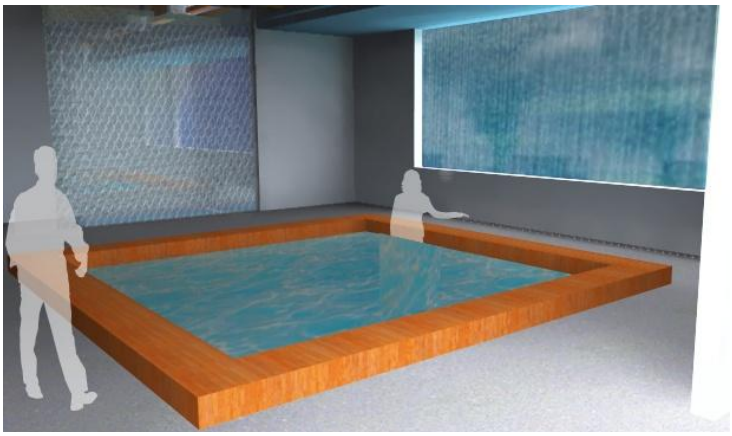


Figure 4.49. Hot Tub with Cascading Water Outside

4.5. Building Systems

The Cycles of Five Elements help to choose the systems that operate in the building. The considerations of energy efficiency and sustainability are essential for any architecture project today. The Five Elements and their cycles remind us that everything in nature works together harmoniously.

One process leads to another process in an endless cycle. By understanding the relationships between these elements, an architect can design a more efficient closed – loop building system.

4.6.1. Water nourishes Wood: Grey Water Recovery and Living Wall

According to the Productive Cycle, the element of water produces wood. Taking this principle, the domestic grey water from the building is used to water the plants after it is mechanically filtered. This water will be further naturally purified by the soil and then released to the ground water system. The same mechanism is also showcased in the interior space. A Living Wall is placed in the Atrium. Not only is it watered by the recycled water from the building, but it also produces clean water that can be used for domestic purposes, such as flushing a toilet. In addition to cleaner water, this system produces a better indoor air quality. These systems are illustrated in Figure 4.50.

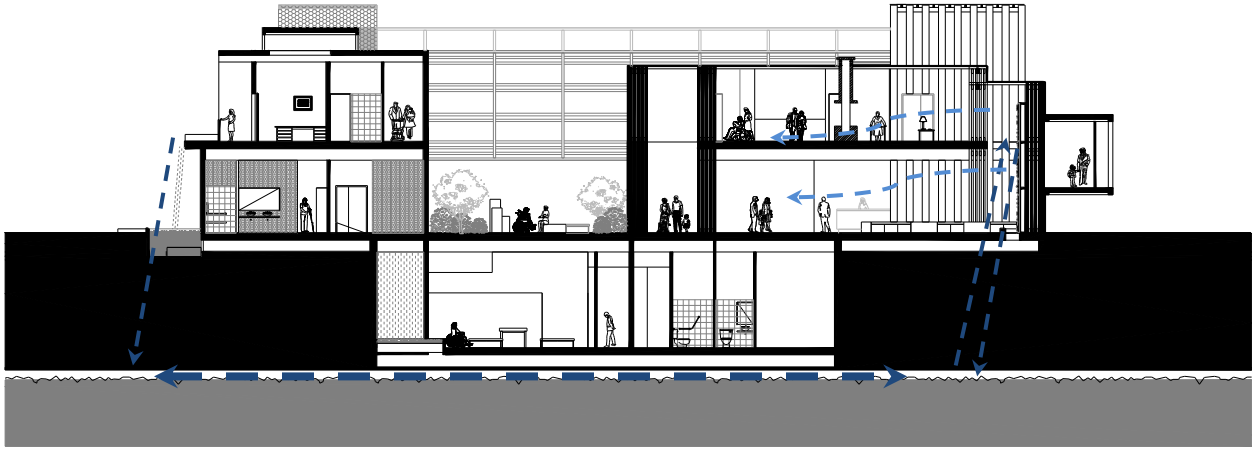


Figure 4.50. Water nourishes Wood: Rain Water Recovery, and Living Wall

4.6.2. Wood feeds Fire: Natural Ventilation

In Feng Shui's Productive Cycle, the element of wood feeds fire. The climatic condition of wood is windy, while fire is heat. The process of oxygen fuelling fire is analogous to air from the outside cooling the interior space. This system is illustrated in Figure 4.51. Operable windows are installed throughout the building to provide natural ventilation and to lower the load on the Air Conditioner in the summer. Together with the Living Wall, the indoor air quality of the whole building is expected to increase.

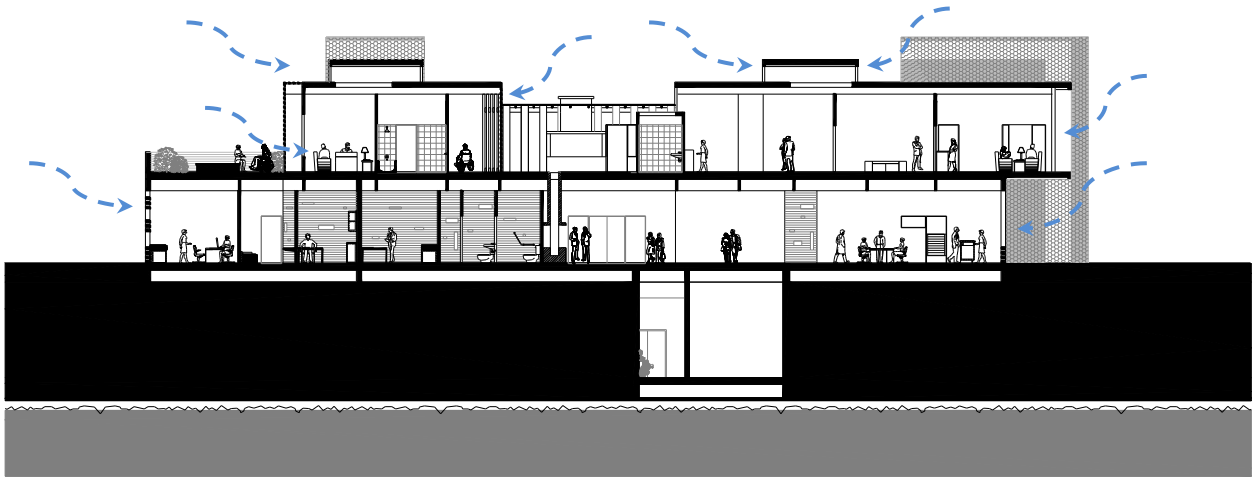


Figure 4.51. Wood (climatic condition windy) feeds Fire (heat): Natural Ventilation

4.6.3. Water quenches Fire: Deep – Lake Geothermal Exchange, Hydronic Radiant Heating

In the Destructive Cycle, the water element quenches fire. The characteristic of the fire element is heat. Understanding this relationship, water from Lake Ontario is used as a heat exchanger to control the indoor temperature. This system is shown in Figure 4.52. In addition, water pipes are installed in the floor plates to heat the space. This system is called Hydronic Radiant Heating. Water circulated from this process can also be used to fulfill the need for water in the building.

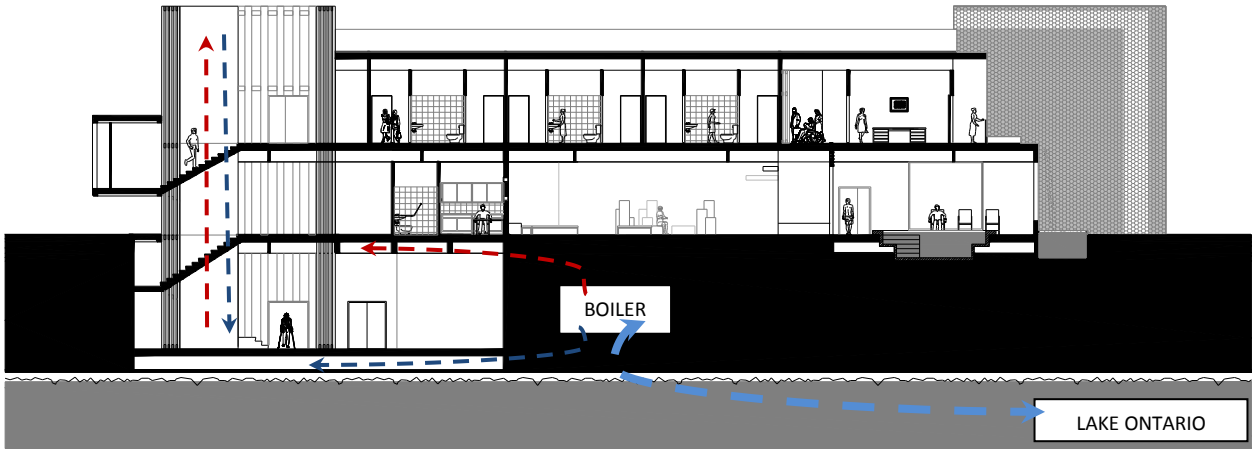


Figure 4.52. Water quenches Fire: Deep – Lake Geothermal Exchange, Hydronic Radiant Heating

4.6. Summary

The advantages that can be reaped by designing with Feng Shui in mind can be summarized in Table 5.01. Three categories of benefits are: (1) it can be an objective methodology, (2) it gives a sense of place and enriches one's sensory experience, and (3) it offers a more holistic and harmonious built environment than is offered by conventional Western architectural theories.

DESIGNING WITH **FENG SHUI** IN MIND		
OBJECTIVE	SENSE OF PLACE ENRICH SENSORY EXPERIENCE	HOLISTIC HARMONIOUS
SYMBOLS ARE HELPFUL IN DECIDING PLACEMENT / USAGE OF THE MATERIALS / SYSTEMS / FUNCTIONS	SPECIFIC TO THE SITE, ORIENTATION, USERS, FUNCTIONS	MACRO TO MICRO SCALE MATERIALS AS ESSENCE CLOSE LOOP "WASTE = FOOD" MATERIALS AS PART OF THE CYCLES

Table 5.01. Design Summary

Designing with Feng Shui in mind undoubtedly provides some challenges, ranging from the myth and symbols it contains to its looseness and subjectivity. Although it takes time to comprehend Feng Shui's symbols and principles, once its essence is gained, it can be helpful in contributing to a design decisions. For example, one can classify any material, system or function with one of Feng Shui's Five Elements and then understand its characteristics and its compatibility with other materials. This method can be useful in deciding upon the geometry, orientation, colour, and material of a building. Feng Shui principles rationalize the effects of material choices and their disposition, programme relationships, cardinal orientation, and geometry. This design guidance can assist an architect in designing a harmonious and supportive environment that can affect people's spiritual and physical well-being.

Feng Shui provides a set of design rules to configure a built environment according to its location, cardinal orientation, occupants, and functions. Feng Shui emphasizes the importance of the siting of a building relative to the natural features and the location of the site. Because of its embrace of

the site, Feng Shui supports the psychological functions of orientation and identification, which Norberg-Schultz called “Genius Loci” or the spirit of place (Nesbitt, 1996). In addition to a sense of place, the application of Feng Shui’s principles enhances one’s sensory experience. The use of a variety of materials, balanced light and shadow, contributes to a more sensorially responsive and environmentally integrated environment.

One of the goals of Feng Shui is to reach a harmony in every aspect of life. The application of Feng Shui’s methodology requires a holistic consideration in every aspect of design. All components of design from site features to interior arrangements are analyzed to achieve a harmony. By thinking through from macro to micro scale, a more holistic and environmentally integrated design can be accomplished. Once the essence of each material in the concept of Five Elements is understood, one can relate almost everything in the universe with one of these elements. The cycles of production, destruction and deduction is analogous with the contemporary idea of “Waste = Food”. Like everything in nature, Feng Shui acknowledges the dynamism of these elements to achieve a harmonious state. When a certain element is lacking, all elements will co-operate to reach a balance again. Each element is capable of changing its own state as well as that of the other element. Physics has confirmed that energy cannot be destroyed; the passing of material’s energy from one state to the next has been recognized by the lore of Feng Shui. Therefore, it can be said that Feng Shui provides a profound understanding of nature and its processes.

This design project for a Community Health Centre on Toronto Island demonstrates that an alternative healthcare facility, that rethinks the scale, program, siting, orientation, material composition, and plan organization of the contemporary hospital through an application of them can improve the human sense of well-being. The decision making process for the design has been driven by the informed application of the design principles of Feng Shui, recognizing that the original objectives of this system were created to generate a sense of well-being and a human-environmental symbiosis.

Chapter 5. Conclusions

Designing with Feng Shui in mind undoubtedly provides some challenges, ranging from the myth and symbols it contains to its looseness and subjectivity. However, this process has been very rewarding. Feng Shui's design guidelines provide a profound understanding of natural materials and processes. Although, it takes time to comprehend Feng Shui's symbols and principles, once its essence is gained, it is helpful in contributing to a design decision. For example, one can classify any material with any one of Feng Shui's Five Elements and then understand its characteristics and its compatibility with other materials.

By analyzing Feng Shui's philosophy with other contemporary theories, namely Biophilia and Phenomenology, it can be concluded that the objectives and methods of these three constructs are similar. Their objectives are the improvement of quality of life and a holistic wellness by creating environments that are more sensorially responsive and environmentally integrated. Although, these three principles agree that sensory perception and human-environmental symbiosis are useful to improve human wellness, Feng Shui is a more prescriptive system providing a set of design rules to configure the built environment. Feng Shui principles rationalize the effects of material choices and their disposition, programme relationships, cardinal orientation, and geometry. This design guidance can assist an architect to design a harmonious and supportive environment that can affect s people's spiritual and physical well-being.

The case studies of seminal healthcare projects studied in this thesis show the evolution of design philosophies in Health Care facilities from the early to late modern period. The research identifies that the rapid advancement in medical technology has emphasized the efficiency of health service delivery through the technological advancements in both medical and architectural technology. What has been lost in this industrial approach to healthcare design is the less easily measured qualities of a space that affect the healing and disease prevention process. Although it is necessary to adapt to medical trends, the psychological and spiritual quality of healthcare facility should not be neglected, since these qualities have a longer and stronger positive influence on a person's well-being. Current studies in medical and healthcare architecture show that the mental, spiritual, psychological,

intellectual, and social conditions of patients can support their healing process (Dilani (2008) in Sorana & Cucurnia, 2008).

This design project for a Community Health Centre on Toronto Island demonstrates that an alternative healthcare facility, that rethinks the scale, program, sitting, orientation, material composition, and plan organization of the contemporary hospital through the application of Feng Shui's design guidelines can improve the human sense of well-being and potentially thereby, their physical and mental health.

The ideas of Feng Shui have lasted for centuries because at their core, they resonate with the human soul. The contemporary philosophies of design of Biophilia and Phenomenology are essentially trying to achieve the same objective, which is a holistic wellness through an authentic engagement with natural materials, geometrical balance, view, sunlight, wind, water, smells, sound, and so on, both in symbolic and in tactile manners.

Architects have the power to improve the quality of life and well being of people through the space they create. The sensuous and tectonic qualities of materials, light, and colour contribute to the poetic quality of a space which is advantageous for human well-being. The absence of the sensuous experience and an imbalance in the human sensory system contribute to the inhumanity of contemporary architecture (Palasmaa, 2005). Therefore, human senses can potentially be used as the mediation between people and nature. Moreover, architecture has the capacity to connect humanity back with nature.

The shift toward sustainability in all aspects of human activity (McMinn & Polo, 2006) requires healthcare architects to find a new typology for a healthcare facility that is energy efficient and that enhances its occupants' quality of life. It can be argued that the additional costs of a smaller and more architecturally elaborate healthcare facility is justified by the potential health benefits that lead to shorter hospital stays and disease prevention.

There is no doubt that designing healthcare facilities will involve solving various complex issues, but engagement in this field can be very satisfying. The prospect of being able to make others feel better and of participating in important moments of people's lives gives meaning and purpose to the profession of architecture.

Appendix A – Field Data Collection

Interview with Greg Colucci (Diamond + Schmitt Architects) – Project Architect of Apotex Centre

(In collaboration with William Harispuru)

1. What is the stance that your firm takes regarding the design of healthcare facilities today, and how they cater to the future of health?
2. We see hospitals/clinics that look like offices, as community centres, as malls, a school, or even an airport. How important is identity in healthcare?
3. We see a number of hospitals built right next to Universities, is this ideal in that the newest treatment can be applied directly into practice?
4. Are you a part of any associations like the 'Centre for Health Design', California, or the 'International Academy for Design and Health', Stockholm?
5. How would you classify the majority of Hospitals that operate today in Toronto? (I.e. General, Mount Sinai, Princess Margaret, Sick Kids and Sunnybrook)?
    - What do you find wrong with them?
6. Would it be a question of 'Process vs. Place'? (Institutionalized feelings because of the reluctance to create healthy places?)
    - Holistic idea of mind and spirit missing?
7. Can you briefly describe the Apotex Centre for Geriatric care and how it attempts to critically redefine the patient experience?
    - Support from family/volunteer?
8. Do you think patients will feel less feared of their disease and encouraged to cope with their disease in a more positive way?
9. It seems like the centre is designed around the concept of the 'nucleic hospital', with an abundance of courtyards-why was this seen as necessary?
10. What are the advantages between atriums vs. courtyards?
11. What is it in nature that inspires your design the most?
12. What is the ideal healing place that can reduce stress in the hospitals?
13. Have you consider of using cultural or alternative approaches such as Feng Shui or other vernacular principles in healthcare design?
14. How do you relate materials with healing?

15. From the outside of the Apotex centre, there exists a less informed quality of the building that resides on the inside-can you expand on this notion?
16. There generally exists a waiting list to get into well designed healing facilities-is that the case at Apotex Centre?
17. What is the role that 'evidence based design' plays in your healthcare projects (nature, color, music, and lighting)?
    - Do you see the benefit of incorporating other living beings, such as plants or animals or their imitations or abstractions?
18. Can you define the project at the Cardinal Carter Wing at St.Michael's Hospital?
19. Does a standardized component exist in your work (flexible spaces)?
    - The problem with the majority of hospitals is that they are not flexible for the future changes in healthcare-Was this apparent in the Cardinal Carter Wing, St.Michael's Hospital?
20. Do you see any inherent risks involved in a standardized mode of planning (and our current definition of it) regarding hospital design?
    - Does a balance need to be struck between the number of walls created (like the single patient rooms) and open flexible spaces?
21. What is your organization strategy? Is there any hierarchy or special priority in design?
22. What is the most effective circulation strategy in healthcare?
23. Do you see the sense of discovery and exploration in healthcare design as beneficial?
24. What are the ideal proportions of recreation, gathering spaces and other supports compare to the treatment area?
25. During the preliminary stages of design inception regarding the hospital projects that you have done, what is stressed as important regarding meeting a positive project outcome?
    - Was an integrated design process (I.D.P) stressed with practitioners?
26. What about the economical value of design? Is it difficult to relieve the stigma with clients 'that a well designed healthcare centre' will undoubtedly save them money in the long run?
27. More and more healthcare is now delivered not in hospitals but at home or community, ambulatory care, day surgery, is now increasing, what are other trends of healthcare, do you think a new typology of hospital is needed today?

28. How about a smaller more specialized care, like a nursing home but for people with terminal illness or chronic disease, maybe they don't have any family to care for them and they don't really need to stay in the hospital, do you think there is a need for that? Or is it going to make patients more agitated knowing that people around them die?
29. Do you think that old hospital facilities can be renovated to orient them more into the direction of the healing environment?
30. What other exploration in healing design that is still need to be expanded?
31. Can we further this research based evidence by implementing them into our homes and offices, so that a preventable approach to living is full circle?

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