

EMBODYING SPIRIT, FOSTERING CONNECTIONS: THE DESIGN OF AN INTEGRATED CANCER TREATMENT CENTRE

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MASTER OF INTERIOR DESIGN

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ABSTRACT

For most people in North America, undergoing treatments for cancer occurs exclusively in a healthcare setting. All too often, this healthcare setting provides a backdrop privileging the technological requirements of conventional medicine over the well-being of the people who inhabit it. Conversely, this practicum project is founded on a different, more holistic approach to cancer care called integrative oncology. The project investigates how an integrative cancer treatment centre can be designed to be more than a technological backdrop, endeavoring to become an active entity that truly supports those dealing with cancer. The investigation includes an extensive literature review of theoretical and evidence-based sources that relate to fostering connections to nature on a variety of levels. Informed by this, a review of relevant design precedents and the functional issues of integrative cancer treatment, the investigation concludes with a design solution for an integrated cancer treatment centre and related findings.

Keywords: biophilia, cancer, embodiment, healing place, healthcare, integrated oncology, interior design, spirit, sustainable

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DEDICATION

This project is dedicated to my parents, Peter and Dorie Westlund. To my dad, for having the faith and courage to seek alternative treatment for your severe cancer, and to my mom, for having the strength and love to support him every step of the way. I know that it was a difficult journey for you both, but one that was well worth the struggle. Thank you for introducing me to the power of nature, always being there for me, and teaching me what hard work, commitment, and faith in your dreams can accomplish.

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INTRODUCTION

To heal, places must infuse us with life – both through living qualities imprinted into lifeless matter and ecological harmony to connect us with the rhythms, processes and life of nature. They must nourish our feeling life through harmony and delight for all our senses. And they must embody messages of value, support for self-esteem. (Day, 2002, p. 237)

Cancer is a disease that affects us all. Indiscriminately it challenges millions of Canadians each year. The influence of cancer reaches out like a ripple that is felt by individuals, families, friends, caregivers and their communities. Like many diseases it is elusive – cancer has many contributing risk factors but no clear cause. As a potentially life-threatening disease, being diagnosed with cancer signals the beginning of a journey that permeates and challenges people in every aspect of their being: physically, mentally, emotionally and spiritually.

For most people in North America, being diagnosed with and undergoing treatments for cancer occurs exclusively in a healthcare setting. All too often, this healthcare setting provides a backdrop privileging the technological requirements of conventional medicine over the well-being of the people who inhabit it (Frumkin, 2001). Conversely, this project is founded on a different, more holistic approach to cancer care called integrative oncology. The project investigates how an integrative cancer treatment centre (the Centre) can be designed to be more than a technological backdrop, endeavoring to become an active entity that truly supports those dealing with cancer.

This investigation includes an extensive literature review of theoretical and evidence-based sources, a review of relevant design precedents and a survey of existing integrative cancer treatment centres. The investigation concludes with a design solution for an integrated cancer treatment centre and related findings. The project site is a ninety-seven year old building located in Winnipeg, Manitoba. It is across the street from one of the city's most significant natural features: the Red River, and within walking distance of one of its most significant cultural areas: the Exchange District.

The Centre is also a short drive from Cancer Care Manitoba's two major treatment sites located beside the Health Sciences Centre and at the St. Boniface Hospital. As such it does not offer chemotherapy or radiation, but rather an alternative non-invasive cancer treatment therapy called sono-photo dynamic therapy and a host of other alternative and complementary therapies discussed further in Appendix A. The Centre offers the option of alternative and complementary therapies to inpatients and outpatients including, but not limited to, those undergoing conventional treatment through Cancer Care Manitoba. Set-up as a 'boutique' clinic, the Centre also offers spaces for consultations, counseling, and education.

The purpose of the project is to create an urban integrative cancer treatment centre that embodies holistic health by enabling experiences in the designed interior that foster spiritual health. This embodiment manifests itself through various levels of connection to nature ranging from the personal to the vast. The intention is to create an environment that supports and encourages a shift in the perception of cancer from being extremely life-threatening to a health challenge that can be conquered, leading to personal growth and a renewed sense of health.

In this project holistic health is defined as:

An approach to life. Rather than focusing on illness or specific parts of the body, this ancient approach to health considers the whole person and how he or she interacts with his or her environment. It emphasizes the connection of mind, body, and spirit. (Walter, 1999, p.7)

Treating illness in a holistic way involves addressing the root cause of illness, increasing patient involvement, and considering the use of both Conventional Medical, and Complementary and Alternative Therapies (CA) (Walter, 1999).

The concept of holistic cancer care has been embraced by a new division of oncology called integrative oncology. Chapter 1 defines and explores integrative oncology and explains how and why it developed from CA. Chapter 1 also considers the evolution and principles behind healthcare delivery and discusses the paradigm shift that is occurring in healthcare today towards a more holistic view of health. This is followed by an examination of the concept of ecological medicine and the relationship between cancer, health and our current environmental crisis. Ecological

medicine is related to the concept of sustainability and together with integrative oncology provides a framework for interior design that has many potentially significant benefits that are discussed at the end of the chapter. In summary, Chapter 1 provides an understanding of the project principles and background that frame the underlying philosophy of the project. It also provides a broad understanding of why spiritual and environmental health is important to cancer treatment.

Understood in a holistic way, spiritual health becomes an integral part of a person's overall health. In the first section of Chapter 2, the meaning of spirituality is defined and the concept of spiritual health is explored in general. This concept is further developed by reviewing evidence-based nursing literature that identifies the spiritual needs and coping strategies of cancer patients. By determining the ways that people nourish their spirit while dealing with cancer, five levels of connection are identified that can be related to the built and natural environment. These connections are carried forward as goals, to guide the programming and design of the project.

Chapter 3 addresses the concept of embodiment as it relates to creating spiritually healing connections. To embody literally means to "give a tangible or visible form to (an idea or quality)" (Barber, Fitzgerald, Howell, & Pontisso, 2005, p. 257). The Centre does this practically by embracing the tenets of both integrative and ecological medicine to provide for the requirements of integrative cancer treatment while being designed as sustainably as possible. On an equally important and more theoretical level, embodying spirit also refers to the inextricable link between the spirit and the body and their interrelation with the surrounding environment. This section draws from the fields of phenomenology and architectural theory and centers on the ideas of David Abrams and Christopher Day. These perspectives provide insight into how the body and spirit are nourished simultaneously by sensory engagement and how framing place within four levels of awareness can ensure that the message of holistic health is communicated by the Centre itself.

The second section of Chapter 3 begins with a brief overview of what makes a healing place by drawing on ideas from human geography and aesthetics and linking these to the concept of biophilia, a term used to describe our innate affinity for the natural world. Backed up by a growing body of research in health, medicine and psychology, biophilia serves as a multi-disciplinary force that convincingly argues that sustainable design can not only preserve nature on a vast scale, but it can also nurture it on an intimate scale in ourselves, by engaging our senses and communicating

holistic well-being in any environment. Delving into our senses and this intimate scale, the following section reviews the different messages articulated by vision and sound compared to the classically 'lower' senses of touch and smell-taste. Returning to human geography and phenomenology, it is argued that these senses play a key role in communicating healing and therefore, designing to engage them becomes an integral aspect of embodying caring spirit in the Centre.

The literature discussed thus far in Chapter 3 is complemented by reviewing evidence-based design guidelines for healthcare developed by prominent researcher and advocate for biophilic design Roger Ulrich. The guidelines are specifically geared towards the design of places that have a positive impact on patient, staff, and family outcomes through programming and design that focuses on the psycho-social needs of these three user groups. The chapter concludes with an overview of how the literature reviewed can begin to be translated into a design that satisfies the five spiritual goals established in Chapter 2.

In Chapter 4, a selection of design guidelines are created based on the analysis of existing precedent projects. The projects vary in scale and typology but they were all chosen to inspire the design of the Centre because they exhibit ways that connections to nature can be fostered in the built environment. To facilitate comparison, the projects are grouped into three categories based on their similarities and the conclusions drawn in Chapter 3. They include light and spirit, biophilia in healthcare, and sensory domains. Each section presents an overview and analysis of the projects followed by a summary including relevant similarities and extracted design guidelines. These guidelines are considered in the program and ultimate design of the Centre.

The theory, research, and projects reviewed in the beginning of the investigation helped to guide the selection of an existing site for the Centre. Chapter 5 analyzes the conditions of the building and site selected and frames them in context with the surrounding culture, history, zoning, access, landscape and microclimate. The site was chosen to appeal to locals and visitors with cancer while presenting opportunities to foster the spiritual goals that are at the core of the project. In close proximity to both the Exchange District National Historic Site and the river trails running along the Red River, the site offers the potential to connect to varying aspects of nature and culture in the urban core. The chapter concludes with a summary of benefits and challenges presented by the site that are either enhanced or mitigated in the design of the Centre.

Chapter 6 outlines the detailed design program of the Centre and includes an analysis of human factors, aesthetic and spatial requirements, and functional requirements for the Centre. Rather than focus on what exists in integrated cancer treatment today, the program for the Centre is based on a vision of what a future Canadian integrated cancer treatment centre could be. It's a hybrid of the program offered at the foremost integrated cancer treatment facility in Canada, and the treatment modalities offered at an integrated cancer treatment clinic in the United Kingdom. The facility program includes spaces for consultations, counseling, education, and research, complementary cancer therapies such as massage, acupuncture and reiki, a variety of alternative cancer treatments that are currently being used around the world, an open area for activities such as yoga, group meditation and fitness classes, a teaching kitchen, a conference area for guest presentations and staff facilities. The program is accommodated in 21,973 square feet in the final design.

The culmination of the knowledge presented in the preceding chapters is translated into a design solution for the Centre in Chapter 7. This chapter explains the design concept for the Centre and how it works with the architectural geometry of the existing building to create a place that embodies spirit and fosters healing connections on a multitude of levels. After reviewing the space planning of each floor, the design concept is explained in detail by focusing on six key areas of experience in the Centre: the exterior approach, the reception, waiting area and juice bar on the first floor, the main staircase, the spiritual space, a typical consultation room, and the immune therapy pods on the second floor. While reviewing each of these spaces, the design guidelines and programming goals that were implemented are discussed, and graphics are used to convey the intangible spiritual qualities that are pivotal to the project.

In conclusion, the final chapter of the project reflects on the process of designing an integrated cancer treatment centre that focuses on fostering experiences of connection. Acknowledging the limitations and challenges that presented themselves throughout the design process, the chapter indicates areas of the design that may have been impacted by changes to the project scope and with more experience in programming healthcare environments. Looking to the final design of the Centre, the chapter also proposes further areas of design study that would strengthen the conclusions drawn by the project. Finally, attention is drawn to the relevance of the project within the field of integrated oncology, reminding us that in the delivery of holistic healthcare, it's the contribution of many factors that empower and assist people on their journey towards health.

CHAPTER 1: PROJECT PRINCIPLES AND BACKGROUND

The role that interior design plays in health has come to the forefront of the construction industry as the benefits associated with sustainable design have been considered in a broad sense. A large number of studies have documented how green building practices related to lighting, material selection and indoor air quality can improve health (Kellert, 2005). Each one of these practices involves a direct or indirect connection to nature. As noted by Schweitzer, Gilpin, and Frampton (2004), nature is the most universally accepted expression of spirituality. It is therefore not surprising that beyond creating sustainable environments that foster physical health, it is possible to design places that have a positive impact on emotional and spiritual health by offering experiences of connection to nature. Kellert (2005) refers to this practice as restorative environmental design; a concept that is discussed further in Chapter 3. Stepping back, this chapter provides the rationale and background that the project is founded on by exploring the significance of designing healing places within the context of holistic health, ecological medicine, and integrative cancer treatment.

Evidence of the health benefits associated with restorative environmental design include a frequently cited study by Ulrich (1984) that found that patients recovered faster and required less pain medication in hospital rooms that featured windows with views of natural scenes than in those that faced a brick wall. Considering healthcare environments, a review of eighty-five published scientific studies by Rubin, Owens, & Golden at the John Hopkins Medical School concluded that “there is suggestive evidence that aspects of the designed environment exert significant effects on clinical outcomes for patients” (as cited in Ulrich, 2000, p. 51). This compelling finding highlights the importance of the interior design of healthcare spaces. Frumkin (2001) agrees and notes that a willingness to accept and integrate the aspects of nature that positively impact health will require collaboration with a wide range of design professionals including interior designers who focus on human-centered environments. In a place where people are often faced with a host of physical and psycho-spiritual health challenges, leveraging the interior to support and foster healing could itself be viewed as a complementary therapy.

When considering the effects that interior design can have on a healthcare facility, a focus on cancer care is especially relevant today due to the enormous number of Canadians who are, and

will be, affected by this disease in their lifetime. Cancer is the leading cause of premature death in Canada and is also primarily a disease of older Canadians. This means that with the aging of the baby-boom generation cancer rates are on the rise. Based on current incidence rates, thirty-nine percent of Canadian women and forty-four percent of men will develop cancer during their lifetimes and one in four Canadians will die of cancer (Canadian Cancer Society/National Cancer Institute of Canada [CCS/NCI], 2007).

Due to the severity of cancer it is clear that any advances that can be made to help people suffering from the disease through changes in environmental design are worth examining and implementing. In addition, there is potential for Canadians to benefit from complementary and alternative healing methods that have been proven to prevent and treat cancer effectively around the world if Canadians are provided knowledge about and access to them. The CCS/NCI (2007) recognizes that “we must do a much better job of primary prevention of those cancers which are amenable to it” (p. 29). Prevention, education and a positive shift toward personal control over disease are central to integrative medicine and are included in the programming goals of the Centre.

TRENDS IN HEALTHCARE AND THE RISE OF INTEGRATIVE MEDICINE

According to the World Health Organization “health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 1946, p. 100). Farmer and ecologist Wendall Berry has also noted that health “comes from the same Indo-European root as heal, whole, and holy. To be healthy is to be whole. To heal is to make whole” (as cited in Shetter, 2006, p. 6). These definitions point towards a holistic view of health that encompasses physical, mental, emotional, spiritual and even ecological dimensions.

Although healthcare and spirituality are linked historically and intuitively, most North American hospitals have been designed around the technological needs of conventional medicine and do not include spaces that are intended to foster the spirituality of patients, families, and staff (Schweitzer, Gilpin, & Frampton, 2004)¹. Conventional medicine as we know it today has largely been shaped

¹ Conventional medicine can be defined as “medicine as practiced by holders of M.D. (medical doctor) or D.O. (doctor of osteopathy) degrees and by their allied health professionals, such as physical therapists, psychologists, and registered nurses” (National Centre for Complementary and Alternative Medicine, n.d.).

by 'the pathogenic perspective'; a perspective that considers patients as objects with sick parts to be treated. The conventional cancer care model is depicted in Figure 1. The pathogenic perspective has resulted in hospital design that essentially ignores the psychological, social and spiritual needs of patients (Dilani, 2000). Furthermore, findings from the recent 'Coping with Cancer Study', a United States (US) federally funded, multi-institutional investigation examining factors associated with advanced cancer patient and caregiver well-being indicate that spirituality is important to advanced cancer patients. Yet, of the advance-stage cancer patients surveyed, "72% reported that their spiritual needs were supported minimally or not at all by the medical system" (Balboni et al., 2007, p. 555).

An opportunity therefore exists in the design of new cancer treatment facilities and in the renovation of those existing, to embody a holistic view of health that fosters spiritual well-being. The exploration of this opportunity is in its infancy in select healthcare facilities around the world. The emergence of hospital-based fitness/wellness centers in the US signals a trend away from acute, inpatient care toward a preference for outpatient care delivery, health promotion and a holistic understanding of wellness that is mirrored in Canada. Hospital-based wellness centres are also championing the incorporation of complementary and alternative therapies (CAT) with conventional healthcare². In the US these facilities stand as an example of the 'consumerism' of healthcare and exist as a response to the public's desire for and willingness to pay for CA therapies.

The use of CA to treat a wide variety of ailments in Canada is also increasing and today's patients are taking more responsibility for their health (Seymour, 2003; Wiles & Rosenberg, 2001). According to the US 2002 National Health Interview Survey, use of CAT by people dealing with life-threatening illnesses such as cancer is especially high (Barnes, Powell-Griner, McFann, & Nahin, 2004). Other studies have reported that up to eighty-three percent of people diagnosed with cancer use CAT (Rosenthal & Dean-Clower, 2005). However, the use of CAT by cancer patients is often unknown and unsupervised by their oncologists, leaving patients susceptible to potential harmful interactions (Rosenthal & Dean-Clower, 2005).

2 "Complementary and alternative medicine is a group of diverse medical and healthcare systems, practices, and products that are not presently considered to be part of conventional medicine...Complementary medicine is used together with conventional medicine. Alternative medicine is used in place of conventional medicine" (National Centre for Complementary and Alternative Medicine, n.d.).

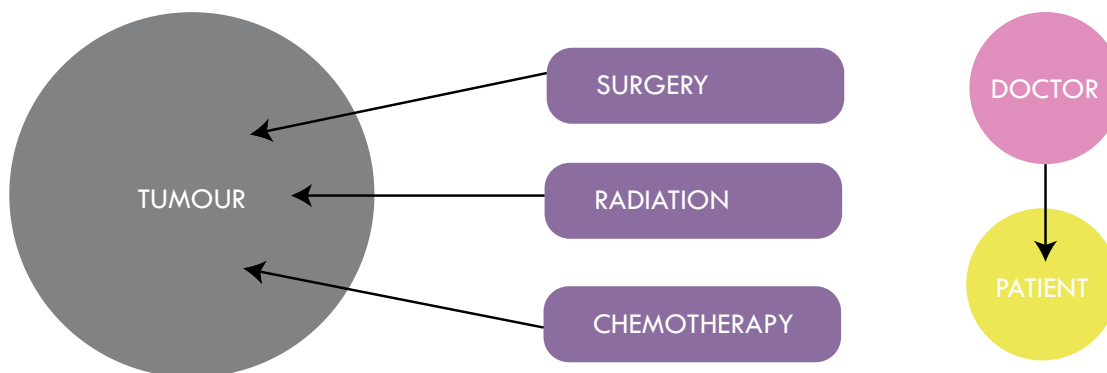


Figure 1
Conventional cancer care model

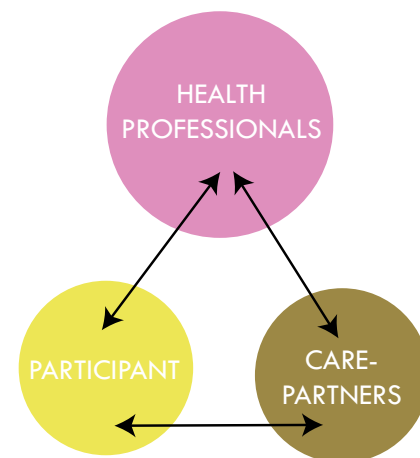
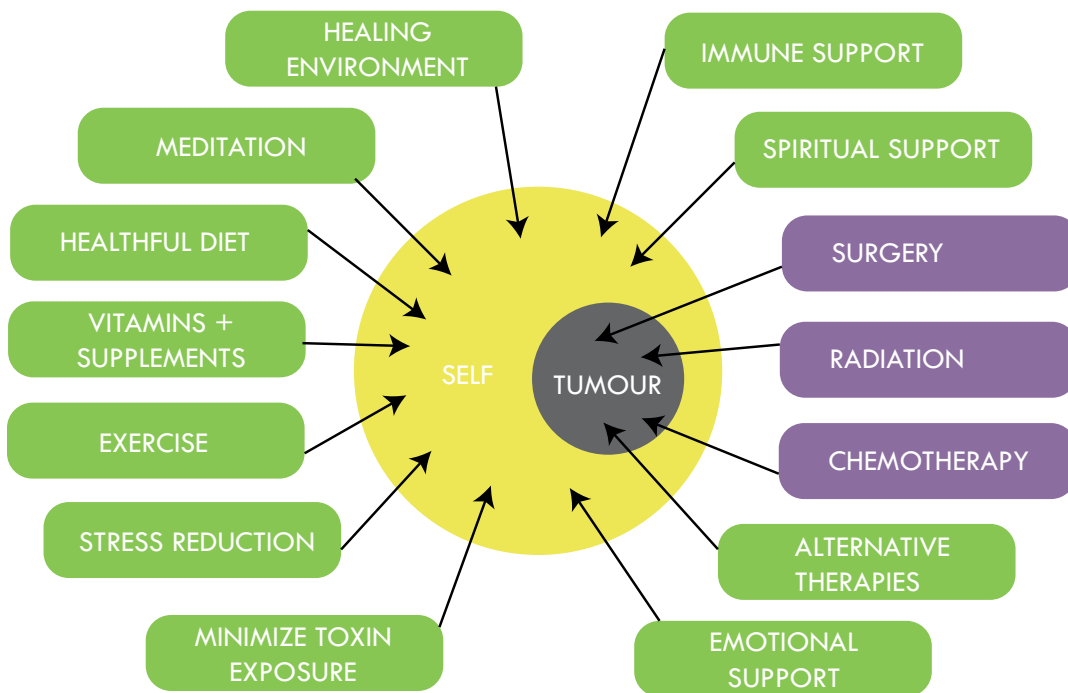


Figure 2
Integrated cancer care model

Enter integrative medicine. Instead of advocating for an either/or approach to healthcare, this newly emerging field offers a best of both worlds approach that “combines mainstream medical therapies and CA therapies (e.g., acupuncture, meditation, music therapy) that have some high-quality scientific evidence of safety and effectiveness” (Rosenthal & Dean-Clower, 2005, p.491). According to Dr. Andrew Weil, an expert on integrative medicine, “integrative medicine is healing-oriented medicine that takes account of the whole person (body, mind, and spirit), including all aspects of lifestyle. It emphasizes the therapeutic relationship and makes use of all appropriate therapies, both conventional and alternative” (Lemley, n.d., p. 1). The integrative approach is supportive of individual empowerment and choice. It marries well with the idea of smaller, community focused decentralized healthcare delivery that is offered in the Centre.

The principles of integrative medicine include:

- A partnership between patient and practitioner in the healing process
- Appropriate use of conventional and alternative methods to facilitate the body's innate healing response
- Consideration of all factors that influence health, wellness and disease, including mind, spirit and community as well as body
- A philosophy that neither rejects conventional medicine nor accepts alternative therapies uncritically
- Recognition that good medicine should be based in good science, be inquiry driven, and be open to new paradigms
- Use of natural, effective, less-invasive interventions whenever possible
- Use of the broader concepts of promotion of health and the prevention of illness as well as the treatment of disease
- Training of practitioners to be models of health and healing, committed to the process of self-exploration and self-development. (Lemley, n.d., p. 2)

Integrative oncology (IO) is a specialization within integrative medicine and is depicted in Figure 2. IO is being practiced today in a variety of integrative cancer treatment clinics and hospitals operating around the world.

While the majority of hospitals in Canada have been designed around the needs of conventional

medicine, the increasing popularity of CA among cancer patients and the birth of integrative medicine has created the need to integrate CA practices into hospital design as well (Schweitzer, Gilpin, & Frampton, 2004). Although strides have been made in select Canadian hospitals to address the psycho-social aspects of cancer care and to integrate some CA practices, adoption of these considerations on a level that supports the philosophy of integrative medicine is not yet widespread. This suggests that a sustainably designed integrative cancer treatment centre that promotes spiritual health while providing people with educational opportunities, choice of treatment, a sense of control over their own health and an emphasis on community well-being would be a welcome addition to the Winnipeg health community. While the center is designed to act as a stand alone clinic, lessons learned from this project could inform the design of spaces that serve similar functions in a hospital environment.

Over ten years ago Biley & Freshwater (1998), researchers in the nursing field, predicted that “the next major perceptual shift in healthcare will be the wholesale movement towards a consideration and recognition of the importance of spiritual and environmental issues for health and well-being” (p. 98). This shift is taking place today and this project addresses how interior designers can be involved in facilitating it.

CANCER, HEALTH AND THE ENVIRONMENTAL CRISIS

Cancer is a disease with many causes, both internal and external. The National Cancer Institute (2003) recognizes many causes of cancer including those that we are born with: genetics, those that involve lifestyle choices: cigarette smoking, excessive alcohol consumption, poor diet, lack of exercise, excessive sunlight exposure, and sexual behaviour, and those that involve factors that are largely out of our immediate control such as exposure to certain medical drugs, hormones, radiation, viruses, bacteria, and environmental chemicals that may be present in the air, water, food and workplace. The report that lists these environmental factors, entitled *Cancer and the Environment* is intended to inform people about how to avoid the risk factors and causes of cancer but it does not address the correlation between our increasing exposure to the latter group of causes and our current ecological crisis. A crisis fuelled by massive, human-induced air, water, and soil pollution that is bringing about environmental degradation at an unparalleled scale and speed. A crisis that

has eradicated millions of species, is threatening millions more, and has already caused irreversible changes to the ecology of our planet.

Over fifteen years ago, a Report by Physicians for Social Responsibility provided significant evidence of the relationship between human health and the natural environment. Two of the three main themes underlying the report include the conclusions that “the physical environment, our habitat, is the most important determinant of human health...[and]... protection of the environment and preservation of ecosystems are, in public health terms, the most fundamental steps in preventing human illness” (Cortese, as cited in Kozlowski & Hill, 1999, p. 118). Cortese also expressed “doubt about how health can be promoted within a fundamental belief system that prevents us from recognizing the dimensions of our environmental crisis” (as cited in Kozlowski & Hill, 1999, p. 118).

While the ecological crisis may be an indirect cause of cancer that is neither easy to avoid or to tackle, it is nonetheless essential to consider in the design of a facility that strives to embody a sense of holistic health. The importance of this dimension of health has even been recognized by a new branch of medicine called ecological medicine. Ecological medicine is a global movement that takes into account the multifaceted nature of health and addresses the interconnectedness of individual health, public health and the health of the planet’s ecosystems (Guenther & Vittori, 2008).

Embodying holistic health in this project is achieved by following sustainable design principles that are related to resource conservation and by embodying the often forgotten spiritual dimension of sustainability. In this project this spiritual dimension is prioritized alongside the three most commonly cited tenets of sustainability: social, economic and environmental³. The intent is to create connections to the natural environment on a variety of scales to promote patient health while conveying a sense of meaning and value for nature. This approach elevates the concept of holistic health entrenched in integrative medicine beyond the self to also acknowledge the environment’s role in human well-being. In summary:

The evidence that health is a fundamental resource to the individual, the community and to

³ Although the concept of sustainable development continues to evolve, since the early 1990’s it has widely been understood as stated in the Bruntland Commission’s 1987 report, *Our Common Future*: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (as cited in Kozlowski & Hill, 1999, p. 113).

human society is overwhelming; as is the fact that social, spiritual and physical well-being depends on the ecological status of the environment in which society functions. Sustainable development, therefore, not only has relevance for the status of natural ecosystems, but may also provide one of the cornerstones for the achievement of sustainable public health. (Kozlowski & Hill, 1999, p. 120)

PROJECT BENEFITS

As stated in the introduction, the purpose of this project is to investigate how an integrative cancer treatment center can be designed to facilitate experiences in the built interior that promote spiritual healing. This emphasis on spiritual health is fuelled by the recognition of its value to people living with cancer, and to sustainable design. The intention is to create an environment that supports and encourages a shift in the perception of cancer from being extremely life-threatening to a health challenge that can be conquered, leading to personal growth and a renewed sense of health.

To this end this project endeavors to help close the gap between the heightened spiritual needs of cancer patients, the emergence of integrative medicine, the broad benefits of creating a connection to nature in the built environment, and the importance of sustainable design in healthcare infrastructure. It is hoped that the acknowledgement of nature's role in healing will help fuel the widespread adoption of sustainable building practices in healthcare institutions in Canada. While the number of Leadership in Energy and Environmental Design (LEED) certified healthcare projects is growing, as of December 2009, there are 1,537 projects registered for LEED certification in Canada, and only 50 of these, or 3.3% are healthcare environments (Canadian Green Building Council, 2009).

The project may also play a small role in raising awareness of the value of integrative medicine for cancer treatment. According to Operation Hope (n.d.), a clinic for integrated medicine in Australia:

Integrated treatment has the potential to transform both individuals and the system of care. In the process, a more sustainable approach to [cancer] care can emerge, grounded in the guiding principles of medicine and focusing on all participants at all levels of their experience. (About us)

Finally, the project showcases the benefits of collaborating with disciplines related to the caring arts and demonstrates the role that interior designers can play in the integrated approach to medicine and the emerging field of evidence-based design - discussed further in Chapter 3 (Ulrich, 2000). The intended result is increased value and recognition for the interior design profession and added potential for interior designers to take a leadership role in the initial and continuing stages of healthcare design.

CHAPTER 2: EXPLORING SPIRITUAL NEEDS

For most people, being diagnosed with cancer marks the beginning of a difficult journey that affects every aspect of life. While cancer manifests itself as a physical disease, it also deeply affects people emotionally and spiritually challenging them to face issues related to their own mortality. Many people with cancer experience emotions such as anger, a feeling of lack of control, sadness, fear, frustration, and a change in the way that they perceive themselves and the future (American Society of Clinical Oncology [ASCO], 2005). Alternatively, some people living with cancer have reported positive changes in outlook including an appreciation for the resilience of their bodies, a sense of peace, gratitude, renewed appreciation for life and/or a shift in priorities (ASCO, 2005). In order to design an environment that supports a positive sense of spirit and in turn, the positive changes outlined above, this chapter outlines the meaning of spirituality and reviews nursing literature that identifies the spiritual needs and coping strategies of people living with cancer.

SPIRITUALITY AND CANCER

Intuitively and empirically it is known that people who are diagnosed with cancer often experience an increased awareness of their spiritual self and increased spiritual needs (Taylor, 2003). A patient's spirituality will likely be a guiding factor in their choice of cancer treatment affecting their approach to disease management, or physical care, and emotional manifestation, or psychological care resulting in the range of positive and negative emotions listed above. For some a difference in outlook may be inherent or related to prognosis, but regardless it is clear that one's sense of spiritual health and quality of life plays an important role in coping with the disease (Mount, Boston & Cohen, 2007). Although spiritual concerns have been found to be prevalent at diagnosis, during a change in disease status and later in the progression of cancer, these needs are unfortunately rarely met in today's medical system (Murray, Kendall, Boyd, Worth, & Benton, 2004; Skalla & McCoy, 2006). Moreover, it has been suggested by many researchers that spiritual care should be an integral part of cancer care (Balboni et al., 2007; Skalla & McCoy, 2006). The National Cancer Institute (2008) confirms that spiritual well-being may be associated with an improved quality of life because of reduced anxiety, depression, and discomfort, reduced sense of isolation, better adjustment to the

effects of cancer and treatment, a feeling of personal growth as a result of living with cancer, and overall improved health outcomes.

Spirituality and spiritual care are very individualistic and qualitative terms that can mean different things to different people. To begin, a distinction between spirituality and religion is necessary. While related concepts that are sometimes used interchangeably, these terms are not synonymous. The Handbook of Religion and Health offers a definition for both:

Religion: Religion is an organized system of beliefs, practices, rituals and symbols designed (a) to facilitate closeness to the sacred or transcendent (God, higher power, or ultimate truth/reality) and (b) to foster an understanding of one's relationship and responsibility to others living together in a community.

Spirituality: Spirituality is the personal quest for understanding answers to ultimate questions about life, about meaning, and about relationships to the sacred or transcendent, which may (or may not) lead to or arise from the development of religious rituals and the formation of community. (Koenig, McCullough & Larson, 2001, p. 18)

Similarly, the National Cancer Institute defines religion "as a set of beliefs and practices associated with a religion or denomination, and defines spirituality as the search for ultimate meaning through religion or other paths" (as cited in Balbonie et. al, 2007, p. 555). By combining these two definitions spirituality can be defined concisely as that which gives a person a sense of ultimate meaning in their life. Religion is one path of many that people follow to find this meaning.

It has already been mentioned that spirituality will guide and affect how a person responds to physical care (the body) and psychological care (the mind). So what is spiritual care? The North American Nursing Diagnosis Association defines it as "the care to relieve a patient's spiritual distress" (as cited in Tu, 2006, p.1031). Furthermore, the association defines spiritual distress as "disruption of the life principle that pervades a person's entire being and that integrates and transcends one's biological and psychological nature" (as cited in Tu, 2006, p.1031). Spiritual distress, or 'altered spiritual integrity' has also been defined as "spiritual pain, alienation, anxiety, guilt, anger, loss and despair; a deep sense of hurt; feelings of loss of, separation from God/deity; loneliness of the spirit" (O'Brien, as cited in Buxton, 2007, p. 920). Overcoming the theme of alienation and

separation prevalent in spiritual distress is significant to consider in the creation of an environment that strives to foster spirituality and deliver holistic healthcare.

SPIRITUAL NEEDS

The body of literature concerned with the spiritual care of cancer patients has been growing steadily for decades. Many studies have used qualitative measures to evaluate the spiritual needs of cancer patients and have identified coping strategies that have been effective in improving quality of life for people living with cancer and other life-threatening diseases. Beyond cancer patients, studies have shown that caregivers of people with cancer including medical professionals and family members have similar spiritual needs suggesting that their overall health and well-being is also adversely affected by spiritual distress (Murray et al., 2004; Taylor, 2003). Although most of these studies are intended to help the medical team and especially nurses to better serve patients' spiritual needs, they also provide direct and indirect suggestions into how the built environment can enable, foster and reinforce spiritual coping strategies for cancer patients and their caregivers.

The spiritual needs identified in several studies are predictably very similar. Needs expressed included the need to maintain a sense of self and self-worth, to have a useful role in life and to retain an active role with family and friends. Generally these needs have been referred to as love, meaning, purpose and transcendence (Murray et al., 2004). Similarly, a research study on the spiritual needs of cancer patients and their family caregivers identified seven categories of spiritual needs including relating to an ultimate Other; the need for positivity, hope, and gratitude; the need to give and receive love; the need to review beliefs, the need to have meaning; and needs related to religiosity and preparation for death (Taylor, 2003).

Based on a literature review by Skalla & McCoy (2006) the way that cancer patients relate to spirituality can be mapped into five dimensions including: moral authority, vocational, aesthetic, social and transcendent. Although each of these can be supported to varying degrees by the built environment, there is specific potential for interior design to impact a patient's connection with the aesthetic and social dimensions in a healthcare environment through design. The aesthetic dimension is tied to a person's experience of place with the bodily senses and is linked to emotions and culture. It includes one's perception of beauty, connection to nature and creativity and is characterized by

delight, joy, humor, playfulness, inspiration or passion. The social dimension describes interactions between family, friends, a sense of community, and practices that support that community. These ways of relating to spirituality can be directly related to the spiritual coping strategies outlined in the following section.

SPIRITUAL COPING STRATEGIES

Not surprisingly, the categories of spiritual coping strategies identified by researchers mirror those identified for spiritual needs. A literature review covering five research studies that directly related to the spiritual coping strategies used in various illnesses found that strategies involving relationships with self, others, and an ultimate other/God or nature helped to lead people to a place of meaning, purpose, and hope when facing illness (Baldacchino & Draper, 2001).

These themes are consistent with a phenomenological study by researchers in the fields of whole person care and oncology that was found to be especially useful in suggesting links between spiritual coping strategies and the built environment. The researchers Mount, Boston and Cohen (2007) interviewed twenty-one cancer patients to achieve an in-depth understanding of their existential and spiritual experiences living with cancer. The study outlines how a person's perceived health can be very different from their physical diagnosis. In this context the concept of quality of life (QOL) was used as a measure of a person's subjective, personal evaluation of their own health. QOL was understood as a continuum (see Figure 3) where movement "towards an experience of integrity and wholeness may be thought of as healing, and towards suffering and anguish as wounding" (Mount, Boston, & Cohen, 2007, p. 373).

QOL is mediated and influenced by all layers of a person's experience and it can change with standards of measurement, value, or a redefinition of what QOL means to a person strongly linking it to the concept of holistic health (Mount, Boston, & Cohen, 2007). Figure 3 provides a conceptual tool for envisioning the overarching design goal of this practicum: to facilitate a shift towards a positive sense of spirit and holistic health for people living with cancer. What is especially relevant is that it's a person's perception of their experiences that determines if they are healing or wounding. As will be explained in the following chapter, the interior environment has a direct influence on how people perceive the everyday experiences they encounter.

In the study, similarly to the others already mentioned, the common theme that emerged with people who experienced integrity and wholeness was an ability to find a sense of meaning in the face of illness. Mount, Boston, & Cohen (2007) found that:

Meaning was not an end in itself, but a by-product of a related experience, a sense of connectedness. It was not meaning, per se, that brought the person alive but the underlying experience of being part of something greater and more enduring than the self. (p. 383)

This sense of connectedness occurred at one of four levels:

- 1) within the individual...an experience of realized personal potential;
- 2) connectedness with others – an awareness of deep attachment...;
- 3) a profound experience of connection to the phenomenal world experienced through the senses, as with nature, music, or sports; and
- 4) an experience of connectedness to ultimate meaning, as perceived by that individual. (Mount, Boston, & Cohen, 2007, p.384)

The study also found that connection at one level led to connection at others. This supports the idea that an environment designed to foster one level of connection such as a connection to the phenomenal world or a connection to others, can impact the quality of life of people with cancer. The researchers concluded that “ the freedom to choose one’s response to adversity is retained, and healing may be fostered by an environment that promotes a sense of security, a loosening of ego defenses, and openness to the healing potential that lies within” (Mount, Boston, & Cohen, 2007, p.384).

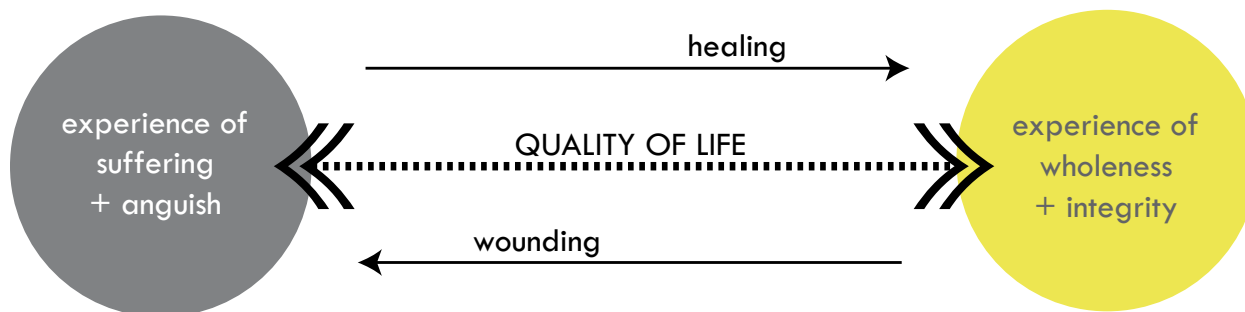


Figure 3
The quality of life
continuum

SUMMARY: SPIRITUAL CONNECTIONS

Based on the literature reviewed in this chapter the concept of a spiritually healing environment becomes one that offers security while fostering a series of experiences that bring about meaningful connections on five levels: connection with self, connection with others, connection to the phenomenal world, and connection to ultimate meaning. These five integral aspects of a healing environment are considered to be five principle goals of this project. They are carried forward alongside information discussed in the next chapter to help establish programming and design criteria for the Centre.

CHAPTER 3: TOWARDS EMBODIMENT, THE CREATION OF HEALING PLACE

How can a building embody spirit? As a person experiences built form, the interior mediates the exchange between visitor and building. Although we are rarely fully aware of the integration, an interior cannot be separated from the structure that supports it, the mechanical systems within it, the landscape that surrounds it, the culture that created it, or the person who experiences it. Whether we are aware of it or not, every building carries a message. As this chapter explains, this message is communicated at all levels, with each level working together and mutually reinforcing one another. Embodiment is the reflection of this message, entwined in the entire fabric of a building.

By exploring the concept of embodiment as it relates to the field of phenomenology, nature, and the creation of holistically healing place, this chapter also delves into how the five goals established at the end of Chapter 2 can be met. This exploration is heavily influenced by the ideas of architect Christopher Day, a founder of the ecological movement in Britain who has dedicated his architectural practice to the creation of places that nourish the human spirit. Day writes based on his own experience, and so his ideas are presented in this chapter alongside other sources whose perspectives validate and strengthen his conclusions. Figuring prominently in the discussion is writing by and related to ecologist and philosopher David Abrams and ecologist and researcher Stephen R. Kellert. Within this overarching review are ideas related to how the body and spirit can be nourished simultaneously by sensory engagement. The result is an understanding of how spiritually nourishing connections can be embodied in the philosophy of a building while being fostered by programming and design elements.

EMBODIMENT, PHENOMENOLOGY, AND MULTI-LEVEL MEANING

To embody literally means to “give a tangible or visible form to (an idea or quality)” (Barber et al., 2005, p. 257). While this definition is clear and concise, the concept of embodiment, especially as it relates to interior design and architecture, involves questioning the nature of how and why we build and what meaning these places convey to the people who occupy them. It involves uncovering the ideas and qualities that should be expressed, and then determining how to best convey them.

From the perspective of ecological medicine, “the twenty-first century hospital can promote the health of its patients, staff, the general public, and the environment in its design and operations...it can model the kind of environmentally responsible institutions every community should have. The hospital, in essence, can situate itself within the broader ecology of its community and region and act as a healing force” (Guenther & Vittori, 2008, p. 66). In exploring how an integrative cancer treatment centre can be perceived as a ‘healing force’, it is worthwhile to consider how we perceive our environment in general. The field of phenomenology provides a theoretical framework within which to do this.

Ecologist and philosopher David Abrams (1996) reviewed the phenomenological perspective of French philosopher Maurice Merleau-Ponty in his book *The Spell of the Sensuous*. Abrams’ motivation in examining Merleau-Ponty’s philosophy is to demonstrate how ecological value can be created by acknowledging our ‘body-centeredness’; the central role that our body has in our perception and awareness of ourselves and the world (Abrams, 1996). This same motivation has inspired its inclusion here, to establish how engaging our body-centeredness can set the stage for fostering a fundamental level of meaning through interior architecture.

Merleau-Ponty proposed that we perceive the world through a series of interrelated experiences. This world of experience is the phenomenal world or ‘life-world’, made up of a tangle of information and sensations from outside of ourselves, coloured by our own thoughts, feelings and sensations. While the information coming to us changes and our thoughts, feelings and sensations also change, the one constant between these seemingly disparate influences is our body (Abrams, 1996). According to Abrams (1996) “the body is that mysterious and multifaceted phenomenon that seems always to accompany one’s awareness, and indeed to be the very location of one’s awareness within the field of appearances” (p. 37). Yet in this field of bodies, mediating our day to day experiences are also many others, each with their own individual personalities and moods. In perceiving the world, we are but one of many people and forces, influencing and relating to each other, and so the ‘life-world’ is in fact a collective dimension, shared with all other perceiving bodies (Abrams, 1996).

What is especially interesting about Merleau-Ponty’s perspective is that he placed the body at the Centre of experience as opposed to our mind or spirit. Every sensation that we see, smell, hear and feel, and even our thoughts and imagination are grounded in the body because “without

any contact, any encounter, without any glimmer of sensory experience, there could be nothing to question or to know” (Abrams, 1996, p. 45). In 1945 when medicine was shifting from a focus on prevention to curing diseases in centralized acute care hospitals, Merleau-Ponty was essentially putting forth a holistic model of perception that explained the body as the threshold to our mind, spirit and the rest of the world. Instead of viewing the body as a boundary, or point in between, the body became a permeable membrane “defin[ing] a surface of metamorphosis and exchange” (Abrams, 1996, p. 46). This mediator and threshold into the world allows us to feel a connection not just to others, but also to ourselves.

The holistic understanding of the act of perception rooted in the bodily senses is synaesthetic, which is to say that it involves a fusion of the senses, each contributing to perception in concert. While one may be more prominent at times “our primordial, preconceptual experience...is inherently synaesthetic” (Abrams, 1996, p. 60). So, in creating a healthcare environment that seeks to foster security and connections to self, others, the phenomenal world and greater meaning, the way that the body interacts with the interior environment becomes paramountly important. The messages that the environment conveys will be perceived through the body synaesthetically, and so this avenue of perception must be taken into consideration in all design decisions in order to embody the positive sense of spirit that the Centre aims to express.

In this way embodiment can be most fully understood as the conversation that our surroundings have with us. According to philosopher and architect Christopher Day (2002):

Places speak to us. What they say affects us and influences our behaviour. Their messages stem from the underlying attitudes with which places are planned, made, used and maintained. Few of us consciously acknowledge these messages, but subliminally we all experience them, are all affected by them. (p. 155)

Places that are built on different values, with different underlying philosophies say different things. So conveying embodiment is not only a matter of what a place looks like but most fundamentally the values that it was conceived and built with. Day (2002) argues that what a place says is more important than how it looks, but also acknowledges that these qualities are mutually reinforcing. From the phenomenological perspective, it is the body that senses these embodied values. It follows

that “unless surface reflects depth, we start to feel uncomfortable even before we recognize the deceit” (Day, 2002, p. 155).

Consequently, designing a place with embodied meaning and value begins with establishing what a place should say. This is followed by considering what feelings it should invoke, then establishing what sequences of experiences can support these, and ultimately determining how this can be achieved physically. These qualities are referred to by Day (2002) as the spirit, soul, life, and body of a place:

- Body of Place: The physical characteristics of the place including shape, size, material, colour, proportions and dimensions.
- Life of the Place: Everything that changes and is related to the passage of time in the space. This is related to movements, postures and how the space is used including form and space gestures such as expansion and contraction. It is affected by space, sound, light, dark, and texture.
- Soul of the Place: What feelings are evoked by the journey through space and what activities they attract such as “empty and barren, inviting and appealing, unloved and abandoned, comfortable and secure, airy and tranquil, or busy and sociable” (p. 161).
- Spirit of the Place: The essence of the place. What it says.

In the case of this project, the overarching spirit of place is an environment that supports and encourages a shift in perception of cancer from being extremely life-threatening to a health challenge that can be conquered, possibly even leading to personal growth and a renewed sense of holistic health. This spirit acknowledges the relationship between factors that influence health, wellness and disease from an integrative and ecological medical perspective including mind, body, spirit, community and the natural environment. With this overarching sense of embodied value in mind, the spirit, soul, life, and body of each space within the clinic guided the foundation of the project program outlined in Chapter 5. This breakdown was employed to ensure that the Centre is successful in communicating the spirit with which it was conceived.

Uniting each of these levels is an awareness of the whole experience that people will have while visiting or working at the Centre. The metaphor of illness as a journey is a valuable way of

envisioning the cancer experience and the experience of the Centre itself implying opportunities for personal growth, exploration, hope, discovery and change (Reisfield & Wilson, 2004). The concept of a journey is not one who's entire focus in on the end result but rather it offers different roads to travel and explore (Reisfield & Wilson, 2004). Day (2002) also frames illness and recovery as a journey. In creating healing place, sequences of experiences make up a person's experience of place. In this way place involves not only end locations, but also spaces for transition. It is the combination of all of these that contribute to making a place that embodies holistic health.

NATURE, BIOPHILIA AND HEALING PLACE

Several specific factors are integral to the creation of place. Human Geographer Yi-Fu Tuan (1977) has referred to place as a moment of pause in space. Similarly, Day (2002) refers to a place as somewhere with "spatial limitation, usually enclosure, and invitation to linger rather than merely pass through" (p. 162). In any environment, especially healthcare environments where the patient experience is typified by spending the majority of time in the same bed and same room, aesthetic experiences have the ability to break up the constancy of what is experienced in a memorable and noticeable way. It is this aesthetic experience that creates a pause contributing to character and identity. Over time and through memory of these different lived experiences, people dwell on – and in place and imbue it with the value of being healthy.

This fundamental aspect of place is joined by recognition of the history of a place, because this too conveys a message whether intended or not. While showing an appreciation for a place's past, we also need to embrace change as an expression of life. "Development can revitalize run-down areas, re-invigorate communities, give new viability to places dependant on declining industries. It can initiate processes that foster economic, social and even ecological sustainability" (Day, 2002, p. 163). Appreciating a building's past can provide insight into what use is appropriate to it in the future. Careful consideration to what aspects of an existing building should be preserved, removed, adapted or updated are part of building sustainably within an existing cultural community (Day, 2002).

Day (2002) also relates the importance of a building growing out of the needs of a place. Often idealized vernacular and traditional building forms evolved based on the needs and skills of the

people, using whatever local materials were available, and were built in tune with the local climate and influence of the seasons. These natural influences were “inseparable from cultural, constructional, spiritual and archetypal factors” (Day, 2002, p. 99). Today many of our buildings, especially those that host the technologically advanced needs of conventional medicine have lost the palpable influence of these ecological and cultural influences - to the detriment of the people who spend time in them. While these buildings necessarily embody the values on which they were conceived, they are not always positive ones.

Kim Dovey’s (2001) definition of healthy places are those that heal by helping to make us more whole, or those that “generate, celebrate and sustain life” (p. 95). This definition is in close accord with the definition of health established in Chapter 1. Properties of healthy places include ontological security, an emotional connection between people and built form, sense of character, inclusive and diverse social relationships, unique identity, embodied change, dynamism, traces of life, active participation of users and a high level of autonomy (Dovey, 2001). This list agrees with the spiritual healing goals identified in Chapter 2 and to Day’s (2002) body, life, soul and spirit of place.

So how can we re-engage the influences that shaped traditional buildings in ways that are in tune with the modern requirements of buildings today? In essence this involves finding new ways to infuse nature into the built environment. The concept of connecting to nature in order make healthier buildings is by no means a new one. Since E.O. Wilson (1984) published his theory about our “innate tendency to focus on life and lifelike processes” in his book *Biophilia*, interest in this subject within the design community has been growing steadily alongside the sustainable design or ‘green’ design movement (p. 1). Prior to this, Rudolph Steiner’s Anthroposophic movement inspired architectural followers including Christopher Day to design sustainably and in accordance with the characteristics of nature.

What is exciting about the concept of biophilia is that it completes the theoretical loop of our relationship with nature. Backed up by a growing body of research in health, medicine and psychology, Biophilia serves as a multi-disciplinary force that convincingly argues that sustainable design can not only preserve nature on a vast scale, but it can also nurture it on an intimate scale in ourselves, by engaging our sense of holistic well-being in any environment. While the breadth and depth of the concept of biophilia precludes the ability to arrive at definitive proof that it exists, the

research that exists supporting it is intuitively and empirically convincing (Kellert, 1993). Creating a connection to nature has been shown to reduce stress, contribute to an improved sense of well-being, and enhance emotional and social functioning in many different environments (Kellert, 2008).

The concept of Biophilia stems from the appreciation that humans have evolved over millions of years; with roots of origin in the African Savanna. This is where our bodies and brains developed over hundreds of thousands of years and where we learned the skills and qualities of environments that are most useful for our survival and fulfillment (Heerwagen & Orians, 1993). Wilson (1993) explains that this evolution was bio-cultural, in that “culture was elaborated under the influence of hereditary learning propensities while the genes prescribing the propensities were spread by natural selection in cultural context” (p. 32). The biophilia hypothesis claims that as a result of this deeply ingrained gene-culture coevolution, we feel most comfortable and secure in places that exude positive aspects of our ancient homes (Kellert, 2005). After all, it is only in the past couple of centuries that North America has been entrenched in a thoroughly mechanized world.

Aspects of these ancient landscapes that immediately signal life through resource availability include openness, large mammals and birds, flowering and fruiting plants, calm, slowly moving water, signs of human occupation, lush, varied vegetation and large trees (Heerwagen & Orians, 1993). Heerwagen and Orians (1993) relate these qualities to Appleton's prospect/refuge theory which suggests that when confronted by an unfamiliar environment, people seek safe places that they can leave to explore and return to for security. Preference for places that reflect more prospect or refuge is assumed to vary depending on people's feelings of emotional, social and physical vulnerability. In an integrative cancer treatment centre, where people are dealing with the fear of facing a life-threatening illness, places focusing on refuge are expected to be preferred, especially when coming to the Centre for the first time. Prospect is characterized by views of or towards a varied natural environment while refuge is related to a sense of spatial enclosure, small and contained fire and climbable trees (Heerwagen & Orians, 1993). While one can be emphasized over the other depending on the desired emotional climate of a place, they are qualities that support each other in conveying life through design.

E.O. Wilson (1984) has unabashedly expressed that central to the concept of Biophilia is a concern for aesthetics and beauty. While a contentious term, here beauty reflects the depth of valuing

nature on an intimate and vast scale, and therefore is an important aspect to embodiment. “The biophilia hypothesis proclaims a human dependence on nature that extends far beyond the simple issues of material and physical sustenance to encompass as well the human craving for aesthetics, intellectual, cognitive, and even spiritual meaning and satisfaction” (Kellert, 1993, p. 20).

Recognizing the health-giving potential of these claims, the biophilia movement has now grown to encompass an entire design methodology termed restorative environmental design. As explained by Stephen Kellert (2008), an authority on the movement, restorative environmental design is “an approach that aims at both a low-environmental-impact strategy that minimizes and mitigates adverse impacts on the natural environment, and a positive environmental impact or biophilic design approach that fosters beneficial contact between people and nature in modern buildings and landscapes” (p. 5). By moving beyond an approach to sustainable design that only considers low-environmental impact objectives, quantifiable gains in productivity, health, and well-being become possible ultimately leading to a greater sense of value for nature (Kellert, 2008).

Biophilic design has two basic dimensions: an organic or naturalistic dimension, and a place-based or vernacular dimension.

The *organic or naturalistic dimension*, [is] defined as shapes and forms in the built environment that directly, indirectly, or symbolically reflect the inherent human affinity for nature...[The] *place-based or vernacular dimension* [is] defined as buildings and landscapes that connect to the culture and ecology of a locality or geographic area.
(Kellert, 2008, p. 5,6)

Kellert (2008) has identified and grouped 70 strategies related to the two dimensions of biophilic design into six related and overlapping categories outlined in the Table 1. As a work in progress, these strategies begin to illustrate how biophilic design can be leveraged to embody holistic health through design that connects humans to nature on an intimate and vast scale. The ways that biophilic design can be employed to support holistic health relative to the five spiritual goals of the Centre is explored at the end of this chapter.

ENVIRONMENTAL FEATURES	NATURAL SHAPES + FORMS	NATURAL PATTERNS + PROCESSES
colour	botanical motifs	sensory variability
water	tree and columnar supports	information richness
air	animal (mainly vertebrate) motifs	age, change, and the patina of time
sunlight	shells + spirals	growth + efflorescence
plants	egg, oval + tubular forms	central focal point
animals	arches, vaults, domes	patterned wholes
natural materials	shapes resisting straight lines + right angles	bounded spaces
views + vistas		transitional spaces
facade greening	simulation of natural features	linked series + chains
geology + landscape	biomorphy	integration of parts to wholes
habitats + ecosystems	geomorphology	complementary contrasts
fire	biomimicry	dynamic balance + tension
		fractals
		hierarchically organized ratios + scales
LIGHT + SPACE	PLACE-BASED RELATIONSHIPS	EVOLVED HUMAN - NATURE RELATIONSHIPS
natural light	geographic connection to place	prospect + refuge
filtered + diffused light	historic connection to place	order + complexity
light + shadow	ecological connection to place	curiosity + enticement
reflected light	cultural connection to place	change + metamorphosis
light pools	indigenous materials	security + protection
warm light	landscape orientation	mastery + control
light as shape + form	landscape features that define building form	affection + attachment
spaciousness	landscape ecology	attraction + beauty
spatial variability	integration of culture + ecology	exploration + discovery
space as shape + form	spirit of place	information + cognition
spatial harmony	avoiding placelessness	fear + awe
inside-outside spaces		reverence + spirituality

Table 1
Elements and attributes
of biophilic design

REINTEGRATION/REPRIORITIZATION OF THE SENSES

As touched on in the previous section, creating a sense of aesthetic pleasure rooted in nature is the central goal of biophilia. Returning the phenomenological perspective and its Greek root, 'aesthetic pleasure' literally means "pleasure associated with or deriving from perception" (Heerwagen & Orians, 1993, p. 142). As the central issue of biophilia, a consideration of the senses in healthcare design is especially relevant to this project.

As sensing beings living in the phenomenal 'life-world', we are a part of nature. Nature is in us as much as it is 'out there'. It follows that embodying spirit in an urban healthcare environment is an exercise of place making that employs a dualistic method of engagement by connecting people to a nature on both an intimate scale – the nature 'in me', and a vast scale – the nature 'out there'. These are mutually reinforcing concepts that can be framed distinctly but in reality have no clear boundary, only a surface of exchange that is mediated by the senses.

On an intimate scale, connecting to nature is achieved by relating to the many facets of the self using all sense modalities. Although classically organized by Aristotle into a hierarchy of categories including sight, hearing, touch, taste and smell, relatively recent architectural theory has reimagined the senses according to psychologist J.J. Gibson's integrated systems view. Gibson positioned the senses as the visual system, the auditory system, the taste-smell system, the basic-orienting system, and the haptic system (as cited in Malnar & Vodvarka, 2004). In this model the basic orienting system is related to the relationship between a person's inherent sense of their vertical posture relative to the horizontal plane. The haptic system is an extension of the concept of touch that encompasses three sub-groups including touch, temperature, and kinesthesia - that is related to body sensation and muscle movement (Malnar & Vodvarka, 2004). Combined, these last two systems provide a realistic tactile understanding of the experience of place.

Spatial understanding is most effectively communicated when tactile experiences are enhanced by visual awareness of the locations that we pass through. As noted by Arthur Rubin and Jacqueline Elder:

Man's experience with buildings is mainly visual. This view is generally supported by both architects and behavioral researchers, although for different reasons. The tradition

of architecture supports the importance of visual qualifiers, while research findings in psychology indicate that man typically obtains more information by visual means than by all other senses. (as cited in Malnar & Vodvarka, 2004, p. 44)

This quality of vision may explain the supremacy it has been attributed historically and architecturally. Still, while the power of sight to communicate cannot be denied, the contribution of the other senses to the experience of place should not be taken for granted; not only in recognition of universal design principles for people with visual impairment, but also for an appreciation of the messages that the senses can convey and strengthen.

Theory suggests that not all sense modalities communicate messages equally. Considering place, Tuan (1974) has argued that there is a palpable difference between places that act as public symbols, that are primarily related to sight, and fields of care, that are primarily related to the other senses. While both places have a distinct identity or character, the first commands awe while the second commands affection. Awe is understood to be sublime and objective. External to human needs, it is known through observation from the outside. This kind of aesthetic experience follows a Kantian mode of thought that involves the separation of the subject or person experiencing from the object or thing being experienced (Savile, 2006).

Conversely, from Tuan's (1974) perspective, affection is imparted by an experience of place that is intimately bound with the user. These places are healing, and are understood from the inside out with a level of intimacy that moves beyond the classically 'higher' senses of vision and hearing to also include the 'lower' senses of smell, taste, and touch that are essential to the internalization of aesthetic experience (Tuan, 1977; Holl, Pallasmaa, & Perez-Gomez, 2006). In this way care is conveyed by embodied experiences that involve dynamic, imaginative sensory responses to the environment:

Caring habits are those that exhibit a regard for the growth, flourishing, and well-being of another. Subtle practices such as gentle tactile interactions, a soft tone of voice, or a nod of the head, as well as more complex interactions such as tending to the sick, cradling a baby, or teaching someone to read, can exhibit care. (Hammington, 2004, p. 57)

While the role that vision and hearing contribute to a healing aesthetic are well understood today as

evidenced by the increasing use of artwork and music therapy in healthcare settings, the importance of the haptic system, taste and touch remain largely ignored in the creation healing places. Yet as the abovementioned quote implies, these are the senses associated with caring interactions between people which can add significantly to a person's sense of healing place (Tuan, 1977).

In a cancer treatment setting the senses of touch, smell, and taste become especially significant for patients who are experiencing heightened emotional states of fear and stress while dealing with their illness. Architectural scholars Steven Holl, Juhani Pallasmaa, and Alberto Perez-Gomez (2006) have noted that when emotions are heightened, the senses shift focus from the more refined senses of vision and hearing down to touch and smell. These 'lower' or secondary senses are closer to physical contact and emotional intimacy. The lack of modes to engage them in hospitals that follow pathogenic models of care, and the resulting widespread dissatisfaction with these institutionalized environments is evidence of the paramount importance of intimacy, affection, and holistic aesthetic experiences that are grounded in the body (Diaconu, 2006). It should be noted, however, that while on chemotherapy, patients' sense of smell is often stronger. This calls for careful design strategies to both avoid unpleasant smells and subtly introduce pleasing ones while prioritizing the haptic dimension to foster experiences that convey care and connection to others.

Touch, smell and taste are important dimensions of healing place relating to care that are associated with concepts of home and memories and associations of nurture. Tuan (1977) notes that to a child place exists in a nurturing parent, and centers on touch but as adults, we become accustomed to relying less on other people and can find security and nourishment through the other senses. Still, it could be argued that touch remains rooted in our memory and is associated with our fundamental need for ontological security. In summary, healing place can be understood as a place that commands affection by being experienced intimately, with all of the senses – beyond the primacy of sight.

Engaging the haptic system and taste-smell system subtly through programming and design brings us an awareness of ourselves, but it is also essential to link this awareness to nature on a larger scale to truly embody holistic health. This can be achieved to a certain degree by introducing biophilic design elements that remind us of the vast wild of nature such as natural materials, running water, pets, plants and all scales of gardens. However, as Jungian analyst Lynda Wheelwright Schmidt observes:

The reason a human-made, human-sized phenomenon [like a garden or park] can work for us is that it is a reference to something greater, something infinite. We may not actually have to be in, or even see, the wilderness for it to reconnect us to the Self, the feeling of completeness. But we do need to know that it exists...A garden without a wilderness to refer to would no longer connect us to the infinite. (as cited in Clinebell, 1996, p. 32)

This quotation suggests that the use of technology to simulate natural phenomena or artifacts, like the projection of a moving cloudy sky, is useful where a real view of the sky is not possible as long as the real view had been experienced before. As the following section on evidence-based healthcare outlines, these types of interventions are most certainly effective on reducing pain and stress in medical situations. However, as David Orr (1993) warns our growing affinity for 'technological artifacts' has a direct correlation to our aversion and lack of concern for nature. This suggests that technology should be employed sparingly in the urban environment to foster connections to nature and only when employing a non-technological solution is not feasible. Most importantly, in the above quotation Wheelwright Schmidt has indicated that any reference to vast nature without a personal awareness of it will not be spiritually nourishing. Although this point could be argued from a Biophilic point of view, the wide scale acceptance of this perspective is a significant call to action for preserving as much of the non-built environment and diversity within it as possible. And so while building to truly embody holistic health, we must choose sustainable systems and materials whenever possible.

EVIDENCE-BASED HEALTHCARE DESIGN

Fuelled by an ever-increasing number of studies related to environmental psychology, the practice of evidence-based design is growing within the interior design and architectural fields. Evidence-based design (EBD) guidelines are being applied across a wide number of design typologies, and have been particularly forthcoming in healthcare design. An authority in evidence-based design for healthcare, professor of architecture and behavioural scientist Dr. Roger Ulrich conducts research on the effects of healthcare facilities on medical outcomes and patient safety. Ulrich, who is also a prominent figure in the biophilic design movement, recently completed a thorough literature review of the scientific research conducted to date related to evidence-based healthcare design.

Although other evidence-based healthcare design sources were reviewed in consideration for this section, only Ulrich's report is cited since it summarizes the results of an "exhaustive search for rigorous empirical studies that link the design of hospital physical environments with healthcare outcomes" (Ulrich, 2008, p. 1). The report references 460 relevant sources, each pre-screened for evidence quality. According to Ulrich (2008): "the evidence indicates that well-designed physical settings play an important role in making hospitals safer and more healing for patients and better places for staff to work" (p.1). Based on this extensive research, Ulrich provides design guidelines in the report for designing better and safer hospitals.

The report is organized into three often overlapping sections: patient safety issues, other patient outcomes, and staff outcomes. Patient safety issues include infections, medical errors, and falls. Other patient outcomes include pain, sleep, stress, depression, length of stay, spatial orientation, privacy, communication, social support, and overall patient satisfaction. Staff outcomes include injuries, stress, work effectiveness, and satisfaction (Ulrich, 2008). While the nature of the issues discussed suggest application in large hospital settings, many of the guidelines remain relevant at a smaller scale and are important to consider for this project.

The report includes a wealth of information and concludes with a list of design recommendations that can influence outcomes. Table 2 summarizes these recommendations by illustrating the relationship between specific design factors and healthcare outcomes. The relationships indicated in the table have either been directly tested by empirical studies or have been supported in an indirect way by strong available evidence (Ulrich, 2008).

Of these design strategies and interventions, creating a family zone in patient rooms, providing single patient rooms, access to daylight and appropriate lighting, using noise-reducing finishes, and creating views of nature are relevant to this project. Each of these recommendations is reviewed below, along with their relevance to this project.

One of the biggest reasons for implementing single patient rooms in any healthcare environment is the reduction of hospital-acquired infections which are a leading cause of death in the United States (Ulrich, 2008). Evidence-based design has the potential to affect the three main transmission routes including air, contact, and water. According to Weinstein "Patients are especially vulnerable

Healthcare Outcomes \ Design Strategies or Environmental Interventions	Single-bed rooms	Access to daylight	Appropriate lighting	Views of nature	Family zone in patient rooms	Carpeting	Noise-reducing finishes	Ceiling lifts	Nursing floor layout	Decentralized supplies	Acuity-adaptable rooms
Reduced hospital-acquired infections	**										
Reduced medical errors	*		*				*				*
Reduced patient falls	*		*		*	*			*		*
Reduced pain		*	*	**			*				
Improved patient sleep	**	*	*				*				
Reduced patient stress	*	*	*	**	*		**				
Reduced depression		**	**	*	*						
Reduced length of stay		*	*	*							*
Improved patient privacy and confidentiality	**				*		*				
Improved communication with patients + family members	**				*		*				
Improved social support	*				*	*					
Increased patient satisfaction	**	*	*	*	*	*	*				
Decreased staff injuries								**			*
Decreased staff stress	*	*	*	*			*				
Increased staff effectiveness	*		*				*		*	*	*
Increased staff satisfaction	*	*	*	*			*				
<p>* Indicates that a relationship between the specific design factor and healthcare outcome was indicated, directly or indirectly by empirical studies reviewed in this report.</p> <p>**Indicates that there is especially strong evidence (converging findings from multiple rigorous studies) indicating that a design intervention improves healthcare outcome</p>											

Table 2
Summary of relationships between design factors and healthcare outcomes

to these infections when they are immuno-compromised or otherwise weakened by age, medical or surgical treatments, or underlying disease” (as cited in Ulrich, 2008, p. 5). All of these are potential medical issues being faced by people undergoing cancer treatment. Environmental approaches for reducing airborne infections that are relevant to this project include installing effective filters, specifying appropriate ventilation systems and air change rates.

To reduce contact-spread infections the provision of easily accessible alcohol-based hand-rub dispensers, easy-to-clean flooring, furniture and wall finishes, and single-bed rooms are recommended. The use of carpeting and upholstery is acceptable except where patients are at a greater risk of airborne infections or in areas where spills are likely to occur such as the bathroom or certain treatment areas (Ulrich, 2008).

Reducing waterborne infections is mostly related to the water supply system and ensuring that it is well cleaned, disinfected and maintained with the proper temperature and pressure while avoiding stagnation, backflow and dead-end pipes. While suspected of having the potential to generate infectious aerosols, a 2006 review by Rogers “found no empirical study linking a waterborne infectious disease or nosocomial outbreak to the indoor placement of a water fountain or water feature in hospitals” suggesting that these features can be used freely as biophilic design elements in the Centre (as cited in Ulrich, 2008, p. 15). In addition, findings cited in the report indicate that “mounting numbers of people admitted to hospitals as inpatients, or who visit EDs [emergency departments] or ambulatory clinics for care, will be carriers of serious community-acquired or community-onset infections” (p. 19). This reinforces the importance of good air quality in emergency departments, and outpatient clinics like the one proposed in this project.

In the report, Ulrich (2008) concludes that implementing single-bed patient rooms is the most influential design intervention as it affects the most outcomes in a hospital setting. Although this recommendation is not necessarily relevant for an outpatient clinic, it draws attention to the importance of reducing the risk of acquiring infections by all means possible. Another recommendation in the report is to provide a family zone in patient rooms with comfortable furniture to encourage social support. A similar zone will be provided in the treatment rooms in the Centre. Allowing family the option to visit with patients while they undergo treatment would provide much needed social support and is anticipated to result in greater patient satisfaction (Ulrich, 2008).

An element of biophilic design discussed in the previous section, access to daylight and appropriate lighting is important to the holistic health and well-being of both patients and staff and is a significant factor in overall patient satisfaction. Access to daylight has been shown to reduce patients' pain and the amount of pain medication they use, as well as reducing symptoms of depression and improving mood while facilitating sleep by regulating circadian rhythms. To provide these benefits, ensuring that buildings are well-sited and not blocked by neighbouring buildings is important, as is providing large windows where patients spend most of their time and in procedure spaces, treatment rooms, and waiting areas where pain is a problem (Ulrich, 2008). These factors were taken into account in selecting the site for the Centre.

Considering artificial lighting, relatively high light levels have been shown to reduce staff errors in places that involve precision work. Conversely, dim lighting is recommended in counseling areas where it has been shown to improve communication between counselors and patients. Patients feel more comfortable opening up during discussions and talk for a longer period of time in environments lit this way (Ulrich, 2008).

Studies reviewed in the report indicate that high noise levels in hospitals worsen patient outcomes such as sleep quality, physiological stress, and satisfaction. As it is well known that people diagnosed with cancer suffer from fear and anxiety related to considering their own mortality, any design measure that exacerbates stress should be reduced as much as possible. The report recommends the use of noise-reducing finishes to improve patient sleep, improve patient privacy and satisfaction and reduce patient and staff stress. Finishes recommended include high-performance sound-absorbing ceiling and wall materials, carpet flooring and upholstered furnishings in waiting and patient rooms (Ulrich, 2008). Other acoustic control measures used to isolate and control sound transmission will also be considered in the design of the Centre to mitigate the negative effects of high noise levels.

The most significant conclusion of the report relative to this project is not surprisingly related to views of nature. The benefits garnered by both patients and staff by incorporating views of nature into healthcare design include reducing pain, stress and anxiety. As discussed in the previous sections, the importance of creating connections to nature is at the core of this project and while backed up by theory, it is also strongly supported by research. When viewing nature "positive feelings such as

pleasantness and calm increase, while anxiety, anger, or other negative emotions decrease” (Ulrich, 2008, p. 31).

Viewing nature is considered to be a positive distraction, and while direct views of nature are ideal, studies have also shown that aquariums, visual art with representational nature and even the use of technology to simulate nature can be effective in reducing pain, and providing restoration from psychological stress within a few minutes. Virtual reality audiovisual nature distraction has specifically been shown to reduce discomfort and stress in female chemotherapy patients (Ulrich, 2008). Furthermore, because pain requires conscious attention “nature distractions may be more diverting and hence effective in reducing pain if they involve sound as well as visual stimulation, and induce a heightened sense of immersion” (Ulrich, 2008, p. 23).

The report also advocates for the implementation of gardens and restorative views of nature from patient rooms and other areas where stress is a problem to benefit not only patients, but also staff and visiting family members. As Ulrich observes, “well-designed gardens not only can provide restorative nature views, but they also reduce stress and improve outcomes through other mechanisms, such as fostering access to social support, restorative escape, and control with respect to stressful clinical environments” (Ulrich, 2008, p. 32).

SUMMARY: EMBODYING SPIRIT

The integrated health perspective acknowledges the multi-faceted nature of human health by envisioning body, mind and spirit as inseparable forces at work within each one of us. By factoring in the ways that we shape and are in turn shaped by the built and natural environment, a truly holistic model of health becomes possible. In order for a healthcare environment to successfully support this model of holistic health, it must embody a diversity of mutually-reinforcing messages of healing.

Communicating a message of spiritual health is critical to this embodiment in a cancer treatment centre. In striving to support and embody the spiritual needs of cancer patients through interior design, five goals were established in chapter 2: creating a connection to self, creating a connection to others, creating a connection to the phenomenal world, creating a connection to ultimate meaning,

and creating a sense of security. This chapter presented theory and research to explore how these goals can be met by creating connections to nature on a variety of interrelated levels ranging from the personal to the vast.

At the most intimate level, connecting to nature begins modestly by connecting to ourselves. The field of phenomenology offers a perspective of experience that is rooted in the senses, providing a framework for understanding how we relate to everything around us. Placing the body at the threshold to our mind, body, spirit and the rest of the world, understanding perception via the senses allows us to feel connected not just to ourselves, but also to everything around us. It is the basis of our conceptions of nature and culture without which experiences would not be possible.

The senses can be engaged to foster experiences that convey care and healing. By framing illness as a journey, a holistically healing environment can be envisioned as one that focuses on sequences of experiences and opportunities for exploration rather than an end result. By first establishing what a place should say, what feelings it should invoke, what sequences of experiences can support these, and how this can be achieved physically, messages of healing are engrained in the physical fabric of a place (Day, 2002). To create experiences of connection to nature and a sense of security, biophilic design principles serve as valuable guidelines. Considering both the organic or naturalistic dimension, and the place-based or vernacular dimension, biophilic design touches on the many levels that we relate to the built environment on.

In a healing environment, connections to self and to others can be conveyed by interior design that carefully engages the haptic system and the smell-taste system in locations where intimacy is desired. Due to the sensitivity of people undergoing chemotherapy to smells, the haptic system is prioritized to create intimate connection in the Centre. While the power of creating visual connections to nature should not be overlooked, it is the engagement of these 'lower' senses that conveys the messages of care that are so important to people who are living with cancer. Views of nature relieve stress and pain while experiences are heightened when coupled with natural sounds, smells and sensations (Ulrich, 2008). These positive distractions immerse people in the phenomenal world and can even relieve fear by evoking sensations of health and life rather than illness and death.

Biophilic design strategies can also be employed to foster experiences of connectedness to ultimate

meaning through ‘fear and awe’, and ‘reverence and spirituality’ (Kellert, 2008). While the need to compensate for the fear that accompanies a cancer diagnosis has been discussed, provoking a sense of awe in select spaces such as a meditation room can contribute to a heightened sense of faith and ultimate meaning. According to Kellert (2008) “extolling majestic natural features...[can] engender an appreciation for powers greater than ourselves” (p.14). Rushing water and majestic light have the potential to connect people to a sense of something greater than themselves, reinforcing a sense of spirituality and transcendence (Kellert, 2008).

In order to achieve the last spiritual design goal: conveying a sense of security, several specific biophilic design strategies can be used that are related to prospect and refuge. This includes designing spaces with pools of warm light such as a hearth or sunlit space that are surrounded by darker spaces. Bounded, comfortable and nurturing places of refuge complemented by open areas offering a sense of prospect can also be effective. Additionally, creating a connection to the geography of an area can enhance feelings of security by providing people with something familiar to relate to (Kellert, 2008).

Within all of these strategies is respect for the evidence-based healthcare guidelines outlined in the previous section. While many of these guidelines are considered in the spatial and functional areas of the project program outlined in Chapter 6, one of the most significant outcomes of Ulrich’s (2008) study is that it proves that there are health benefits associated with employing specific biophilic design principles including access to natural light, positive distractions, and views of nature. The report convincingly argues that emerging people consciously and subconsciously in the beneficial pulses of the natural world has a positive impact on health.

CHAPTER 4: DESIGN PRECEDENTS

In order to inform the development of the project beyond the literature review, a variety of existing projects were selected for analysis. The projects were selected because they each exemplify one or a combination of the design strategies summarized at the end of Chapter 3. These strategies provide means on various levels to foster a sense of connection to nature for people visiting and working at the Centre. In turn, they contribute to satisfying the five central spiritual goals of the project.

The projects selected offer inspiring examples of how spiritually-nourishing connections can be achieved through strategies involving both programming and design elements. They span a variety of typologies, but have been grouped together under subheadings based on their varying similarities to facilitate comparison and the extraction of relevant design concepts and ideas.

As discussed in Chapter 2, research indicates that fostering connections at one level of spiritual need facilitates and strengthens connections at other spiritually nourishing levels as well. So, while the precedents selected and guidelines extracted from them may be associated with a dominant level of connection – and a specific spiritual goal of the project – by fostering a positive and engaging experience, each one contributes to satisfying the other spiritual goals of the Centre as well.

The first group of projects provides a means of exploring light and spirit in temporal space. Projects outside of the healthcare typology were chosen in order to explore the use of light beyond what has been employed in healthcare design. As a design element, light is a powerful tool that has the capacity to create connections at each level of spiritual need. At its most majestic, light is a universal symbol of the divine. Natural light in particular has the ability to convey a sense of awe, reverence and spirituality connecting people to ultimate meaning (Kellert, 2008). From a more modest perspective, light also has the capacity to contribute to the sense of journey through space, bring people together and reinforce messages of safety and security.

The second group of projects specifically explores biophilic healthcare design. The number of hospitals being built today with some sort of connection to nature in mind is rapidly increasing, so the

potential pool of projects to analyze in this section is significant. With this in mind, the three projects in this section were chosen based on their respective significance: historically, to healthcare design in Canada, and to the scale and program of the Centre itself. Each one demonstrates a variety of biophilic principles that have the capacity to be spiritually nourishing.

The third group of projects encompasses small-scale interventions that succeed at creating engrossing sensory domains. In interior environments, creating connections to self, others, and the phenomenal world often occurs at a very modest and human scale. Looking at the installations in this section provides insight into how experiences of connection to nature can be fostered by specific and sometimes unexpected design elements.

Each section presents an overview and analysis of the projects followed by a summary including relevant similarities and extracted design guidelines. Within this review is an awareness of the Centre, its program, and the opportunities and constraints of the project site. For this reason, only aspects of the precedents that relate directly to the design of the Centre have been highlighted.

LIGHT AND SPIRIT

The projects discussed in this section all use light as a means to impress and transcend. Two are intended to be used for worship; the University of Toronto's Multi-Faith Centre and the Bigelow Chapel in Minnesota. The third, the Diane Von Furstenburg's office in New York is a commercial and event space.

BIGELOW CHAPEL

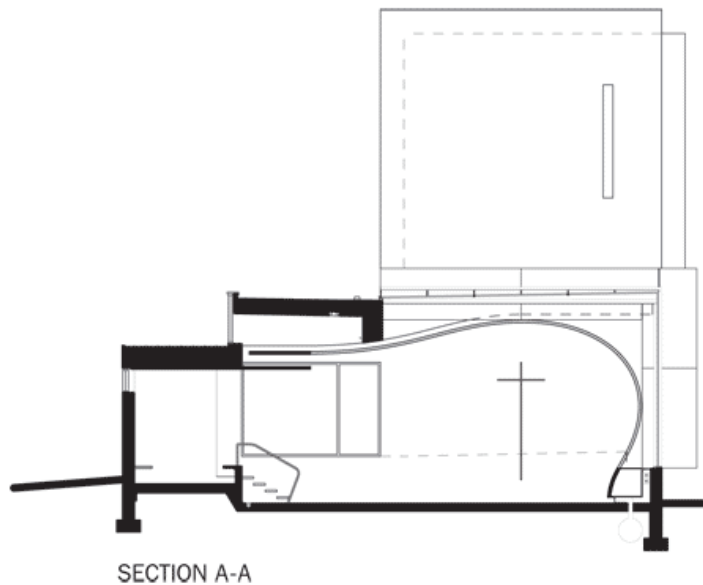
Location: New Brighton, Minnesota

Designer: Hammel, Green and Abrahamson (HGA)

Completed: 2004

Size: 5,300 square feet

The Bigelow Chapel is built on the grounds of the United Theological Seminary in New Brighton, Minnesota. The design intention was to "suggest a spiritual invitation to worship" conveying transcendence, mystery and power while remaining relevant and accessible to the seminary's



multidenominational community (LeFevre, 2005, p. 236).

While not specifically designed with biophilic principles in mind, the chapel exemplifies several biophilic strategies. It illustrates ways that an interior can connect people to a sense of self, and to a sense of transcendence at a modest scale.

In order to achieve the design intention, architect Joan Soranno based the design around the tangible qualities of intimacy, warmth, and light (HGA, 2005). The sanctuary was inspired by traditional religious spaces such as gothic cathedrals whose scales are monumental while containing intimate areas bounded by darkness. Conversely, the sanctuary is small in scale but is flooded with natural light (HGA, 2005). Daylight enters the space from above through skylights and clerestory windows and is filtered through curvilinear translucent maple panels that envelop the space along the west curtain wall. This material reference to nature is repeated on the floors and on rectangular quilted maple panels that are suspended on the opposite side of the room. The result is a bounded space of refuge that exhibits the curvilinear lines, rhythmic variation, materiality and luminosity of nature on an intimate scale.

Figure 4 (above left)
Bigelow Chapel - section
looking south. See floor
plan in Figure 6

Figure 5 (above right)
Bigelow Chapel
sanctuary

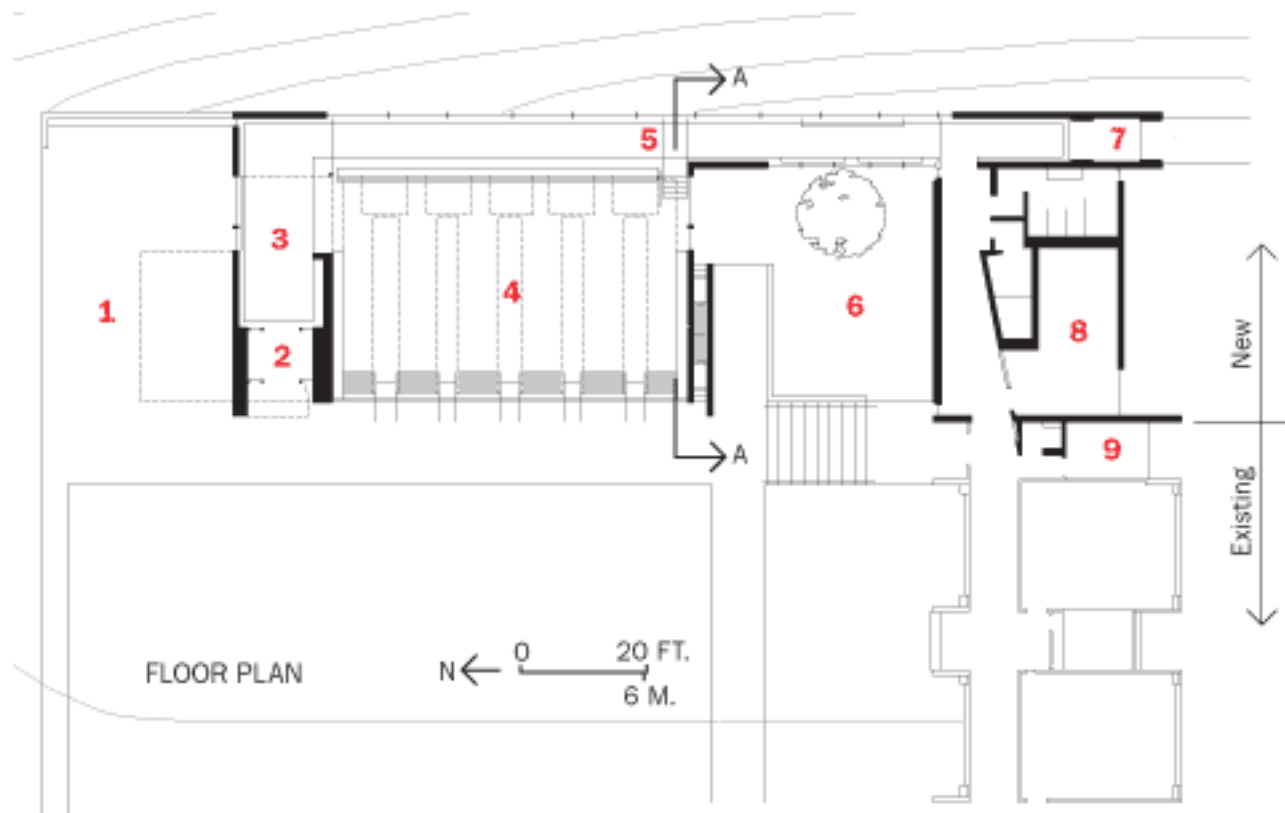


Figure 6
Bigelow Chapel
floor plan

1. North garden
2. West entry
3. Narthex

4. Sanctuary
5. Processional Hall
6. Meditation garden

7. South entry
8. Mechanical
9. Office



Figure 7 (above left)
North garden



Figure 8 (above right)
Bigelow Chapel at night

The spiritual qualities of nature are referenced directly by two windows that provide views framing a single tree and the meditation garden. The meditation garden is also visible from the processional hall enhancing the feeling of connection and calm on the journey from the south entry to the sanctuary. This sense of journey is a significant part of the project. The volume of the two entries is very small compared to the sanctuary. This provides a humbling experience upon entry to the chapel, and the slight incline of the processional hall when approached from the south engages the haptic system as views of nature are introduced along the path. This demonstrates how in a short distance, a spiritually nourishing experience can be fostered that contrasts and therefore enhances the experience of the destination, or sanctuary in this case, when it is reached.

In and outside of the sanctuary, the visual aesthetic dominates the sensory experience, but the haptic dimension is also referenced by the textural contrast of glass, wood and stone in the interior and the warmth of the quality of light. From the exterior, the tension between vertical and horizontal elements is increased by the roof slab that appears to float above the structure. This contrast of heaviness versus weightlessness is repeated on the inside in the suspended maple panels (HGA, 2005). All of these elements suggest qualities of natural forces, patterns, and processes reinforcing a sense of life and spirit in and around the chapel.



Figure 9 (above left)
Main activity hall



Figure 10 (above right)
Concealed cabinets
behind the onyx ceiling
panels

THE UNIVERSITY OF TORONTO MULTI-FAITH CENTRE FOR SPIRITUAL STUDY AND PRACTICE

Location: Toronto, Ontario

Designer: Moriyama & Teshima Architects

Completed: January, 2007

Size: 6000 square feet

The University of Toronto's Multi-Faith Centre provides an example of how spiritual space can be created inside an existing institutional, concrete building. Here again, light is employed as a universal expression of spirituality, and is the focal point of the main activity hall. Interestingly, the panels in the main hall are back-lit using fluorescent lights although the effect reads like daylight. This, along with the glow from cove lighting, and concealed fluorescent fixtures in the ablution room, demonstrate several possibilities for using electric light as a source of engagement in an interior that lacks access to daylight.

The translucent panels that wrap the main activity hall's east wall and ceiling define the seating area and are made of a creamy Iranian onyx with swirling patterns of grey, taupe and brown. These patterns lend a soft, biomorphic quality to the rectilinear space while warming and diffusing the fluorescent light. This is an example of how curvilinear or biomorphic lines can be introduced into a space without actually introducing a curved form. This bounded space, surrounded by dark wood

1. MAIN ACTIVITY HALL
2. SHOE STORAGE - MALE AND FEMALE
3. HALL ENTRY
4. MAT AND CUSHION STORAGE
5. ABLUTION ROOM - MALE AND FEMALE
6. COAT/SHOE STORAGE
7. MEDITATION ROOM
8. MULTIPURPOSE ROOM
9. KITCHEN
10. ATRIUM



Figure 11
University of Toronto
Multi-Faith Centre
floor plan



Figure 12 (above left)
Meditation room



Figure 13 (middle)
Ablution room

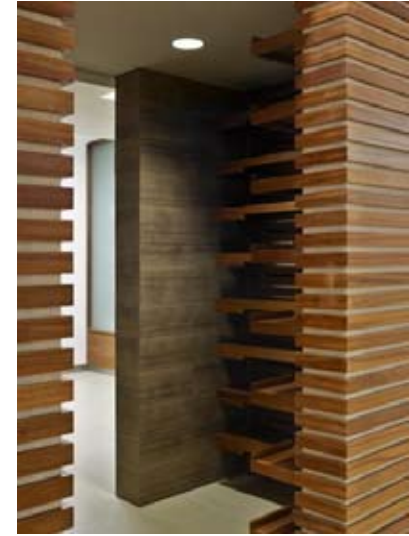


Figure 14 (above right)
Shoe storage area
leading to the main
activity hall

exhibits the qualities of refuge and suggests security. As an engaging focal point, the panels are also successful at bringing people together and offering them a space to connect with each other.

The biophilic quality of integrating parts to a whole is present here in the subdivision and patterning of the onyx ceiling panels. The ceiling geometry is made up of divisions of three, four, eight and twelve as a vague reference to numbers of spiritual significance for various faiths that use the Centre. While the significance of the divisions is lost in the experience of the panels, the pattern itself is aesthetically appealing simply because of its biophilic presence.

Before entering into the main activity hall, visitors pass through a small shoe storage area made of rhythmic sapele hardwood slats and shelves. This area is dimly lit, has a lower ceiling and features a pivoting wall of recycled wood that is pushed open to reveal the light filled space. This haptic encounter and the contrast of volume, material, and darkness between the two spaces contribute to the sense of entering a place of importance. In the storage area dim light, a diminutive volume and dark textured paneling combine to create a humbling sense of contraction. The activity hall reads as expansive and important in comparison because it occupies a much larger volume and is lit with bright and invigorating light. This sequence is the last in a series that gradually distances visitors

from the secular environment similar to that described above in the Bigelow Chapel. This kind of journey is created by linked, but distinct experiences of place that connect people to the surrounding phenomenal world.

Without access to views of nature, the Multi-Faith Centre includes natural material references in the form of stone and wood that contrast the cold, thirty year old exposed concrete structure. The meditation room features a large planted bio wall that filters the air from the main activity hall while providing several phenomenal references to nature: the appearance and smell of lush plant life, and the sound of trickling water (Bozikovic, 2007; Moriyama & Teshima Architects, n.d.; Ota, 2009).

DIANE VON FURSTENBURG STUDIO

Location: New York City

Designer: Work Architecture Company

Completed: 2007

Diane Von Furstenburg Studio's (DVF) new headquarters is a new, six story building that is built behind two historic facades in New York's revitalized Meat Packing District; also known as the Gansvoort Market Historic District. The building houses the company's flagship store, a 5,000 square foot event space, offices and studios for one hundred and twenty people, an executive suite and a penthouse apartment (Work Architecture Company, 2007). While the project's program is very different from an integrative health centre, it contains elements that reflect the possibilities and context of the Centre's site.

The project's main gesture is the "stairdelier" that was conceived as a cross between a chandelier and a staircase (Work Architecture Company, 2007). It connects and distributes natural light to all six levels of the building via the faceted glass olot on the roof of the building. The amount of natural light channeled through the staircase is maximized by a series of heliostat mirrors installed in the diamond. The main mirror tracks

Figure 15 (below)
DVF stairdelier



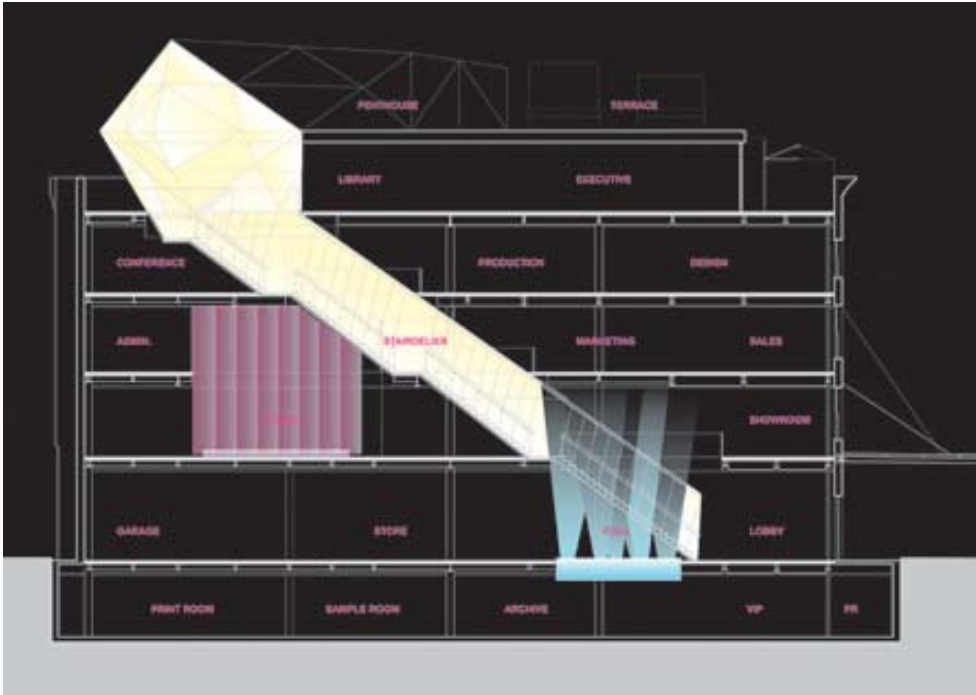


Figure 16 (above left)
Section through the
stairdelier



Figure 17 (above right)
Shifting light patterns in
the stairdelier

sunlight throughout the day directing it down at a fixed angle while the others reflect light onto the web of suspended Swarovski crystals that line the staircase (Work Architecture Company, 2007). A reflecting pond at the base of the stairdelier employs a second natural element – water to further disperse light through the space. The result is a space that has the potential to illicit sensations of awe and delight by distributing shifting patterns of natural light throughout the building. At the pinnacle of the staircase is a view of the planted terrace and the city providing two phenomenal references to nature and culture.

As an adaptive reuse project, the DVF headquarters demonstrates how a new use can be married with an old façade but does not provide guidance on the renovation of an older building without completely gutting the interior. Still, the project has several sustainable features that are relevant to the design of the Centre including:

- geothermal heating and cooling via three 1500 feet deep wells

- limited artificial light due to the abundance of daylight distributed by the heliostat mirrors, crystals and ancillary mirrors and LEDs used to light the staidelir at night
 - a green roof planted with native grasses and wildflowers
 - tightly zoned and efficient air conditioning using very small heat pump air conditioners that allow for the air conditioning to be on in one area while windows are open in another
 - recycled and salvaged materials used as often as possible
- (Work Architecture Company, 2007)



SUMMARY AND PARALLELS

The designers of the Bigelow Chapel have been credited with “take[ing] a restrained approach to form and space, understanding that simple is often more powerful than complex when it comes to expressing what is sacred” (Pearson, 2005). Each of the projects in this section demonstrates this approach to design with results that are elegant and simple yet powerful.

In a place that is connected to spirit, the vernacularly-based biophilic principle of time becomes a critical element in both the architectural program and design. Undeniably, “the intersection of the timelessness of faith and the transitory nature of our lives on Earth provides the emotional

Figure 18 (above left)
Views to nature and culture from the lot

Figure 19 (middle)
Aerial view showing the green roof and lot

Figure 20 (above right)
Building at night

tension that drives the best examples of religious architecture”(Pearson, 2005, p.235). The same could undoubtedly be said for any building that embodies a strong sense of spirit. As a physical yet timeless expression of the divine, light is employed universally to connect people to a sense of ultimate meaning. Light is the focus of the three projects reviewed in this section and is carefully manipulated in each. Within the three projects is also a strong sense of journey and distancing oneself from the outside world. For the two religious buildings this distance is used to create a sense of safety and to connect visitors to the divine. For the DVF Headquarters, the mode of distance is more fanciful, creating a place of creativity, and ultimately home and renewal.

A further comparison of the three projects resulted in the creation of the following design guidelines for the Centre:

- Use reflected, refracted or filtered light to increase its captivating qualities and penetration into the building creating a sense of connection to the divine and others
- Consider wrapping certain areas with distinct materials to provide a sense of enclosure and safety
- Create experiential sequences as a form of ritual focusing on contrasts of light, volume, and haptic qualities to distance visitors from the outside environment while connecting them to the phenomenal world
- Introduce curved, biomorphic elements to signal life, in form, volume, line or texture
- Include plant life, a view to plant life or a graphic reference to wildlife in every area of the Centre as a literal reference to living qualities
- Use natural materials throughout the Centre, and include elements that exhibit hand work or the patina of time to connect people to a sense of themselves, and the phenomenal world

BIOPHILIA IN HEALTHCARE

The label of ‘biophilic design’ is relatively new to healthcare and its application is continually evolving. Nevertheless, it has guided the design and expansion of a growing number of large facilities across Canada and the United States. The three projects reviewed in this section are distinguished by their period of construction, program, and scale but are similar in their design

intent to create uplifting environments that use nature as a means to create connections and to heal. Beyond their biophilic qualities, the projects were also chosen based on their significance to the public, staff, and the design community as evidenced by the awards and recognition each has received.



PAIMIO HOSPITAL (FORMERLY PAIMIO TUBERCULOSIS SANATORIUM)

Location: Paimio, Finland

Designer: Alvar Aalto

Completed: 1932

Size: unknown

Figure 21 (above left)
Sunning balcony with
biomorphic roof line

Figure 22 (middle)
The Paimio chair

Figure 23 (above right)
The brightly coloured
staircase features a
view of nature

The significance of the Paimio Hospital (the Sanatorium) lies in Aalto's vision of its main purpose: 'to function as a medical instrument' (as cited in Schildt, 1998, p.27). At a time when medical building was primarily concerned with functional and technological requirements, the importance of light, fresh air and sunshine to the treatment of tuberculosis offered Aalto a unique opportunity: to design a hospital that leveraged the health-giving potential of the built environment while integrating nature into the healing process. Aalto believed that architecture played a significant role in the

medical process, and that it worked in concert with conventional medicine to heal (Schildt, 1998).

The needs of tuberculosis patients in the nineteen-twenties and thirties differ significantly from those of people with cancer today, and so the value of this precedent is primarily in Aalto's approach and details than in specific design strategies. People suffering from tuberculosis are very weak, and so Aalto intended for the design to provide complete peace for the patient (Schildt, 1998). As Aalto noted: 'The room design is determined by the depleted strength of the patient, reclining in his bed. The color of the ceiling is chosen for quietness, the light sources are outside the patient's field of vision, the heating is oriented towards the patient's feet, and the water runs soundlessly from the taps to make sure that no patient disturbs his neighbor' (as cited in Schildt, 1998, p.27). Shown in Figure 22, the angle of the Paimio chair that Aalto designed to ease patients' breathing is still manufactured today and is yet another example of how an architectural element or detail can serve a clinical role and become part of an overall treatment strategy (Schildt, 1998).

The Sanatorium is sited on a north-south access and the social areas and rooms are oriented towards the south to receive the best sun exposure inside, and on the sunning balconies located at the end of each patient wing (UNESCO, 2010). Engagement with nature in the expansive pine forest surrounding the site is also encouraged on winding paths that lead to a water fountain.

Aalto's careful attention to site, orientation and interior detailing impacts the overall sensory experience of the patient. This example not only showcases fundamental ways to connect people to nature through the senses, but also ways that design can mitigate unpleasant sensations such as excessive noise, glare, and strain on the body. The Paimio Hospital is of such significance that it was nominated to become a UNESCO World Heritage Site in 2004 for its cultural value (UNESCO, 2010).

CARLO FIDANI PEEL REGIONAL CANCER CENTRE, CREDIT VALLEY HOSPITAL

Location: Mississauga, Ontario

Designer: Farrow Partnership Architect's Inc.

Completed: 2005

Size: 320,000 square feet

Farrow Partnership Architects are leaders in evidence-based sustainable design for healthcare facilities in Canada. They are also internationally recognized for creating inspiring facilities that create connections to nature and lift the human spirit. The Carlo Fidani Peel Regional Cancer Centre was designed in response to research that supports biophilic design and is intended to increase productivity and emotional well-being while reducing staff and patient stress (MacLeod, 2005). The lead designer on the project, Tye Farrow was the recipient of the Architect Award from the Stockholm-based International Academy of Design and Health.

The aesthetic focus of the facility is the lobby and radiation treatment waiting area. Here the roof is supported by four-storey wooden members that strongly resemble trees or giant reeds (Guly, 2009). The scale of the space coupled with these evocative natural elements is awe-inspiring, and the effect is enhanced by the daylight that shines through extensive glazing and sky-lights. These curved wooden structures contrast with the straight lines and form present in the rest of the building, softening and enlivening the overall experience of the space. The lobby also includes other natural references such as plants, trees, stone and wood finishes.

The facility is considerably larger than the Centre, but it draws attention to the importance of the lobby as a mediator of first impressions and demonstrates how a sense of nature can be created in an interior without creating a visual connection to the urban world outside.

Figure 24 (below)
Lobby and radiation
treatment area





Figure 25 (above)
Nursing station

Figure 26 (right)
Public corridor



The images of the public corridors and a nursing station include limited natural materials and soothing colours, but they lack the elegant complexity of the lobby and appear to prioritize function over spatial experience. These are institutional spaces, but visual interest is engaged by the rhythm in the flooring accents and cove lighting along the walls.

MAGGIE'S CENTRE, CHARING CROSS HOSPITAL

Location: Hammersmith, London, England

Designer: Roger Stirk Harbour + Partners

Completed: 2008

Size: 4000 square feet

Maggie's Centers are a series of cancer centres that are located beside Cancer Treatment Hospitals in the UK. They are small-scale, non-institutional environments that strive to create uplifting buildings that delight and refresh the spirit while offering information, psychological support, courses and stress reducing strategies for people, families and friends affected by cancer. Each Maggie's is distinct, and is designed to entice people to enter. Once inside the goal is to engage visitors in the open-plan interior that conveys light, calm and comfort.

Figure 27 (below)
Maggie's Centre ground
floor site plan

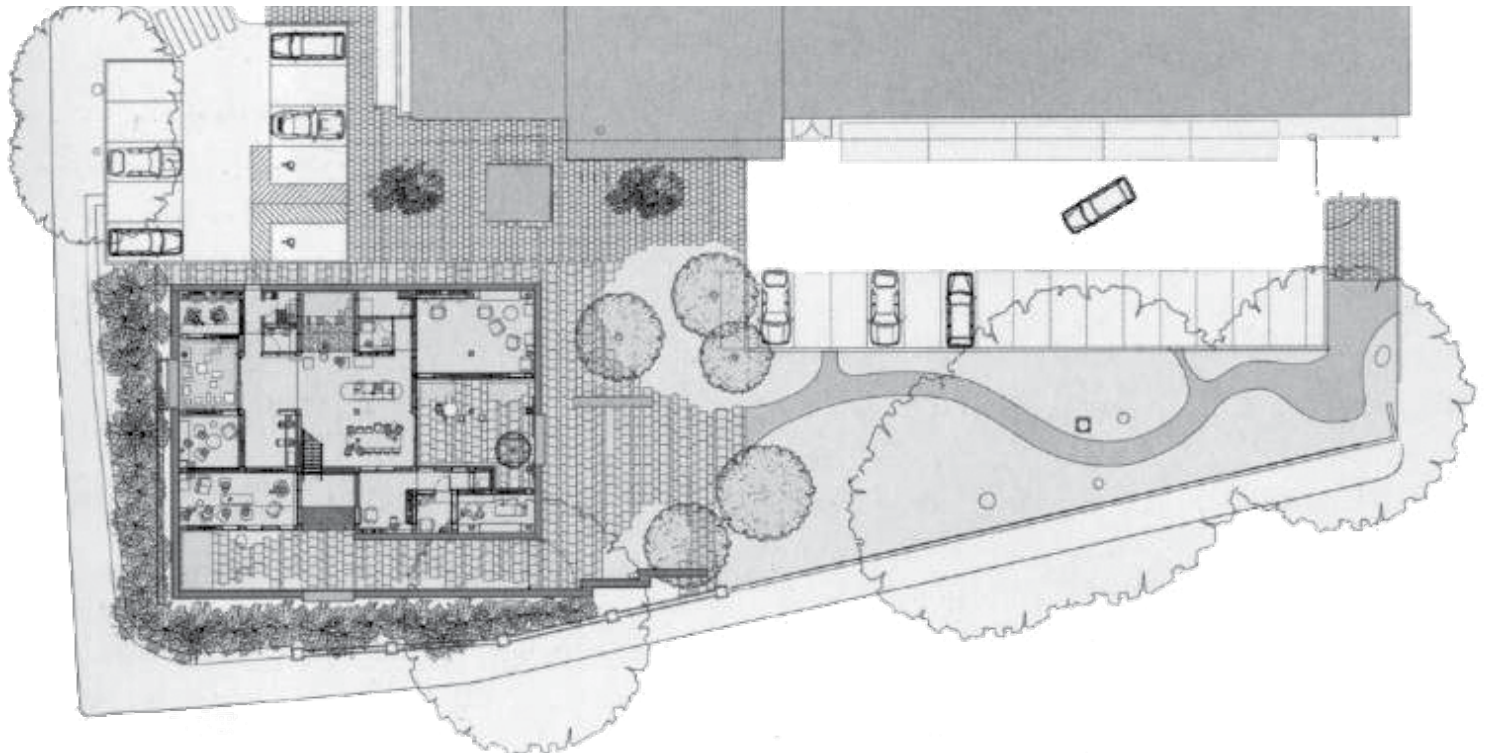




Figure 28 (above left)
Aerial perspective of the building and courtyards



Figure 29 (above right)
Rhythm mirrored in the skylights and trellis

Maggie's Center London is located on a busy street in an urban environment so both its scale and site are similar to that of the Centre. The bright and lively exterior wall colour both physically separates the building and site from its urban surroundings while inviting people in. The project demonstrates how a landscape of internal and external courtyards can be used to reduce traffic noise and close off undesirable aspects of the surrounding environment while opening up views to nature in the form of landscaped gardens (Gregory, 2008). The wall and series of courtyards also contribute to the sense of adventure and journey through the site to the building. Although Maggie's is a very linear building, the forty-five degree turn of the skylights in the roof breaks up the constancy of this rectilinear form. The roof itself also conveys a sense of delight as it appears to float above the rest of the building. In this case, creating a visually distinct, private and alluring building has taken precedence over creating a connection between the site and the surrounding urban fabric.

Additionally, the project displays how a building can use specific programming and design elements to create a sense of connection to others. Maggie's entrance centers visitors in the kitchen, a common gathering place that offers the opportunity to talk and connect with other people in a relaxed and familiar setting. In the waiting area furniture is grouped in flexible arrangements to



foster connections between visitors while the gas fireplace offers the phenomenal and multi-sensory experience of open flame.

Figure 30 (above left)
The social kitchen

The contrast of concrete to wood and brightly coloured fabrics in the interior is pleasing visually but the amount of concrete still reads as somewhat cool and austere. A palette with warmer and more varied textures could increase phenomenal engagement in the space.

Figure 31 (above right)
Moveable furniture in
the waiting room

SUMMARY AND PARALLELS

By consciously placing the patient experience at the Centre of healthcare design, the three projects reviewed in this section demonstrate the potential for an interior to truly become an active entity that supports healing. In doing this, they also highlight the importance of creating connections to nature on varying levels.

While the Paimio Sanatorium embraces the healing potential of architectural details, the last two projects demonstrate the importance of the entrance, lobby and waiting areas as pivotal spaces to communicate messages of embodied health in an urban context. They also both employ bold strategies to serve as first impressions: Maggie's uses colour while the Carlo Fidani Peel RCC uses a striking and awe-inspiring natural form.

Despite their differences, all three projects maximize daylight and turn inward in various ways, using interior elements to create connections through detailing, materiality or programming. The need to focus people's attention inward when views to the outdoors are undesirable is highly relevant for the Centre since the views to the West and South of the site are less desirable than those to the North and East. Considering all of these points the following additional guidelines were established for the Centre:

- Consider the patient in each space in the Centre and how the interior detailing can either heighten, or mitigate sensory experiences depending on their healing influence
- Ensure that the entrance, lobby and waiting areas strongly communicate the overarching message of embodied spirit through multi-sensory forms of engagement
- Consider employing a bold strategy to serve as a first impression
- Use interior elements and programming to foster connections to the phenomenal world in areas where views to the outdoors are undesirable
- Locate patient rooms and social areas to the south or east to maximize daylight and desirable views
- Use rhythm and patterning to bring a life-giving aesthetic to surfaces

SENSORY DOMAINS

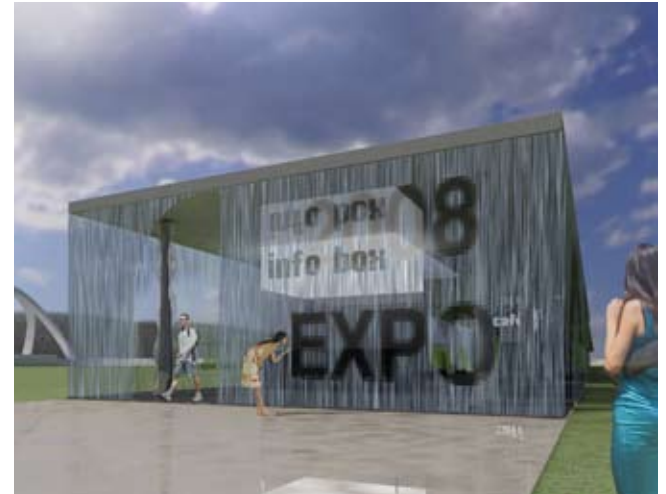
This last group of projects provides examples of sensory elements that engage people directly. The intention of including them here is to question the strategies conventionally employed in healthcare environments and to push the boundaries of designed sensory engagement beyond the expected towards the surprising and lighthearted. Using these projects as inspiration the hope is to create an environment in the center that is balanced between professionalism, comfort, and delight.

DIGITAL WATER PAVILION

Location: Zarazoga, Spain

Designer: Carlorattiassociati Architects

Completed: 2008



Figures 32 and 33 are depictions of the Digital Water Pavilion (DWP), an installation that uses water to engage people in an interactive environment. As noted by William J. Mitchell, head of MIT's Design Laboratory and former Dean of Architecture at MIT, 'water, actuated by gravity, has traditionally been the most dynamic element in architectural and urban space' (as cited in Richards, 2007, para 6).

Figure 32 (above left)
Digital Water Pavilion
approach

Figure 33 (above right)
Digital Water Pavilion
interaction

The digital water pavilion, designed by Carlorattiassociati Architects in association with the Massachusetts Institute of Technology (MIT), Ove Arup & Partners, Agence Ter, Lumiartecnia Internacional and Officinesirtori for the entrance to Expo Zarazoga 2008 in Spain, is both captivating and interactive. The walls are made of digitally controlled water curtains that fall from a series of closely spaced solenoid valves that can be opened and closed at high frequency, acting like pixels on a computer screen. The resulting words and images conveyed on the screen are responsive to users. Additionally, the wall detects people and objects approaching and parts to let them enter or exit without getting wet; 'this provocatively subverts the fundamental architectural conception of an opening as something, like a door, found at a fixed location' (as cited in Richards, 2007, para 9). The wall also has sustainable qualities. It is much more efficient than traditional fountains and it recycles the water used. The cooling effect of the vapour from the wall can reduce or eliminate the need for air conditioning as well, reducing energy consumption (MIT, 2007).

WINDOW WITH A VIEW + MY CEILING

Location: National University Hospital, Singapore

Designer: Ruzica Bozovic-Stamenovic

Completed: 2004

The images in Figures 34 and 35 are visual interventions that have been implemented at National University Hospital in Singapore to mitigate undesirable views or the lack of view. In Window with a View, partitions are placed on the windows that simulate the fractal patterning of trees. These



Figure 34 (top right)
Window with a View:
Real View, Ideal View,
and Possible/Optimal
View

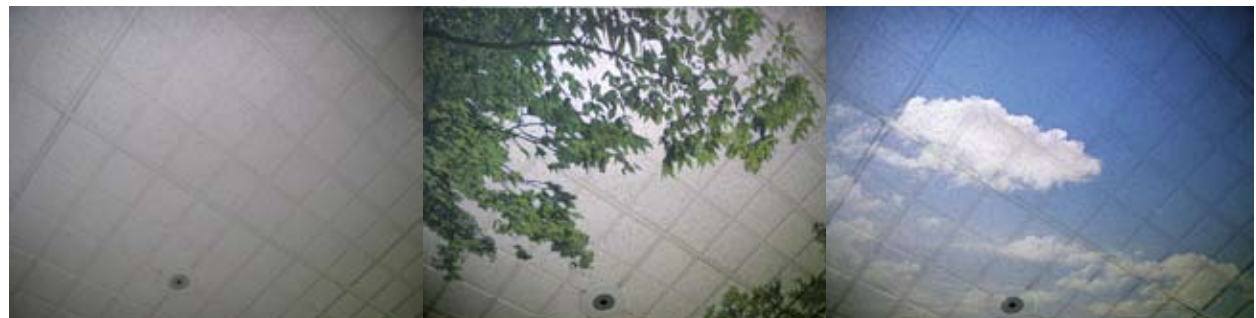


Figure 35 (bottom right)
My Ceiling:
The Common Ceiling,
and two biophilic
alternatives

elements create reflections and shadows on the floor that enhance the visual aesthetic of the space and mitigate potentially poor views out the window. In *My Ceiling*, projectors currently available on the market are adapted for use on the ceiling above a patient's hospital bed. The patient controls the device by choosing the desired nature scene. This creates a visual connection to nature, and enhances their sense of control in the space (Bozovic-Stamenovic, 2004).

PLEASUREScape

Location: Deitch Gallery, New York City

Designer: Karim Rashid

Completed: 2001

The final installation in this section is an example of the kind of haptic interaction and exploration that can be fostered by an interior element. Karim Rashid's *Pleasurescape* is a four-hundred square

Figure 36 (below left)
Pleasurescape
installation

Figure 37 (below right)
People interacting with
Pleasurescape



Image available at www.artnet.com/Magazine/reviews/robinson/robinson4-17-2.asp
(click hyperlink to view)

foot art installation that invites people to lounge and interact in varying positions. Pleasurescape is made up of three plastic biomorphic modules that can be reconfigured to achieve “an extension of the natural landscape to the artificial landscape” (Karim Rashid, as cited in Waters, 2003, p.137).

Although the material is not sustainable and this particular design would not be appropriate for the Centre, the project showcases the potential to create connections to nature on several levels through an interior element that has biomorphic form, haptic qualities, and facilitates social interaction.

SUMMARY AND PARALLELS

The installations presented in this section all foster unexpected sensory experiences that have the potential to deeply engage people in their surroundings. These kinds of positive distractions break up boredom and ensure that people interact with their surroundings in a beneficial way (Ulrich, 2008). By engaging specific senses, they connect people to their own phenomenal perceptions and the surrounding phenomenal world. The Digital Water Pavilion and Pleasurescape also carry the potential to invite people to interact with each other as they experience these sensory domains. Inspired by these installations, the following guidelines were established to foster similar connections in the Centre:

- Leverage water as a contemplative and potentially interactive medium. Water engages all of the senses and evokes a powerful association with nature to create a connection to self, the phenomenal world and possibly others.
- Consider creating screening elements with fractal patterns at unpleasant views to the exterior and interior, or the use of projections in areas where people will be sitting or lying in one position for a long period of time. These positive distractions can create a connection to the natural phenomenal world.
- Design seating and lounging areas that invite interaction between the form, materials and other people in the space to create connections to self and others.

SUMMARY: DESIGN GUIDELINES

Irrespective of typology, certain spaces have the capacity to move us spiritually. The guidelines created in this chapter demonstrate ways that the environment can foster a multitude of experiences

of connection. By offering methods of connecting people to themselves, others, the phenomenal world, greater meaning and a sense of security, these guidelines translate the literature reviewed in Chapter 3 into methodologies for design. Since the modes of engagement overlap and reinforce each other, they cannot always be attributed to a specific spiritual goal. For this reason they are presented again below in no particular order:

- Use reflected, refracted or filtered light to increase its captivating qualities and penetration into the building creating a sense of connection to the divine and others
- Consider wrapping certain areas with distinct materials to provide a sense of enclosure and safety
- Create experiential sequences as a form of ritual focusing on contrasts of light, volume, and haptic qualities to distance visitors from the outside environment while connecting them to the phenomenal world
- Introduce curved, biomorphic elements to signal life, in form, volume, line or texture
- Include plant life, a view to plant life, or a graphic reference to wildlife in every area of the Centre as a literal reference to living qualities
- Use natural materials throughout the Centre, and include elements that exhibit hand work or the patina of time to connect people to a sense of themselves, and the phenomenal world
- Consider the patient in each space in the Centre and how the interior detailing can either heighten, or mitigate sensory experiences depending on their healing influence
- Ensure that the entrance, lobby and waiting areas strongly communicate the overarching message of embodied spirit through multi-sensory forms of engagement
- Consider employing a bold strategy to serve as a first impression
- Use interior elements and programming to foster connections to the phenomenal world in areas where views to the outdoors are undesirable
- Locate patient rooms and social areas to the south or east to maximize daylight and desirable views
- Use rhythm and patterning to bring a life-giving aesthetic to surfaces
- Leverage water as a contemplative and potentially interactive medium. Water engages

all of the senses and evokes a powerful association with nature to create a connection to self, the phenomenal world and possibly others.

- Consider creating screening elements with fractal patterns at unpleasant views to the exterior and interior, or the use of projections in areas where people will be sitting or lying in one position for a long period of time. These positive distractions can create a connection to the natural phenomenal world.
- Design seating and lounging areas that invite interaction between the form, materials and other people in the space to create connections to self and others.

While this is an extensive list, it is only intended to serve as a list of suggestions that are considered in Chapter 6 to help establish the project program. Not each of the guidelines translates directly into a design solution, although they are all considered in the final design of the Centre discussed in Chapter 7.

CHAPTER 5: SITE AND BUILDING EVALUATION

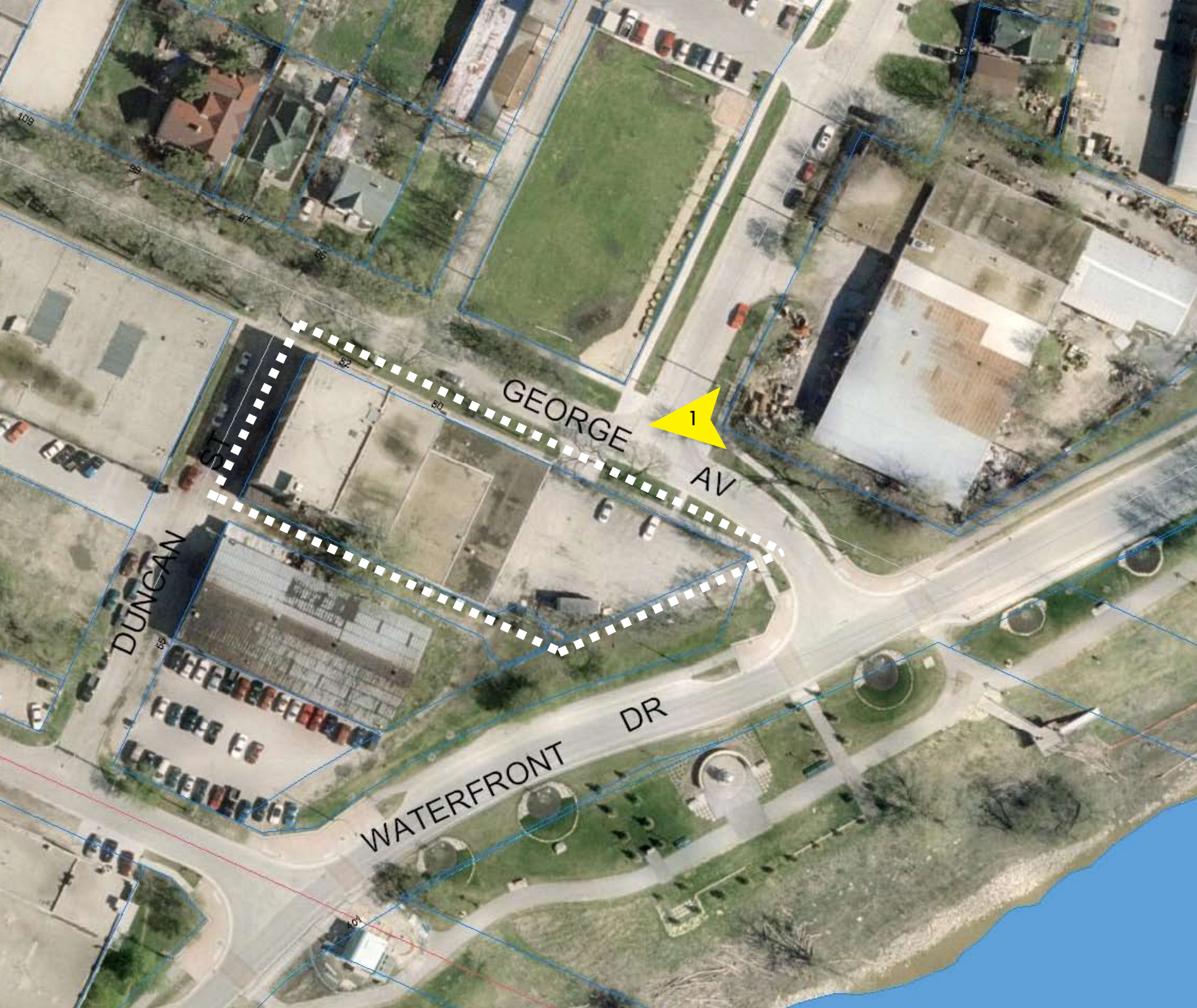
Selecting an existing site for the Centre presented a variety of challenges and opportunities. First and foremost, the Centre is intended to serve both locals and people travelling from across Canada to receive treatments. With this in mind the building and site selected needed to be accessible and attractive to both of these user groups while presenting opportunities to foster the spiritual goals that are at the core of the project. Tied to the potential opportunities of the site, a desire to challenge conventional notions of connecting to nature resulted in purposely choosing a downtown, urban site. Since so many hospitals and clinics are located in urban cores, the desire was to work through the challenges of an urban site to discover how the interior environment can create connections to nature in ways that may not be conventionally considered. As opposed to a rural site surrounded by abundant natural beauty that focuses outward to foster connections, the Centre follows the lead of the biophilic healthcare projects reviewed in the last chapter and focuses inward, embodying spirit from the inside out.

Having access to a major public transit corridor was also a priority in site selection to ensure equal access to the Centre for all people in Winnipeg. It has been stressed by Adler and Page (2007) that “lack of transportation to medical appointments, the pharmacy, the grocery store, health education classes, peer support meetings, and other out-of-home resources is common, and it can pose a barrier to health monitoring, illness management, and health promotion [for people with cancer]” (p.3).

FRAMING THE SITE

LOCATION, HISTORY & CONTEXT

After considering several cities, Winnipeg was chosen to act as the Centre’s home. At the near geographic centre of North America, Winnipeg stands as a centrally located city that is as easily accessible from the East of Canada as the West. Winnipeg is the eighth largest city in Canada, and is serviced by the Winnipeg James Armstrong Richardson International Airport providing easy access to the city by air from anywhere in the world. Named Canada’s cultural capital for 2010, the city also offers access to an extensive number of cultural activities in the urban core.



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The project site selected is 82 George Avenue, a former factory building built in 1913 that is located in the South Point Douglas neighbourhood. This site borders two of the strongest biophilic forces in the city: the Red River, a dominant natural feature, and the Exchange District (the Exchange), a National Historic Site and epicenter of arts and culture. The location is within walking and short driving distance of a variety of local hotels where out of town visitors can choose to stay. Since these visitors may not be suffering from any side effects from chemotherapy or radiation they will likely be well enough to explore the natural and cultural offerings of the city. For locals undergoing conventional cancer treatment the Centre is also conveniently located within a five minute drive of Cancer Care Manitoba's two primary treatment sites at the St. Boniface Hospital to the south-east and beside the Health Sciences Centre to the west.



The Exchange is a dynamic thirty block area of historical and cultural significance. The area is named after its former function as the Centre of the grain and wholesale trade industries in Canada from 1880-1913. Winnipeg's rapid growth during this prosperous period attracted architects from Chicago whose influence infused the Exchange's architecture with a distinct 'Chicago style'. Approximately eighty percent of the Exchange's 149 buildings pre-date 1914 and were built during this period (Heritage Winnipeg, n.d). The advent of the First World War in 1913 and the opening of the Panama Canal slowed Winnipeg's growth and centered it south of the Exchange resulting in few of the area's buildings being demolished. This culminated in the preservation of "one of the most historically intact turn-of-the-century commercial districts on the continent" (Heritage Winnipeg, n.d., para. 2).

Being in such close proximity to this vibrant historical area offers the potential for visitors of the Centre to connect to a strong vernacularly-based biophilic experience of a place. It also offers to potential to connect to a sense of culture as an expression of human nature displayed through the concept of "gene-culture co-evolution" (Kellert, 2005). The Exchange District is home to Winnipeg's

Figure 38 (opposite)
Aerial view of the site
and existing building at
82 George Ave

Figure 39 (above)
View 1: 82 George Ave.
North building facade

theatre district, the Centennial Concert Hall that hosts the Winnipeg Symphony Orchestra and the Royal Winnipeg Ballet, the Manitoba Museum as well as a diversity of specialty retailers, restaurants, and art galleries, all within a five to ten minute walk of the site. In addition, the Exchange's central Market Square area accommodates several festivals in the summer including the Fringe and Jazz festivals.

The Exchange has been experiencing a period of renewal since the 1970's and this revitalization continues to bring new life into the area. Although the project site is just north of the Exchange District, it falls within the Waterfront Drive area which has been earmarked by the city to become "a thriving, pedestrian-oriented, mixed-use residential neighborhood that conserves and strengthens the unique identity of this historic warehouse precinct" (Centreventure, 2004, p.2). This area is especially valued for its proximity to the Exchange District, river views, views of the downtown skyline and massive stone and brick warehouses (Centreventure, 2004).

Just north-west of the site is a rapidly evolving area known as Neeginan that is of significant cultural importance to the city's Aboriginal population (City of Winnipeg, 1999). The City's Centreplan envisions linking this area to the Exchange District and the Forks through the implementation of a historical streetcar system along the Red River, improved waterfront walkways, developing Rupert Avenue as a primary pedestrian route and developing the Alexander Dock and surrounding land into a waterfront activity centre (City of Winnipeg, 1999).

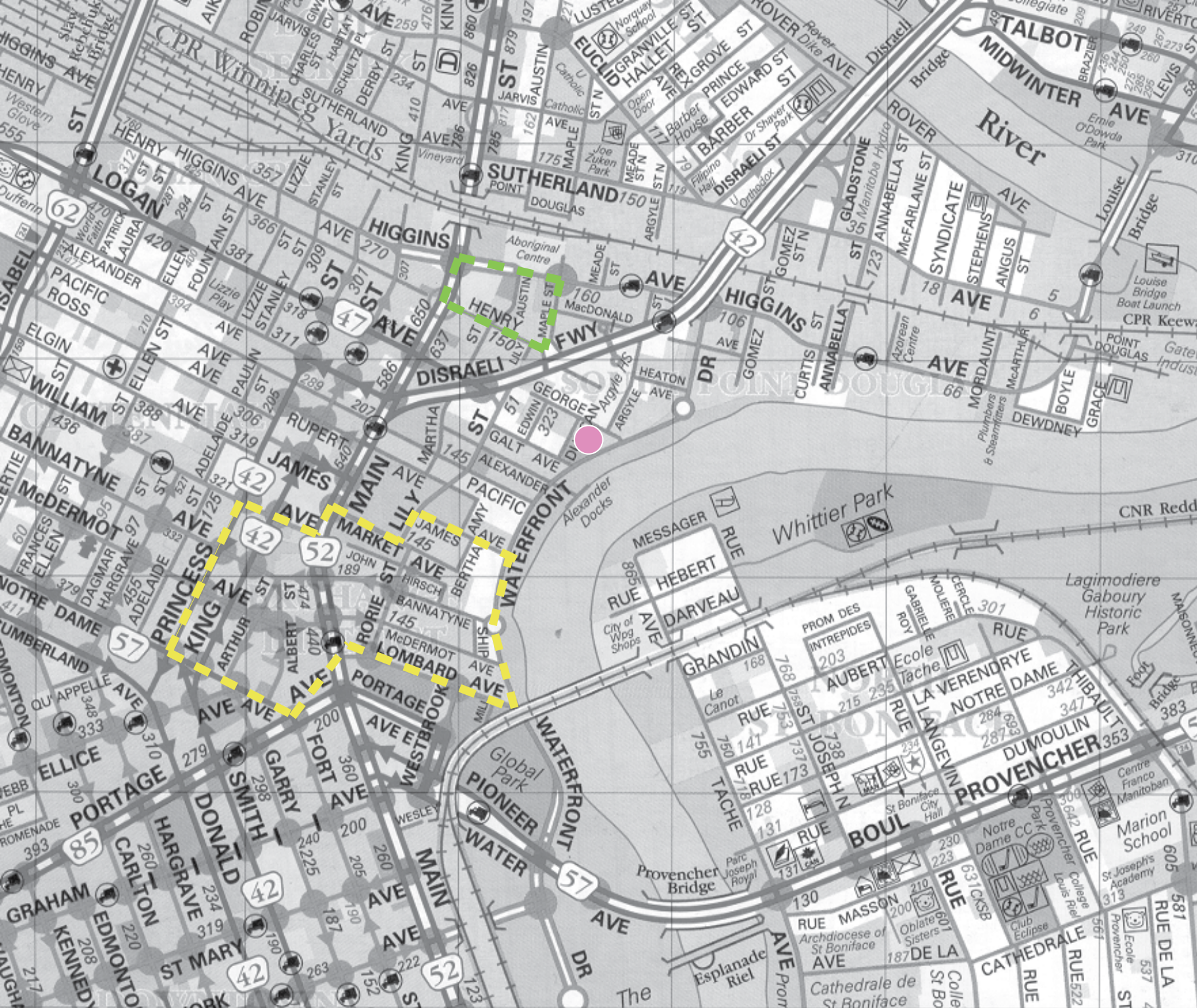
Figure 40 (opposite)
Map showing Neeginan
and the Exchange in
relation to the site

LEGEND:

- Site
- Exchange District
- Neeginan

As of the beginning of 2010, redevelopment in the Waterfront Drive area continues to push north and mixed use residential and commercial development has almost reached the site. All of these factors enhance the attractiveness of 82 George Avenue as the location for the Centre. Not surprisingly, the city is also interested in this site and has proposed building a Scottish Heritage Center between the existing building and the river (City of Winnipeg, 1999). If the Centre was built, this area would function instead as part of the Centre, including parking and green space linking the Centre to the pedestrian walkway along the river.

The continued renewal of the area and increased pedestrian traffic around the site would contribute to an enhanced feeling of security in and around the Centre, especially at night. Neighboured to the north by houses and a high school, to the south by a curling rink, and the west by a warehouse,



the site does not currently attract a lot of activity beyond the limited number of people who work in the building. The current owner has experienced issues in the past with homeless shelters being erected behind the building and high school students loitering in the west ally. With the creation of the Centre and the anticipated redevelopment of neighbouring sites for residential and mixed-use typologies, twenty-four hour activity at the site would increase dramatically and much of this is expected to stop. However, these issues must be accounted for in the design to ensure a psychologically and physically safe climate for visitors and employees of the Centre irrespective of development progress around the site.

DEVELOPMENT CRITERIA, ZONING AND INFRASTRUCTURE

Development criteria established for the Waterfront Drive area by CentreVenture (2004) for the City of Winnipeg is included below. These guidelines are intended to guide development and facilitate the design review process:

The Setting

- Built form: Acknowledge the scale of the existing buildings and the established pattern of streets and alleys
- Heritage: Maintain a respectful relationship to the Exchange District National Historic Site, between Lombard Avenue and James Avenue
- Mixed uses: Build upon the existing mix of uses to create the critical mass necessary for around the clock activity
- Riverbank edge: Maintain existing and create new connections between the river and the streets and buildings of the warehouse precinct
- Views and vistas: Respect and enhance views and vistas

The Site

- Building orientation: New construction should relate to both Waterfront Drive and, where applicable, historic streets. New buildings on corner lots should have two primary building facades
- Building placement: Maintain the continuous building edge on historic streets. Buildings on Waterfront Drive may be setback from the property line to provide amenity space for pedestrians
- Pedestrian first: Place the pedestrian before the vehicle; limit curb cuts on Waterfront Drive

- Service areas: Parking, loading, garbage containers, and hydro transformers should be located internally or at the rear of buildings

The Building

- Building height: 2 storey to 6 storey-building heights are encouraged
- Building massing: Should appear substantial (scale, height, silhouette, relationship to the ground). Where the parcels are large, new construction should have the appearance of a series of several buildings
- Building composition: Respect the composition of existing buildings (proportion, geometry, mass versus void relationship, texture)
- Building materials and construction methods: Construction materials and craftsmanship must be at least of quality comparable to those found in the National Historic Site
- Building transparency: Buildings will have transparent and active storefronts through the use of glass and entrances. Inviting connections between the inside and outside of the building increases feelings of security and comfort on the street
- Signage: Should be oriented to the pedestrian level and integrated into the building's architecture. Develop a sign plan for buildings with multiple occupants.
- Public entries: Buildings should have clearly defined and inviting multiple entries. Private and semi-private areas should be clearly demarcated at grade by changes of level, low planting or setbacks
- Mechanical units: Rooftop equipment should be inconspicuous

(p.3-4)

The project site is zoned in a Multiple-Use Sector of the city and was valued at \$329,000 in 2004. Based on the outpatient program of the Centre, it falls under the medical/dental/optical/counseling clinic category: "a facility for the provision of human health services without overnight accommodations for patients. Includes accessory laboratory facilities" (City of Winnipeg, 2004, p. 64, 65). This use is permitted in the Multiple-Use Sector without conditions.

The last issue of zoning significance is parking. The city dictates that accessory parking off-street at grade cannot exceed ten parking spaces or forty percent of the lot area, however there are no restrictions on above or below-grade parking (City of Winnipeg, 2004).

ACCESS, LANDSCAPE AND MICRO CLIMATE

82 George Avenue is easily accessible by pedestrians, bicycles, transit and cars. The site is just off Waterfront Drive and is easily accessible from two major thoroughways: the Disraeli freeway and Main Street. Due to its central location the site is also easily accessible by the sixty-eight thousand people who work downtown during the weekdays and is only a fifteen minute drive from the airport. Waterfront Drive accommodates pedestrians and cyclists along the river walk. The closest bus stop is only two blocks away on the Disraeli Freeway and is serviced by three bus routes. As well, a five minute walk brings people to Main Street where many more bus routes pass through from a variety of areas in the city (see Figure 41).

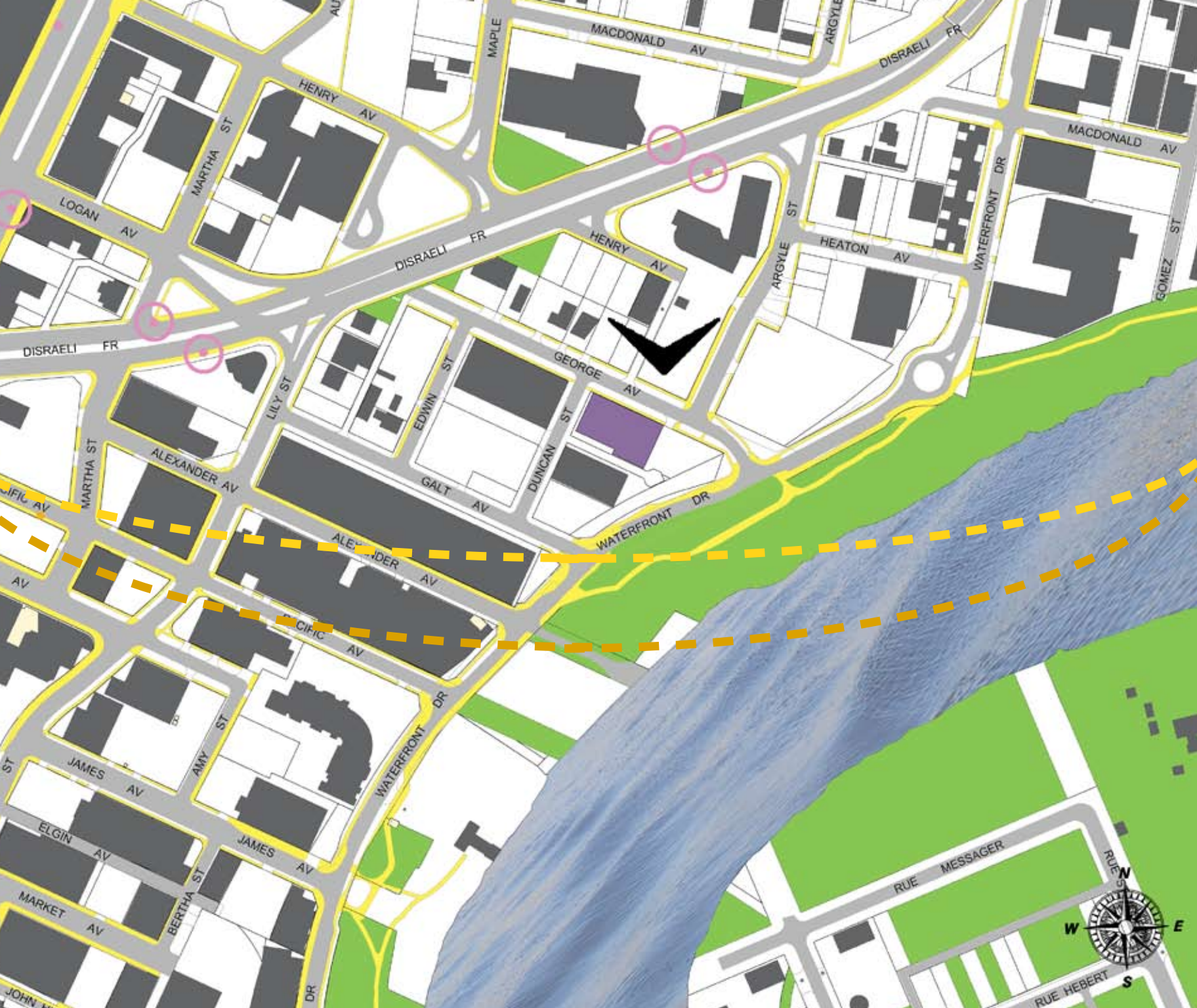
Figure 41 (opposite)
Site access and micro
climate

LEGEND:

	Existing building
	Buildings
	Roadways
	Pedestrian paths
	Parks/open space
	The Red River
	Bus stops
	Summer sun path
	Winter sun path
	Prevailing winter wind

The existing site is flat and is mostly paved around the existing building but there are trees lining the site on waterfront drive and George Avenue. Unpaved areas are covered in wild and planted grass and small shrubs and weeds. Views to the North of the site are pleasant but the best views look east over the river to Whittier Park and South from the Waterfront edge of the site to the River Trail towards Stephen Juba Park as shown in Figures 42 and 43 on the following pages. Having access to the river trail just across the street from the Centre is a huge advantage of this location. The trail runs south along the river and provides convenient pedestrian and cycling access to the Exchange District, the future Human Rights Museum and the Forks Market - two additional and extremely significant cultural features of the city. In the winter, the trail provides easy access to skating rentals at the Forks. Despite it's central location the site is relatively quiet but traffic sounds are audible from the moderate traffic on Waterfront drive and heavy traffic on the Disraeli Freeway.

The microclimate in Winnipeg varies considerably throughout the year. As a city that experiences all four seasons dramatically, buildings in Winnipeg must be designed to tolerate record temperatures as high as 40 degrees Celsius in the summer and -40 degrees Celsius in the winter although the average range is 20 degrees to -18 degrees. The average snow depth is 23 cm in January and rainfall typically peaks in the summer with an average of 84 cm in June. Mosquitoes can be active in the summer months. Winnipeg receives sun year round making it an ideal city for active and passive solar heating and energy strategies. The city also receives a significant amount of northerly wind with speeds averaging one hundred and sixty-nine kilometers per hour that contributes to wind chill throughout the winter months (The Weather Network, n.d.).



View 1



View 2

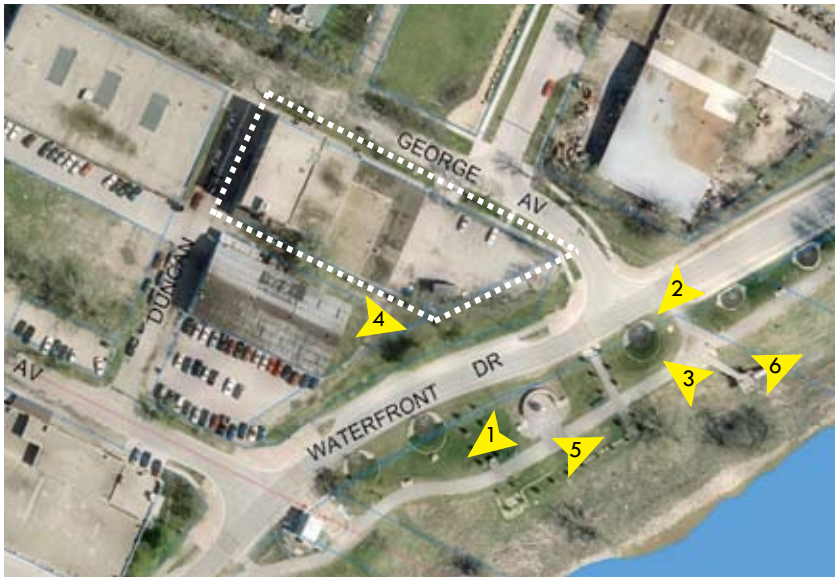


Figure 42 (this spread)
Views at river



View 5

View 3



View 4



View 6

View 1



View 2



View 5

View 3



View 4



View 6



Figure 43 (this spread)
Views at building

SUMMARY: SITE CONDITIONS

Considering all of the factors reviewed in the site analysis, the site exhibits more positive qualities than negative.

Benefits of the site include:

- Proximity to the cultural and historical Exchange District area offering visitors the opportunity to connect to the phenomenal world through experiences of the arts, music, dance, food and shopping.
- Proximity to the Red River and the walking and cycling trail along waterfront drive providing views of this dominant natural feature and access to year-round outdoor recreational activities just outside of the Centre.
- Central location that is easily accessible from the airport, two major Cancer Care Manitoba treatment sites and for people working downtown by car and transit.
- At the cusp of redevelopment of the Waterfront Drive and Exchange District neighbourhoods and likely to be redeveloped in the next few years.
- Good sun exposure from the north and east with reasonable exposure from the south and west suggesting that passive solar heating strategies, and energy conservation through the use of daylighting could be implemented.

Figure 44 (opposite top)
Plan of the original
building in 1913
(WCIUA, 1906, p.12).
Photograph
by Anna Westlund

Figure 45
(opposite bottom)
Plan of the original
building and two
additions in 1956
(WCIUA, 1956, p.210).
Photograph by Anna
Westlund

Challenges of the site include:

- Moderate traffic noises from the Disraeli freeway and Waterfront Drive.
- Occasional loitering on the site by homeless people and high school students threatening a psychological sense of safety for visitors to the Centre.
- Neighbouring buildings to the west and south are not visually appealing suggesting that views to these buildings should be minimized or screened.
- Harsh winter weather that will focus all activities indoors for several months of the year.

BUILDING ANALYSIS

HISTORY OF THE BUILDING

82 George Avenue was originally built in 1913 by Imperial Tobacco who used the building as a warehouse for tobacco products. The building was serviced at that time by a rail line that ran east-west on the south side of the site allowing train cars access to the concrete loading dock at the back of the building. It's unclear when the addition was built east of the original building but the treatment, massing, windows and materiality of this portion are similar to the original building suggesting that it was built soon after the original.

The one storey addition east of the three-storey structure was built in 1956 and the building was used by Universal Signs, JMR Promotions Ltd and Atlas Distributors + Messenger for silk screening, sign painting and a garage at this time. The Henderson's Winnipeg City Directory (n.d.) indicates that Asbestos Corp. Ltd. auto brake lining manufacturers moved into the building 1970. The building served these functions until 1985 when it was taken over by National Typewriter and Office Equipment and its Canon Office Systems division. Today the original building is home to several tenants renting office and art studio space however much of it remains empty. The 1956 addition hosts the offices of a local paddle wheel company.

EXISTING BUILDING CONDITIONS

As indicated on the plans in Figure 44 and 45, the structure of the original building consists of a reinforced concrete frame, brick walls, concrete floors supported by concrete piers spaced twelve feet apart and a wood deck roof over a concrete slab (see Figures 46, 47, and 48). The concrete piers are flared at the top to minimize their cross-section and it is expected, based on the date of construction, that the number and sizes of reinforcing bars in the concrete are the

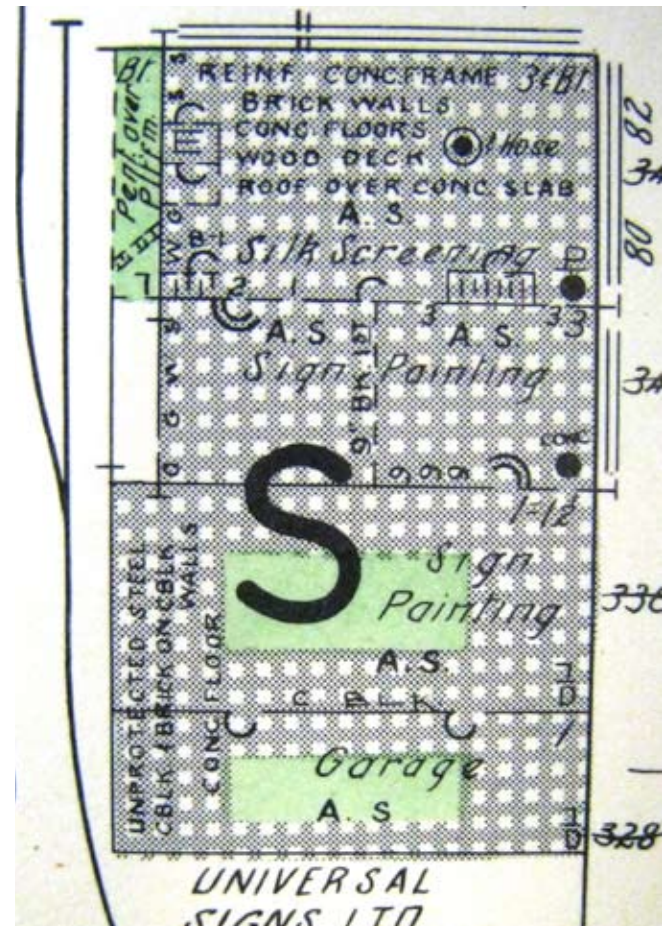




Figure 46 (above left)
Exposed exterior brick
walls and doors leading
to train platform



Figure 47 (above right)
Exposed 1st floor
structure

Figure 48 (opposite)
Exposed 3rd floor
structure

minimum required and placed in tension zones only (Giebler, Fisch, & Krause, 2009). Because of this structural system, problems with stability and damage are not expected to be a problem but “both the minimized reinforcement and the minimized dimensions of the compression zones of suspended floor slabs cannot be cut away, which makes chases and slots in such structures virtually impossible” (Giebler, Fisch, & Krause, 2009, p.163).

The first floor area of the original building and addition is 6855 square feet total. The second and third floors are 6933 square feet each bringing the total square footage of the three storey building to 20,721 square feet (see Figures 51, 52, and 53). Windows in the building are wood framed and divided by wooden mullions. The structure of the second, single-storey addition built in 1959 is unprotected steel, concrete block and brick on concrete block walls. Visually and spatially it is not a very sensitive addition to the three-storey structure and so it is proposed that it be demolished to accommodate the needs of the Centre (see Figure 38).





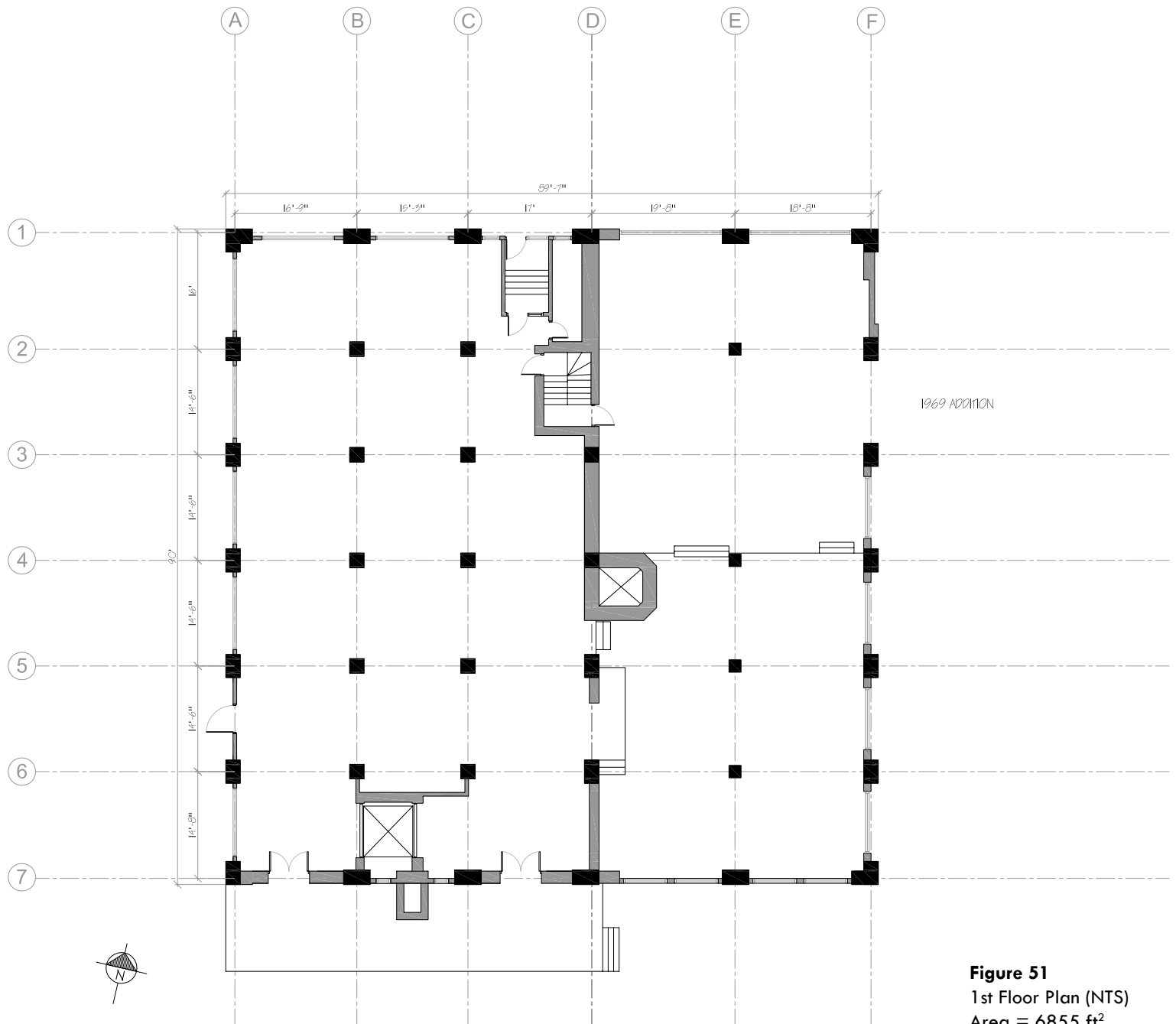
Figure 49 (above left)
Detail of damaged
windows and
deterioration on facade



Figure 50 (above right)
Existing interior fit-up at
north-west corner of 1st
floor

The three storey building shows signs of deterioration on the brick and concrete walls and severe damage to the windows with many warped frames and broken glass panes (see Figure 49). Gaps in the windows caused by shrinkage and swelling has likely lead to moisture infiltration and fungal growth in the wood. These issues and the broken panes and edge seal failures mean that replacing all of the windows will be necessary (Giebler, Fisch, & Krause, 2009). In addition, the exposed brick and concrete need to be refurbished.

Views to the outside from within the building vary significantly in each direction (see Figures 50, 54, 55, and 56). Views to the north of the high school and residential properties are pleasant but the best views by far face east towards the river. When looking out from the third storey windows the eye is directed towards the unappealing roofs of the warehouse to the west and the sportsplex to the south. Although the sportsplex is slated for redevelopment the warehouse is not and this view is expected to remain constant for the life of the Centre.



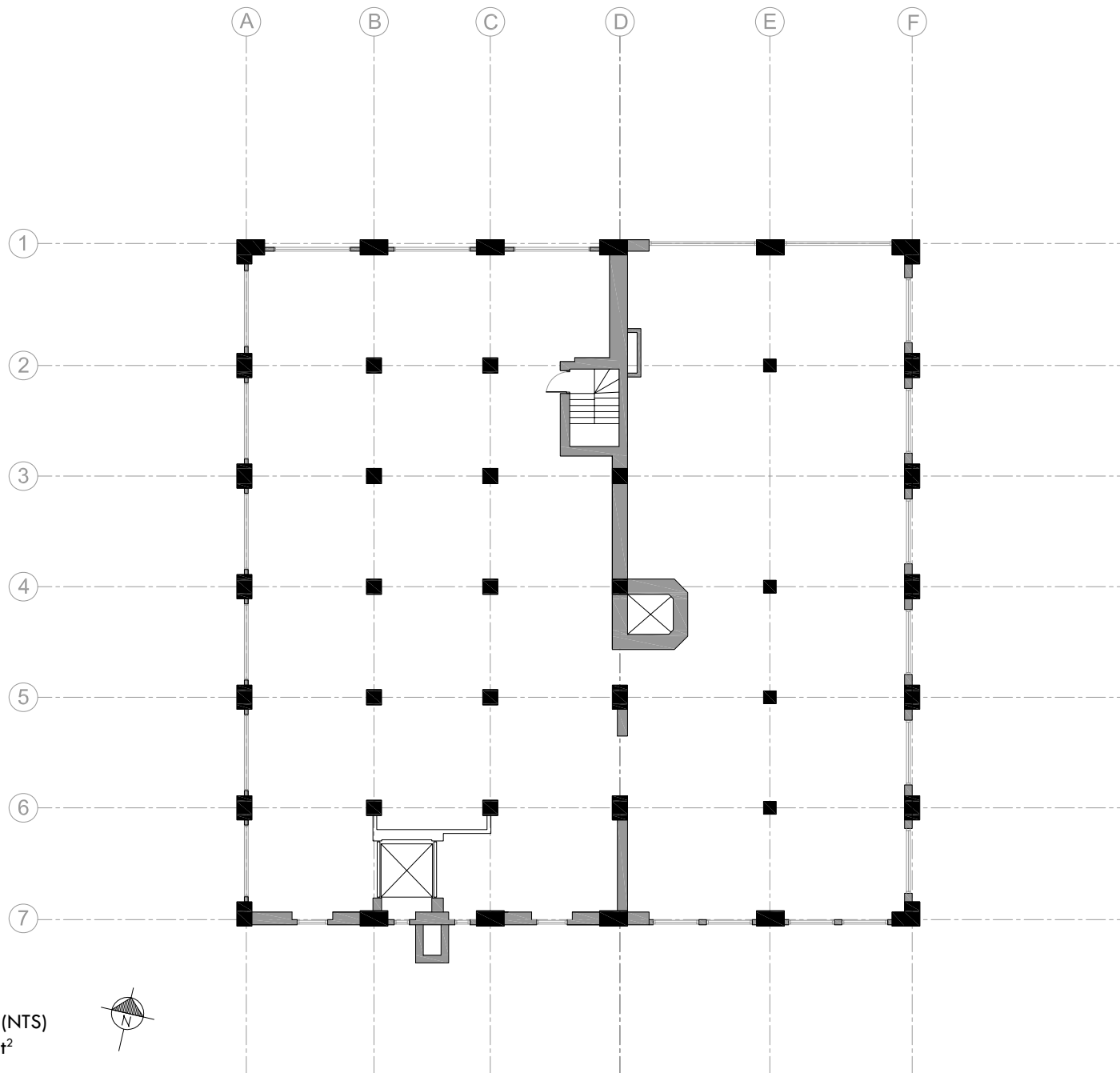


Figure 52
2nd Floor Plan (NTS)
Area = 6933 ft²



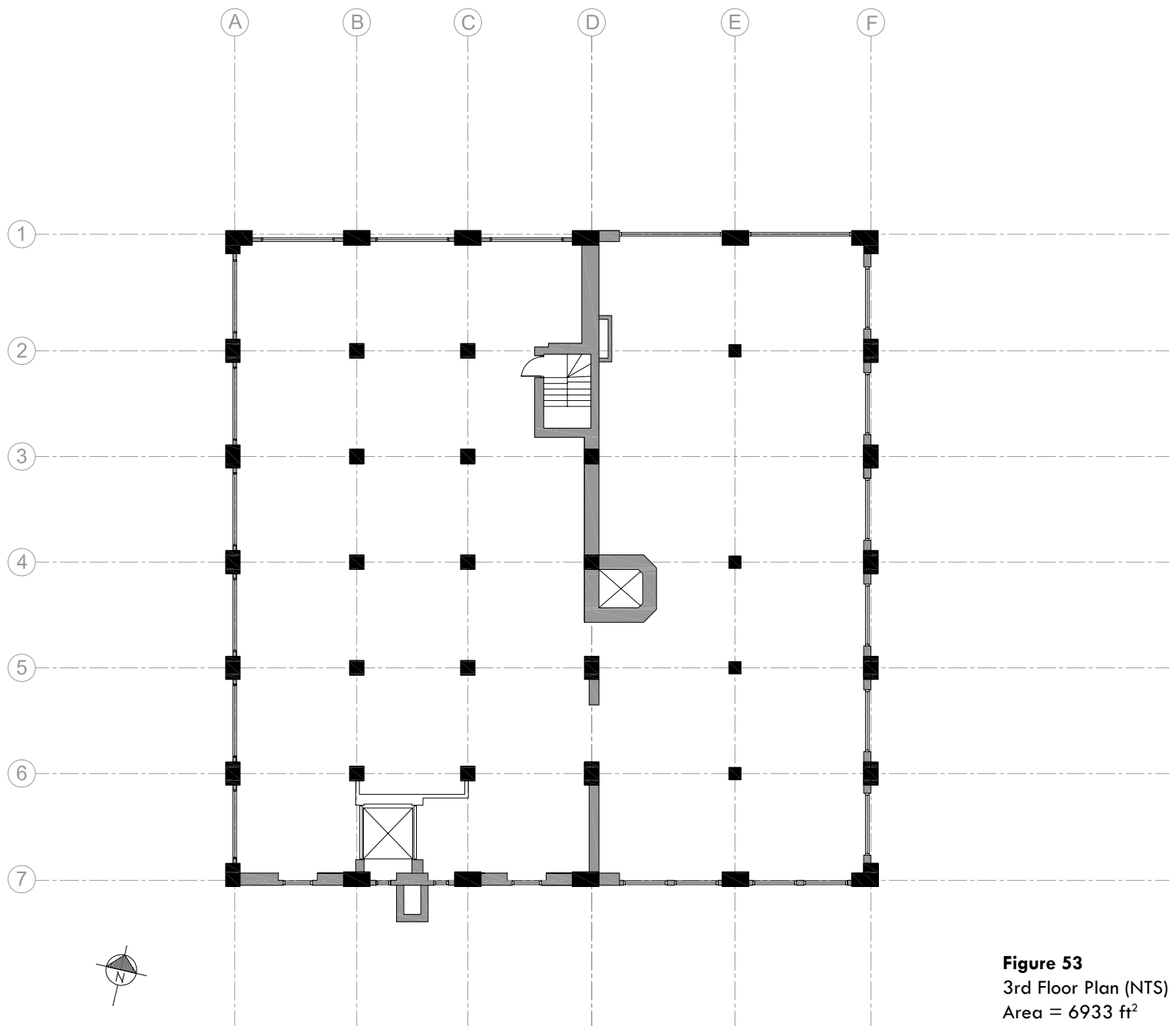


Figure 53
3rd Floor Plan (NTS)
Area = 6933 ft²



Figure 54 (above left)
View from 3rd floor
window to the south



Figure 55 (above right)
View from 3rd floor
window to the west

Figure 56 (right)
View from 3rd floor
window to the east
- looking past existing
addition



Figure 57 (opposite)
Exposed heating pipes
and building services

MECHANICAL SYSTEMS

The original building's electricity is provided by a power line to the north of the site and the building is heated by steam. Heating pipes running in the walls are visible in several locations (see Figure 57) as well as radiators on the first floor. The services are exposed and run along the walls and at the ceiling. It is expected that all of the mechanical systems will need to be replaced to accommodate the needs of the Centre.

SUMMARY: BUILDING CONDITIONS

The original function of the building as a tobacco warehouse is ironic considering the proposed adaptive reuse of the space as an integrated cancer treatment centre. The building carries signs of its former use in its structure, layout and circulation. However, the open plan has also served alternate functions including screen printing, sign painting facilities as well as office space. Transforming the look and feel of the building into a life-giving healthcare centre as opposed to a deteriorating former warehouse will pose one of the main challenges of the design of the Centre.

This process will involve and take into account the following:

- De-constructing the 1959 addition leaving 16,838 square feet of existing space to be used in the new design and the potential for a new building extension on the east side of the building.
- Salvaging the bricks from the demolition to be incorporated into the design of the Centre.



- Restoring the façade of the building and replacing the windows to provide a tighter building envelope.
- Salvaging the windows for possible alternate use in the interior.
- Adding additional insulation, sealing air leaks and upgrading the mechanical systems to increase energy efficiency and conserve resources.
- Building services will need to be surface-mounted due to the potential structural problems associated with cutting into the suspended floor slab.
- If large cuts are made in the slab the load will need to be picked up by an alternate structural system.
- The layout of the concrete piers is rectilinear and this geometry is mirrored on the building façade suggesting that any curved lines and forms used in the new design will need to be treated in careful relationship to the existing and contrasting geometry.
- Views to the north and east should be maximized while those to the west and south mitigated.

CHAPTER 6: DESIGN PROGRAM

The concept and approach of integrated oncology is constantly evolving. Different clinics and hospitals in countries around the world have taken varying approaches to this philosophy of healing. In Canada, integrative cancer treatment is currently focused on maximizing the benefits of conventional treatment by supplementing with widely-researched and accepted complementary modalities (InspireHealth, n.d.). In many other developed countries around the world, alternative treatment modalities are also integrated into the cancer healing process when appropriate. This difference in approach can be attributed to government regulation, the availability of resources and number of clinical trials for alternative treatments, and the professional opinion and experience of healing professionals. While the legality surrounding complementary and alternative cancer treatments is contentious, this project is solely concerned with the role that interior design can play in the overall healing experience for people dealing with cancer. Because of this, the treatment modalities selected for this project serve to showcase many of the spaces that interior designers may have the potential to design within the typology of integrated cancer treatment, rather than solely what is offered today in Canada.

In light of this approach, the program for the Centre is based on a vision of what the Canadian integrated cancer treatment centre of the future could be. It is a hybrid of the program offered at the foremost integrated cancer treatment facility in Canada, and at an integrated cancer treatment clinic the United Kingdom (UK). Information for the program was gathered from information available on the internet about each centre, a phone interview with InspireHealth Integrated Cancer Centre in Vancouver, questionnaires from The Dove Clinic for Integrated Medicine in London and Operation Hope in Australia. The literature review informed the experiential requirements for the program.

The facility program includes areas for patients to learn about integrated cancer treatment, a teaching kitchen, spaces for consultations, counseling, and research, complementary cancer therapies such as massage, acupuncture and reiki, a variety of alternative cancer treatments that are currently being used around the world, and a common area for activities such as yoga and guest presentations. The program is accommodated in approximately 15,000 square feet and the Centre is intended to provide outpatient services to roughly 600 people each week.

HUMAN FACTORS

The proposed client for the Centre is a group of integrated oncologists who work with nurse practitioners and a variety of allied health professionals and support staff to provide services to people diagnosed with cancer, their families and care partners. In order to understand the organizational and functional goals of the spaces to serve these user groups, information gathered from several existing integrative cancer treatment centres and literature on user needs is summarized in the following section.

CLIENT PROFILE

The overall approach, current and future goals and organizational structure of the Centre is based on InspireHealth Integrated Cancer Centre (IH) in Vancouver. Information about additional alternative treatments that will be offered at the Centre are based on The Dove Clinic for Integrated Medicine in UK.

Inspire Health (IH) is the foremost integrated cancer treatment centre in Canada and has been operating in Vancouver, British Columbia since 1997. According to their website:

InspireHealth's medical doctors have helped guide more than 5,500 patients to integrate research-informed natural approaches to health into their cancer treatment and recovery. There is growing evidence that these natural approaches to supporting health and immune system function can significantly decrease the risk of cancer recurrence and increase survival. (InspireHealth, n.d.a)

IH is a non-profit organization that offers a variety of introductory free of charge programs intended to educate and empower people with cancer so they can create their own integrated healthcare program. These programs are funded by a combination of government, corporate and private donations. Follow-up services, extended core health classes and services with associate practitioners are offered at a fee for service rate and must be paid for by the client. IH's existing integrated cancer care programs encompass:

- A weekly one hour drop-in group information session with a medical doctor
- A two-day information program offered in workshop format to forty people that introduces people living with cancer to the foundations of healthy living and the integrative

healing approach at IH. An advanced program is also offered in four two-hour weekly sessions

- An extended one and a half hour consultation with a Medical Doctor to review the health history of the patient and provide recommendations to create a holistic integrated treatment plan
- Core health classes in nutrition, meditation, yoga, shared learning and relaxation with music and imagery
- Follow-up physician consultations, in person or via telephone
- Sessions with Associate Practitioners in Massage/Reiki, Naturopathic/Homeopathic Medicine, Acupuncture, Psychology/Counseling, and an Exercise Therapist
- Access to InspireHealth's collection of research on cancer treatment including an extensive library of resource books and articles (InspireHealth, n.d.c)

The office space that IH operates out of includes facilities for the abovementioned programs as well as staff offices and common areas and is accommodated in 5,058 square feet distributed across two floors. Based on a floor plan of InspireHealth's existing facility, a bubble diagram indicating the spaces required for the services offered at IH is summarized graphically in Figure 58. This structure is expanded and reorganized to accommodate the final program of the Centre later in this Chapter.

The different types of spaces are generally grouped in clusters that include clinical staff, operations and marketing staff, patient common areas, staff common areas and storage. Within these groups adjacencies are not critical, because "everyone is just down the hall from each other" (D. Adams, personal communication, February 10, 2010).

GOALS, CHALLENGES AND CONCERNS

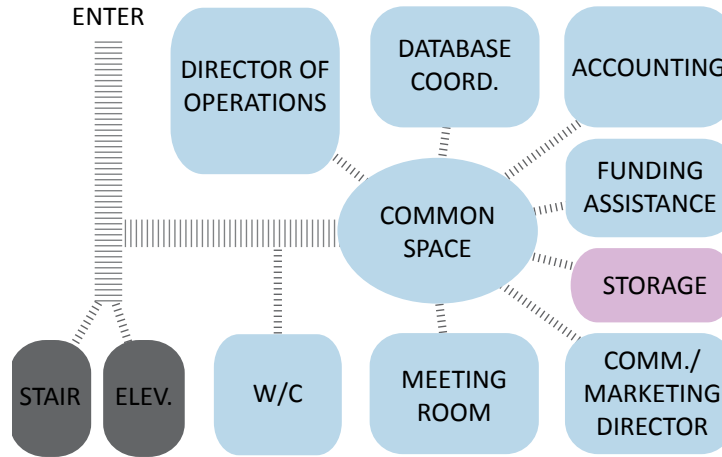
InspireHealth's Mission is to:

- 1) Provide integrated care for people with cancer and their families in a safe and caring environment supervised by medical doctors and respected healing practitioners
- 2) Research the effectiveness of integrative therapies
- 3) Educate the public and conventional healthcare providers about integrative cancer

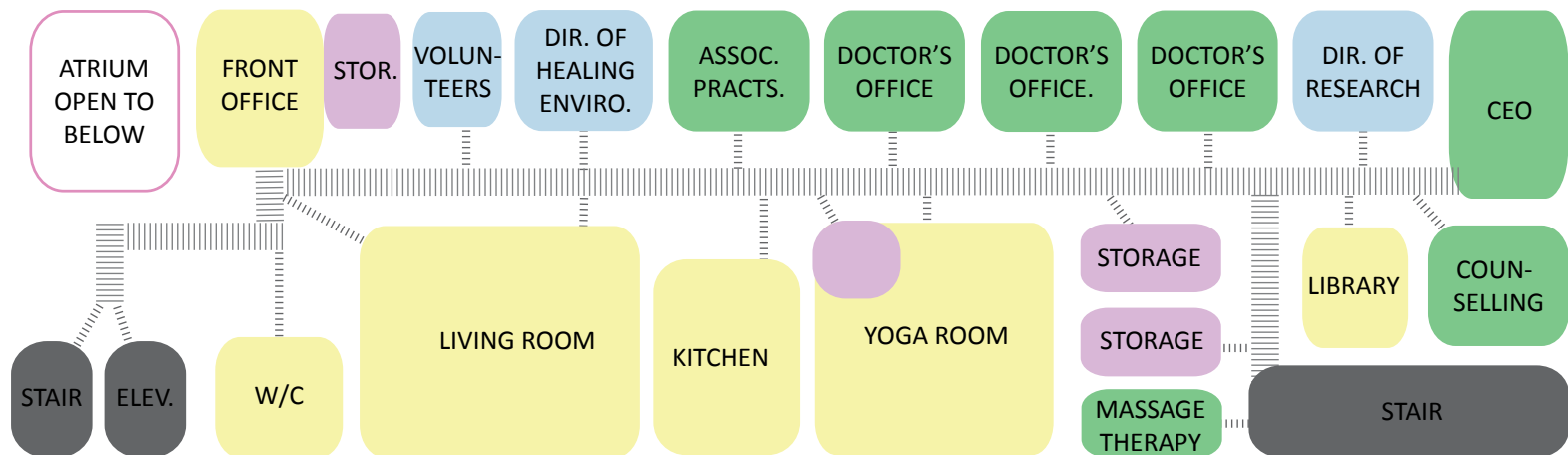
IH GROUND FLOOR

Figure 58
Spatial organization
of InspireHealth in
Vancouver

LEGEND:



IH SECOND FLOOR



care, bridge the gap between conventional and complementary healthcare and facilitate their integration

- 4) Inspire one another to live healthy, happy and passionate lives
(InspireHealth, n.d.d)

A phone interview with IH's Director of Operations, David Adams revealed that in satisfying this mission their team views the physical space of the Centre as "an extension of medical oncology" (D. Adams, personal communication, February 10, 2010). Their intention is to offer visitors to the Centre an environment that supports healing and this vision is at the core of all of their operational decisions. Adams did however express a degree of tension between IH's intentions and the reality of what is financially and physically feasible in the office space that they are currently renting. It became apparent that there is definitely room for improvement.

The following list outlines the operational challenges that IH is experiencing in its current space. The concerns are common to many growing businesses and will be accounted for in the design of the Centre:

- Activities at IH generally run smoothly but dealing with the amount of existing space and planning to accommodate growth is the biggest challenge
- The current storage space for vitamins, supplements and files is moderate but insufficient and the desire for more storage space is a significant concern
- The lack of operable windows in the building cuts staff off from their desire to enjoy fresh air year round and contributes to the widespread use of air conditioning in the facility.
- The facility experiences temperature issues and staff members complain about areas that are both too hot and too cold resulting in the use of space heaters.
- The shortage of office space in Vancouver means that a move to another location is not likely in the near future.

Possible future changes to IH's programs and facility include:

- Maximizing all available space and time for workshops and fee per service associate practitioner appointments, including evenings and weekends.

- Integrating additional treatment modalities only if they fit with IH's overall mission (D. Adams, personal communication, February 10, 2010)

The Dove Clinic (the DC) offers integrated treatment to people suffering from a number of health issues but their focus is on chronic illness. They are experienced in treating people with cancer and their integrated approach includes discussing conventional modes of cancer treatment with patients including surgery, chemotherapy, and radiation. They also propose and offer alternative and complementary modalities when appropriate, but these are offered on an informed consent basis only. The alternative modalities offered by the DC are safer than conventional ones, but are significantly less researched, which impacts the availability of healthcare funding for them.

The following information from the Dove Clinic's website introduces the background and evolution of their approach to potential clients:

[The Dove Clinic has] formed a group of doctors in the UK who have an interest in treating life threatening illness using the complementary integrated approach, at which we invite appropriate speakers to come and talk to us. Amongst these speakers are oncologists, particularly those who have a broadminded approach to the treatment of life threatening illness. These kinds of oncologists are increasing in numbers. We are also prepared to teach (by arrangement), individual doctors who have a special interest in the approaches we are using. We encourage research into the approaches used at The Dove Clinic for Integrated Medicine, and have a research charity called The Dove Healing Trust, which is set up to fund this kind of work. The reason for this is that conventional funding for these kinds of studies tends not to be forthcoming.

We frequently work with oncologists and radiotherapists and we consistently find that a number of our approaches, especially organ based complex homeopathy, based on the traditional Chinese model and methods for maintaining cell mediated immunity, lead to much lower side effects from chemotherapy or radiotherapy. Specifically we find that hair loss and nausea occur less often with these approaches running concurrently with chemotherapy, and post-radiotherapy scarring is less common. We are planning to incorporate hyperthermia, a treatment that is known to enhance the effects of radiotherapy. Anti-oxidant therapy running alongside chemotherapy is a controversial

area. A detailed discussion document on this issue by Frank Moss, comes down in favour of moderate anti-oxidant use during chemotherapy, even though chemotherapy is a pro-oxidant treatment.

The problem with life threatening illnesses is that they are complex illnesses and operate as systems rather than as linear processes in which cause A gives a result B. The science of genetic disorders giving rise to life threatening illnesses, is just such a complex process. This means therefore, that we would need a systems view of assessing these treatments in order to truly establish their value. This sort of research methodology does not exist currently; a research problem also for the majority of complementary medicine, which has a poor evidence base but an increasing number of patients - interestingly enough, doctors are major users! ...

If you have a tumour that is curable by surgery, or by any other conventional means, then we would most probably advise you to follow the conventional route, and we would provide supportive treatment approaches to reduce any damage which conventional approaches may have. If you chose to completely forego conventional treatment approaches with a conventional tumour, we would clearly have to state that in writing to you, and make sure that you know that the evidence base of the treatment we are offering is not as solid as that offered by conventional medicine.

(The Dove Clinic, n.d.a, para. 4-7)

To assure that patients are informed of their choices and the research supporting treatment modalities, services at the Dove Clinic are offered on an informed consent basis only. Due in part to the different healthcare system in the UK, all of the DC's services are also offered on a fee per service basis with some eligible for reimbursement by medical insurance. The cancer care modalities offered by the DC, with the inclusion of Hyperthermia are listed below:

- Acupuncture
- Angiogenesis Inhibitors
- Biochemical Blood Tests
- Electrodermal Testing
- Homeopathy

- Hyperthermia
- Immune Therapy
- Mindfulness Based Cognitive Therapy
- Nutritional Support
- Ozone Therapy
- Psychological Support
- Sonodynamic Photodynamic Therapy
- Traditional Chinese Medicine

Several of these modalities overlap with those offered at InspireHealth, but those that do not will be added to the program of the Centre. An overview describing each of these therapies is included in Appendix A along with all of the other integrated cancer treatment modalities that will be offered at the Centre.

USER PROFILES

The report *Environments for Cancer Care: A Point of View* by Redman, Bajaj, Handler, & Kelley (1998) for Nurture includes detailed overviews of the needs of cancer patients, oncology staff and care partners gathered from primary and secondary research. Information from this report is current and comprehensive and is central to establishing goals in the Centre to accommodate the needs of all user groups. Many of the main points of the report are summarized in the sections that follow.

PRIMARY USERS: HEALTHCARE STAFF AND CANCER PATIENTS

The primary users of the Centre are cancer patients and full time staff. These two user groups have individual and common needs that have to be integrated into the design of the Centre. Although the focus of the Centre is on the healing experience of the patient, healthcare providers spend week after week, and possibly year after year working at the Centre. Creating a positive work environment for them helps to ensure that they pass along a message of healing to their patients.

Some of the issues in a large hospital environment are irrelevant in a more modestly scaled outpatient clinic. However, the needs of healthcare staff who support people dealing with cancer are as important as those of the patient. Similar to the needs of care partners discussed in the

following subsection, healthcare staff are better able to deliver holistic health and create meaningful connections with patients when their own needs are accommodated first. Redman et al. (2008) cited a British study on the desirable characteristics of an environment that supports nurses's needs. These points are applicable to the entire healthcare team. They recommend:

- public spaces that encourage interaction so that nurses feel part of the bigger picture rather than a discrete unit
- visible security
- designing for flexibility so that as changes in patient care are made, one space can easily be converted into another
- sufficient workspace and wide-enough doors
- exposure to natural light and ventilation
- having dedicated spaces for staff rest and relaxation, including attractive areas outside as well as adequate staff facilities such as lockers, showers and so on
- provision of space for confidential discussions with patients and other staff
- sufficient and functional storage space
- door frames, locks and sink fittings that facilitate good infection control (p. 75)

Many healthcare providers are involved in the cancer care of one patient. Since they are not all involved in each session, communication and transfer of information is a huge priority for healthcare staff. In the Centre, possible collaboration with the conventional oncology team may also occur via telephone or face-to-face meetings. A common type of collaboration in conventional cancer care is called a tumor board, and a comparable type of collaboration is expected to occur in an integrated cancer treatment centre between practitioners who work with different treatments and complementary modalities. A tumor board is:

A group of practitioners with various areas of expertise, who meet to review cases, confirm diagnosis and discuss treatment options for individual patients. ... Participants need to be able to view the patient's medical history, lab results, imaging studies and other health records, which may require digital and analog support. These meetings often occur in multipurpose rooms that are not equipped for these activities. (Redman et al., 2008, p. 36)

The provision of offices and meetings rooms that can accommodate telephone or web conferencing

along with display capabilities for digital records is an important component in ensuring effective collaboration.

Beyond planned meetings, communication is required between staff at the Centre to ensure that people flow easily through the building. People are constantly coming and going in an outpatient facility and so this flow is constant throughout the day from nine in the morning until nine at night. Redman et al. (2008) explain:

A patient who has arrived needs to be checked in, the administration staff needs to notify the clinical staff that the patient is there and the clinical staff needs to work together to care for the patient. This may involve the transfer of verbal information, paper or digital charts, specimens, supplies and the patient himself [or herself] from person to person.
(p.36)

The implementation of a light system could help to notify the healthcare team when people have arrived at the Centre without introducing the noise distractions from a PA system which is more appropriate for a larger facility.

A need that is common to all user groups in the Centre is stress mitigation. Beyond the ability of positive distractions and creating connections to nature to mitigate stress as discussed in Chapter 3, effective and uncluttered wayfinding is an important component to communicating a message of holistic health. In the Centre, where multiple services are offered in one building, patients and carepartners should not experience stress trying to find where they are going. One aspect of effective wayfinding is providing hallways that are neither cluttered - a sign of ineffective storage, or barren - a sign of insufficient sensory stimulation. Paths of travel should be intuitive and effective. The use of strategically placed interior plantings, differences in light, colour, volume, and texture can differentiate between spaces of transition and those for pause (Redman et al., 2008)

The needs of patients are highlighted by the fear that accompanies a cancer diagnosis. A study by the Centre for Health Design and the Picker Institute revealed seven desires that patients have in healthcare environments. According to this study patients want a facility that:

- Facilitates a connection to staff and caregivers
- Is caring of the family

- Is convenient and accessible
- Promotes confidentiality and privacy
- Is considerate of physical impairments
- Is conducive to a sense of well-being
- Is close to nature and the outside world

(The Picker Institute, as cited in Redman et al., 2008)

Beyond these general needs, cancer patients have physical needs related to the side effects of conventional cancer treatments. While undergoing chemotherapy and radiation, patients can experience nausea and vomiting, weakness and fatigue, sores on the skin and mouth, and hair loss (Redman et al., 2008). The severity of these side effects varies for different people and can occur during, immediately after or a few days after treatment (CCS, 2009). Side effects of alternative cancer care are much less severe, but patients can feel tired after some treatments and may need to urinate frequently if receiving large quantities of fluids intravenously. These physical conditions indicate the need for an environment that is comfortable, has easily accessible washrooms, mitigates unpleasant and strong smells, offers places for patients to relax and rest and can be navigated without strain.

According to a study by Nurture that had cancer patients rank their physical, emotional, social and cognitive needs in a cancer care environment, the most critical need cited by cancer patients was to be perceived and treated as an equal:

I am important. Treat me as an equal. Respect my values and preferences. Ask my opinion. These needs were prioritized over symptom control and access to food and water. This sheds light on the profound need that patients have to be seen as a whole, and thinking, person throughout their cancer experience.

(Redman et al., 2008, p.24)

The abovementioned study indicates that people with cancer are more concerned with their quality of care than their immediate physical surroundings. Therefore to embody spirit, the physical environment must support and encourage a positive perception of the care experience. This of course is the primary goal of this project. This goal is achieved by fostering the spiritual needs of cancer patients as a means to enable a positive shift in their perception of care and cancer. The

spiritual needs of cancer patients were discussed in Chapter 2 and are summarized again below:

- Experiences of connection with self
- Experiences of connection with others
- Experiences of connection with the phenomenal world
- Experiences of connection to ultimate meaning
- Experiences of safety (Mount, Boston, & Cohen, 2007)

By combining the physical and psychological needs of people with cancer with these spiritual needs, a complete picture of the broad needs of this user group emerges.

SECONDARY USERS: CARE PARTNERS

Although often forgotten, the needs of the family and friends who support people with cancer are important. If these needs are not met, it affects not only their own well-being but the well-being of the patient as well. In an outpatient facility, these care partners play a critical role in everyday care. Care partners can be involved in a patient's cancer journey by communicating with healthcare professionals, conducting research, helping with scheduling and transportation, talking, listening and providing emotional support, and acting as cancer activists (Redman et al., 2008).

Because of the many needs of people with cancer, often more than one person in a patient's life acts in the capacity of a care partner. It is typical for several people to accompany a patient to an appointment. Providing areas for care partners to wait, relax, research and sit in treatment areas ensures that they feel welcome and included.

The greatest needs of care partners are informational and psychological. The fear experienced in cancer patients is mirrored in their care partners and with this comes high levels of stress and confusion. All too often, care partners ignore their own needs (Redman et al., 2008). The same strategies that foster connections in cancer patients can benefit care partners as well. As human beings, we all have similar spiritual needs.

TERTIARY USERS: EDUCATORS, PRESENTERS AND VISITORS

Since the Centre will house a resource library on subjects related to integrated cancer care and conference space, people from the community or visiting healthcare professionals will visit the Centre to learn about the integrated approach, and to attend or give presentations. Accounting for the

varied needs of the primary and secondary user groups discussed above, especially related to wayfinding and providing spaces for communication, rest and research also benefit tertiary users of the Centre.

SUMMARY: USER NEEDS AS PROJECT GOALS

Organizational Goals

- Ensure that a message of holistic health is communicated on all levels by the design and operation of the Centre
- Provide adequate space for all treatment modalities offered at the Centre
- Plan for change, flexibility, and expansion so that spaces can be converted if necessary
- Provide conveniently located and sufficient storage
- Provide space for confidential discussions with patients and other staff
- Provide offices and meetings rooms that foster collaboration and can accommodate telephone or web conferencing along with display capabilities for digital records
- Create intuitive, effective, and uncluttered paths of travel to facilitate wayfinding and the easy flow of people through the Centre
- Ensure washrooms are easily accessible and located close to infusion areas

Psycho/Spiritual Goals

- Create spaces that embody spirit by fostering connections to nature in relation to the self, others, the phenomenal world and a higher power
- Offer a visibly secure environment
- Design treatment areas with options for varying levels of privacy and the inclusion of care partners
- Provide designated spaces for care partners and patients to relax and rejuvenate or connect to the outside world
- have dedicated spaces for staff rest and relaxation, including attractive areas outside as well as adequate staff facilities

Physical Goals

- Employ universal design principles
- Select materials by considering how they impact infection control, durability, ergonomics, environmental impact and the psycho/spiritual goals of the Centre
- Create tight heating and cooling zones and operable windows
- Avoid the introduction of unpleasant or strong smell

Table 3

Spatial and experiential requirements

SPACE	QTY.	INTERIOR AREA (FT ²)	ACTIVITIES	TIME	FURNITURE, FIXTURES + EQUIPMENT
PATH TO BUILDING	1	-	APPROACH		-
OUTDOOR COMMON PATIENT AREA	2	-	REST RELAX SOCIALIZE		Lounge seating Social tables + seating
BUILDING ENTRANCE	1	144	ENTER/EXIT TRANSITION/MOVE		-
RECEPTION	1	60	COMMUNICATE (PHONE + IN PERSON) WORK (COMPUTER + PAPER) COLLABORATE/DIRECT		Transaction + work surface Phone, computer + accessories File + other storage
INDOOR COMMON PATIENT AREAS	1	600	INTRODUCE WAIT REST/RELAX SOCIALIZE/COMMUNICATE		Lounge seating, social tables + seating, resting surfaces, hard vertical surfaces to rest things on

EXPERIENTIAL FACTORS

The tables on the following pages list all of the spaces in the Centre, their size and required furniture fixtures and equipment. Inspired by Day's (2002) spirit, soul, life and body of place, and drawing from the guidelines summarized at the end of Chapter 4, the table frames the desired experiences in the Centre.

Focusing on the different kinds of connection to spirit fostered in each area, the Centre is intended to take on a life of its own. The table contains a large amount of information, but it provides an impression of the journey that is anticipated through the clinic. The design result, that incorporates Day's (2002) "body" of space is discussed in Chapter 7.

LEGEND:

-  Patient Common Areas
-  Clinical Therapy + Education
-  Staff Work + Common Areas
-  Washrooms, Service + Storage

SPIRIT	SOUL	LIFE
CONNECTION TO THE PHENOMENAL	fluid + active	changes in texture, view + forms along path contrast in light/shade
CONNECTION TO OTHERS CONNECTION TO SELF/PHENOMENAL	social + active comfortable + relaxing airy + tranquil	variety of views, sounds + smells of nature group seating - invite interaction between form, materials + people
CONNECTION TO THE PHENOMENAL	movement/transition hopeful + humbling	contrast in texture + materials reflected/refracted natural light
CONNECTION TO OTHERS	professional + inviting social + active hopeful + empowering	bold first impression reflected/refracted natural light biophilic materials, forms, textures + views
CONNECTION TO OTHERS CONNECTION TO SELF/PHENOMENAL	social + active comfortable + relaxing sense of delight	bold biophilic statement of life focal point draws you into space reflected/refracted natural light warmth + views of nature group seating - invite interaction between form, materials + people

SPACE	QTY.	INTERIOR AREA (FT ²)	ACTIVITIES	TIME	FURNITURE, FIXTURES + EQUIPMENT
NOURISHMENT: JUICE + SNACKS	1	300	DRINK/EAT SOCIALIZE		Social tables + seating, horizontal food prep. surface, transaction surface, kitchen equipment, sink, dishwasher, cold + regular storage
SPIRITUAL SPACE	1	100	MEDITATE/PRAY CONTEMPLATE		Moveable seating + cushioning
LIBRARY	1	200	RESEARCH LEARN READ/WATCH		Lounge Seating, Desks + Task Seating, Computer + Accessories Storage for Books + Journals Flat Screen TV + Video Storage
WASHROOMS	4	100	GO TO THE BATHROOM, SHOWER WASH UP BE SICK		Toilet, Urinals, Lavatories Horizontal Vanity Surfaces + Mirrors 1 x shower for each sex
DOCTOR AND NURSE OFFICES: INTEGRATED CANCER TREATMENT	4	100	CONSULT (PHONE + IN PERSON) WORK (COMPUTER + PAPER) REVIEW RECORDS (DIGITAL + PAPER + TRANSPARENCY) CONDUCT TCM + HOMEOPATHY	30-60 min.	Work Surface, Task Seating, Patient + Guest Seating, Book Storage, File Storage, Supply + Equipment storage (for vitals: pulse, temperature, blood pressure, respiratory rate, weight and body-mass index)
INTEGRATED THERAPY: ACUPUNCTURE	3	50	PATIENT: LAY DOWN CLINICAL STAFF: MOVE AROUND	20-30 min. x ongoing	Changing area, Firm/Soft Horizontal Patient Surface, Needle + Supply Storage, Infrared heat lamp, Electrical acupuncture stimulator, Writing Surface, Waste Receptacle

SPIRIT	SOUL	LIFE
CONNECTION TO OTHERS CONNECTION TO SELF/PHENOMENAL	social + active sense of delight	reflected/refracted natural light smells + sounds + views of nature + food surfaces with rhythm + patterning
CONNECTION TO A HIGHER POWER CONNECTION TO SELF/PHENOMENAL	slowed movement, curiosity quiet + contemplative sense of safety/enclosure	contraction at threshold, filtered natural light, qualities of water, wrapped with distinct form/ materials , focal point to draw you in
CONNECTION TO SELF/PHENOMENAL	slowed movement quiet + focused	reflected/refracted natural light biophilic materials, forms, textures + views surfaces with rhythm + patterning
CONNECTION TO SELF SENSE OF SAFETY	private + comfortable	soothing textures + materials Include plant life
CONNECT TO SELF CONNECT TO OTHERS	Professional + Inviting	biophilic materials, forms, textures + views include plant life
CONNECT TO SELF CONNECT TO THE PHENOMENAL WORLD SENSE OF SAFETY	Relaxed + Open Positive Distractions	relaxing sounds, dim light, warm air, soft textures, gestures of slow movement wrapped with distinct form/materials

SPACE	QTY.	INTERIOR AREA (FT ²)	ACTIVITIES	TIME	FURNITURE, FIXTURES + EQUIPMENT
INTEGRATED THERAPY: SONODYNAMIC (SDT) PHOTODYNAMIC (PDT) THERAPY	1	200	PATIENT: LAY DOWN CLINICAL STAFF: SIT + WALK	3-20 min. x 3 or ongoing	Changing area, PDT Bed or stand- ing equipment, SDT Patient Seating, Guest and staff seating, Writing Surface, SDT Equipment + Supply Storage, Waste Receptacle
INTEGRATED THERAPY: IMMUNE THERAPY	3	100	PATIENT: SIT / LAY DOWN CLINICAL STAFF: SIT + WALK	90 min. x 15 over 3 weeks	Soft Seating, Guest Seating, Staff Seating, IV Tower, Sink, Writing Surface, Equipment + Supply Stor- age, Refrigerated Storage, Waste Receptacle
INTEGRATED THERAPY: OZONE THERAPY	2	200	PATIENT: SIT / LAY DOWN CLINICAL STAFF: SIT + WALK	30 min.prior to IV or SPDT pro- gramme	Ozone Generating Machine (2.8ft x 1.5ft x 1.5ft), Patient Seating, Guest Seating, Staff Seating, Sink, Writ- ing Surface, Ozone Supply Storage, Waste Receptacle
INTERGATED THERAPY: MASSAGE THERAPY + REIKI	1	100	PATIENT: LAY DOWN CLINICAL STAFF: MOVE AROUND	30-90 min. x ongoing	Soft Horizontal Surface, Writing Sur- face, Supply Storage, Waste Recep- tacle
INTEGRATED THERAPY: PSYCHOTHERAPY + COUNSELLING	1	100	PATIENT: SIT CLINICAL STAFF: SIT	30-60 min. x ongoing	Work Surface, Phone, Computer + Accessories, Task Seating, File Stor- age, Soft Seating
INTEGRATED SPACE	1	1600	LEARN + SHARE YOGA MUSIC THERAPY	30 min. - 4 hrs.	Flexible Seating, Stackable Seating, Speakers, Display Screen, Horizontal Surface
TEACHING KITCHEN	1	240	COOK + EAT TEACH + LEARN	30-60 min.	Cooking Surfaces, Preparation Sur- faces, Above + Undercounter Stor- age, Refridgeration

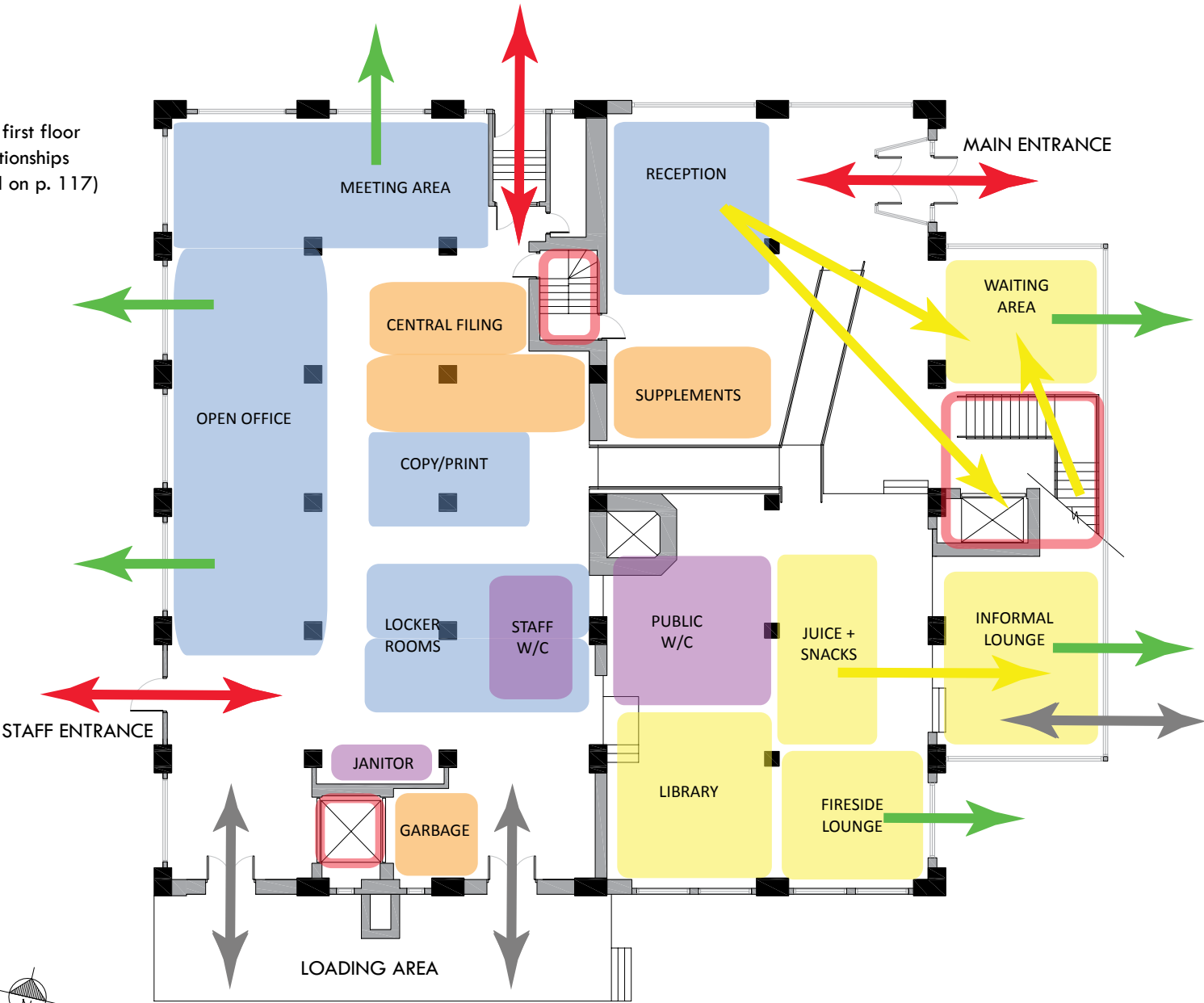
SPIRIT	SOUL	LIFE
CONNECT TO THE PHENOMENAL SENSE OF SAFETY	Comfortable + Private Positive Distractions	relaxing sounds wrapped with distinct form/materials fractal screening elements include plant life
CONNECT TO SELF CONNECT TO THE PHENOMENAL WORLD	Comfortable + Engaging Positive Distractions	abundant natural light views of nature + relaxing sounds biophilic materials, forms, texture
CONNECT TO SELF SENSE OF SAFETY	Comfortable + Engaging Positive Distractions	relaxing sounds wrapped with distinct form/materials fractal screening elements at windows include plant life
CONNECT TO OTHERS CONNECT TO THE PHENOMENAL WORLD	Comfortable + Relaxing	relaxing sounds, dim/shifting light directed away from eyes, warm air, soft textures wrapped with distinct form/materials gestures of slow movement
CONNECT TO SELF CONNECT TO OTHERS SENSE OF SAFETY	Relaxed + Open	dim lighting + views of nature
CONNECT TO SELF CONNECT TO OTHERS CONNECT TO THE PHENOMENAL WORLD CONNECT TO A HIGHER POWER	Active + Inviting	abundant natural light + variable artificial light views of nature + include plant life
CONNECT TO OTHERS CONNECT TO THE PHENOMENAL WORLD	Active + Engaging	abundant natural light surfaces with rhythm + patterning group seating - invite interaction between form, materials + people

SPACE	QTY.	INTERIOR AREA (FT ²)	ACTIVITIES	FURNITURE, FIXTURES + EQUIPMENT
NURSING STAFF WORKSPACE	3	64	COMMUNICATE (PHONE + IN PERSON) WORK (COMPUTER + PAPER)	Work Surface, Task Seating, File Storage
OPERATIONS STAFF WORKSPACE	8	100	COMMUNICATE (PHONE + IN PERSON) WORK (COMPUTER + PAPER)	Work Surface, Phone, Computer + Acces- sories, Task Seating, Guest Seating, Book Storage, File Storage
VOLUNTEERS	2	36	COMMUNICATE (PHONE + IN PERSON) WORK (COMPUTER + PAPER)	Work Surface, Phone, Computer + Accesso- ries, Task Seating, File Storage
BOARDROOM	1	600	MEET, PRESENT, BRAINSTORM COLLABORATE, VIDEOCONFERENCE	Boardroom Table, Seating for 20, LCD Screen, Horizontal Surface, Speakers, Cam- era, Computer + Phone Connections
MEETING ROOM	2	400	MEET, BRAINSTORM, COLLABORATE, REVIEW	Meeting Table, Seating for 10, LCD Screen, Horizontal Surface, Speakers, Camera, Computer + Phone Connections
LOCKER ROOM	1	300	CHANGE, WASH, SHOWER, STORE	Seating, Secure Storage for Bicycles + Per- sonal Items, Showers, Toilets, Sinks, Horizon- tal Surfaces
COMMON AREA	1	224	COOK + EAT REST + RELAX	Lounge Seating, Social Tables + Seating, Side Tables

SPACE	QTY.	INTERIOR AREA (FT ²)	ACTIVITIES	FURNITURE, FIXTURES + EQUIPMENT
LABORATORY	1	225	BLOOD ANALYSIS	Horizontal Work Surfaces, Open + Closed Storage, Cold Storage, Lab Equipment
CENTRAL FILING	1	300	STORE	Vertical File Storage
MEDICAL EQUIPMENT + SUPPLIES	3	200	STORE	Open + Closed Storage, Shelving, Drawers, Cold Storage, Floor Space
MEDICAL SUPPLEMENTS	1	150	STORE	Open + Closed Storage, Shelving, Drawers, Cold Storage
JANITORIAL	3	100	STORE, CLEAN	Floor Sink, Open + Closed Storage Shelving, Drawers
LAUNDRY	1	200	WASH (TOWELS, LINENS)	Washers, Dryers, Floor Space for Bins, Horizontal Surfaces, Open + Closed Storage
MECHANICAL	1	1600	SERVICE	Mechanical Equipment

The initial spatial layout of these areas is depicted in Figures 59, 60, and 61. These adjacencies are mostly the same in the final floor plans discussed in Chapter 7, although the layout evolved during the design stage of the project.

Figure 59
Preliminary first floor
spatial relationships
(see Legend on p. 117)



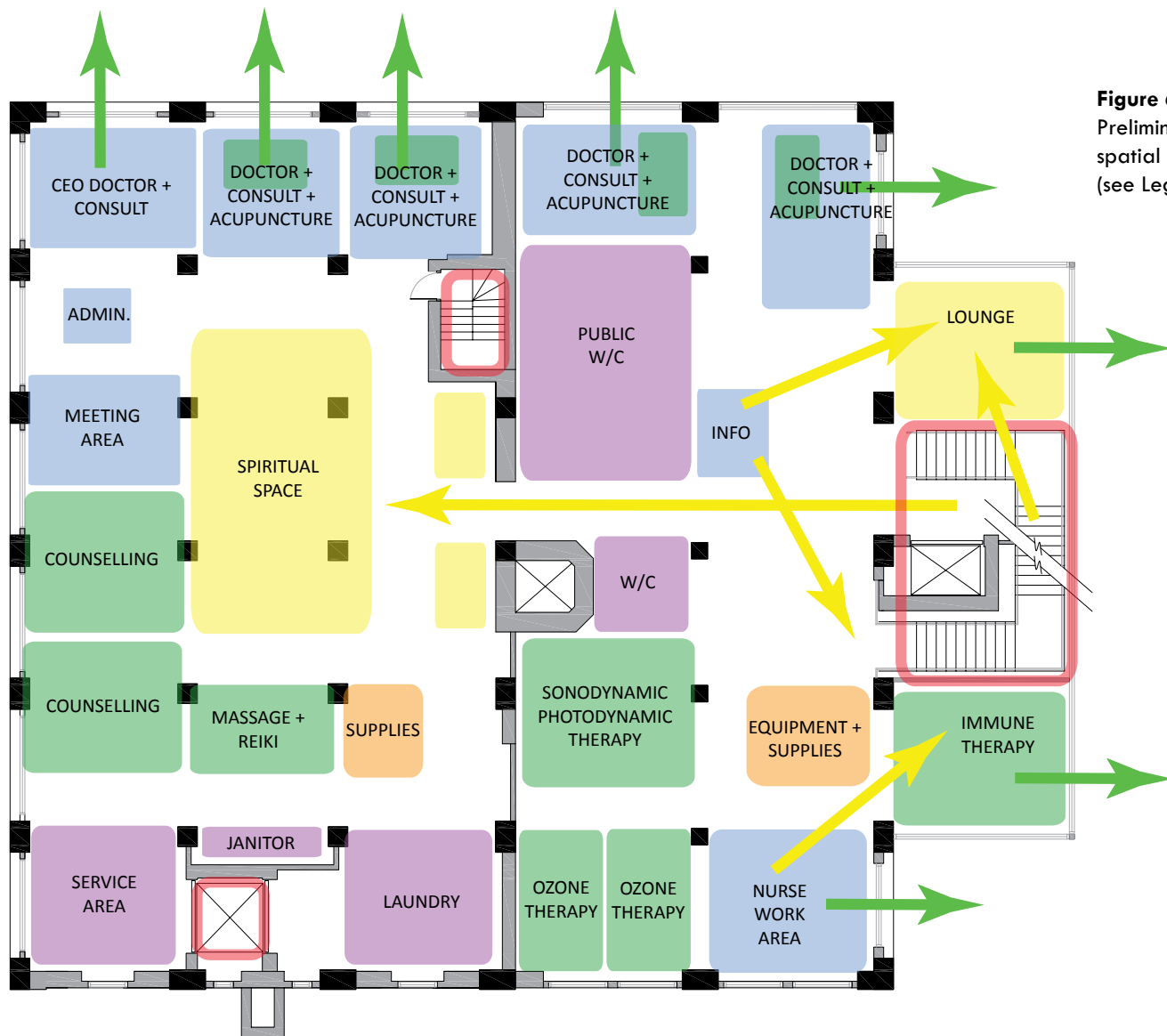


Figure 60
Preliminary second floor
spatial relationships
(see Legend on p. 117)



Figure 61
Preliminary third floor
spatial relationships
(see Legend on p. 117)





ACCESS AND LIFE SAFETY REQUIREMENTS

A review of the Building Code of Canada and its relevance to the design of the Centre is included in Appendix B.

CHAPTER 7: DESIGN

Imagine a healthcare building that inspires you and uplifts your spirit. A bright, inviting place that exudes life, professionalism and comfort. A place firmly rooted in the history, culture and ecology of its surroundings while signaling change and renewal. A refuge that engages and supports you in your journey back to health.

The integrated cancer treatment centre (the Centre) presented in this chapter strives to be this kind of place. It's designed as an engaging environment that supports a shift in the perception of cancer from being extremely life-threatening to a health challenge that can be conquered, possibly leading to personal growth and a renewed sense of holistic health. Inspired by the healing power of nature and informed by the research, theory, precedents, program and site analysis outlined in the preceding chapters, it stands as an example of the positive role that interior design can play in the delivery of cancer treatment.

The research and theory discussed in Chapters 2 and 3 established how an interior environment can foster this kind of change in perception, and was the conceptual starting point for the design presented in this chapter. As discussed in Chapter 2, people's sense of holistic health improves when they are able to find a sense of meaning in the face of cancer, and meaning is uncovered in experiences that connect people to a sense of something greater than themselves. Connection occurs at one of five levels: within the individual, with others, with the phenomenal world, with ultimate meaning, and to a sense of security (Mount, Boston & Cohen, 2007). These five levels of connection were considered in the design of the Centre and the design strategies and elements employed to foster them are outlined in this chapter.

It's critical to recall that it is a person's individual perception of their experiences that determines if they are healing, or wounding. Presented in Chapter 3, David Abrams' (1996) interpretation of Maurice Merleau-Ponty's phenomenological perspective established how a person's perception of their experiences is grounded in the body, and mediated by the senses. For this reason, the sensory environment in each area of the Centre is highlighted in this chapter, as well as the contribution each makes to fostering experiences of connection.

According to Yi-Fu Tuan (1974), engaging the haptic system and taste-smell system through dynamic, imaginative sensory responses to the environment is critical to creating a healing place. Recognizing the limited avenues for engaging the taste-smell system in a healthcare environment, design elements relating to touch, temperature and kinesthesia are also specifically noted in this chapter. Due to the necessity of infection control, the tactile experiences fostered by the design are subtle. They relate not only to a person's interaction with the built environment, but also to designed opportunities for people to interact with each other.

Related to the design philosophy of Christopher Day (2002), embodying spirit in the design of the Centre occurs at a series of mutually reinforcing levels of connection to nature. In each area presented in this chapter, the spirit, soul, life and body of the place is discussed. These are expanded upon from Table 3: Spatial and experiential requirements that was presented in Chapter 6. The spirit and soul are established by explaining the intended experiences of connection and feelings evoked in specific areas. The life and body of these areas are related to Stephen Kellert's (2008) biophilic design strategies, and the design guidelines extracted from the precedents reviewed in Chapter 4. Within these considerations is an explanation of the aspects of the design that relate to Appleton's prospect/refuge theory, which was also outlined in Chapter 3.

Ulrich et al.'s (2008) evidence-based design guidelines and the user needs discussed in the program in Chapter 6 are introduced in the following section relative to the spatial organization of the Centre. They also factor into the design decisions discussed relative to specific areas within it. The provision of family zones in patient rooms, access to daylight, and views of nature factored heavily into the design and space planning of the Centre.

Perhaps the least obvious to user experience, but nonetheless a significant level of connection to nature, sustainable design principles are also integrated into the design of the Centre. Not all of the potential sustainable design strategies that could be incorporated into the design were explored in detail as part of this project. However, those that contribute to people's sensory experiences in the Centre and played a significant role in design decisions are mentioned in this chapter.

While considering the experience of people in place and sustainable design principles, the overall design concept of the Centre is steeped in the prairie landscape. Working with the rectilinear

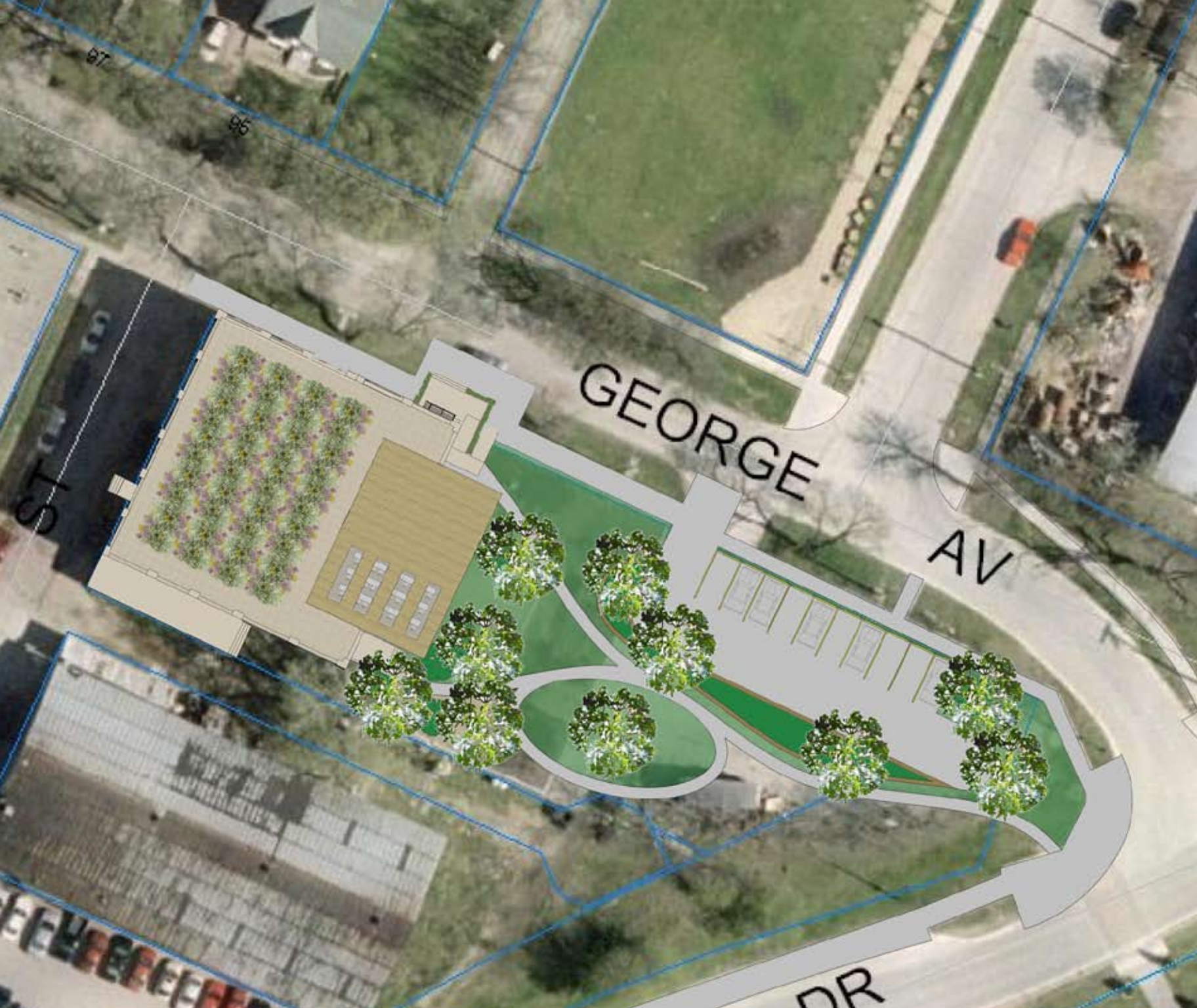
geometry of the existing building, the prairie influence is introduced through colours, textures, materials and plant life that speak to prairie ecology and add warmth to the existing architectural geometry. In this way, while satisfying the spiritual and programming goals of the Centre, the interior also communicates a biophilic place-based sense of home and belonging. As “the unifying element of nature” and a universal symbol of life and rejuvenation, water and rainfall are also central to the design concept of the Centre (Mador, 2008, p. 43).

DESIGN OVERVIEW

The design presented in this chapter encompasses the adaptive reuse of a three storey historical warehouse at 82 George Avenue in Winnipeg. It also involves the replacement of an existing addition with a more sensitive intervention to better accommodate the goals of the Centre. This addition provides an abundance of natural light, views to the garden, additional space and an expansive area used for vertical circulation discussed further in following sections. The additional daylight reduces the need for artificial light in the Centre and contributes to a more energy efficient building. As explained in Chapter 5, the existing building would require refurbishing before being adapted as a cancer treatment centre. Imagining it in this renewed state, the building provided a framework of limited size within which to realize the project program; and an existing design language to interpret and expand upon.

The proximity of the building to the Exchange District and the Red River imbues the site with a strong vernacularly-based biophilic experience of place. Additionally, the revitalization of a historic building on the edge of an area zoned for redevelopment is expected to contribute to economic, social and ecological sustainability within the existing cultural community.

Superimposed on a satellite image of the site, Figure 62 shows the refurbished building and addition from above. The building is well sited as it is not cloaked by neighboring buildings, providing access to natural light throughout the day. Although not fully developed for this project, the garden shown in the open east side of the site is critical to the overall experience of the Centre. Planted with native trees, flowering and fruiting plants; the garden provides multi-sensory walking paths that connect the Centre to the riverwalk along Waterfront Dr. while offering therapeutic views from within. The figure also shows native prairie flowers planted on the roof of the Centre. With



GEORGE

AV

DR

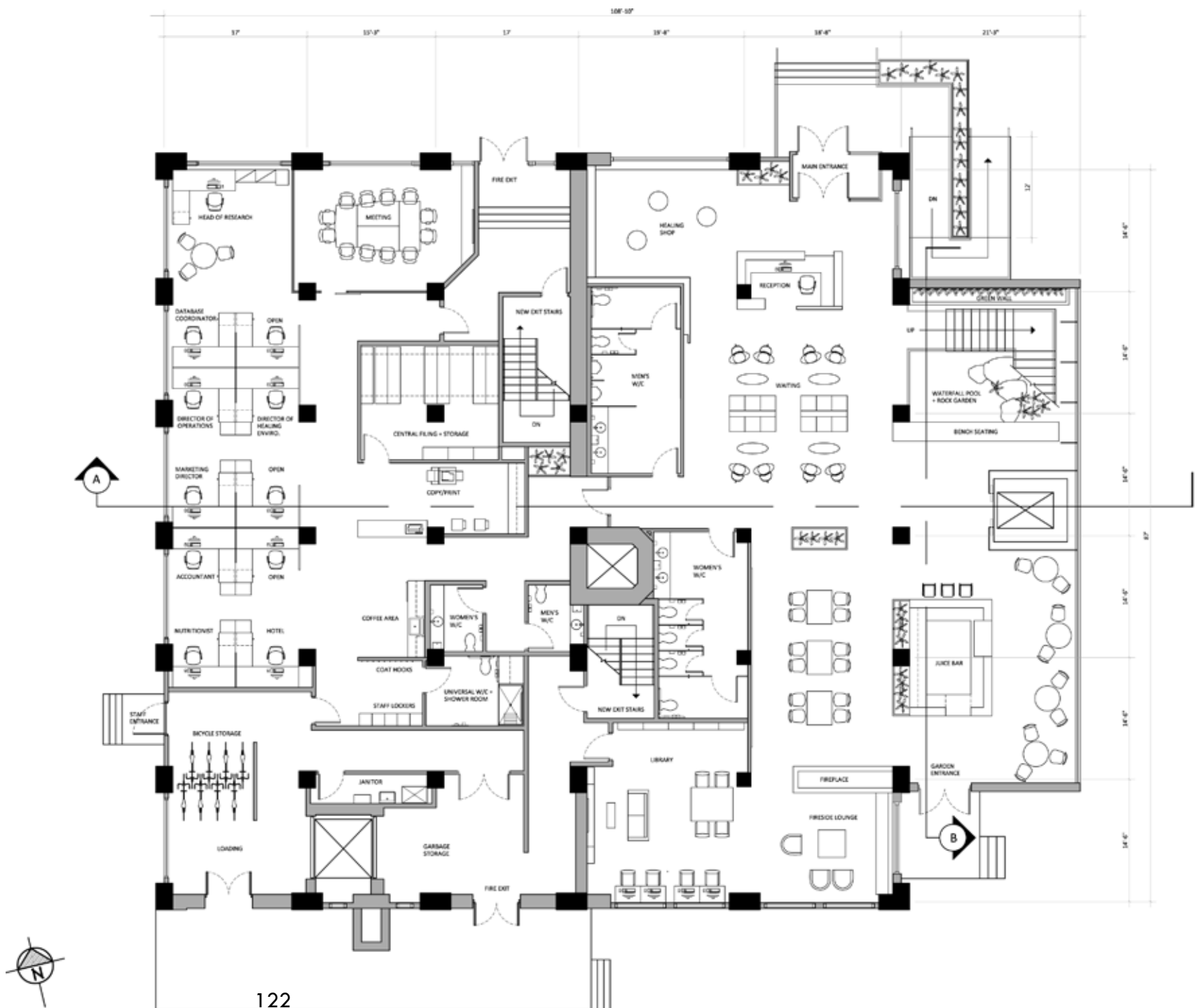
elevator and stair access, this space is proposed as a green roof that could be developed into a more private healing garden if the project were realized. The fully developed green roof would contribute to a reduction in the heat-island effect and also reduce the amount of storm water runoff from the site.

The spatial planning of the three floors of the Centre is outlined on the floor plans in Figures 63, 64, and 65. Beginning with an overall explanation of the design in relation to the plans, the concept is presented in the remainder of this chapter as it would be experienced by a visitor, from public to private. At 21,973 square feet, the Centre is a large facility, and so the design concept is communicated graphically by focusing on six key areas of experience: the exterior approach, the reception, waiting area and juice bar on the first floor, the main staircase, the spiritual space, a typical consultation room, and the immune therapy pods on the second floor. The graphics are intended to convey the function, materiality and layout of these spaces while striving towards the intangible qualities of spiritual connection that are pivotal to the project. While reviewing each of these spaces, the theory, research, design guidelines and programming goals that were implemented as part of the design are discussed. Materials are also presented, and their sustainable qualities are outlined in Appendix C.

SPATIAL ORGANIZATION

The first floor of the Centre is divided in half based on the existing walls and columns. The east half of the floor is dedicated to the most public areas of the Centre since it offers the best views, most access to daylight and proximity to the main staircase and elevator. The west half serves as the Centre's administrative office space. This area also has favorable views of the residential area to the north and is close to staff parking on Duncan Street. The open layout of the office and inclusions of a meeting room with video conferencing capabilities facilitate collaboration between colleagues in and outside of the office. The office area is also adjacent to a staff bicycle storage area, showers and lockers to promote the use of sustainable active transportation among staff members. The south-west portion of the building is used for service, storage and janitorial areas on each floor of the building. This area has access to the existing service elevator and is in the area of the building with the least desirable view since it is occupied by the fewest number of people.

Figure 62 (opposite)
Site Plan
Scale: NTS



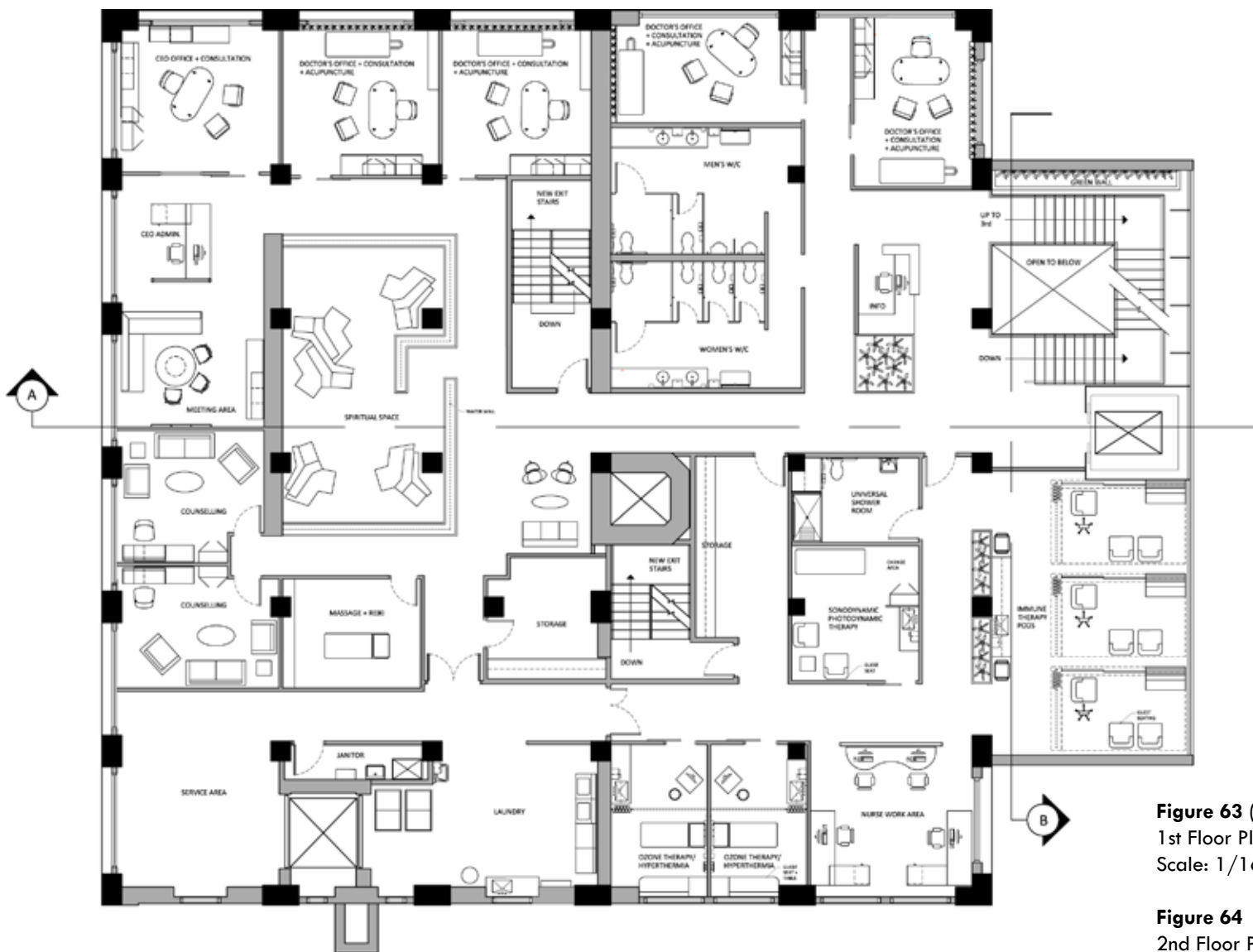
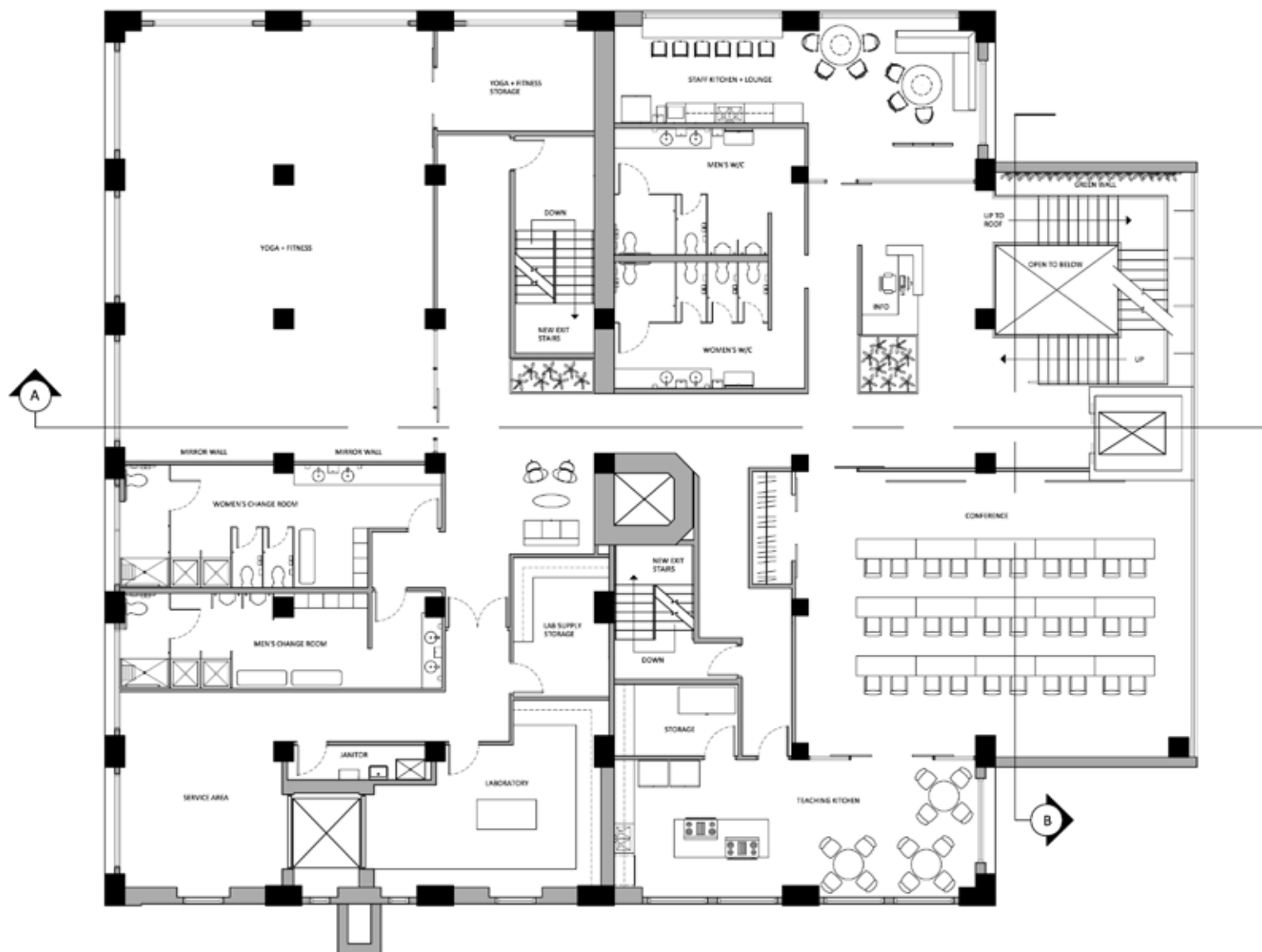


Figure 63 (opposite)
1st Floor Plan
Scale: 1/16" = 1'

Figure 64 (this page)
2nd Floor Plan
Scale: 1/16" = 1'



The second floor is dedicated to the Centre's consultation and therapy areas and also includes a spiritual space for quiet reflection. Consultation and therapy rooms are arranged on the perimeter of the building so each is located more privately and most have access to an operable window, fresh air and natural light. The massage/reiki and sonodynamic/photodynamic therapy rooms don't have access to a window since they involve therapies where patients would have their eyes closed for most of the session.

The south-east area of the second floor is closed off from the rest of the floor. It houses the most invasive therapies that include intravenous therapies, injections and blood re-infusion so this area is secured for patients' privacy and safety. In this area windows are inoperable and all materials and finishes support infection control. Within this area, the immune therapy pods are positioned to have the best view on the floor since people can spend up to an hour and a half receiving intravenous treatments. As noted by Ulrich et al. (2008), when viewing nature and in places lit by natural light, people experience less pain, reduced stress and their satisfaction with treatment increases. The pods are located to maximize the benefits of these evidence-based design guidelines. They are also located next to an accessible washroom since people typically have to urinate frequently while receiving large volumes of fluid intravenously. The second floor also includes an info desk adjacent to the stair and elevator landings to direct people when they arrive on the floor. The same is included on the third floor to ensure that people have a clear sense of where they are going and do not experience the stress of being lost on their way to a therapy or fitness session.

The third floor of the Centre is dedicated to group and educational functions. It houses a yoga and fitness room for large group classes, conference space with an attached kitchen for learning and catering and a private lounge area for staff. The yoga and fitness space is located adjacent to change rooms and while having access to natural light, does not afford views in from the existing surrounding buildings allowing people to retain a sense of privacy while taking part in fitness and meditation classes. Conversely, the conference room and teaching kitchen are located more publicly and offer views of the garden since they will accommodate people attending multi-day seminars. The conference space has a double height ceiling (see Figure 79, Section B) making this an impressive space for visiting professionals and patients.

The relationship between the floors and vertical circulation in the Centre is illustrated in Figure 66:

Figure 65 (opposite)
3rd Floor Plan
Scale: 1/16" = 1'

Section A and Figure 67: East Elevation. The views afforded by the stairs and transparent elevator are shown as well as the wayfinding accent colour on each floor. To someone who may be feeling disoriented, the sight of pale yellow on the first floor, sage green on the second and lilac purple on the third will quickly signal what floor the elevator is stopped on. These colours were inspired by the native prairie wildflowers planted on each floor. The elevator also opens onto the main east-west corridor on each floor providing views directly to the spiritual space on the second floor and yoga and fitness space on the third. These clear sight lines across each floor plate are intended to further reduce wayfinding confusion.

Figure 66
Section A
Scale: NTS



EXTERIOR APPROACH

Turning off Waterfront Drive, the exterior approach is the first encounter that people have with the Centre. Figure 68 illustrates the approach and shows how prominent the building addition is when approaching the Centre from the east.

As the first sight that people have of the Centre, the exterior and landscape are the first design elements to signal that this is a place of life, growth, change and renewal. Life and growth are communicated by the landscaped pathways and protective trees that surround the building. These not only provide opportunities for engagement with nature but also a habitat for birds and animals, adding to the sensory variability of the landscape.



Considering the combination of a historic building and a new addition, the contrast between old and new is most apparent from the exterior. The east facade is constructed of structural glass, but it's contained in a cube that relates strongly to the existing building in form, line and colour. The contrast between modern glass and historic architecture signals change while the cube appears to grow out of the existing building. In this way the building exhibits the biophilic qualities of change and metamorphosis communicating that this is a place of growth and renewal.

Beyond the aesthetic appearance of the building addition, it's clad in an environmentally responsible exterior panel product called EcoClad specified in Appendix C. This product is not only sustainable, but also highly durable. So while outwardly exhibiting biophilic qualities, the physical composition of the building addition is also environmentally responsible.

Additionally, the structural glass fin facade invites people to look into the vertical circulation space of the building while bringing healing natural light and unobstructed views of the landscaped garden to people inside the Centre. To control glare and heat gain in the south-east areas of the Centre, custom louvers are installed on the south half of the facade. The rhythm and colour of the louvers play on the patterning of prairie grass at a grand scale. They also contribute to a sense of enclosure, privacy and safety within the juice bar, immune therapy pods and conference areas on the east side of the building.

All of these elements combine to embody spirit by communicating messages of connection to nature on a variety of mutually reinforcing levels; through biophilic design strategies, coupled with evidence-based design guidelines, realized with sustainable materials and practices.

Figure 68
Approach to the Centre
from the east along
George Avenue





RECEPTION, WAITING + JUICE BAR

Entering the building off George Avenue, people's first impression of the Centre's interior is formed at the reception area depicted in Figure 69. Established in the design guidelines in Chapter 6, the first impression of the Centre is critical to communicating the overall message of healing in the Centre. The reception, waiting and juice bar areas convey this message by fostering aesthetic experiences that create connections to the phenomenal world and others.

At first sight, the space is filled with light, patterning, plants, and natural materials that speak to the prairie landscape and activate the space with a certain level of complexity. Evolved human-nature relationships are exhibited by overlapping planes that create visual interest as views invite people into the space. Immediately, a visitor can feel confident about where to go and is enticed to explore the space. After checking in, people make their way to the waiting area behind reception where they have direct access to the elevator and main staircase when it's time to go upstairs (see Figures 72 and 74).

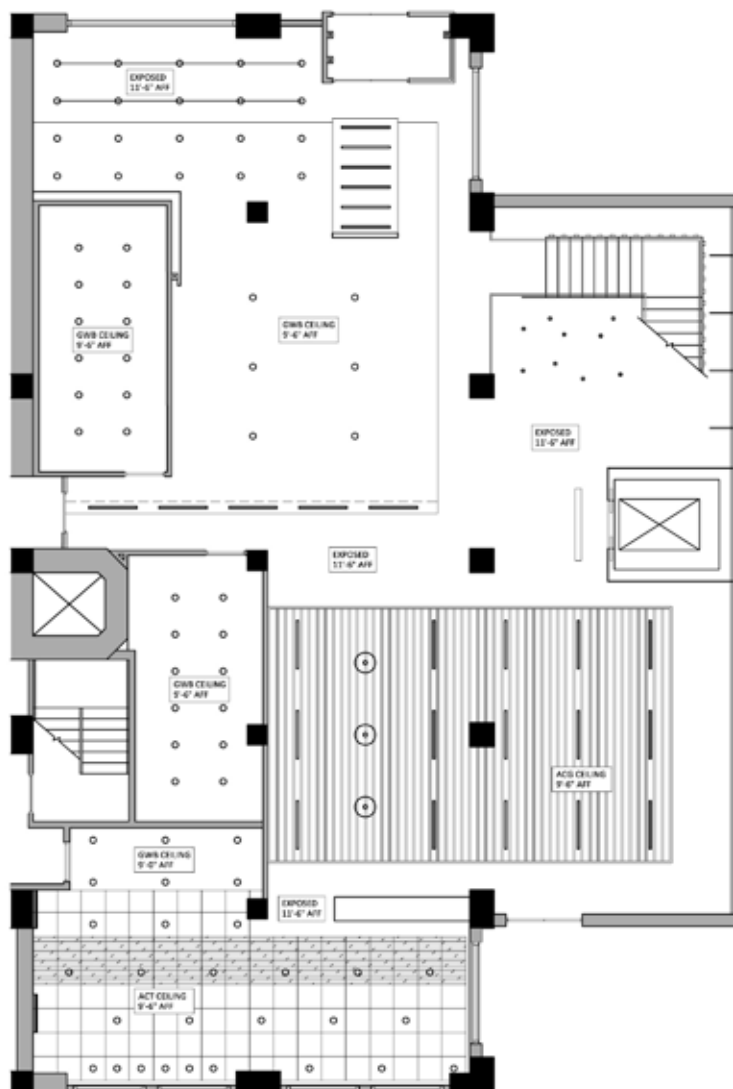
Figure 69
First impression:
reception, waiting +
juice bar







Figure 70
Rendered floor plan of
the east side of the first
floor
Scale: 1/16" = 1'



LEGEND:

- 4" WIDE LINEAR FLUORESCENT WALL MOUNTED
- 6" TRACK LIGHTING SUSPENDED
- 6" ROUND FLUORESCENT RECESSED
- 4" LINEAR FLUORESCENT CONCEALED
- 4" BOCCI 24.2 LED CUSTOM PENDANT
- 2" ROUND LED ACCENT FIXTURE RECESSED IN STAIR BALUSTRADE
- 5' LONG ATOMIS WING-C DIRECT/INDIRECT SUSPENDED
- LIGHTOLIER FD02 WITH OUTERGLASS PENDANT
- ARMSTRONG WOODWORKS GRILLE CUSTOM ACOUSTIC CEILING - MAPLE
- 2' x 2' ARMSTRONG WOODWORKS TEGULAR ACOUSTIC CEILING TILE - MAPLE
- 2' x 2' ARMSTRONG TEGULAR ACOUSTIC CEILING TILE - WHITE
- FOSCARINI FIELDS WALL SCONCE - BIANCO

Figure 71
Reflected ceiling plan of
the east side of the first
floor
Scale: 1/16" = 1'

As shown in the rendered floor plan (Figure 70), the open area progresses from the most public areas at the front to the most private at the back. Figure 71 illustrates the contribution of the ceiling plane and lighting concept to the experience of these areas. While the floor is open, contrasts in the flooring material, ceiling plane, and furniture help to create linked but distinct experiences of place when moving from area to area. Shown in Figure 72, a planter holding native prairie grasses between the waiting area and juice bar further delineates these two areas and the fireplace distinguishes the quiet library and fireside lounge from the rest of the public area.

In the waiting area, varied sensory experiences are created by the texture of the waiting chair upholstery, therapeutic views of the landscape beyond the structural glass wall, the subtle scent of the green wall that runs the length of the staircase and by the multi-sensory waterfall feature that is discussed in the following section. Seating options are provided in this area for people of all ages and abilities while the biomorphic form of Hans J. Wegner's Shell Chair introduces an additional biophilic element to strengthen the sense of connection to nature in the space.

Figure 72

View of the juice bar and elevator access from the waiting area





Of the entire open area, the juice bar is the most social area. It provides a place for people to relax and connect to each other before or after a fitness class or treatment. This space leverages the biophilic design principles outlined below to connect people to each other, the phenomenal world and a sense of safety.

Shown in Figures 73, 74, and 76, the juice bar is enveloped by an acoustical grille ceiling and wooden slats that run down the west wall. The ceiling is intended to dampen noise while providing a sense of enclosure in the space. The ceiling's texture also plays off the patterned shadows cast onto the floors and walls from the exterior louvers. In essence, the juice bar is a place of refuge from the other functional areas of the Centre. This quality of refuge is reinforced by the views to climbable trees in the garden, the availability of food and nourishment, wildflower and berry bushes planted in the juice bar millwork and the proximity to the small fire at the back of the space (See Figures 73 and 74). The fire also engages the haptic sense as the warming sensation it creates provides a tangible comfort in the space. This area engages all of the senses while its function and dynamism invite people to stay and interact with each other.

Figure 73
(opposite top)
Cafe - south elevation

Figure 74 (bottom left)
Reception, waiting + juice
bar - east elevation

Figure 75 (bottom, right)
Reception, waiting + juice
bar - materials + finishes.
See Appendix C







Figure 76
Approaching the juice
bar from the waiting
area

MAIN STAIRCASE

The main staircase is the focal point and most immersive area in the Centre. It carries a significant biophilic presence that is felt on each floor and fosters a sense of spirit related to connections within the individual, to the phenomenal world, and to ultimate meaning. The staircase runs alongside the strongest environmental feature in the Centre: a green wall that runs the length of the staircase on the north wall as a literal reference to nature. It also frames a custom chandelier that cascades through the Centre. At the base of the staircase, a small waterfall garden fosters a range of aesthetic experiences to invite people's awareness. These multi-sensory elements combine to create a strong sense of connection to the phenomenal world when experiencing this area (see Figures 77 to 83 on the following pages).

As a space of transition, the staircase has the unique ability to connect people to a kinesthetic sense of themselves as they circulate through the building. At its most bare, a staircase signals health as the act of climbing or descending it is a form of exercise that engages the body in motion. In the Centre, the main staircase builds on this engagement and seeks to be a place of delight; encouraging people to use it and inviting haptic interaction with the architecture.

The staircase itself is constructed of steel and clad in maple, softening the industrial structure and referencing the trees in the landscape beyond the glass facade. The risers are closed and the exterior balustrade is solid maple conveying that the stairs are secure and safe to climb. Conversely, the inner balustrade is transparent to provide an unobstructed view of the chandelier beyond.

The chandelier is a custom installation of the Bocci 14 light fixture designed by Omer Arbel and randomly arranged cut crystals as indicated in Detail 1 (Figure 80). It cascades through the void in the staircase evoking an image of rainfall and renewal. During the day, the luminaires are turned off and the abundance of natural light from the glass facade illuminates the staircase. Shown in Figure 77, this natural light is refracted by the crystals and casts rays of coloured light on the staircase and into the floor plates. This enchanting light illicitly the biophilic qualities of awe and delight and speaks to a connection to a higher power that is intimately memorable. In the late afternoon and evening, the luminaires are turned on and cast an ephemeral glow in the staircase. Looking up from the base of the staircase, the effect of the grouping of 520 luminaires is extraordinary (see Figure 83).





Figure 77 (left)
The main staircase by day,
viewed from the second floor

Figure 78 (right)
Cluster of Bocci 14
luminaires

DETAIL 1



Figure 79
Section B

DETAIL 2

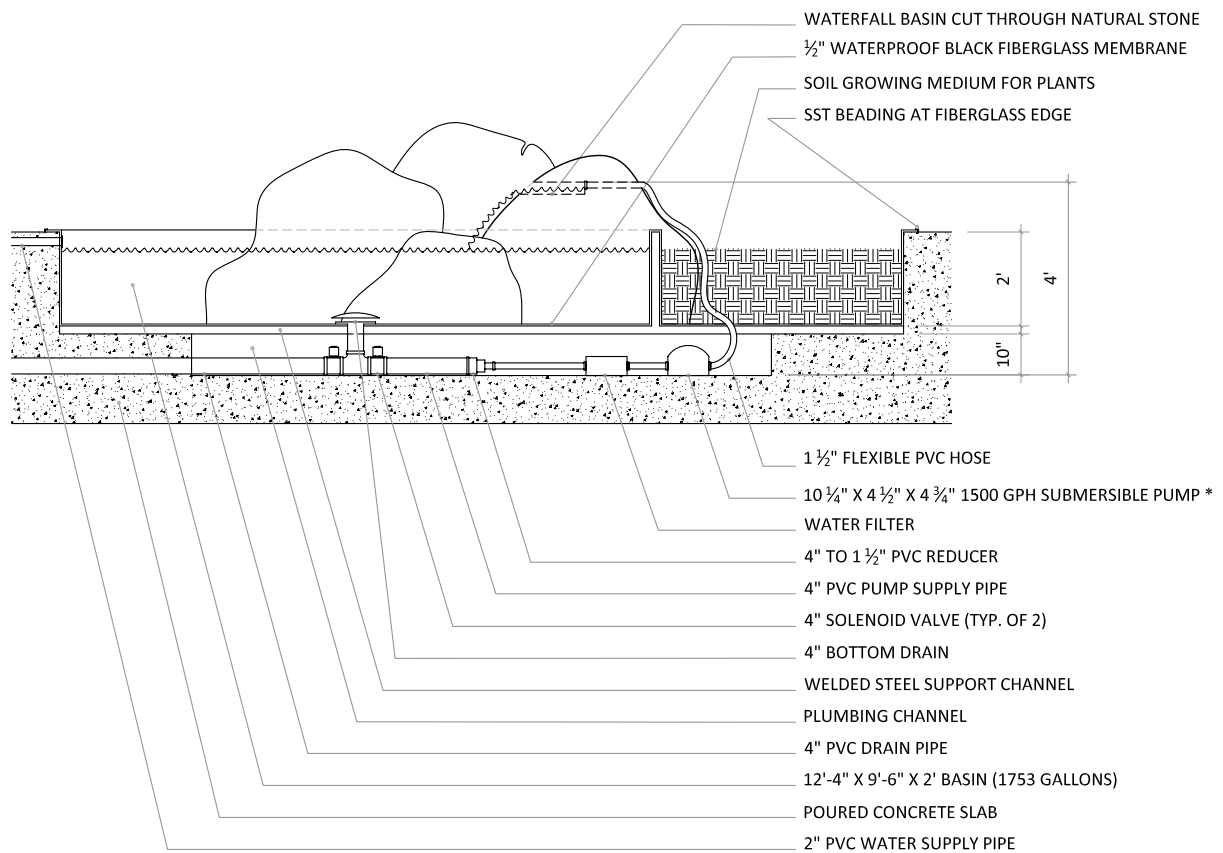


Figure 82 (this page)
 Detail 2 - Section at
 waterfall feature
 Scale: 1/2" = 1'

Figure 83 (opposite)
 The custom chandelier
 and waterfall at night

* NOTE: 1500 GPH PUMP PROVIDES 1100 GPH
 AT 4' HEAD. IT RECIRCULATES 2/3 OF THE BASIN'S
 WATER EACH HOUR.



The waterfall garden at the base of the stairs, also shown in Figure 83, can be experienced intimately from the seating beside the feature or at a moderate distance from the waiting area beyond. In the waiting area, this feature is expected to break up the boredom and stress of the experience of waiting by providing a multi-sensory positive distraction that engages the visual, auditory and taste-smell systems. The evidence-based support for the inclusion of natural elements as positive distractions indicates that these contribute to reduced patient and staff stress and increased patient satisfaction (Ulrich et al., 2008). These positive effects are increased when visual features are combined with the engagement of other sense modalities (Ulrich et al., 2008).

The overall effect of the main staircase is an alluring place that engages all of the senses and communicates messages of life and healing at each turn. As an especially immersive place that is experienced in motion, the staircase contributes to the sense of journey through the Centre and is especially effective at distancing people from the outside world by offering a dynamic series of experiences of connection on a series of mutually reinforcing levels.

SPIRITUAL SPACE

The spiritual space is a quiet area of contemplation and restoration on the second floor of the Centre whose focus is the creation of connection to ultimate meaning. As indicated by Stephen Kellert (2008), rushing water and majestic light have the potential to connect people to a sense of something greater than themselves, communicating messages of spirituality and transcendence. Bounded by a water wall on three sides and enveloped with shifting light, the spiritual space is a multi-sensory area that creates a strong sense of connection to ultimate meaning and of enclosure and privacy while retaining an impression of openness (see Figure 84).

Arriving on the second floor from the elevator, a reclaimed bur oak floor accent guides people to the space, creating a sense of procession along the length of the hallway as the water wall draws people in. To enter the space, visitors walk around the wall, reinforcing that this is a place away from the rest of the Centre with a kinesthetic act. Screening the interior from view until coming around this corner, the reveal evokes delight at the sense of discovery upon entry (see Figure 87).

Inside the space, a person has the feeling of being under a protective tree canopy with the glow of natural light casting shadows all around. The effect is created with subtly shifting fluorescent lights concealed behind laser cut panels that mimic the form of a trembling aspen tree canopy. Although the spiritual space does not have access to natural light, this lighting effect communicates the impression of being outdoors in nature. The form of the seating, an adaptation of Patricia Urquiola's Rift, further extends the impression of the natural landscape indoors. The seating invites interaction and offers options to sit alone or with a companion providing the opportunity for comforting tactile interactions between family and friends.

The key element of the space remains the water that surrounds it. Water is a restorative element that holds spiritual significance across religions. It is also especially immersive as a positive distraction; it conveys distinctly natural and pleasing sounds and smells while inviting a cooling touch. By dissolving the solidity of the spiritual space's walls with water, the area is bounded and conveys a sense of security without boxing people in. Along the back wall, carved sculptural panels speak to the movement of falling water and also call to be touched (see Figures 86 and 87).

Connections are felt at all levels in the spiritual space, but the focus is decidedly inward, while strong references to restorative natural elements speak to a higher power and ultimate meaning.

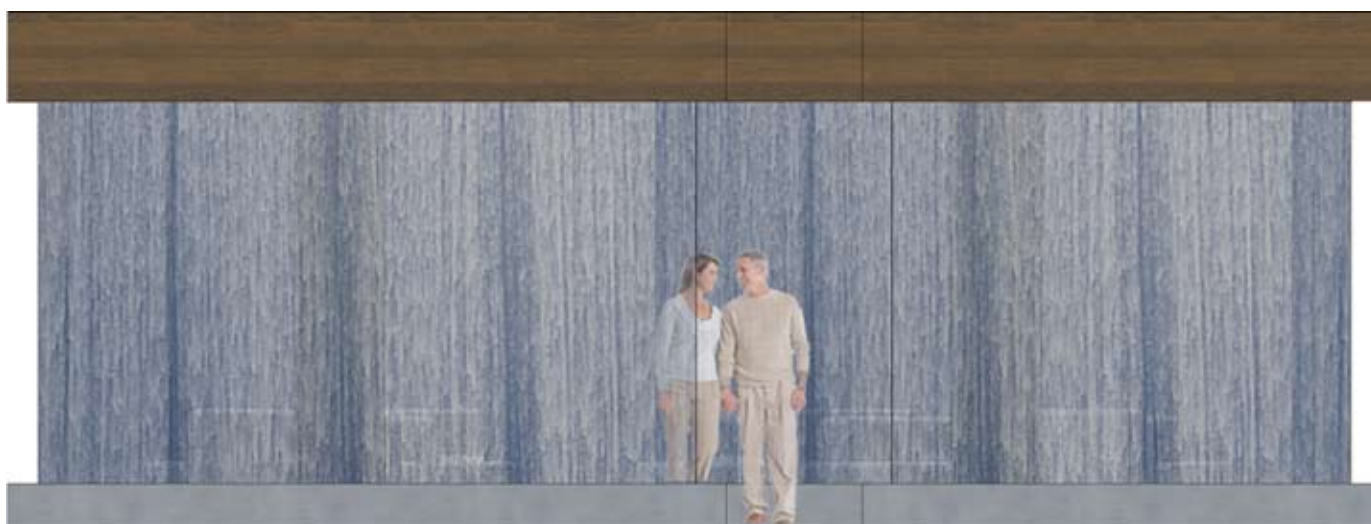


Figure 84 (opposite)
Interior perspective of
the spiritual space

Figure 85 (right)
Spiritual space -
materials and finishes.
See Appendix C







TYPICAL CONSULTATION + ACUPUNCTURE ROOM

The four consultation and acupuncture rooms are arranged along the north wall of the Centre. Two are across the hall from the spiritual space. In these rooms, function dictates a large part of the experience but biophilic evidence-based elements are also incorporated into the design to connect people to the phenomenal world and to ease patient stress. The soul of these rooms enable patients to feel comfortable, relaxed and in control of their healing process.

Shown in Figures 88, 89, and 90, the detailing in the consultation room is intended to heighten favourable sensory experiences while mitigating patient discomfort. The effect of the spiritual space's water wall is carried into the rooms with the fluid action of opening a sliding door to enter. Doors also include lights with glass etched in a fluid pattern. The concept of the aspen tree canopy is translated into the room with the inclusion of wallcovering depicting tree trunks on the interior wall. Biophilic environmental features are also present in the room including maple surfaces, native wildflowers planted along the windowsill, and access to natural light, fresh air and favourable views through the operable windows.

The interior of the consultation room is furnished with uninstitutional pieces and guest seating is provided for care partners. During consultations, an LCD screen behind the doctor's chair allows the patient and care partner to view the same medical information on the doctor's laptop as it's discussed. This provides the opportunity for all parties to take an informed role in treatment decisions.

Lighting also plays a role in the experience of this room. Overhead, four square recessed light fixtures incorporate coloured light technology to create emotional coloured effects or a biodynamic white light environment during consultations. During acupuncture sessions these lights are turned off and blend into the ceiling allowing an unobstructed natural scene to be projected. The scene is selected by the patient, further enhancing their sense of control in the space. The nature scene also acts as an evidence-based positive distraction, diverting people's attention from the potential discomfort of the acupuncture needles and their intended purpose. When not in use, the projector slides into the moveable custom millwork that supports the acupuncture table.

Figure 86
(opposite top)
Elevation showing
sculptural panels on the
interior west wall

Figure 87
(opposite bottom)
The concealed entry
in the water wall



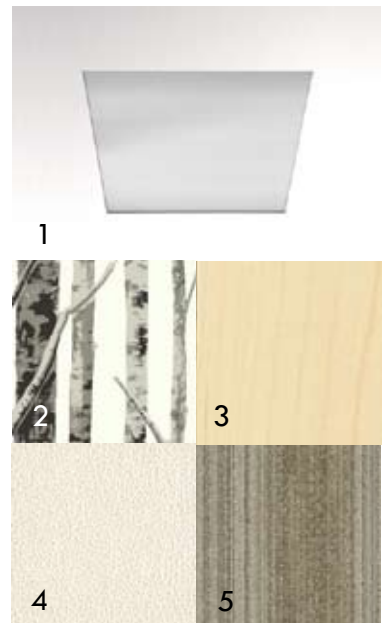


Figure 88 (opposite)
Interior perspective of
the consultation room

Figure 89 (top)
North elevation

Figure 90 (bottom left)
South elevation

Figure 91 (bottom right)
Consultation room -
materials and finishes



IMMUNE THERAPY PODS

In the immune therapy pods, people spend up to an hour and a half receiving immune system boosting compounds intravenously. The design of the pods is intended to prioritize a sense of user control and safety during these treatments while connecting people to others and a personal sense of the phenomenal world.

Each pod is envisioned as it's own private enclosure, enveloped with natural materials and references. Shown in Figure 92, these enclosures provide a sense of privacy, security and enough space and ergonomic seating to accommodate two care partners during treatment. The east glass facade affords restorative views of the garden beyond and the tall grass patterning in the resin panels and bird-like form of the pendant lamp carry the impression of the garden indoors. Individual television screens in each pod afford people the option of watching a sports game or other show connecting them to the phenomenal world in a way that has personal relevance.

Beyond this, a key element of the pods is their versatility. Figure 93 demonstrates how the pods can transform from very private enclosures into an open common space by sliding the resin panels into the wood enclosure and opening the privacy curtain. This layout shows the relationship of the pods to the transparent elevator enclosure beyond and invites interaction and camaraderie between patients. Figures 94, 95, 96, and 97 show the interior elevations in both configurations.

Evidence-based design guidelines also factored heavily into the design of the immune therapy pods. The prioritization of space for care partners in each pod is expected to reduce patient stress while improving patient privacy, confidentiality, social support and communication between patients and family members. Prioritizing views of nature and providing an abundance of natural light is expected to reduce staff and patient stress and patient discomfort while receiving treatment. All of these factors contribute to increased patient satisfaction (Ulrich et al., 2008).

In this area, the passive act of receiving treatment is transformed into an active time spent engaging with the surrounding landscape and connecting to the people and themes that hold meaning for each patient. Similar to the typical consultation and acupuncture rooms, there is also a strong sense of user control in the space.

Figure 92 (opposite)
The private immune
therapy pods







Figure 93 (opposite)
The public immune
therapy pods

Figure 94 (top)
West elevation - private

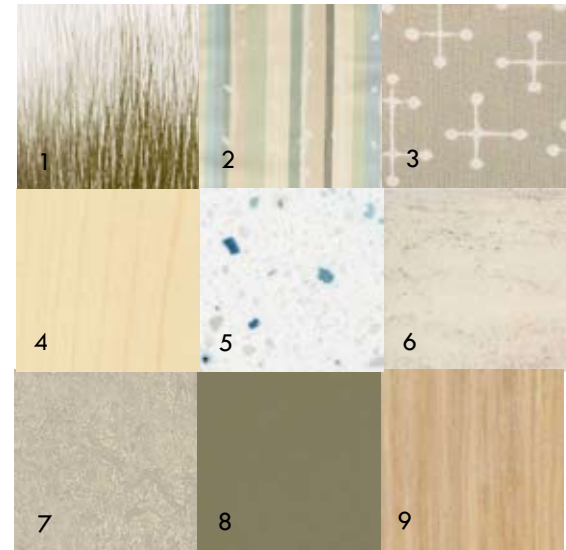
Figure 95 (bottom)
West elevation - public

Figure 96 (right)
East elevation
showing view
to garden

Figure 97
(below left)
North elevation -
private



Figure 98
(above right)
Immune therapy pods -
materials and finishes.
See Appendix C



SUMMARY

To embody spirit, places must connect us to a sense of ourselves and the phenomenal environment, to those around us, and to greater meaning while remaining safe places to explore and return to. While fostering these connections, they must also speak to the history of their surroundings and be founded on and built with sustainable design principles.

The design presented in this chapter illustrates how these kinds of places can be created within the healthcare typology. Looking to the effect of natural elements, materials, patterns and processes on a person's experience of place, solutions are presented that respond to the body of evidence-based research on the therapeutic benefits of biophilic design. Within the design, care partners are envisioned as integral team members in each person's healing journey and views of nature and natural light are leveraged as a proven way to enhance the healing process.

The materials and design language employed in each space in the Centre are similar, but they distinguish themselves by housing different functions and fostering varying levels of connection to nature. The selection of materials and resulting colour palette is subtle, yet speaks to the prairie landscape providing a place-based environment that people from Winnipeg can relate to home.

Informed by the theory, research, precedents, program and site analysis outlined in Chapters 2 to 6, the design result is a place that embodies spirit, and fosters the connections, that are critical to the healing journey of people living with cancer.

CONCLUSION

First and foremost, this practicum is an exploration of how the interior environment can be leveraged to make people feel more whole while seeking treatment for cancer. It focuses on the often forgotten spiritual dimension of people's experiences with cancer treatment, and is an earnest attempt to shed light on the influence of interior design in these experiences. Seeking to provide for the spiritual dimension is not an easy task. The subjective and highly personal nature of spirituality precludes the ability to design for it in a formulaic manner. Nonetheless, the literature that formed the conceptual starting point of this project was instrumental in providing insight into how people find spiritual meaning in the face of cancer, and in creating guidelines into how these meaningful connections may be fostered by an interior environment.

Beginning in the field of whole person care and oncology, a phenomenological study established that when faced with life-threatening illness, people find spiritual meaning when perceiving experiences of connection within themselves, with others, with the phenomenal world, and with greater meaning in a secure environment. Information from the fields of phenomenology, architectural theory, human-geography and biophilia provided awareness into how these connections can be fostered in a healthcare environment by creating mutually reinforcing connections to nature. Beginning by engaging the nature 'in us' through sensory stimulation design; natural views, light, forms, patterns, process, elements and materials were employed in the design to enable conceptually externalized experiences of connection as well.

The design of the Centre, and specific places of experience within it, were realized through the adoption of environmentally responsible design methodologies, beginning with the reuse of an existing historical building. The penetration of natural light into the building was increased with the inclusion of a structural glass wall reducing the use of already energy efficient artificial lighting. Active and public transportation to the Centre was encouraged by selecting a site close to major bus routes and providing secure bicycle storage, showers and lockers for staff use. Storm water run-off and heat radiating from the building were reduced by a healing garden on the roof. Within the Centre, the inclusion of plant life cleans the air while non-toxic materials avoid off-gassing harmful

substances. Materials were also chosen that are local, recycled, rapidly-renewable, and easily cleaned.

As one of the project benefits, this practicum also sought to demonstrate that many of the abovementioned industry-accepted environmentally responsible design strategies are sustainable on a multitude of reinforcing levels. For example, the provision and manipulation of daylight, is as economically sustainable as it is effective at fostering connections to greater meaning, and is proven to reduce patient pain and stress (Ulrich et al., 2008). Acknowledging the spiritual significance of this and other design strategies that connect people to nature can only strengthen the case for building sustainably, especially within the healthcare typology.

REFLECTION: CHALLENGES, LIMITATIONS AND OPPORTUNITIES

As a master's of interior design student with an engineering background, undertaking the conceptual design of an integrated cancer treatment centre was not without its challenges and limitations. Without experience in the field of healthcare, and with limited time and financial resources, I had to rely heavily on internet sources to determine the functional requirements of the integrated therapies that are accommodated in the Centre. Although several healthcare professionals working in the field of integrated oncology made themselves available to answer some of my questions, actual observational studies in an integrated cancer treatment setting would have been an asset to the programming stage of the project.

As the project developed into the detailed design stage, working within a building of finite size presented issues as well. In particular, limited area on the first floor of the Centre precluded the ability to include washrooms without doors to reduce the transmission of infection, and the provision of additional seating in the waiting area. On the second floor, the expansion of the existing staircase to meet building code regulations reduced the open area in front of the spiritual space's water wall. With more space, other areas could have been included as well such as a play space for children and a secondary waiting area on the second floor. Additional floor area on the second floor would also have created an opportunity for future expansion of the therapy spaces. This was listed as a concern in the facility management of integrated healthcare spaces in Chapter 6. With more experience space planning healthcare facilities and in building code application, these issues

could have been resolved in the earlier stages of design possibly leading to a larger, or secondary addition to the existing building.

At just under 22,000 square feet, the Centre is a large facility. Undertaking the design of the entire interior meant that the scope of my project focused on interior design at a large scale. I was only able to zero in on select areas to design in depth. Even in these areas, my focus was on the overall experiences that could be fostered in each space, rather than on intimately detailed design. Realistically, any area in the Centre could be analyzed and designed in detail as part of a future project. In the later stages of design, I became especially curious about the potential to design the washrooms as places that transcend their utilitarian function to become active places that support people in their most vulnerable moments.

Other critical areas that could be examined include spaces for waiting, examination rooms, and ergonomic, spiritually engaging furniture. Designing from an existing hospital layout would also present a different set of important design challenges to study. With interior partitions that could be salvaged in place, and plumbing and mechanical systems to incorporate into the design, the ability to create grand design gestures like the main staircase in the Centre would be reduced. Designing to enhance people's holistic health would need to occur on a more modest scale, with colour, texture, materiality and related individual elements taking a leading role in communicating messages of connection.

Finally, a shift in the project focus and scope could enable an in-depth exploration of some of the environmentally sustainable design strategies that were touched on in this project. For example, the multi-level benefits of incorporating a greywater biofiltration pond as a biophilic design feature could be examined. Thoroughly researching water and energy efficient interior elements, and the benefits of incorporating them into engaging interior design elements would further strengthen the case for designing sustainably in concert with nature.

Working through this project, I found myself revealing on paper what I have felt for some time intuitively: that the environment that surrounds us, both natural and human-made, affects us on physical, mental, emotional, and spiritual levels. The translation of research, theory and precedents into design guidelines necessarily involves personal interpretation. While I endeavoured to present

unbiased conclusions, the synthesis of information from varying fields of study requires the guidance of a thesis while searching for meaning. My thesis states that it is possible for interior design to have a positive impact on the holistic health of people living with cancer. I think that I have made a convincing argument to support this thesis through this project. However, my argument would no doubt be strengthened if my project scope included a contrast of the literature I presented with academic work that does not support my point of view.

SUMMARY

"Nobody made a greater mistake than he who did nothing because he could only do a little."
- Edmund Burke

Treating cancer within a model of integrated care involves the consideration of many factors. Although the physical environment may be viewed as only one of these, the role that it plays in communicating effective messages of healing should not be overlooked. Beyond displaying proven evidence-based design strategies that have a direct impact on reducing people's stress, pain and dissatisfaction with their overall healthcare experience, this practicum sought to establish that interior design also has the capacity to foster spiritually meaningful experiences of connection. While it may be impossible to prove in the traditional sense, the potential that interior design has to impact the spiritual health of people with cancer remains. By providing experienced interior designers with a voice in the initial stages of oncology healthcare design, embodied messages of healing have the potential to be communicated by the entire fabric of healthcare spaces.

APPENDIX A:

OVERVIEW OF SELECTED INTEGRATED CANCER THERAPIES

The following descriptions are based on information obtained from the National Centre for Complementary and Alternative Medicine's (NCCAM) web-based information sheets on health topics, the book *Integrative Oncology: Incorporating Complementary Medicine into Conventional Cancer Care*, and descriptions of integrated therapeutic approaches listed on the Dove Clinic for Integrated Medicine's (DCIM) web site.

ACUPUNCTURE

Acupuncture is one of the oldest healing practices in the world and is an integral part of Traditional Chinese Medicine (NCCAM, 2007a).

The term "acupuncture" describes a family of procedures involving the stimulation of anatomical points on the body using a variety of techniques. The acupuncture technique that has been most often studied scientifically involves penetrating the skin with thin, solid, metallic needles that are manipulated by the hands or by electrical stimulation. (NCCAM, 2007a, para. 3)

In an integrated oncology setting, acupuncture can be used to relieve the physical and emotional symptoms associated with conventional cancer treatment and to enhance the quality of life of all cancer patients. Cohen & Markman (2008) explain:

Acupuncture is a reasonable option for cancer patients given the nature of their symptoms and side effects from conventional therapies, such as chemotherapy-induced nausea/vomiting, cancer pain, insomnia, fatigue and anxiety. Acupuncture is used at all stages of cancer: patients who are in the midst of chemotherapy or radiation therapy and experiencing side effects; patients who have completed cancer treatment and are in a transition period rehabilitating back to their normal life; and patients who have been off treatment for years, but want to enhance their immune system, quality of life, or general sense of well-being. (Cohen & Markman, 2008, p. 183)

The Dove Clinic also employs a specialized form of acupuncture centered on the ear called Auricular Therapy. This technique uses the pulse to locate specific organ targeted acupuncture points on the ear. This therapy “produces significant clinical benefits” (DCIM, n.d.a, para.1).

ANGIOGENESIS INHIBITORS

Angiogenesis inhibitors are substances which slow or stop the growth and spread of tumours by restricting the growth of new blood vessels to supply the tumour. The Dove Clinic has had “encouraging results” using a low molecular weight extract of bindweed used in this application (DCIM, n.d.b, para.1).

BIOCHEMICAL BLOOD TESTS

Biochemical blood tests are laboratory tests that “require examination and measurement of the cells of blood, as well as blood clotting” (DCIM, n.d.b, para.1). At the Dove Clinic these tests are used to monitor the details of immune system function in cancer patients and to track tumour activity (DCIM, n.d.b).

ELECTRODERMAL TESTING

According to the Dove Clinic (n.d.d), electrodermal testing is:

A means of testing the electrical characteristics of acupuncture points and balancing them against several thousand medicinal substances and pathogens, both in order to make a diagnosis and also to determine treatment. [However], this diagnostic approach is not well researched compared to methods such as scans, X-rays etc. (para.1)

The clinic administers a range of organ-based complex homeopathic preparations and cell mediated immune system preparations orally based on the results of electrodermal testing. (DCIM, n.d.d)

HOMEOPATHIC MEDICINE

Homeopathy, also known as homeopathic medicine, is a whole medical system that was developed in Germany more than 200 years ago and has been practiced in the United States since the early

19th century. Homeopathy is used for wellness and prevention and to treat many diseases and conditions (NCCAM, 2009a, p.1).

Homeopathy operates on the principle of similars or that “like cures like” that states that “a disease can be cured by a substance that produces similar symptoms in healthy people. ... Homeopathy seeks to stimulate the body’s ability to heal itself by giving very small doses of [these] highly diluted substances” (NCCAM, 2009a, p.1).

In classical homeopathy substances are progressively diluted and thoroughly shaken between dilutions to transmit the energy of the healing substance to the water. In the end, no molecules of the healing substance are left but “it is believed that the substance has left its imprint or “essence”, that stimulates the body to heal itself (this theory is called the “memory of water”). (NCCAM, 2009a, p.2)

IMMUNE THERAPY

Immune therapy could be considered to be any therapy that activates the body’s immune system so that it is better able to fight off disease. In this sense any number of stress-reducing modalities described in this appendix could be considered to be immune therapy. As noted by Cohen & Markman (2008) “extensive research has now established that stress and depression cause suppression of cell-mediated immunity and are associated with [the growth and spread of cancer]” (p.141). So modalities including MBCT, Yoga, Massage Therapy and others could be considered to be immune therapy.

Immune therapy practiced at the Dove Center for Integrated medicine (n.d.e) “centres around the use of medications known to improve cell mediated immunity” (para.1). Therapies administered at the center include proteglycan preparations and intravenous Vitamin C administered at very high doses. According to the Dove Centre, this dosage of Vitamin C is:

a safe way of killing tumour cells [that] doesn’t carry the side effects of chemotherapy. High dose intravenous Vitamin C has published evidence to show that cancer cells can be killed using this approach, but there are currently very few studies in specific cancers to indicate success rates in specific tumours. [However], research using this approach into

specific cancers is currently being carried out at various centres worldwide. (The Dove Clinic for Integrated Medicine, n.d.e, para.3)

The Dove Clinic also administers Vitamin C using various oral supplements to increase Vitamin C levels in cancer patients undergoing Vitamin C infusion (The Dove Clinic for Integrated Medicine, n.d.e).

INDIBA HYPERTHERMIA

Hyperthermia is a method of cancer treatment that uses heat, up to 45 degrees Celsius to damage and kill cancer cells. It is also used in combination with non-toxic cancer therapies, chemotherapy drugs or radiotherapy to increase the effectiveness of these treatments (Hope4Cancer, n.d.).

In Local Hyperthermia treatment, heat is applied to a small area of the body containing a localized cancerous tumour. According to the Hope4Cancer Institute “Local Hyperthermia ... is a well-established cancer treatment method with a simple basic principle: If a rise in temperature to [41 degrees Celsius] can be obtained for one hour within a cancer tumor, the cancer cells will be destroyed” (Hope4Cancer, n.d., para.1). In local hyperthermia, cancer cells are killed without harming the surrounding healthy tissue.

The Hope4Cancer Institute (n.d.) has described how hyperthermia treatment works:

Hyperthermia treatment destroys cancer cells by raising the tumour temperature. This is similar to the way the body uses fever to fight infection. When normal body tissue is heated the blood vessels open up (dilate) to allow the blood to flow more freely. This helps to cool down the area and prevent damage. The blood supply to cancer cells is different. The blood vessels cannot dilate as well and blood flow is generally slower. When heat is applied to a cancer, the cells are less able to cool down and are more likely to be damaged by the high temperature. The effect of the heat damages the cancer cells and can deprive them of the nutrients they need to survive. (para.5)

Indiba Hyperthermia is a type of local hyperthermia treatment that involves the placement of an electrode on the skin that produces a radio frequency current. This current is dissipated deep

into the tissue beneath the electrode that results in an electrical resistance in the tissue that creates power and heats up the temperature of the tissue. As opposed to applying heat externally, Indiba Hyperthermia is very efficient and only a slight warming sensation is felt by the patient from the inside out. Indiba Hyperthermia also has no known side effects or contraindications and is believed to be completely harmless (Hope4Cancer, n.d).

The National Cancer Institute is currently conducting clinical trials to study the effectiveness of local, regional, and whole-body hyperthermia and is conducting studies to improve hyperthermia techniques (NCI, 2004).

LIVE BLOOD ANALYSIS

Live blood analysis (LBA) “is a relatively new technique for looking at blood in the living state” (DCIM, n.d.g, para.1). As opposed to the conventional practice of looking at blood in a dead state, LBA uses High Resolution Darkfield Microscopy to magnify a drop of fresh blood from a patient’s fingertip nearly ten thousand times. The cells and contaminants in the patient’s blood are shown on a video screen and used to assess the nutritional status, immune function, oxygen levels, toxic overload and other aspects of the patient’s health. This method of analysis is graphic, educational and interactive and allows both the medical practitioner and the patient to see the components of the blood interacting “in real time” (DCIM, n.d.g, para.1).

Although LBA is not a stand alone tool for diagnosis, it acts as a useful fundamental screening tool and “acts as a valuable clinical tool in the screening process” (DCIM, n.d.g, para.4).

MASSAGE THERAPY

Massage therapy has been used for thousands of years in cultures around the world and includes a variety of different types of therapy (NCCAM, 2009b). “In general, therapists press, rub, and otherwise manipulate the muscles and other soft tissues of the body. They most often use their hands and fingers, but may [also] use their forearms, elbows, or feet” (NCCAM, 2009b, p.2).

Although it has been taught in the past that massaging cancer patients is not advisable, “it is [now]

known ... that patients with cancer can benefit from massage and some simple precautions and extra training [by massage therapists] can make it safe to massage cancer patients” (Cohen & Markman, 2008, p. 61). “For cancer patients to receive maximum benefit from massage, therapists vary pressure and duration of body work according to the patient’s clinical status” (Cohen & Markman, 2008, p. 73).

MEDITATION

The term meditation encompasses a group of mind-body techniques that originated in Eastern religious or spiritual traditions and have been used by different cultures around the world for thousands of years (NCCAM, 2009c).

Generally, a person who is meditating uses certain techniques, such as specific posture, focused attention, and an open attitude towards distractions. Meditation may be practiced for many reasons, such as to increase calmness and physical relaxation, to improve psychological balance, to cope with illness, or to enhance overall wellness. (NCCAM, 2009c, p. 1)

Mindfulness meditation has been shown to decrease mood disturbances and stress symptoms in cancer patients and is appropriate for people at any stage of cancer treatment (Cohen & Markman, 2008).

MINDFULNESS BASED COGNITIVE THERAPY

The Dove Clinic for Integrated Medicine (n.d.i) has succinctly defined and summarized the evolution of Mindfulness Based Cognitive Therapy:

Mindfulness Based Cognitive Therapy (MBCT) is a programme of classes designed to help people ‘move toward greater balance, control and participation’ in life. It was developed at Cambridge University by Professors Mark Williams, Zindel Segal and John Teasdale, to bridge the gap between mindfulness based approaches to healthcare and Cognitive Behavioural Therapy (CBT), which has been scientifically proven extremely effective for a wide range of physical and psychological problems.

MBCT evolved from a programme called Mindfulness Based Stress Reduction (MBSR) developed by Jon Kabat-Zinn in the USA for people suffering from chronic pain and psychological difficulties. ...

MBCT is [offered at the Dove Clinic as] an 8 week programme of 2 hour classes, consisting of mindfulness meditation and cognitive exercises. There are also opportunities during the classes to discuss and reflect on your experiences with the programme facilitators and fellow participants. Participants are also invited to carry out a daily mindfulness meditation practice of approximately 45 minutes in duration in between classes guided by professionally recorded CD's. (para.2)

The benefits of MBCT, proven by randomized control trials include:

- Lasting decreases in physical and psychological symptoms
- Increased ability to relax
- Reductions in pain levels and enhanced coping ability for pain that may not go away
- Greater energy and enthusiasm for life
- Improved self-esteem
- Improved ability to cope more effectively with both short and long-term stressful situations (DCIM, n.d.h)

The benefits of MBCT have also been specifically studied in outpatient oncology populations and have been proven to improve mood and sleep quality and reduce the symptoms of stress and fatigue in cancer patients (Cohen & Markman, 2008).

MUSIC THERAPY

Music has been a part of the human experience since ancient times, marking important private and communal events and serving as a centerpiece for daily activities. Music affects people deeply and has the capacity to sooth, energize, or call to action. Every culture has its music, which often originated in efforts to mimic sounds found in nature using simple pipes, drums, and strings. The use of music for healing and spiritual ceremonies

predates the written word and may even predate language. The benefits of music therapy, which involves a trained practitioner who uses music to reach therapeutic goals, include a period free from interruption, the companionship and skills of the therapist, and live, soothing music. (Cohen & Markman, 2008, p.73)

Administered by healthcare professionals known as music therapists, music therapy has been a recognized form of health treatment for over sixty years. It has also been shown to reduce anxiety and depression in cancer patients waiting to undergo a particular surgery that is known to cause high psychological distress (Cohen & Markman, 2008).

NATUROPATHIC MEDICINE

Naturopathic Medicine (or Naturopathy) is a whole medical system that originated in Germany and has been further developed over the past two centuries in the United States (NCCAM, 2007b).

The word naturopathy comes from Greek and Latin and literally translates as “nature disease.” A central belief in naturopathy is that nature has a healing power (a principle called *vis medicatrix naturae*). Another belief is that living organisms (including the human body) have the power to maintain (or return to) a state of balance and health, and to heal themselves. Practitioners of naturopathy prefer to use treatment approaches that they consider to be the most natural and least invasive, instead of using drugs and more invasive procedures. (NCCAM, 2007b, p.1)

Examples of treatments associated with naturopathic medicine include:

- Dietary changes (for example, eating more whole and unprocessed foods)
- Vitamins, minerals, and other dietary supplements
- Herbal medicine
- Counseling and education on lifestyle changes
- Homeopathy
- Hydrotherapy (for example, applying hot water, then cold water)
- Manual and body-based therapies such as manipulation and mobilization
- Exercise therapy
- Mind-body therapies such as yoga and meditation. (NCCAM, 2007b, p.4).

NUTRITIONAL COUNSELLING

Nutritional counseling for people with cancer includes “scientifically based recommendation for healthy eating and encourage[ing] optimal well-being for patients about to begin or in treatment for cancer” (Cohen & Markman, 2008, p.76). In integrative oncology diet is understood to have an impact on symptom relief, disease progression and prevention.

Dietary recommendations for the same patient may vary with the course of disease, for example, a patient may need one diet for controlling symptoms of chemotherapy and another diet if a secondary cancer is found. This customization of diet helps relieve patients of the stress of shifting through the plethora of information available on cancer and diet. (Cohen & Markman, 2008, p.76)

At the Dove Clinic specific dietary approaches are used “to reduce tumor growth, promote overall health and prevent illness”. (The Dove Clinic for Integrated Medicine, n.d.c, para.1)

OZONE THERAPY

Medical ozone is a mixture of pure oxygen and pure ozone. With bacterial, fungicidal and virocidal properties, medical ozone is widely used as a disinfectant as well as to stimulate circulation. When administered at low concentrations, ozone can also activate or reactivate the immune system making it useful for people with low immune system activity (DCIM, n.d.i).

Ozone is administered to cancer patients at the Dove Clinic by “major autohaemotherapy”. Autohaemotherapy involves treating a patient’s blood with medical ozone externally before reinfusion. It is used to complement other treatment modalities that stimulate the immune system and prior to I.V. programmes and Sono-Photo Dynamic Therapy (DCIM, n.d.i).

PSYCHOTHERAPY AND COUNSELING

Psychotherapy and counseling can be used in integrative cancer treatment to help people become aware of “the broader emotional, lifestyle and spiritual issues in relation to their illness – recognizing bad patterns and fundamentally changing them. In many cases this can be a key step in the healing process.” (DCIM, n.d.k, para.1)

REIKI

Reiki is a healing practice originating in Japan which works on the principle that the body holds a universal or source energy that brings balance and health to the body when flowing freely. To activate the flow of this energy “Reiki practitioners place their hands lightly on or just above the person receiving treatment, with the goal of facilitating the person’s own healing response” (NCCAM, 2008, p.1).

In an integrative oncology setting Reiki can be used for relaxation, stress reduction, symptom relief from the side effects of surgery and conventional cancer treatments, and to improve overall health and well-being (NCCAM, 2008).

SONODYNAMIC PHOTODYNAMIC THERAPY

Sonodynamic Photodynamic Therapy (SPDT) is a form of non-invasive cancer treatment that is typically used as an alternative to surgery and radiotherapy. SPDT can be targeted accurately and unlike conventional cancer treatment options, it can be repeated without concern for dose limitations or side effects beyond the potential for minimal scarring on the skin (DCIM, n.d.l).

SPDT begins with a patient ingesting a Photodynamic agent via drops under the tongue 48-72 hours before treatment. This sensitizing agent accumulates selectively in cancer cells. To begin treatment the patient is exposed on a light bed for a few to twenty minutes depending on the advancement of the tumour; the treatment programme is slower with more advanced tumours. When the sensitizing agent is exposed to light at a specific frequency it enters an excited state that sets off a chain of reactions in cancer cells that ultimately leads to the initiation of tumour cell death. This sequence of reactions in the cancer cells is fed by oxygen and so Ozone Autohomeopathy is often used before SPDT to increase the amount of oxygen at the tumour site to increase the effectiveness of SPDT (DCIM, n.d.l).

After Photodynamic Therapy is complete, Sonodynamic Therapy is initiated on the patient in the seated position. Sonodynamic Therapy involves the use of low-level ultrasound to destroy tumours and allows deeper penetration into the body than Photodynamic Therapy. Sonodynamic Therapy

is carried out by moving an ultrasonic probe covered with ultra sound gel over the skin at the area closest to the tumour. At the Dove Clinic, the same sensitizing agent used for Photodynamic Therapy is also effective for this process thanks to its sensitivity to the specific frequency of ultrasound used. According to the Dove Clinic (n.d.I), “there has been the best success using next generation PDT with breast cancer and prostate cancer. There have been encouraging results with several types of brain tumour including glioblastoma multiforme, and many brain tumours significantly regressed during photodynamic therapy” (DCIM, n.d.I, para.7).

TRADITIONAL CHINESE MEDICINE

Traditional Chinese medicine (TCM) is a diverse medical practice that has evolved over 5000 years. The TCM approach focuses on individualized treatment using herbs, acupuncture, moxibustion, cupping, massage, mind-body therapy such as qi gong and tai chi, and dietary therapy to treat a wide range of conditions. The most commonly used approaches in North America are Chinese herbal medicine and acupuncture (NCCAM, 2009d).

The practice of moxibustion involves burning a moxa stick and creates a strong odor so it is not recommended for use in a cancer-care environment where people may be experiencing sensitivity to strong smells as a side effect of conventional cancer treatment. Cupping involves applying a heated cup to the skin to create light suction and is typically only considered on patients after they have completed conventional treatment (Cohen & Markman, 2008).

Underlying the practice of TCM is a unique view of the world and the human body that is different from Western medicine concepts. This view is based on the ancient Chinese perception of humans as microcosms of the larger, surrounding universe – interconnected with nature and subject to its forces. The human body is regarded as an organic entity in which the various organs, tissues, and other parts have distinct functions but are all interdependent. In this view, health and disease relate to balance of the functions. (NCCAM, 2009d, p.2).

Practitioners traditionally use four methods to evaluate a patient’s condition: observing (especially the tongue), hearing/smelling, asking/interviewing, and touching/palpating (especially the pulse). (NCCAM, 2009d, para. 7).

The Dove Clinic (n.d.f) uses an organ based approach to cancer that is grounded in TCM. “This approach in tumours has been shown by many observational outcome studies conducted in China, to increase median survival time, reduce the risk of recurrence and to improve outcomes from surgery.” (para.1)

YOGA

Yoga is a mind-body technique that originated thousands of years ago in India that is now practiced all over the world in various forms. It was developed to help people reach spiritual enlightenment. There are many styles of yoga but they all have various elements in common including physical postures, breathing exercises, meditation, and a specific philosophy. Intended to increase relaxation and balance the mind, body, and spirit, there is also a growing body of evidence that suggests practicing yoga helps to reduce stress and increase mind-body awareness (NCCAM, 2009e).

Because yoga includes both mental and physical aspects, Cohen and Markman (2008) suggest that it is especially useful for people undergoing conventional cancer treatment “early on in the diagnosis and treatment process and later when moving into post-treatment” (p. 144). For people who are not undergoing surgery, chemotherapy or radiation therapy, it is assumed that yoga could be practiced at any time throughout the treatment process.

APPENDIX B: ACCESS AND LIFE SAFETY REQUIREMENTS

To ensure that the Centre conforms with the access and life safety requirements required by law, the following is an analysis of the National Building Code of Canada (Canadian Commission on Building and Fire Codes, 2005). These requirements were incorporated into the design of the Centre presented in Chapter 7.

PART 3 Fire Protection, Occupant Safety and Accessibility

Section 3.1 General

3.1.2.1. Classification of Buildings or Parts of Buildings by Major Occupancy

The building is intended for use by more than one major occupancy and therefore is classified according to all major occupancies for which it is intended to be used. However, major occupancies are assumed to include integral subsidiary occupancies and so the occupancies in the Centre have been divided by the major use of each floor as follows according to Table 3.1.2.1:

- D Business and Personal Services Occupancies – Integrated Cancer Treatment Center Offices, Consultation and Therapy Areas, Support Areas, Library, Juice Bar (1st and 2nd floor)
- A-2 Assembly Occupancies not elsewhere classified in Group A – Conference Room + Teaching Kitchen, Yoga Room, Staff Lounge + Kitchen (3rd floor)
- F-2 Laboratory, Laundry Area, Storage Areas (Located near service elevator on 1st, 2nd and 3rd floors)

3.1.3. Multiple Occupancy Requirements

According to Table 3.1.3.1, the minimum fire-resistance rating of fire separations between the adjoining major occupancies in the Centre are:

- D to A-2 1 hour
- D to F-2 –
- A-2 to F-2 2 hours

This means that a 2 hour fire separation is required on each floor between the public and service areas of the Centre. The fire separations required between floors is addressed after 3.2.2.68 below.

3.1.17.1. Occupant Load Determination

The occupant load is the number of people that a building is designed for. The minimum occupant load for each of the areas in the Centre is calculated based on Table 3.1.17.1. A table summarizing the occupant load breakdown for the Centre is included in section 3.7.2.2. Water Closets. The occupant loads per floor are:

1st Floor: 223

2nd Floor: 151

3rd Floor: 337

Section 3.2 Building Fire Safety

1.2 Building Fire Safety

Interior Areas (not including exits and vertical service spaces)

Original building 1st Floor: 603 m² (6489 ft²), 1st Floor Extension: 56 m² (598 ft²)

Original building 2nd Floor: 602 m² (6845 ft²), 2nd Floor Extension: 56 m² (598 ft²)

Original Building 3rd Floor: 602 m² (6845 ft²), 3rd Floor Extension: 56 m² (598 ft²)

Building Area (largest floor plate): 691 m² (7443 ft²)

Total Interior Area: 2041 m² (21,973 ft²)

Building Height: 17 m (56 ft)

Number of floors within building: 4 (3 floors + roof garden)

The building will be sprinklered throughout

3.2.2 Building Size and Construction Relative to Occupancy

Buildings must be constructed in conformance with this subsection to prevent fire spread and collapse caused by the effects of fire.

3.2.2.4 Buildings with Multiple Major Occupancies

Since the Centre includes three major occupancies, the most restricted major occupancy contained applies to the whole building. The requirements of each major occupancy are included below.

3.2.2.10 Streets

The entire north façade borders on George Ave. and the west façade borders on James Ave. These two facades are located within 15m of both streets and so the building is considered to face two streets.

3.2.2.13 Occupancy on Roof

Since a portion of the building roof is intended to support occupancy it is to be constructed in conformance with articles 3.2.2.20 to 3.2.2.83 for floor assemblies.

3.2.2.24 Group A, Division 2, up to 6 Storeys, Any Area, Sprinklered

The building must be non-combustible construction and:

- floor assemblies shall be fire separations with a fire-resistance rating not less than 1 h
- mezzanines shall have a fire-resistance rating not less than 1 h
- loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly

3.2.2.54 Group D, up to 4 Storeys, Sprinklered

Since the Centre is sprinklered throughout, 4 storeys (3 + roof garden), and has a building area less than 3600 m² (38,750 ft²) it can conform to the following:

- be of combustible construction or noncombustible construction used singly or in combination
- floor assemblies shall be fire separations with a fire-resistance rating not less than 1 h
- mezzanines shall have a fire-resistance rating not less than 1 h, and
- loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly.

3.2.2.68 Group F, Division 2, up to 4 Storeys, Increased Area, Sprinklered

Since the Centre is sprinklered throughout, 4 storeys (3 + roof garden), and has a building area of less than 4500 m² (48,438 ft²) it can conform to the following:

- floor assemblies shall be fire separations with a fire-resistance rating not less than 1 h
- mezzanines shall have a fire-resistance rating not less than 1 h, and
- loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly.

Each of these categories has almost the same list of conforming statements, but those for Group A-2 are the most stringent so they are applied to the whole building. The building must be non-combustible construction and:

- floor assemblies shall be fire separations with a fire-resistance rating not less than 1 h
- mezzanines shall have a fire-resistance rating not less than 1 h

- loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly

3.2.3 Spatial Separation and Exposure Protection

3.2.3.1 Limiting Distance and Area of Unprotected Openings

For a building or fire compartment that is sprinklered throughout, the unprotected opening limits between the exposed building face are:

Exposed Building Face	Area of Unprotected Opening for Groups A and D Limiting Distance, m			
Max. Area, m ²	10 m (33ft) from north building face to centre line of George street	66 m (215ft) from east face to property line	5 m (17ft) from south face to an imaginary line between the Centre and the adjacent building	8m (25ft) from the west face to centre line of Duncan st.
North Wall	100%			
East Wall		100%		
South wall			40%	
West wall				82%

The percentage area (total square footage of glazing that does not need to be fire rated) allowed is expressed as a percentage based on adding up all of the unprotected openings in the building face.

3.2.3.7 Construction of Exposing Building Face

Since the table allows the south and west exposing building faces to have unprotected openings more than 25% but less than 100% , the exposing building face must have a fire-resistance rating not less than 45 min.

3.2.3.10 Unlimited Unprotected Openings

Since the North and East exposing building faces of the Centre face streets and their limiting distances are more than 9m, they are allowed to have unlimited protected openings as indicated in the table above. This indicates that the curtain wall on the east side of the building is acceptable on this façade.

24.24.3. Fire Alarm and Detection Systems

3.2.4.1 Determination of Requirement for a Fire Alarm System

The Centre requires a fire alarm system because it includes an automatic sprinkler system.

3.2.4.2 Continuity of Fire Alarm Systems

The system must serve all occupancies since the building contains more than one major occupancy.

3.2.4.4 Types of Fire Alarm Systems

The system must be a single or 2 stage system.

3.2.4.10 Fire Detectors

Since the floor areas are sprinklered throughout, fire detectors are not required.

3.2.4.11 Smoke Detectors

Must be installed in:

- each room in a contained use area and corridors serving those rooms (the Centre has no contained use areas)
- each exit stair shaft

3.2.5.3 Roof Access

With the inclusion of a roof garden, the Centre is considered to be 4 storeys in height. Since it is over 3 storeys in height, and the roof slope is less than 1 in 4, all main roof areas must be provided with direct access from the floor areas immediately below either by a stairway or a hatch. Access to the roof of the Centre will be provided by an exit stairway.

3.2.5.4 Access Routes

An access route is required for fire department vehicles to the building face having a principle entrance.

3.2.5.5 Location of Access Routes

This access route must be located between 3-15 m (10-49 ft) from the face of the building. This access is provided on George Ave.

3.2.8 Mezzanines and Openings through Floor Assemblies

3.2.8.1 Application

Each floor area of the Centre terminates at an exterior wall, a firewall or a vertical shaft except for vertical circulation spaces so the only item that applies is:

The penetration of a floor assembly by an exit or a vertical service space shall conform to the requirements of Sections

3.4, 3.5 and 3.6 for Exits and Vertical Transportation.

3.2.8.2. Exceptions to Special Protection

Since the interconnected floor space created by the main staircase is sprinklered throughout and contains only Group A-2 and D occupancies it should not have to comply with the requirements of Articles 3.2.8.3 to 3.2.8.9 listed below. However, building code requirements indicate that above the second floor the space cannot be interconnected. So, either glass fire separations would need to be added to enclose the circulation space or the design would need to be adapted according to the following requirements to ensure that it follows the intent of code. For the purposes of this project however, it has been left open to properly communicate the intended design concept. Consultations with building code officials would be necessary to properly remedy this issue.

3.2.8.3. Construction Requirements

The building must be of noncombustible construction

3.2.8.4. Sprinklers

The building contains an interconnected floor space so it must be sprinklered throughout

3.2.8.5. Vestibules

Each exit opening into an interconnected floor space must be protected by a vestibule that conforms to the following points:

- doorways that are not less than 1.8 m (6 ft) apart
- separated from the rest of the floor area by a fire separation (no rating)
- designed to limit the passage of smoke
- the required exit width must be cumulative

Since the elevator opens into an interconnected floor space and into the storeys above the interconnected floor space, either the elevator doors opening into the interconnected floor space or the elevator doors opening into the storeys above the interconnected floor space should be protected by vestibules conforming to the points listed above. These could be added to the final design of the centre.

3.2.8.6. Protected Floor Space

Since no exists pass through the interconnected floor space, a protected floor space used to satisfy the requirements of

Clause 3.4.3.2.(6)(b) is not required.

3.2.8.7. Draft stops

A draft stop is required at each floor level within the interconnected floor space immediately adjacent to and surrounding the opening, and shall be not less than 500mm (20 in) deep measured from ceiling level down to the underside of the draft stop.

3.2.8.8. Mechanical Exhaust System

A mechanical exhaust system shall be provided to remove air from an interconnected floor space at a rate of 4 air changes per hour.

3.2.8.9. Combustible Content Limits

The combustible contents of an interconnected floor space cannot be more than 16g for each cubic meter of the interconnected floor space.

Section 3.3 Safety Within Floor Areas

3.3.1. All Floor Areas

3.3.1.1. Separation of Suites

The following occupancies in a building that is sprinklered throughout are not required to be separated from one another by fire separations: suites of business and personal services occupancy. This means that only the storage, laundry and laboratory areas in the building must be separated from the rest of the floor area by a 2 hour fire separation as established in 3.1.3.

3.3.1.3. Means of Egress

- Required from the roof since it is intended for occupancy.
- Two separate means of egress must be provided from a roof intended for an occupant load more than 60, to stairs designed in conformance with the requirements for exit stairs in Section 3.4. The maximum occupant load of the roof will be 60 so only one exit is required.
- A rooftop enclosure shall be provided with an access to exit that leads to an exit at the roof level.
- Although the roof is not developed as part of this project, these requirements would need to be satisfied before the roof garden could be approved for occupancy.

3.3.1.4. Public Corridor Separation

The building is sprinklered throughout so no fire-resistance rating is required for a fire separation between a public corridor and the remainder of the building.

3.3.1.5. Egress Doorways

A minimum of 2 egress doorways must be located so that one doorway could provide egress from the room or suite for every room and every suite:

- intended for an occupant load more than 60
- the travel to an egress doorway is more than 25m (82 ft).
- the area of the room or suite is more than the value in Table 3.3.1.5.B (below):

Occupancy of Room or Suite	Maximum Area of Room or Suite, m ²
Group A	200 (2153 ft ²)
Group D	300 (3229 ft ²)
Group F-2	200 (2153 ft ²)

3.3.1.9. Corridors

- The minimum width of a public corridor is 1100 mm (3.6 ft). All of the corridors in the Centre are at least 5ft wide even in locations where corridors contains an occupancy.
- Obstructions within 2 m (6.5 ft) of the floor cannot project more than 100 mm (4 in) horizontally into an exit passageway or public corridor.
- The maximum length of dead end corridor permitted is 6 m (20 ft) unless it is entirely within a suite. The Centre does not contain any dead end corridors longer than 6 m (20 ft).

3.3.1.11. Door Swing + 3.3.1.12 Sliding Doors

A door not located within a suite that opens from a suite into a corridor providing access to an exit must swing on a vertical access or if it is a sliding door, it must:

- be designed and installed to swing on the vertical axis in the direction of travel to the exit when pressure is applied, and
- be identified as a swinging door by means of a label or decal affixed to it.

If a door serves an occupant load greater than 60, or if it divides a corridor that is not wholly contained within a suite it must swing in the direction of travel to the exit.

3.3.1.13. Doors and Door Hardware

- A door that opens in a public corridor is to have a clear opening of 800 mm (32 in) and not open onto a step.
- Door release hardware must be:
- operable by one hand and the door must be openable with not more than one releasing operation
 - installed no more than 1200mm (4ft) above the finished floor

3.3.1.18. Guards

- Since the roof of the Centre includes access other than maintenance, a guard is required around the perimeter that is at least 1070 mm (42 in) high.
- No opening that passes a sphere with a diameter of more than 100 mm (4 in) is allowed in a guard serving an exterior balcony or a room, stairway, or space in the Centre.

3.3.1.19. Transparent Doors and Panels

- Must be readily apparent with non-transparent hardware, and be constructed of laminated tempered safety glass or wired glass

3.3.1.21. Janitor's Rooms

- must be separated from the remainder of the building by a fire separation that is not required to have a fire-resistance rating since the building is sprinklered throughout

3.3.2. Assembly Occupancy (additional requirements)

3.3.2.3. Non-fixed Seating

Shall conform to the NFC (National Fire Code)

3.3.2.12 Libraries

No fire separation is required for the small library in the Centre.

Section 3.4 Exits

3.4.1. General

3.4.1.10. Combustible Glazing in Exits

Combustible glazing is not permitted in wall or ceiling assemblies or in closures used to construct an exit enclosure. The exit doors leading from the front of the building would need to be constructed of noncombustible glazing.

3.4.2. Number and Location of Exits from Floor Areas

3.4.2.1. Minimum Number of Exits

Every floor intended for occupancy in the Centre must be served by at least 2 exits. These are provided by the existing exit stair and new exit stair.

3.3.3.3 Distance Between Exits

The least distance between exits measured as the path that smoke would travel, assuming it would not penetrate an intervening fire separation:

- one half of the maximum diagonal dimension of the floor area, but doesn't need to be more than 9 m (30 ft) for a floor area with a public corridor.
- one half of the maximum diagonal dimension of the floor area, but doesn't need to be more than 9 m (30 ft) for all other floor areas.

Exits do not need to comply with the restrictions above if the floor area is divided so that at least one third of the floor area is on each side of the fire separation and it is not necessary to pass through the fire separation to travel from one exit to another exit.

The diagonal dimension of the floor area in the Centre is 86 ft, so the minimum distance between would be 13 m (43 ft), but this is greater than the maximum required of 9 m (30 ft). There are two exits on each floor provided by the staircase at the north of the building and the new staircase southeast of the Centre of the building. The distance smoke would travel between the two exits is 14 m (45 ft) on each floor which is more than the minimum required.

3.4.2.4. Travel Distance

The distance from any point in the floor area to an exit measured along the path of travel to the exit. Travel distance from a suite or room not within a suite can be measured from an egress door to the nearest exit if it is separated from the remainder of the floor by a fire separation, or opens onto a public corridor. The fire separation does not need to have a fire resistance rating since the Centre is sprinklered throughout.

3.4.2.5. Location of Exits

Since the Centre is sprinklered throughout and does not contain a high-hazard industrial occupancy, the travel distance to at least one exit can be no more than 45 m (148 ft) on each floor. The longest travel distance from any location in the Centre to an exit stair is 28 m (93 ft).

3.4.2.6. Principal Entrance

At least one door at ground level must be designed in accordance with the requirements for exits.

3.4.3. Width and Height of Exits

3.4.3.2. Exit Width

The minimum aggregate width of exits serving floor areas intended for assembly occupancies, business and personal services occupancies and industrial occupancies is 8 mm (0.315 in) per person for a stair with rise not more than 180 mm (7 in) and run not more than 280 mm (11 in). However, the required exit width does not need to be cumulative if the exit serves 2 or more floor areas located one above the other. This applies to both exit stairs – one is part of the existing building and one is new.

In this case the width of an exit can be no less than:

- 1100 mm (3.6 ft) for corridors and passageways, ramps and stairs that serve more than two storeys above the lowest exit level. The width of the new exit stairs is 1200 mm (4 ft).

3.4.3.4. Headroom Clearance

Every exit must have a headroom clearance of not less than 2100 mm (6.9 ft) and doorways must have a clearance of at least 2057 mm (6.75 ft)

3.4.4. Fire Separation of Exits

3.4.4.1. Fire-Resistance Rating of Exit Separations

Must be one hour for each exit.

3.4.4.2. Exits Through Lobbies

There are no exits through the lobby of the Centre. A fire separation is maintained between the two exits and the rest of the building.

3.4.4.4. Integrity of Exits

The two exit stairs in the building must not have any other openings apart from protected plumbing and electrical and exit doors. Each of the exit stairs is enclosed by a fire separation and leads outside through a protected passageway.

3.4.6. Types of Exit Facilities

3.4.6.1. Slip Resistance of Ramps and Stairs

- surfaces, landings and treads must have a slip resistant finish and have a colour contrast or pattern that demarcates the edge of a tread or landing, and the beginning and end of a ramp.

3.4.6.3. Landings and Maximum Vertical Rise of Stair Flights

- The maximum vertical rise between floors or landings is 3.7 m (12 ft).
- The length and width of a landing must be at least the same as the width of the stairway.
- The top and bottom of every flight of stairs and ramp requires a landing.

3.4.6.4. Handrails

The new main stairway in the Centre is 1500mm (5ft) wide, so it requires handrails on both sides. The handrails must be:

- continually graspable along their length
 - have a circular cross section with an outside diameter between 30 – 43mm (1.2 – 1.7 in)
 - Height between 865-965mm (34-38 in)
 - At least one handrail must be continuous throughout the length of the staircase to assist people with visual impairments.
- Both sides of the staircase have a continuous handrail between floors and the inner handrail is continuous for the entire length of the staircase.
- At least one handrail must extend horizontally at least 300 mm (1 ft) beyond the top and bottom of the stairway or ramp.
 - the minimum distance between the handrail and the surface behind it is 50 mm (2 in)

3.4.6.5. Guards

- A wall or guard is required at each exit.
- the height of guards for exit stairs can be no less than 920 mm (36 in) from stair nosings and 1070 mm (42 in) around landings and along ramps
- No opening is allowed in the guard that can pass a sphere more than 100 mm (4 in) in diameter.

3.4.6.7. Treads and Risers

- steps for stairs must have a run of at least 280 mm (11 in) between successive steps and a rise between 125 mm-180 mm (5 in-7 in). Steps of the main staircase of the Centre have been designed with a run of 305 mm (12 in) and rise of 150 mm (6 in).
- Treads and Risers in every exit stair have a uniform run and rise in the Centre.

3.4.6.10. Doors

- the minimum distance between a stair riser and the leading edge of a door during its swing is 300 mm (12 in).
- An exit door with more than one leaf must have leaves with a width of at least 610 mm (2 ft) each.

3.4.6.11. Direction of Door Swing

- Each exit door must open in the direction of exit travel and swing on a vertical axis.
- If it is a sliding door, it must swing in the direction of travel if adequate pressure is applied.

Section 3.5 Vertical Transportation

3.5.3.1. Fire Separations for Elevator Hoistways

Since the elevator hoistway shaft is partially transparent and exposed, it is not separated from the rest of the building by a fire separation. This is allowed in an interconnected floor space provided the elevator machinery is located in a room separated from the remainder of the building by a 1h fire separation. This room is located in the basement.

3.5.4. Dimensions and Signs

3.5.4.1. Elevator Car Dimensions

At least one clearly marked elevator; accessible from all floors must have minimum dimensions of 2012 mm x 610 mm (6.6 ft x 2 ft) to accommodate a stretcher. The new elevator in the Centre is 2042 mm x 1295 mm (6.7 ft x 4.25 ft) and is accessed by a 915 mm (3 ft) door on the narrowest side of the car.

Section 3.7 Health Requirements

3.7.2. Plumbing Facilities

3.7.2.2. Water Closets

The number of water closets is based on the occupant load determined in Section 3.1.17.1. The occupant load is divided

by two to determine how many water closets are required for each sex. Urinals can replace two thirds of the water closet requirements for men, except when only two water closets are required one of them may be substituted for a urinal. Based on the occupancies of each floor of the building, and according to Table 3.7.2.2.A. for assembly occupancies and Table 3.7.2.2.B. for Business and Personal Services Occupancies, the water closets required for the Centre are summarized below in bold:

Occupancy	Type of use of Floor Area or Part Thereof	Min. area/ person	Area of Space (ft²)	Min. Load of Occupants
1st floor – East Side				
D	Business and Personal Services uses - shops: Reception	4.60 m ² (49.5 ft ²)	302	6
D (subsidiary uses)	Mercantile uses: Sales area	3.70 m ² (39.8 ft ²)	247	6
	Space with non-fixed seats and tables: Waiting Areas	0.95 m ² (10.2 ft ²)	663	65
	Dining, beverage and cafeteria space: Juice Bar + Seating	1.20 m ² (12.9 ft ²)	1067	83
	Reading or writing rooms or lounges: Library + Fireside Lounge	1.85 m ² (19.9 ft ²)	628	32
W/C REQUIRED: 3 male and 3 female, but 4 are provided for each sex to reduce wait times.				192 (96 each sex)
1st floor – West Side				
D	Business and Personal Services uses: Operations Staff Offices	9.30 m ² (100 ft ²)	2757	28
F-2	Cleaning and repair goods: Janitorial	4.60 m ² (49.5 ft ²)	50	1

F-2	Storage	46.00 m ² (495 ft ²)	683	2
W/C REQUIRED: 1 male and 1 female, and 1 unisex barrier-free W/C + shower room				31 (15.5 each sex)
2nd floor				
D	Business and Personal Services uses - shops: Clinic Therapy and Support Areas	4.60 m ² (49.5 ft ²)	6570	133
F-2	Cleaning and repair goods: Janitorial and service	4.60 m ² (49.5 ft ²)	873	18
W/C REQUIRED: 3 male and 3 female, but 4 are provided for each sex to reduce wait times. 1 barrier-free W/C + shower room provided for convenience across from IV pods.				151 (75.5 each sex)
3rd Floor – West Side				
A-2	Standing space: Yoga + Fitness Area	0.40 m ² (4.3 ft ²)	1347	313 Actual max: 150*
W/C REQUIRED: 2 male and 3 female, but 3 are provided for each sex.				150
3rd Floor – East Side				
A-2	Space with non-fixed seats and tables: Conference Room + Teaching Kitchen	0.95 m ² (10.2 ft ²)	1570	154
A-2	Reading or writing rooms or lounges: Staff Lounge	1.85 m ² (19.9 ft ²)	443	23
F-2	Cleaning and repair goods: Janitorial + laboratory	4.60 m ² (49.5 ft ²)	416	9
F-2	Storage: Laboratory, Yoga, Conference + Kitchen	46.00 m ² (495 ft ²)	426	1
W/C REQUIRED: 2 male and 3 female, but 4 are provided for each sex to reduce wait times.				187 (93.5 each sex)

* Although the minimum value for standing space in the yoga and fitness room gives an occupancy of 313 people, this is far greater than the number that the room is intended to accommodate. If it can be shown that an area will be occupied by fewer people than indicated in Table 3.1.17.1, a permanent sign indicating the occupant load must be posted in a conspicuous location. A sign indicating a maximum occupant load of 150 people would be posted at the entrance to the yoga/fitness room, although the number of people permitted in a typical class would not exceed 60.

3.7.2.3. Lavatories

One lavatory is required for one or two water closets, and one lavatory is required for every 2 additional water closets.

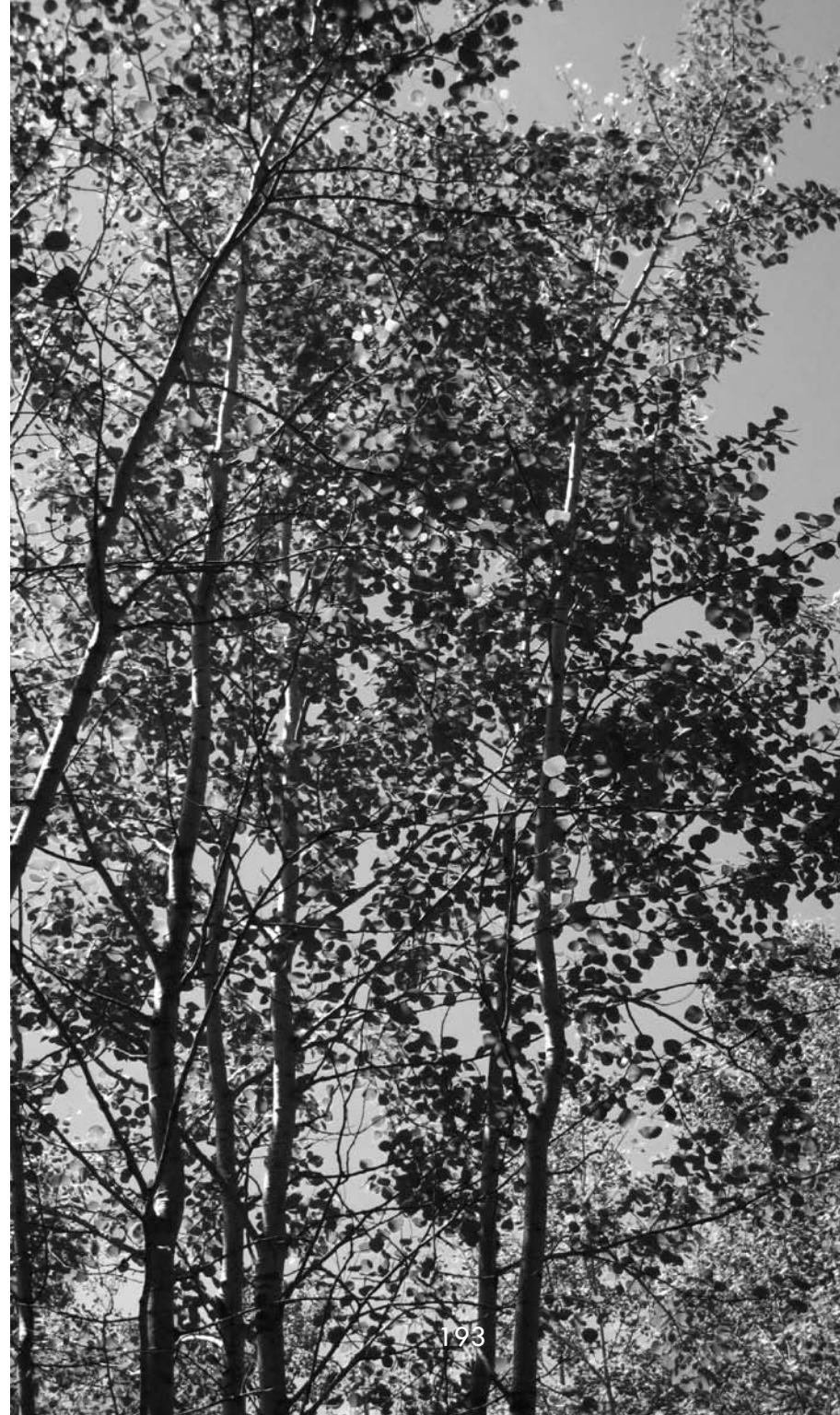
3.7.2.5. Safety Glass

If glass is used in shower enclosures, it must be safety glass

3.8 Barrier-Free Design

The Centre is designed to be completely barrier free. The code clearly outlines all requirements; and these have been integrated into the design of the Centre.

APPENDIX C : MATERIALS + FINISHES



RECEPTION, WAITING + JUICE BAR



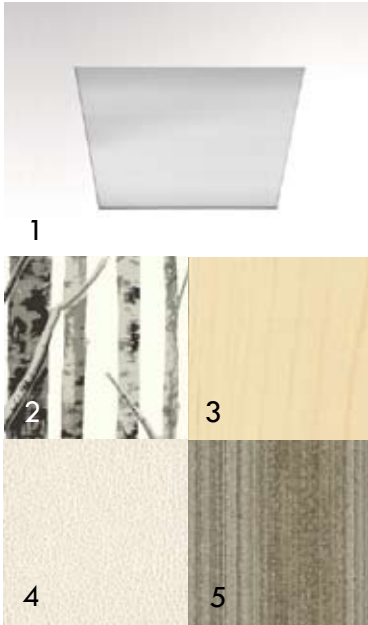
1. Reception desk accent panel
Product: 3Form - EcoResin - Swept Silver
Sustainability: Recycled content
2. Solid surface
Product: Avonite - Recycled Collection - White
Sustainability: Greenguard certified, recycled content
3. Maple laminate, veneer + flooring
Product: Various
Sustainability: Low-VOC, FSC certified
4. Field Tile Flooring
Product: Manitoba honed limestone
Sustainability: Local material
5. Waiting area carpet
Product: Shaw - Bloom tile
Sustainability: Cradle-to-Cradle silver certified, Low-VOC
6. Waiting furniture upholstery
Product: DesignTex - Cusco - Pearl Eggshell
Sustainability: Environmental Design, Extreme Performance
7. Waiting furniture upholstery
Product: DesignTex - Southside - Limestone
Sustainability: Environmental Design, Extreme Performance
8. Accent paint
Product: Benjamin Moore - Aura
Sustainability: Low Odour, Low VOC, High Performance
9. Tyndall stone veneer
Product: Gillis Quarries - Split face finish
Sustainability: Local Manitoba product
10. Wall panels
Product: Eco Clad - Custom Colour
Sustainability: Rapidly renewable, recycled content
11. Cafe seating upholstery
Product: DesignTex - FauxSure - Honey
Sustainability: Environmental Design, Extreme Performance

SPIRITUAL SPACE



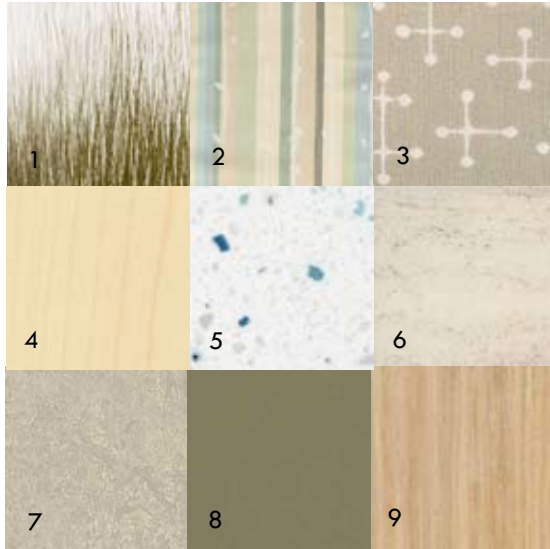
1. Carved MDF panel
Product: Marotte - Roseaux
2. Accent wood
Product: Wood Anchor - Reclaimed White Bur Oak
Sustainability: Manitoba landfill diverted trees
3. Spiritual space seating upholstery
Product: DesignTex - Cusco - Pearl Gelato
Sustainability: Environmental Design, Extreme Performance
4. Field flooring
Product: Forbo Marmoleum - Concrete
Sustainability: Rapidly Renewable, Recycled Content
5. Carpeting
Product: Modernweave - Fields Rug
Sustainability: Natural Wool
6. Lounge sofa upholstery
Product: DesignTex - Santiago - Dune
Sustainability: Environmental Design, Extreme Performance
7. Maple veneer
Sustainability: FSC Certified
8. Lounge shell chair upholstery
Product: DesignTex - Cusco - Pearl Eggshell
Sustainability: Environmental Design, Extreme Performance
9. Accent Paint
Product: Benjamin Moore Aura
Sustainability: Low Odour, Low VOC, High Performance

CONSULTATION ROOM



1. Recessed overhead lighting
Product: Artemide - Simos RGB
Sustainability: Fluorescent T16 24 watt bulbs
2. Wallcovering
Product: DesignTex - Custom digital wall
Sustainability: PVC-free, recycled content
3. Maple laminate + veneer
Product: Various
Sustainability: Low-VOC, FSC certified
4. Guest seating upholstery
Product: DesignTex - Cusco - Pearl Gelato
Sustainability: Environmental Design, Extreme Performance
5. Carpet Tile
Product: Shaw - Dissolve Tile - Saffron Metal
Sustainability: Cradle-to-Cradle silver certified, Low-VOC

IMMUNE THERAPY PODS



1. Sliding Panels
Product: 3Form - EcoResin - Bear Grass Fade
Sustainability: Recycled content
2. Privacy Curtain Fabric
Product: DesignTex - Waterfall - Saffron Multi
Sustainability: Environmental Design, Extreme Performance
3. Seating Upholstery
Product: Maharam - Eames Small Dot Pattern - Sand
Sustainability: Classic design, Extreme Performance
4. Maple Laminate + Veneer
Product: Various
Sustainability: Low-VOC, FSC Certified
5. Solid Surface Countertop
Product: Avonite - Recycled Collection - Cozumel
Sustainability: Greenguard Certified, Recycled content
6. Stone Wall Veneer
Product: Polished local limestone
Sustainability: Local Manitoba material
7. Field Flooring
Product: Marmoleum - Concrete
Sustainability: Rapidly renewable, recycled content
8. Accent Flooring
Product: Marmoleum - Walton Cirrus - Rosemary Green
Sustainability: Rapidly renewable, recycled content
9. Accent Flooring
Product: Artoleum - Striato - Pacific Beaches
Sustainability: Rapidly renewable, recycled content

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