

# **Healing and the Healthcare Environment**

Redesigning the hemodialysis centre at Health Sciences Centre in Winnipeg, Manitoba

by

Monique A. Gougeon

A Thesis submitted to the Faculty of Graduate Studies of

The University of Manitoba

in partial fulfilment of the requirements of the degree of

MASTER OF INTERIOR DESIGN

Department of Interior Design

University of Manitoba

Winnipeg

Copyright © 2008 by Monique A. Gougeon

# Abstract

Stress within healthcare environments can be the result of uncertainty, illness, or the environment itself. In order to promote better health outcomes for dialysis users, scientific literature advocates stress reduction within healthcare environments. Dialysis patients are subject to numerous stressors, including the threat of potential losses and lifestyle change. Studies have revealed that patients who suffer from chronic illness perceive different levels of quality of life than those who are considered healthy and because of these lifestyle changes they employ various coping mechanisms when dealing with stress. There is a rising movement to mitigate stress through the use of holistic healing, an approach that addresses a person's mental, emotional, physical, and spiritual elements to create a total healing environment. In accordance with this growing movement, the intent of this practicum is to create an outpatient centre for Manitoba's dialysis patients that increases their perceived quality of life.

The inquiry process began by questioning dialysis patients and conducting observational research at the Winnipeg Health Sciences Centre. Literature and precedent reviews were conducted, and the design programme was developed. The result of this research-based design proposal is an outpatient hemodialysis centre located within the Winnipeg Health Sciences Centre that helps mitigate stress while patients attempt to cope with lifestyle changes.

The resulting design is one that is warm, welcoming, home-like and comfortable, which is supported by the theories explained in the literature review. This environment provides a greater sense of control, creates positive distractions and allows spiritually evoking opportunities to take place for all users of this new facility.

# Acknowledgements

Many people are to thank for the overall process, creation, and final result of this practicum. First and foremost, I would like to thank and acknowledge my committee members: Maureen Doyle, for the passion you exert and the inspiration you emit. Your vast knowledge into the healthcare industry and in particular dialysis units was invaluable. Sincere thanks to Jerry Weslake for your enthusiasm, encouragement, and technical knowledge. Thank you to Dr. Cynthia Karpan for your patience, guidance, and attention to detail. Learning is at times difficult but in the end it is well worth it, thank you.

Thank you to the Health Sciences Centre Planning department, particularly Karen Beek and Robert Bruce for providing countless drawings and building information. I wish to thank all dialysis staff members who brought much enthusiasm to this project and patience while answering my endless questions. In a world that was foreign to me, I began to understand the complexities and importance of such a project. I would especially like to thank Doug Franklin, Julie Evans, Jan Schneider, Dan Skwarchuk, and of course the dedicated, passionate, and inspiring Cindy Soulsby.

I wish to thank my colleagues at Stantec Architecture for the flexibility and continuous encouragement throughout this process. I feel a sense of privilege to work with such a talented group of individuals. I would particularly like to thank Kimberly Jean and Theresa Hnatishin for their time and opinions throughout this lengthy process. Your knowledge, sense of humour, and encouragement was heart felt.

I have also been privileged to have studied with such a talented and creative group of people. Thank you to Jennifer Bouchard for always making the time, Lindsay Hamonic, Stephanie Yuzicapi, and Lindsay Nesbitt for your critiques, support and friendship.

Everything is easier with a good support system made up of friends and family. I have been fortunate throughout this process and in life to have both. Warmest thank you to my parents, Emilienne and Lucien Gougeon, who have always encouraged my endeavours and given unconditional support and love throughout my life, especially during my long educational experience. I have also been blessed with three siblings who emit my parents' values and endless encouragement, thank you. Finally, I wish to thank Claudio Zubin for the incredible patience you possess and your unwavering faith in my abilities.

Pour terminer j'aimerais remercier Mme Yvette Gagnon, et j'espère qu'à l'avenir l'ambiance hospitalière s'améliore.

# Table of Contents

Chapter 1:	Introduction.....	1
	1.1. General Introduction.....	1
	1.2. Context.....	3
	1.3. Objective.....	5
	1.4. Rationale.....	5
	1.5. Limitations.....	7
	1.6. Overview.....	7
Chapter 2:	Investigation Process.....	9
Chapter 3:	Literature Review.....	13
	3.1. Stress.....	13
	3.1.1. Physiological Stressors.....	14
	3.1.2. Psychological Stressors.....	15
	3.1.3. Mental Fatigue.....	16
	3.2. Strategies in Stress Reduction.....	17
	3.2.1. Privacy.....	17
	3.2.2. Theory of Supportive Design.....	19
	3.2.3. Spirituality.....	21
	3.2.4. Restorative Environments.....	23
	3.2.5. Design Considerations.....	29
	3.3. Coping.....	31
	3.3.1. Design Considerations.....	34
	3.4. Models of Care.....	35
	3.3.1. Planetree Model of Care.....	35
Chapter 4:	Precedent Review.....	38
	4.1. Precedent One: Center for Advanced Medicine.....	38
	4.2. Precedent Two: DaVita Dialysis Clinic.....	40
	4.3. Precedent Three: Archette Hemodialysis Centre.....	42



Chapter 5: Programme.....	45
5.1. Contextual Issues.....	45
5.2. Site Analysis.....	48
5.3. Building Analysis.....	63
5.4. Human Factor Analysis.....	69
5.5. Functional, Aesthetic, Technology, Material, and Lighting.....	81
5.6. Building Code, Access, and Life Safety Requirements.....	98
5.7. Spatial Requirements and Analysis.....	99
Chapter 6: Design.....	104
6.1. Spatial Concept.....	104
6.2. Design Objectives.....	107
6.3. Organization and Zones.....	107
6.4. Design Features.....	109
Chapter 7: Conclusion.....	125
References.....	126
Appendices.....	134
Appendix A: Life Safety Plan.....	135
Appendix B: U of M Ethics Approval.....	137
Appendix C: HSC Ethics Approval.....	140
Appendix D: Information to HSC Dialysis Head Nurse.....	142
Appendix E: Participants' package.....	144
Appendix F: Executive Summary.....	151

# List of Figures

## Chapter 1: Introduction

1. Existing corridor within Central dialysis unit.....	1
2. Existing corridor within Sherbrook dialysis unit.....	1
3. Hemodialysis process.....	3

## Chapter 3: Literature Review

4. Bird.....	20
5. Birds.....	20
6. Vegetation.....	24
7. Vegetation.....	24
8. Nature.....	27
9. Nature - flower.....	28
10. Meditating.....	32

## Chapter 4: Precedent Review

11. Waiting room, Center for Advanced Medicine.....	38
12. Waiting room and lobby, Center for Advanced Medicine...	39
13. Exterior of DaVita Dialysis Clinic.....	40
14. Axonometric of DaVita Dialysis Clinic.....	41
15. Treatment stations, DaVita Dialysis Clinic.....	41
16. Building plan, Archette Hemodialysis Clinic.....	42
17. Floor plan, Archette Hemodialysis Clinic.....	42
18. Corridor, Archette Hemodialysis Clinic.....	43
19. Treatment area, Archette Hemodialysis Clinic.....	43

## Chapter 5: Programme

20. Location of HSC within the city of Winnipeg.....	49
21. HSC and surrounding area.....	49
22. Site plan, Health Sciences Centre.....	50
23. Site plan and adjacencies, Health Sciences Centre.....	51

24. Pedestrian tunnel system, Health Sciences Centre.....	52
25. Site, Health Sciences Centre.....	53
26. Wind patterns, Health Sciences Centre.....	54
27. Shadow studies of site, Winter shadows.....	55
28. Shadow studies of site, Spring/Fall shadows.....	56
29. Shadow studies of site, Summer shadows.....	57
30. Views and vistas site lines, Health Sciences Centre.....	58
31. West facing view.....	59
32. South facing view.....	59
33. Pedestrian and vehicular activity.....	60
34. Future site of the Faculty of Pharmacy.....	61
35. New parkade.....	61
36. Central dialysis unit.....	62
37. Building Analysis.....	66
38. Building Analysis.....	67
39. Exterior elevation of GF and GH buildings.....	68
40. Parking adjacent to GH.....	68
41. Organizational structure of Manitoba Renal Program.....	75
42. Organizational Structure of HSC dialysis.....	76
43. Zoning and Circulation Analysis.....	102
44. Zoning and Circulation Analysis.....	106

## **Chapter 6: Design**

45. Main Floor Organization.....	108
46. Second Floor Organization.....	109
47. Floor Plan: Main Floor.....	110
48. Floor Plan: Second Floor.....	111
49. Elevation: Exterior South.....	112
50. Elevation: Exterior West.....	113
51. Section A.....	114
52. Section B.....	115
53. Section C.....	116

54. Perspective 1: Atrium facing reception.....	117
55. Perspective 2: Major node.....	118
56. Perspective 3: Seating area adjacent to Isolation pods.....	119
57. Isometric: Private treatment pod.....	120
58. Isometric: Semi-private treatment pod.....	121
59. Isometric: Isolation treatment pod.....	122
60. Floor Pattern: Main Floor.....	123
61. Floor Pattern: Second Floor.....	124

# Chapter 1: Introduction

## 1.1. General Introduction

The hospital environment was a foreign place to me until the age of 13, when my grandfather was diagnosed with cancer. As he neared the end of his struggle I can distinctly remember my impressions of the hospital environment. It was an environment of real discomfort and uneasiness. The long sterile hallways, strange smells, and immense clutter had a complete disconnect from the outside world. The environment did not support patients, or visitors and certainly not staff; it was a strange juxtaposition as the only warmth to be found was from staff members. Fourteen years later, as I visited a family friend receiving dialysis, I noted that nothing had really changed; spatial arrangements were awkward and privacy was nonexistent. The word “warmth” is not one I would have linked with healthcare facilities.



Figure 1. Existing hospital corridor.  
Used with permission by Health  
Sciences Centre Winnipeg



Figure 2. Existing hospital corridor.  
Used with permission by Health  
Sciences Centre Winnipeg

Today, healthcare in Canada is in a state of transition, slowly following the radical healthcare changes seen in advanced centres for healing around the world. Several factors are attributed to

this transformation; for one, the elderly population is growing in size due to the aging baby boomer generation, those born between 1946 and 1964. Secondly, medical technology has changed. Expectations of patients and staff have also changed because of the increase in work demands and stress. In addition, scientific literature increasingly confirms that conventional hospital design contributes to unnecessary stress and danger (Ulrich, Quan, Zimring, Joseph & Choudhary, 2004). Finally, the economic impacts of illness and the benefits seen in advanced centres for healing have really propelled change as healthcare management and governments have begun to realize the potential benefits of good design.

In the past, healthcare institutions were seen as centres for the diseased and the physically injured. Now, facilities are changing the patient care experience by attempting to provide a total healing environment based on principles of patient-centered healthcare that support the total patient (Stewart-Pollack & Menconi, 2005). Such examples incorporate the inclusion of family and friends and create an appropriate physical environment that nurtures and supports staff and patients through interior design and architecture.

Carpman and Grant (1993), long time activists in healthcare design, state that patients are no longer recognized as the “objects on the scene” but rather the *focus* of hospital design. The concept of a “total healing environment” is only being gradually implemented into smaller metropolitan areas like Winnipeg as many of Winnipeg’s hospitals lack the funding to dramatically upgrade their facilities. Although attempts are being made, upgrades usually occur in isolated pockets. These pocket upgrades usually occur within cancer, cardiovascular, children’s

health and emergency facilities. Dialysis environments are long overdue for an upgrade that incorporates healing environments.

## 1.2. Context

Kidney disease, also known as End-Stage Renal Disease (ESRD), is described by University Hospital of Columbia and Cornell (2007) as being: “temporary or permanent damage to the kidneys that result[s] in loss of normal kidney function.” As a result, an artificial method of cleaning the waste and fluids from the body must be utilised in the form of dialysis<sup>1</sup>. In order to receive this treatment, individuals with ESRD must spend approximately 3-5 hours dialyzing three times a week (Y. Gagnon, personal communication, April 30 and May 1, 2005; W. Whalley, personal communication, November 9, 2004 & April 25, 2005). Kidney disease can affect anyone at any stage in their life, and delay or refusal of treatment can become fatal within a matter of days or weeks (Kidney Foundation of Canada, 2007).

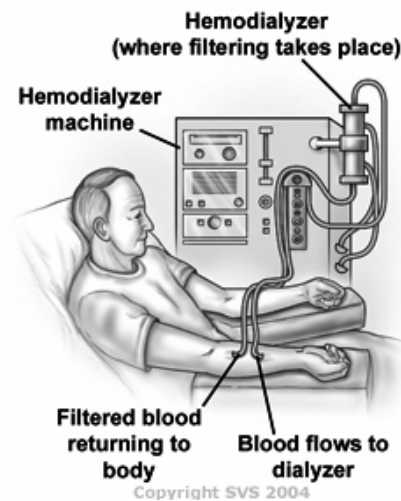


Figure 3. Hemodialysis process. Image(s) reproduced by permission from the Society for Vascular Surgery. For more information, visit [www.VascularWeb.org](http://www.VascularWeb.org)

Diabetes is certainly not the only disease contributing to ESRD, however, it is the most prevalent. Hemodialysis volumes have been rising steadily with an increase of 40 to 50 patients across Manitoba every year (D. Skwarchuk, personal communication,

<sup>1</sup> Two forms of dialysis exist: Hemodialysis, the most common form of treatment (81%) and Peritoneal dialysis (19%). This project addresses hemodialysis.

April 7, 2007). Province-wide in the last five years, the provincial government has increased funding for the redevelopment, expansion and construction of new dialysis clinics. Examples of these developments include: Misericordia Health Centre (expansion underway in 2007); Thompson General Hospital (redevelopment – completed 2007); Swan Valley Health Centre (future expansion being planned); Flin Flon General Hospital (relocation & improvement of dialysis services – completed spring 2006); St. Anthony General Hospital in The Pas (expansion); Garden Hill Renal Health and Treatment Unit (new 2004); and Seven Oaks General Hospital (expansion 2003) (Manitoba Health News Releases, 2004, 2005, 2006, 2007). Likewise, during the 2007 provincial election, the Provincial government announced three new dialysis clinics in the areas of Berens River, Gimli and Hodgson. Currently, a fourth dialysis clinic is being developed with the Assiniboine Regional Health Authority for the town of Russell (D. Skwarchuk, personal communication, April 7, 2007; D. Franklin, personal communication, June 4, 2007).

The above examples of expansion, renovation and new construction are due to the rapid rise in kidney disease. According to the National Kidney Foundation of Canada (December 2004), approximately two million Canadians are living with kidney disease or are at risk for developing kidney disease. In December 2004, fewer than 31,000 Canadians were receiving renal replacement therapy; that number is expected to double over the next decade (National Kidney Foundation of Canada). The Manitoba Renal Program (n.d.a) reported approximately 1,000 Manitobans were receiving dialysis in 2005 and an additional 1,000 were being monitored. These numbers confirm a continued growth in renal disease.



### **1.3. Objective**

The aim of this research-based design process is two fold: (1) to create greater awareness of therapeutic and restorative environments and their impact on people undergoing dialysis and (2) to promote and encourage facilities to design and build in this fashion, thereby positively impacting the lives of dialysis patients.

Research indicates that physical environments can affect quality of life (Ulrich, 1990). Therefore, the intent of this study is to determine how the physical environment can assist patients with ESRD achieve a greater quality of life. More specifically, the following questions are addressed:

1. How can the physical environment facilitate restoration and healing?
2. How can the environment enable spiritual development and renewal?
3. What type of design elements contribute to stress reduction?

This practicum explores how stressors impact coping and health outcomes and how, through specific environmental considerations, these stressors can be reduced. The proposed facility would improve patients' ability to cope with the lifestyle changes ESRD brings.

### **1.4. Rationale**

Healthcare environments have been both enhanced and plagued by technology. On one hand, technology has played a large role in diagnosing diseases, treating diseases and consequently prolonging life. On the other hand, technology has caused the physical environment to become “mechanical” and more suited

to the equipment than to the people who occupy the space. Frampton (2003) suggests that, “although conditions have improved, hospitals have a long way to go in meeting patients’ needs. Nothing less than a complete transformation of health care organizational culture is needed.” (p. xxxiv). It seems that many healthcare environments remain stagnant, institutional, cold and sterile.

In Winnipeg, renovation and expansion of some health facilities is underway. However, numerous departments, such as the dialysis centre operating out of the Health Sciences Centre, have yet to implement the transformations suggested by Frampton. The current units provide care to individuals who are in renal failure and require an artificial method to clean waste and fluids from the body.

Operating from two separate locations, the dialysis unit is currently situated on the sixth floor of the general hospital (known as Central) and one block away at 765 Sherbrook (referred to as Sherbrook). Originally, the Sherbrook location; comprised of two separate spaces for (1) self starts (patients who were not high risk and considered more independent) and (2) monitored and fragile patients (R. Ross, personal communication, March 13 2007). Due to the continued increase in kidney disease the HSC has expanded into the General Hospital where the unit cares for patients who require greater monitoring. This disconnected expansion has led to inadequate and inefficient spaces, and is an inconvenience to patients and staff members.

Neither the HSC, nor the other dialysis clinics within Winnipeg incorporate a restorative approach. It is my hope that designers will consider the information within this practicum to be useful

when developing restorative environments; environments that create positive associations and experiences for patients, visitors and staff alike.

## **1.5. Limitations**

Certain limitations are associated with this study, and include the following:

1. Interviews and questionnaires were conducted in English, thereby potentially reducing and limiting population size.
2. Sample size was limited to 22% of the hemodialysis population in both Sherbrook and Central locations. This sample size may limit the general applicability of the results.
3. Participants' lack of knowledge of the advances in healthcare design could have affected their responses.

## **1.6. Overview**

This document is organized as follows:

A description of the investigation methods utilized is described in detail in Chapter Two. Chapter Three reviews related literature regarding the impact of negative stress and offers strategies to mitigate and cope with stress through design. Included at the conclusion of each major section in the literature review are charts summarizing key points and describing design considerations. In Chapter Four, three precedents are reviewed and key features from each are discussed. All precedents are also examined in relation to their relevance to the HSC dialysis programme. A detailed design programme follows in Chapter Five, with an analysis of the site and of building and human factors, and the specific requirements required for dialysis

patients. Chapter Six provides the design solutions and finally Chapter Seven summarizes the design.

## Chapter 2: Investigation Process

To develop a better understanding of the rigorous schedule demanded by dialysis treatment and the environment in which it is administered, a preliminary literature review led to the development of a questionnaire regarding holistic healing. A total of 70 patients on chronic hemodialysis were invited to participate in this study.

Prior to initiating the study, approval was obtained from the University of Manitoba Joint Faculty Ethics Board as well as the Health Sciences Centre (HSC). Following approval, a cover letter explaining the purpose and process of the study was provided to HSC dialysis patients in the waiting room as well as within the treatment areas in each unit. Because the dialysis facility at HSC is comprised of two distinctly separate units (Sherbrook and Central locations), an attempt was made to administer an equal number of questionnaires at each site. The questionnaire was comprised of three parts; addressing demographics, dialysis experience, and spirituality. Patients showing interest were then asked to sign a consent form indicating their willingness to participate before receiving the written questionnaire. Subjects were surveyed over a one week period from March 12, 2007 to March 19, 2007.

Ultimately, a total of 62 patients, 22% of the HSC dialysis population returned the completed questionnaire. In total 36 patients participated from Sherbrook and 26 from Central. Of the patients, 29 were female and 33 were males.

The data revealed the following trends.

- 1) The centre caters to an aging population. Ages varied between 22 to 90 with more than 70% of respondents above the age of 50.
- 2) Greater than 50% of subjects utilize public transit (Handi-Transit services), to get to and from treatment.
- 3) The majority of subjects reside in Winnipeg. Few commute to the city in order to receive treatment. Approximately 15% of respondents moved to Winnipeg to accommodate hemodialysis treatment.
- 4) No clear preference for physical comfort is evident among respondents with responses equally divided among the given options (i.e., lying down, sitting, blanket, and pillow).
- 5) Patients favoured dimness versus brightness at a rate of 2 to 1 while receiving treatment.
- 6) A majority of patients preferred comforting activities (i.e., watching television/movie, sleeping, and reading) that would require some level of privacy.
- 7) A relatively equal variety of spiritual exercises (i.e., prayer, nature, music, and images) are practiced.
- 8) Patients considered both music and prayer s a private activity, whereas nature and art were considered public and private activities.

Informal interviews with staff and observation of dialysis units at HSC led to the development of interview questions for staff members. Responses obtained through this method provided practical information about the way each of the units operates. These findings also provided information on staff preferences.

Together, the patient questionnaires, staff interviews, and observation revealed that:

- 1) The aging demographics of dialysis users suggests that although design considerations must be made to support all users, special consideration must be made for the elderly and aging population (e.g.: sensory cues).
- 2) In order to maximize desired levels of privacy, a reception area away from the treatment area should be implemented.
- 3) Since hemodialysis patients are frequently visiting the centre and experience high levels of fatigue, a drop-off point is beneficial to those coming by vehicle with a family member or those accessing Handi-Transit. Likewise, near-by accessible parking must be made available.
- 4) To reduce congestion, two waiting areas are required for pre-treatment and post-treatment (patients waiting for pickup from a family member or Handi-Transit).
- 5) It is essential that washrooms be located near both waiting areas for convenience.
- 6) Given that patients spend up to 1/3<sup>rd</sup> of their day in the centre, a home like environment should be implemented.
- 7) The centre caters to a wide ethnic group therefore natural elements such as vegetation, fire, and water relate to all individuals, regardless of ethnicity.
- 8) In order to provide patients with environment control, greater flexibility is required to enable individuals to adapt their surroundings to suit their needs and to choose their preferred treatment furniture (i.e.: bed or recliner) and room type (i.e.: private or semi-private room).

- 9) Staff spend a great time in this environment. Comfort levels also must be addressed, therefore privacy is equally important for off-duty staff and should be incorporated away from treatment areas.

These research findings provide valuable information and informed the spatial design of the proposed dialysis facility. The following literature review addresses these findings.



## Chapter 3: Literature Review

*Healthcare is currently in a crisis of meaning. We have lost our focus, distracted by the powerful waves of change that have rendered the work that we do increasingly challenging. We have turned medicine into rocket science, and we have allowed ourselves to be swept up completely by the allure of technology at the expense of simple human dignity.*

*(Frampton, 2003, p. 306).*

With stringent dietary restrictions and rigorous treatment schedules, dialysis patients often lose many liberties enjoyed by healthy people. Struggling to cope with lifestyle change is an enormous obstacle and many individuals resist treatment until the severity of their disease means choosing life or death. A thoughtfully designed restorative environment can reduce stress, aid in acceptance of the disease, and improve overall quality of life. Coming to terms with kidney disease requires acceptance of regimented diets, schedules, and ultimately, acceptance of the disease.

As is the case with most situations involving change, the experience of adjusting to a disease can be highly stressful, both physiologically and psychologically, therefore it is critical that the healthcare environment facilitates stress reduction to the greatest degree possible. Strategies for reducing stress include the following: (a) the concept of privacy, (b) theory of supportive design, (c) spirituality, (d) the concept of a restorative environment, and (e) coping mechanisms. The following literature addresses these five topics and reveals the connection between restorative environments and the ability to cope with kidney disease.

### 3.1. Stress

Although many definitions of stress exist, Ulrich (1999) defines stress as a process of responding to events and environmental features that are challenging, demanding, or threatening to well-

being. While stress is required to stimulate the senses in preparation to take action in a situation, chronic stress can overwhelm individuals and ultimately affect their physical and psychological well-being (Lazarus, 1966; Saegert, 1976; Stuart-Pollack & Menconi, 2005). Consequently, when people's ability to cope or adapt becomes exhausted, stress becomes negative (Seyle, 1974).

According to psychologists Richard Lazarus and Susan Folkman (1984), in order for stress to affect a person, two characteristics must be present (a) perception of the situation is seen as threatening or demanding and (b) belief that resources are unavailable to cope with the situation (Degraff & Schaffer, 2008 as cited in Lazarus & Folkman).

When hemodialysis is required due to the loss of renal function, dramatic life changes occur. These changes are expected to be stressful and require major coping efforts (Welch & Austin, 2001). The following sections discuss the multiple stressors hemodialysis patients may experience during their treatment.

### **3.1.1. Physiological Stressors**

Physiological stress involves changes in bodily systems (Ulrich, 1990). For chronic hemodialysis patients, the changes in bodily systems involve: (a) disruption in body biochemistry (altered body water homeostasis, metabolic acidosis, and elevation of serum potassium, sodium, phosphorus, calcium, magnesium, creatinine, and uric acid (Stapleton, 2000) and (b) disruption in the organ system (hypertension, heart failure, anemia, gastrointestinal irritation, osteodystrophy, soft-tissue calcification, clotting

deficiencies, altered endocrine function, and neuropathy) (Baldree, Murphy, & Powers, 1982; Stapleton).

As a result of these two types of disturbances patients may experience decreased energy, impaired concentration, insomnia, weight loss, muscle cramps, itching, nausea and vomiting, joint stiffness, and limited use of the extremity with the inserted fistula (Baldree et al.; 1982, Stapleton as cited in Wright, Sand, & Goodhue, 1966). Likewise, common among hemodialysis patients is an increase in blood pressure, higher muscle tension, and higher levels of circulating stress hormones (Ulrich, 1990 as cited in Frankenhaeuser, 1980). Patients with constantly elevated blood pressure from chronic stress have an increased susceptibility to developing permanent high blood pressure or hypertension, a common problem with hemodialysis patients.

### 3.1.2. Psychological Stressors

When demands imposed on a person are *perceived* (accurately or inaccurately) to go beyond their ability to cope with these demands, psychological stress arises (Cohen, Evans, Stokols & Krantz, 1986). This type of stress occurs between a person and the environment and their perception of their relationship to this environment (Cohen et al). As a result, the experience of stress produces a response that can be physiological and/or behavioral in nature (Cohen et al).

Within the health care environment, psychological stress is regarded as a serious problem because it can directly affect many other health outcomes (Ulrich, 1999). Psychological reactions include feeling a sense of helplessness, anxiety, and depression (Ulrich). Studies revealed that depression is common among

*Patients with chronic kidney disease typically experience pronounced loss of control and endure substantial stress for years. Among the many factors that reduce sense of control are restrictive diets, fatigue, pain, and complex medication regimes....*

*....Inside the clinic, control is further undermined by, among other factors: noise; crowding; arrangements that prevent self-regulation of privacy or social interaction; blocked access to window views, uncontrollable television; and the inability of patient to control air temperature.*

*(Ulrich, 1990, p.92).*

dialysis patients due to the fluid limitations, length of treatment, and role reversal with children (Gurklis & Menke, 1988; Welch & Austin, 2001). Likewise, fear, anger, and sadness are additional psychological reactions to concerns with body image, frustrations with basic drives, fear of death/life, and dependence-independence conflict (Stapleton, 2000). Ulrich suggests that stress manifestations such as helplessness, depression, verbal outbursts, passivity, sleeplessness, alcohol and drug abuse, and social withdrawal could be linked with noncompliance or reduced adherence to doctor prescribed medical regimens and recommendations, a critical issue with dialysis patients as it is counter productive to wellness. Finally, long-term patients, those with a chronic illness, often experience depression, the most serious emotional manifestation of stress due to fluid limitation, length of treatment and limited mobility (Lok, 1996; Ulrich, 1999; Welch & Austin).

### **3.1.3. Mental Fatigue**

While stress involves responding to events and environmental features that are challenging, demanding, or threatening to well-being (Ulrich, 1999), mental fatigue can result from hard work on an enjoyable project (Kaplan & Kaplan, 1989). According to environmental behavior psychologists Kaplan & Kaplan, mental fatigue refers to a state of over-worked capacity for directed attention.

The Kaplans (1989) theorized that mental fatigue has a direct impact on the ability to focus or pay attention. If a task is uninteresting, then it is seen as being onerous, however if that task is appealing, then it is perceived as easy. Based on William James' research, published in 1892, Kaplan & Kaplan identified two types of attention that affect mental fatigue. *Involuntary*

*attention* requires no effort because it is directed at something deemed to be interesting, while *directed attention* requires an immense amount of effort as it is directed at something deemed to be uninteresting. It is, therefore, this directed attention that contributes to the core of mental fatigue. As a result, negative behaviours such as irritability, aggressiveness, lack of tolerance, and insensitivity to important social cues occur.

It is evident that hemodialysis patients experience numerous physiological and psychological stressors. For these patients, the ability to cope with stress is critically important to optimizing their physical, emotional, and mental well-being. Without providing an environment that properly addresses stress, negative health outcomes may result. As the environment plays a large role in the Kaplans' attention restoration theory, it will later be discussed in section 3.2.4. Although the impacts of stress and mental fatigue can be detrimental to health outcomes, following the theory of supportive design and providing increased privacy and control can mitigate stress and mental fatigue.

## **3.2. Strategies in Stress Reduction**

### **3.2.1. Privacy**

The ability to control privacy and the environment has the beneficial effect of mitigating stress. Numerous definitions of privacy exist, from having the ability to keep people away, to a process of control (Altman, 1975). Privacy theorist Irwin Altman describes privacy as a process where an individual has the ability to control access to themselves or a group and a condition of selective distance or isolation. Privacy is multifaceted, universal and essential for greater spiritual, emotional, and physical

*It is possible to have privacy on a crowded street, and at the same time, it may prove to be impossible to attain privacy alone in a room. Privacy exists at many levels, with both physical and spiritual requirements. The activities of our daily lives require periods of spatial separation, as well as a sense of space that transcends physical barriers.*

*(Stewart-Pollack & Menconi, 2005, p.1, as cited by Kaplan & Kaplan).*

development. It cannot, however, be attained without the ability to control one's surroundings whether the control is perceived or real (Gatchel et al., 1989, p. 39).

When privacy mechanisms do not function effectively, excess undesired social contact occurs, a phenomenon called crowding (Altman). Crowding is a “psychological response to overstimulation caused by too much interaction with others within a given space” (Stewart-Pollack & Menconi, 2005, p.32). Overstimulation can cause psychological distress such as withdrawal, the main coping mechanism associated with crowding (Stewart-Pollack & Menconi).

Within healthcare environments, patient privacy and control are often absent. A human response study conducted in 2001 and led by environmental and developmental psychologist Gary W. Evans indicated that the effects of crowding are detrimental to the physical and psychological health of individuals (Stewart-Pollack & Menconi, 2005). A fine balance must be attained in order to achieve privacy because too little brings on crowding and too much leads to isolation (Altman, 1975). The environment plays a significant role in whether the desired level of privacy is achieved.

### **3.2.1.1. Privacy and Environment**

To facilitate an environment that supports privacy and eliminates negative psychological conditions such as crowding, physical surroundings must be “rich in meaning” (Stewart-Pollack & Menconi, 2005). Accordingly, privacy theorist Dahl Pederson (1999) developed different types of privacy to clarify this meaning. The first, *solitude*, provides individuals with the opportunity to be uninterrupted, where they cannot be seen or

heard; comparable to attaining privacy by closing the bedroom door. *Isolation* offers a person the ability to physically distance themselves from others in order to obtain privacy. *Intimacy* is the ability to minimize contact with outsiders while increasing interaction with a desired group such as friends and family. Lastly, *anonymity* is a person's desire to go undetected in a crowd, similar to being in a shopping mall. By providing these types of privacy, patients have both the opportunity to *choose* the desired level of interaction and the ability to *control* their surroundings. This creates environments that provide personal autonomy, emotional release, self-evaluation, and limited or protected communication (Altman, 1975).

Privacy enables physical and psychological restoration for multiple reasons: (1) it is an indication of both choice and control, necessary for the development and maintenance of healthy self-identity; (2) it can encourage recovery from stress by providing the chance to foster rest, recovery, and contemplation; and lastly (3) it can provide positive social interaction (Stewart-Pollack & Menconi, 2005).

Within existing dialysis clinics in Manitoba, physical and psychological restoration is difficult if not impossible to achieve due to the loss of control and lack of privacy available. Opportunities for social interaction are limited and the ability to control the physical environment is absent. Ulrich's (1990) research in supportive design helps designers understand how to develop design criteria for dealing with stress and control.

### **3.2.2. Theory of Supportive Design**

Developed by Dr. Roger Ulrich in 1990, the theory of supportive design is centered on the concept of stress and how individuals'

experiences with the environment can affect their physical and psychological health and well-being (Stewart-Pollack & Menconi, 2005; Ulrich, 1998). Ulrich hypothesizes that in order for patients to be able to cope with the major stress that accompanies their illness, a “psychologically supportive” physical environment must be provided (Stewart-Pollack & Menconi).

A psychologically supportive environment is one that encompasses three components (Ulrich, 1990). First, a sense of control must be established for the patient. Patients can alleviate stress by having control over desired levels of light, temperature, and privacy. Secondly, patients must have access to social support. Patients who interact with family, friends, and healthcare staff experience less stress and a greater degree of wellness, however strong social support must be balanced with access to privacy. Lastly, patients must have a variety of positive distractions<sup>2</sup> (Stewart-Pollack & Menconi, 2005). Such distractions can include elements of nature, being surrounded by happiness or laughter and nonthreatening animals.



Figure 4.



Figure 5.

The theory of supportive design provides healthcare designers and administrators with a framework that will ease the decision making process during the design phase of healthcare facilities.

---

<sup>2</sup> A positive distraction is an environmental feature or element that elicits positive feelings, holds attention and interest without taxing or stressing the individual, and therefore may block or reduce worrisome thoughts (Ulrich 1990, 95).



Patients with chronic kidney disease who frequent healthcare environments for treatment experience negative stress through loss of control, lack of social support networks, and missing positive distractions. The following section addresses spirituality and the role it can play in helping patients cope with stressful events.

### 3.2.3. Spirituality

There is a general consensus that spirituality is a broad concept that is distinct from, but similar to religion (Burkhardt & Nagai-Jacobson, 2002; Dossey et al., 2000; Galanter, 2005; Handzo & Wilson, 2005; Kaiser, 2003; McSherry, 2006; Sheridan, 2008; Young & Koopsen, 2005). Spirituality is considered to be the overall experiential and dynamic process of finding meaning and connectedness in life (Handzo & Wilson; Young & Koopsen). Religion on the other hand, is one way in which a person can exercise and practice his or her spirituality (Handzo & Wilson).

Positive psychological effects result from exercising spirituality (Graham, Furr, Flowers & Burke, 2001; Laubmeier, Zakowski & Bair, 2004; O'Brien, 1982). Studying patients with a chronic disease has shown that positive health outcomes can be linked with the regular practice of spirituality. Spirituality can offer hope and a connection with the universe, the environment, nature, and the earth (Burkhardt & Nagai-Jacobson, 2002; Young & Koopsen, 2005). Studies (Laubmeier et al.; O'Brien; Siegel, Anderman, & Schrimshaw, 2001) have shown that three important variables affect healing: (1) maintaining a connection with a supportive and caring group (2) having a sense of control over oneself and the response to the disease (not the disease itself) and lastly (3) the

*In any unfamiliar situation, people carry with them a certain degree of worry and fear. They may experience depression, emptiness, boredom, stress or a need for feverish activities to occupy their time. People using medical facilities experience altered priorities which causes a change in attention spans, communication skills, and cognitive abilities. Many people's lives change dramatically in the midst of this environment; patients, their families, and other visitors may find themselves questioning their very existence, their purpose, their past and future.*

*(Huelat, p.185).*

ability to make meaning out of the disease or illness. Reverends George Handzo and Jo Clare Wilson (2005), explain:

How we behave – our being – is a product of our belief system. And our belief system is our spirituality, our way of making meaning in the world. A system of belief can be defined as an external entity. Some would even say that there are concepts we learn and take on as a way of believing about or viewing the world. But even how we determine our thoughts is influenced by what we believe to be true and the ways we value the world around us. The expression “spirituality is an inside job” is used to describe our ability to alter our beliefs, attitudes, and ways of making meaning. This is true, regardless of the process a person chooses to nurture and create a spiritual life, whether it is the use of religion, nature, meditation, art, or any of [a] myriad [of] other choices (93).

When HSC (Central and Sherbrook) dialysis patients at were questioned in 2007, 93% felt spiritual through a variety of elements, such as prayer, nature, and music.

Spirituality has the ability to give meaning and a sense of purpose to life during times of illness and offers positive outcomes for all healthcare users (Burkhardt & Nagai-Jacobsen, 2002; O'Brien, 1982). A strong connection exists between illness and spirituality as spirituality has the ability to reduce anxiety and stress. (Carver, Scheier, & Weintraub, 1989; Laubmeier et al., 2004; O'Brien; Siegel et al., 2001). To provide elements of spirituality, the physical environment must embody what Ulrich terms “psychologically supportive” opportunities through restoration.

### 3.2.4. Restorative environment

Restoration is described as the process of recuperating from diminished physiological, psychological and social resources, resources that have decreased in order to meet the demands of everyday life (Hartig, 2007). This may include recovery from mental fatigue and stress. Restorative environments are places which allow a person to unwind, to free their mind, and to distance themselves from pressures, demands and direct attention (Hartig; Kaplan & Kaplan, 1989; Scopelliti & Giuliani, 2004). This type of environment does not simply permit, but actively promotes restoration.

Extensive research from various fields of study suggest that *nature* offers the utmost degree of restoration for a person (Burkhardt, 1994; Hartig, 2007; Kaplan & Kaplan, 1989; Pedretti & Soren, 2006; Scopelliti & Giuliani, 2004; Ulrich, 1990) and aids in one's recovery from stress (Ulrich).

#### 3.2.4.1. Nature

Nature has always played a vital role in “humane medical care” because its mythological and historical presence is linked to renewal of life, healing, and death (Gerlach-Spriggs, Kaufman, Warner, 1998). Nature has served to uplift patients suffering from depression or sadness while also providing spiritual healing and positive emotional therapy (Marcus & Barnes, 1996).

Psychological studies of nature and its effect on patients' health outcomes have been an increasingly popular topic of study since the 1980's. Ulrich (1999), an advocate of nature within healthcare facilities, has conducted numerous studies on the impact nature can have on hospital patients. His research concludes that nature and natural elements have the ability to hold a person's attention,

*Gardens have a mythology, a poetry, and a history, strongly linked to life cycles and the processes of healing, renewal, and ultimately dying. The persistent appearance of healing gardens in places and times of medical innovation suggest that beyond the aesthetic human beings feel a biological need for contact with the natural.*

*(Gerlach-Spriggs et al., p.5).*

which in turn blocks or reduces worrying thoughts, decreasing negative emotions such as fear, anger and sadness. Recently, new research suggests that when patients have a predominant view of nature, psychological restoration is more swift and complete (Ulrich & Zimring, 2004). Similarly, Marcus and Barnes have performed several case studies on gardens and their effects on people. One study conducted in 1996, reported that users felt spiritual or had religious experiences while being in nature (Marcus & Barnes). The results indicated that nature served to uplift patients, especially those suffering from depression or sadness. Ultimately, their study has shown that healing and therapy can take place when one is surrounded by nature.



Figure 6.



Figure 7.

According to Kaplan & Kaplan (1989) three important benefits are derived from being in nature and are linked with the aesthetic factors nature provides; these include a pleasurable experience, supporting human functioning, and promotion of recovery from mental fatigue.

Encouraging recovery through the aesthetics of nature can be experienced through four different aspects. The first aspect of

restorativeness is “clearing the mind.” After a person finishes a task where intense cognitive activity occurs, lingering pieces remain to occupy the mind, to distract. The aesthetics of nature allow these cognitive pieces to run their course. Secondly, it encourages recovery of directed attention. A third aspect of a restorative experience relies on the cognitive peace fostered by soft fascination (holding ones attention voluntarily). Most people carry with them cognitive remains of the past that can encumber the mind and create internal noise that confuses thoughts and requires significant directed attention to keep focused on the present; nature allows people to minimize this clutter. Finally, a deep restorative experience allows a person to reflect on their life, their priorities, their actions, and their goals.

*Where restorative gardens appear, the emphasis is not on machinery or advanced technologies, though they are often in place, but on the intimacies of patient care.*

*(Gerlach-Spriggs et al., p.4).*

As highlighted by Kaplan & Kaplan, Marcus & Barnes, and Ulrich, natural environments have a wide range of benefits. Nature increases one’s ability to cope and spiritual renewal fosters feelings of being “at one”, enabling meaning and tranquility to take place and physical and mental health benefits to result.

Through Kaplan & Kaplan’s investigation and research, it was determined that recovery from stress and mental fatigue takes place through one’s experience of various forms of restoration. In order to qualify as a restorative environment five features must be present:

#### 1. Being Away

When seeking a restorative experience, people speak of needing to “get away” or requiring “an escape”. Kaplan & Kaplan (1989) present three types of escape. The first involves removing oneself from a particular space in order to escape from a specific distraction. This can involve changing rooms so the distraction

such as a television or telephone is no longer present. The second form entails putting aside customary work, thereby receiving escape from the task at hand. The last form of escape is achieved internally by taking a rest from mental effort of any kind. Incorporating all three types of escape provides a more powerful restorative effect for a person. For many, nature meets the criteria of “being away” since it is no longer part of the everyday for most individuals.

## 2. Extent

The concept of “extent” is described as being physically or perceptually in a “whole other world” by occupying and engaging the mind through content and structure (Kaplan & Kaplan, 1989; Pedretti & Soren, 2006). For instance, visiting a walkthrough aquarium can give that feeling of being in another world as it allows visitors to experience the animals’ natural environment. On the other hand, a person can also obtain extent through intense focus, such as solving a computer problem (Kaplan & Kaplan). Connectedness and scope are two important properties to this experience as there must be enough familiarity to allow a mental map to occur, and sufficient depth to become fully immersed (Kaplan & Kaplan). Within nature, extent is easily achieved because of universal recognition and because it engages the mind beyond what is immediately visible (Pedretti & Soren).

## 3. Fascination

Fascination refers to a source that draws people in by capturing their interest and alleviating boredom. According to William James this can include natural elements such as water, fire, and sunsets (Kaplan & Kaplan, 1989). Fascination is critical in attaining a restorative environment as it naturally encourages people to use involuntary attention. As a result, it facilitates

recovery from directed attention which causes mental fatigue and stress.

Studies show that gardens have incredible “attention holding power” because of the diverse information being displayed (Kaplan & Kaplan, 1989; Ulrich, 1990), yet the benefit of nature is that, although the mind is focused on nature, it also has room to wander to other thoughts.



Figure 8.

#### 4. Compatibility

The concept of compatibility, as Pedretti & Soren (2006) state: “is the match or fit between personal purposes or inclinations and the kinds of activities encouraged and supported by the setting” (85). In other words, the environment must be appropriate for what a person would like to accomplish (Kaplan, 1995). Kaplan & Kaplan describe it best by using the familiar expression “may the wind be always at your back”; not meaning that the journey be effortless, but rather that a person follows their goals in an environment that supports their effort.

### 5. Synergy

Although the Kaplan & Kaplan framework provides four elements, Pedretti & Soren, refer to a fifth that can be incorporated to aid in the creation of a restorative experience. Synergy is the concept of providing an environment that is multi-sensory. It appeals to all the senses through sights, sound, smell, and rich textures that can be explored through touch (Pedretti & Soren, 2006).

The five features presented, *being away*, *extent*, *fascination*, *compatibility* and *synergy* are those that characterize a restorative environment. The use of this framework in the design of environments allows individuals to recover from the use of directed attention and experience stress reduction, resulting in significant psychological benefits.



Figure 9.

The following design considerations are a summary of the theories and concepts presented in the literature. They provide a quick and easy reference that informs the spatial design of the proposed dialysis facility.



### 3.2.5. Design Considerations

The preceding theories should be considered when designing a dialysis facility. These tables can be used to inform the spatial design of the proposed facility and provide designers with useful recommendations (see tables 3.2.5.1, 3.2.5.2 and 3.2.5.3).

#### 3.2.5.1. Design considerations for increased Privacy

Literature influence	Consideration	Description	Benefits	Design Implications
Dahl Pederson	Solitude	The opportunity for interrupted isolation; where a person cannot be seen or heard.	Allows for contemplation, rejuvenation, emotional release, and self-evaluation.	Provide physical or perceived enclosures for increased psychological, emotional, and spiritual benefits.
Dahl Pederson	Isolation	Offers a person the ability to distance themselves from others.	Allows for contemplation, rejuvenation, emotional release, and self-evaluation.	Provide private seating areas and flexible spaces in order to allow distancing to occur.
Dahl Pederson	Intimacy with Friends and Family	The ability to reduce contact with outsiders while increasing interaction with the desired group.	Permits recovery and rejuvenation to take place.	Provide space for flexible seating arrangements of various sizes.
Dahl Pederson	Autonomy	The ability to go undetected in a crowd.	Provides choice and anonymity.	Flexible seating for grouped activities or performances in order for a person to lose themselves in the audience.

## 3.2.5.2. Design considerations for a Restorative environment

Literature influence	Consideration	Description	Benefits	Design Implications
Kaplan & Kaplan (1989)	Being Away	Getting away from the usual by being able to physically and mentally remove oneself.	Allows for recovery, restoration, and contemplation to take place.	Provide art, music, and natural elements such as water and vegetation.
Kaplan & Kaplan (1989)	Extent	The environment is perceived to extend beyond the immediate, the visible.	Allows one to immerse him/herself in the environment.	The correct depth for design elements.
Kaplan & Kaplan (1989)	Fascination	An environment that provides involuntary attention.	Keeps people from getting bored by not using directed attention and blocks negative thoughts.	Incorporation of natural elements such as fire, water and vegetation.
Kaplan & Kaplan (1989)	Compatibility	An environment that supports the goal of the user.	Reduced effort is required to achieve personal goals.	Purpose built environments and variability or customization for users.
Pedretti & Soren	Synergy	Multi-sensory experiences.	Evoke a range of emotional responses such as playfulness.	Sound and touch of water, smell of vegetation.

## 3.2.5.3. Design considerations for the Theory of Supportive Design

Literature influence	Consideration	Description	Benefits	Design Implications
Roger Ulrich	Control	Enable patients to control their environment to the greatest degree possible.	Alleviates stress.	Enable patients to control light levels, temperature levels, privacy level.
Roger Ulrich	Social support	The ability to interact with family and friends.	Higher levels of wellness.	Spaces that allow for family and friends to gather, both in common areas and treatment areas.
Roger Ulrich	Positive distractions	Environmental feature or element that elicits positive feelings and engages the mind.	Holds attention without taxing or stressing individuals and blocks or reduces worrisome thoughts.	Incorporate natural elements such as vegetation, fire, water, art, and music.

### 3.3. Coping

When a person is faced with a stressful situation or crisis, coping strategies and resources are employed in order to reduce the distress (Billings & Moos, 1981; Lazarus, 1966; Lazarus & Folkman, 1984). Coping is defined as: “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 141). Therefore, Lazarus and Folkman theorize that people experience stresses when they *believe* insufficient resources<sup>3</sup> are available to help them deal with difficult events (Hyman, 2002).

This theory defines the transaction process as the relationship between the evaluation of the situation, dealing (coping) with the situation and the outcome (Lazarus & Folkman, 1984; Logan, Pelletier-Hibbert & Hodgins, 2006). Through the person’s assessment of the stressor, the transactional process is initiated, which allows the individual to assess the situation in terms of what is at risk and the resources available to help cope with it (Cohen & Lazarus, 1983; Lazarus & Folkman, 1984).

Typically, through trial-and-error, the individual in this third step (the outcome of the transaction) uses a number of coping strategies. These strategies are intended to either change the situation in order to receive a better outcome (problem-focused coping strategies) or to simply guide the level of emotional stress (emotion-focused coping strategies).

---

<sup>3</sup> Coping is determined by the resources available to the individual and the factors which enable or prevent their use. As a result, Lazarus and Folkman’s research identify six major resource categories people draw upon to cope (see table 3.3.1).

*Problem-focused coping* attempts to alter or eliminate the problem or situation through confrontation and problem solving. The process of problem solving involves the following strategies; defining the problem, generating alternative solutions, and weighing the alternatives in terms of the costs and benefits (Billings & Moos; 1981, Blake & Courts, 1996; Lazarus; 1966; Lazarus & Folkman; 1984). As a result, this coping strategy employs a logical process that aims both inward (toward a person's values and beliefs) and outward (toward their environment) (Lazarus & Folkman). Seeking social support, for instance, is an example of problem focused coping.

*Emotion-focused coping* focuses on reducing emotional stress by using such strategies as avoidance, distancing, selective attention, escape, positive reappraisal, and receiving positive values from negative events (DeGraff & Schaffer, 2008; Lazarus; 1966; Lazarus & Folkman, 1984; Logan, Pelletier-Hibbert & Hodgins, 2006; Walsh; 2008).

This coping strategy is useful when the source of stress cannot be reduced or resolved (Lazarus & Folkman). Meditation, for example, is an emotion-focused method of dealing with stress, (Walsh) which helps mitigate stress by lowering adrenaline



Figure 10. Meditating. Used with permission from Alain Gougeon.

flow, metabolic rate, heart rate, in addition to enhancing immune and cardiovascular function, relaxation, and pain reduction (Young & Koopsen, 2005).

Both types of coping strategies can be used and often are used concurrently (Lazarus & Folkman, 1984; Logan et al., 2006). By appraisal of the situation the predominant method of coping can be determined: if something can be done about the situation, problem-focused coping dominates. If it is deemed that the situation cannot be changed, emotional-focused coping prevails (Lazarus, 1993). As such, stress and coping are closely linked to each other and to cognitive factors (Hyman, 2002). By changing how a situation is interpreted; to make it *appear* more favorable enables coping to be achieved (Lazarus).

A great deal of research has been conducted with chronic hemodialysis patients and the relationship between coping methods and stressors. This research (Billings & Moos, 1981; Logan et al., 2006; Lok, 1996; Welch & Austin, 2001) revealed that both types of coping strategies will be implemented by dialysis patients at one time or another during their treatment.

The concepts and theories discussed throughout this section are critical components in mitigating stress, and therefore conducive to helping patients with ESRD cope with life-style changes. In order to encourage these concepts, a proper model of care must be in place.

## 3.3.1. Design considerations for coping

Literature influence	Consideration	Description	Benefits	Design Implications/ Resources
Lazarus & Folkman	Health and Energy	Easier to cope when one is feeling well.	The healthier the individual, the better their ability to cope.	Access to kitchenette and nutritional information.
Lazarus & Folkman	Positive Beliefs	Positive personal outlook on life/world.	Serves as a basis for hope and improves personal outlook on life.	Environment that supports spiritual development – include natural elements such as vegetation, water, and fire.
Lazarus & Folkman	Problem Solving	Ability to search for information.	Greater awareness about illness.  Become active participants in their own care.	Provide access to resources such as the internet and literature.
Lazarus & Folkman	Social interaction	The ability to interact with other individuals.	Facilitates problem solving with other people.  One is able to enlist cooperation or support.	Provide an environment conducive to social interaction.
Lazarus & Folkman	Social Support	The ability to interact with family and friends.	Receive emotional, informational, and/or tangible support.	Provide flexible seating arrangements.
Lazarus & Folkman	Material Resources	Materials and equipment required.	Easier access to the required resources.	Universal access to information and care.

### 3.4. Models of Care

Although the term, “model of care” is used widely, no consistent definition exists. However, a model of care can be thought of as a framework that defines the way health services are delivered within a healthcare system (Queensland Health, 2000).

Within the last 30 years, the model of care employed by most healthcare facilities was one termed “medical model” or “bio-medical model”, as it restricted itself to the physical aspects of illness, limiting itself to the body. It has been found that patient well-being is not determined solely by the physical symptoms (Ulrich, 1990; Stokols, 2003). Today, facilities are moving toward a more “patient-centered” model of care to address the shortcomings of the bio-medical model. The concept of this delivery system is one that focuses primarily on meeting the physical and psychological needs of its users. This is accomplished by considering the complete environment, changing the elements that do not meet the needs of its patients, and thus changing the patient care experience (Sohn, 2007). The results of employing patient-centered care include less discomfort and concern, better mental health, increased efficiency of care, improved patient-outcomes, greater patient satisfaction, and happier staff (Nurture by Steelcase, 2007; Stewart, Brown, Donner, McWhinney, Oates, Weston and Jordan, 2008). “Patient-centered care” also encourages patients to become active participants in their own care. One such model of patient-centered care is the Planetree Model.

#### 3.3.1. Planetree Model

Planetree is a new model of care that considers it the role of healthcare facilities to provide environments that nurture,

comfort and support patients, staff, and family members. Established in 1979 by Angela Thierot, Planetree provides a holistic approach to healing by including both mind and spirit in the healing process (Frampton, 2003). This approach is utilized because Planetree strongly believes that healing can take place faster and more completely when all needs are addressed.

Planetree encourages patients to take an active role in their care by empowering them through appropriate resources and environment. A three year study of the first Planetree model, established in 1984 in San Francisco has clearly demonstrated the benefits of patient-centered care. The overall positive user experience and high satisfaction level was due to the 10 elements of patient-centered care that Planetree embodies (see table 3.3.1.1).

#### 3.3.1.1. Design considerations for Planetree Model of Care.

Core Component	Description	Benefits	Design Programme Influence
Human interaction (Gilpin)	Social support from having people care for other people.	Creates an environment that provides support and comfort, and offers hope to families, patients and staff.	Create flexible spaces that can provide privacy and promote social interaction among family, friends and staff members.
Inclusion of family and friends (Edgman-Levitan)	Encourages participation of friends and family in a patients' hospital experience.	Creates compassionate and loving relationships	Provide flexible seating, space in patient rooms, and alternative spaces for family and friends to gather.
Informing and empowering diverse populations (Ford & Gilpin)	Access to important and meaningful information.	Involves patients and ultimately allows them to take responsibility for their own health and healthcare.	Include resource space(s) that provide access to internet, literature, group discussions.
Nutritional and nurturing aspects of food (Reinke & Ryczek)	Food is recognized as a powerful tool as it nourishes the body.	Patients develop a greater understanding of the importance of their diet.	Incorporate a kitchenette for patient and family use.
Spirituality (Kaiser)	Provides meaning and connectedness in life.	Patients feel a sense of purpose and hope. Allows for healing and positive health outcomes to occur.	Provide private and public spaces for prayer and meditation. Incorporate a healing garden for contemplation and reflection.



Human touch (Spatz & Storby)	Human contact through therapy.	Connects human beings, communicates caring, provides therapeutic value and reduces anxiety, pain, and stress while increasing physical relaxation and a positive mood.	Provide space for patients to receive a foot massage.
Healing arts (Ulrich & Gilpin)	Music and artwork provide engagement and entertainment.	Reduces stress.	Provide patient controlled access to music in each treatment area. Provide visual access to art displayed in each patient room.
Complementary therapies (Katz)	Additional therapies should be offered.	Fosters a sense of empowerment as it allows patients the opportunity to obtain care that is consistent with their beliefs and preferences.	Provide access to additional services (e.g.: massage while patients receive treatment)..
Architecture and Interior Design (Arneill & Frasca-Beaulieu)	The physical environment contributes to stress reduction by creating a nurturing and supportive environment and comfort zones.	Provides dignity to those requiring hospitalization and humanizes the environment.	The incorporation of healing gardens, water features, fireplaces and comfortable materials.
Healthy communities (Planetree)	Expand the borders of healthcare through the larger community; including schools, church, and other community partners.	Increases awareness and supports health and well-being.	Incorporate design features of local community.

These 10 fundamental elements of the Planetree model of patient centered care, allow positive experiences for all users and better outcomes for patients.

The literature review indicates the key design strategies, to mitigate and cope with stress include privacy, supportive design, spirituality, and restorative environments. The following chapter evaluates various facilities that provided valuable insight into existing healthcare environments.

## Chapter 4: Precedent Review

The chapter examines characteristics of current healthcare institutions which will inform the spatial design of the proposed dialysis facility.

### 4.1. Precedent One

Name of Project: Center for Advanced Medicine

Site: Washington University Medical Center, St. Louis, Missouri

Designers: Hellmuth, Obata + Kassabaum, P.C.



Figure 11. Waiting Room, Center for Advanced Medicine. Used with permission from Visual Reference Publications.

**Key Features:** Open volume | Natural Light | Gathering space

The waiting area within the Center for Advanced Medicine, located in St. Louis, Missouri, offers its users a comforting and restful waiting environment. Natural light penetrates this space through large floor to ceiling windows. Recessed lighting is incorporated throughout and includes cove lighting in order to soften the environment and evoke a warm, welcoming appeal. The area is spacious, enabling users of all abilities to move freely

through the furniture groupings. The furniture is strong, sturdy, and flexible and incorporates table lamps and ottomans with the aim of humanizing the environment. Vegetation and planters are located in and around the waiting area to relate to a human scale and create a more welcoming space. In addition, the waiting room is located on the main floor where it is easily accessed by all patients.

The characteristics of this precedent can be incorporated into the HSC dialysis clinic; particularly the quality of flexibility and the access to natural light. Post dialysis patients would have visual access to transportation (typically handi-transit), and furniture could be reconfigured for large or intimate functions or discussions.



Figure 12. Waiting room and lobby, Center for Advanced Medicine. Used with permission from Visual Reference Publications.

## 4.2. Precedent Two

Name of Project: DaVita Dialysis Clinic

Site: La Grange, Kentucky

Designers: Whitley Manufacturing Co, Inc.

Number of stations: 12

Total square feet: 5,000



Figure 13. DaVita Dialysis Clinic in La Grange, Kentucky. Used with permission from Whitley Manufacturing Co. Inc.

**Key Features:** Small, home-like unit | Lack of privacy | Lack of positive distraction | Lack of spiritual development

Although the DaVita Dialysis clinic is the largest independent provider of dialysis services in the United States, the facility in La Grange Kentucky does not have a suitable design for stationary patients. This modular building was constructed off site and does not address its site by considering its surrounding views, sunlight orientation or nature. The waiting room is located upon entrance, however no positive distraction is incorporated to occupy the patients time while they wait for treatment. The treatment area is a typical U-shaped configuration with the main nursing station centrally located, allowing visual access to each patient treatment station (see Figure 14). Treatment chairs face inward, toward the nursing station and patients are in a position to overhear conversations between nurses containing confidential

information. Similarly, patient privacy is absent as the person at the adjacent treatment station can overhear any conversation taking place, whether it be a medical discussion with physician or a conversation with a visitor. (see Figure 14).

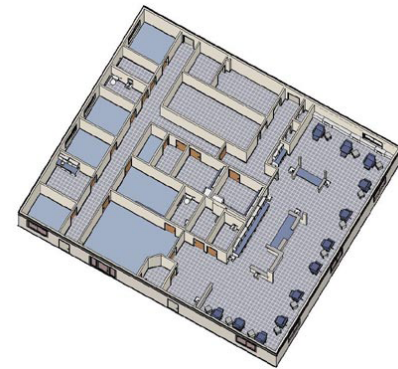


Figure 14. Axonometric of DaVita Dialysis Clinic. Used with permission from Whitley Manufacturing Co. Inc.

Large windows permit natural light to penetrate the space, however patients have no opportunity to look outside or “get away” as Kaplan & Kaplan suggest is beneficial. In this instance, the view would be a positive distraction, but it is



Figure 15. Treatment Stations. Used with permission from Whitley Manufacturing Co. Inc.

located behind the patient (see Figure 15). The main distraction patients are offered are televisions and the on going activity surrounding the nurses’ station. According to Ulrich, these are considered negative distractions. Healing is difficult because of the lack of control over the environment, the lack of privacy and the missing restorative and spiritual evocative elements.

The precedent offered is an excellent example of the current state of dialysis configurations found across Manitoba and thus shows the importance of this practicum. Its large nursing station creates a barrier between patients and staff and the environment offers little comfort and support in dealing with healing and coping with lifestyle changes.

### 4.3. Precedent Three

Name of Project: Archette Hemodialysis Centre

Site: Archette Clinic, Olivet, France

Designers: Unknown

Number of stations: 16

Total Square Feet: 9041

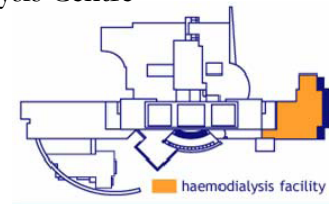


Figure 16. Archette Clinic Floor Plan. Used with permission by Archette Hemodialysis

**Key Features:** Circulation | Division of space | Natural light

Archette dialysis clinic was designed with two waiting rooms for its patients; the first for patients waiting to receive treatment and the second, for post dialysis patients who are waiting for transportation home.

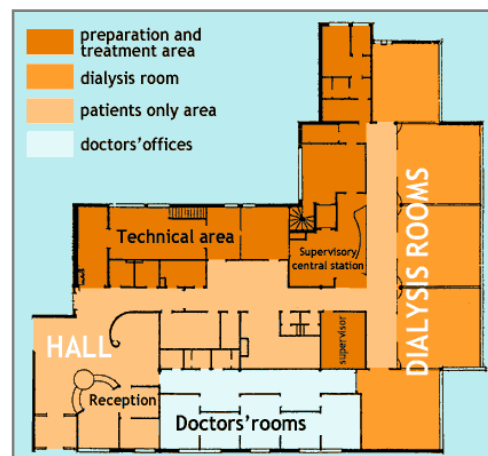


Figure 17. Floor Plan – Archette Dialysis Clinic. Used with permission by Archette Hemodialysis

This allows circulation to flow through the facility without creating congestion (see Figure 17). The single design issue observed is that the post-dialysis room does not have any windows in order to allow the patients to see if their transportation has arrived. Future designs may explore placing the post-dialysis room closer to the entrance rather than near the treatment area.

This clinic's five pods are grouped in a U-shape formation; allowing for the central nursing station to be positioned in the middle without obstructions. Likewise, it provides nurses with a

central location where questions can be answered and supplies are readily available (see Figure 17).

Another key feature of the Archette dialysis clinic is the abundance of natural light penetrating the treatment area. Figure 18 demonstrates how much natural light penetrates the interior corridor linking the five pods. Allowing the pods access to daylight can be therapeutic not only for patients receiving treatment but also for staff.

In addition to providing natural light, windows also provide patients and staff with views to nature, a great positive distraction and an alternate way to pass the time, reducing stress and evoking spiritual contemplation.



Figure 18. Interior corridor linking dialysis pods. Used with permission by Archette hemodialysis



Figure 19. Views to the exterior while receiving dialysis treatment. Used with permission by Archette Hemodialysis

The Archette dialysis clinic is significant to this practicum in several ways. It is an excellent example of how space can be provided for waiting pre-dialysis and post-dialysis patients and reducing crowding during peak times. Secondly, location of the nursing station in relation to the five pods is vital as this can reduce travel distances for staff. As well, separating patients in pods with glazed partitions allows increased privacy while maintaining clear views. This example also demonstrates how natural light can penetrate inner spaces, allowing all users;



patients and staff alike, to benefit from its therapeutic effects. Lastly, it allows views to the exterior and provides an additional positive distraction for patients.

Each of the positive features (open volume, natural light, gathering space, circulation, division of space) and negative features (lack of privacy, of positive distraction, and spiritual development) are important components to consider and will inform the spatial design of the proposed dialysis facility. The next chapter, Programme, is pertinent to the design as it analyzes various issues including site and building.



## Chapter 5: Design Programme

This chapter examines and reviews the current issues and components of the site, including a detailed description of all parties involved. Numerous requirements are taken into consideration in order to create an environment that mitigates stress, encourages and supports healing for all users.

### 5.1. Contextual Issues

The following issues pertain to the Health Sciences Centre (HSC) site and content.

#### **Social Issues:**

- Many hemodialysis patients experience reduced energy levels and therefore live on a low and fixed income.
- There is a general lack of education concerning diabetes and its preventative aspects.

#### **Political Issues/History**

1973:

- The Legislative Assembly of Manitoba passes the Health Sciences Centre Act that brings together several Western Health Care Institutions. The intent is to operate under a single administration and to create better hospital planning (Health Sciences Centre [HSC] a).

2000:

- HSC merges with the Regional Health Authority (RHA) (HSC b).
- HSC becomes governed by the Board of Directors of the Winnipeg Regional Health Authority (WRHA) (HSC a).

- The Legislative Assembly of Manitoba repeals the Health Sciences Centre Act and HSC becomes part of the operating division of the WRHA (HSC a).

### **Current Issues**

- Funding for the WRHA is received annually through Manitoba Health.
- The WRHA distributes funding to different divisions within the WRHA.
- Funding is continuously being sought for dialysis clinics due to the rising number of people developing kidney disease each year.
- The HSC Central dialysis unit is expanding into the GG-6 wing in order to increase the quantity of beds by 10.
- Currently there is a lack of space for staff and patients. Specifically:
  - Insufficient waiting space
  - Insufficient storage space for staff and patients
  - Insufficient number of treatment stations
  - Insufficient access to nature and light
  - Insufficient privacy

### **Economic Issues**

- Provincially/Federally Funded
- Private donations
- Fundraising:
  - Health Sciences Centre Foundation
  - Kidney Disease Foundation
  - Manitoba Renal Program

### Historical Issues

- Sherbrook dialysis was established and was originally self care (patients connecting themselves to the machine and monitoring themselves).
- Dialysis expanded into the General Hospital, GA-6 and GB-6 (termed “Central”) for patients requiring more monitoring.
- Health Sciences Centre changes its name to Health Sciences Centre Winnipeg in 2006.

### Theoretical Issues

- Economic Trends and Forecasts
  - Provincial government funding is being invested to expand current dialysis units as kidney disease is rising at an exponential rate (Manitoba Health, 2004, 2005, 2006, 2007)
  - During the last election, the provincial government announced plans to fund three new dialysis clinics:
    - Berens River
    - Gimli
    - Hodgson (D. Skwarchuk, personal communication, August 21 2007)
  - The WRHA and the Assiniboine Regional Health Authority are working together to construct a new dialysis clinic in Russell, Manitoba (D. Skwarchuk, personal communication, August 21 2007).
- Demographic forecasts
  - It is expected that there will be an increase in kidney failure due to Type 2 diabetes and other medical conditions.
  - The HSC currently operates at a relatively stable patient volume due to facility constraints. The plan

is to expand capacity to accommodate an additional 60 patients (D. Skwarchuk, personal communication, August 20 2007).

- Currently, an increase in Home Dialysis is underway as a result of recent funding by the provincial government (R. Ross, personal communication, March 13 2007). However, as the population suffering from kidney failure in Manitoba is older, home dialysis is not as successful as it is in other provinces (e.g. Alberta) (D. Franklin, personal communication, June 14 2007).

The contextual issues suggest a need for a new, amalgamated facility that will accommodate all users while educating its patients and creating a community atmosphere. By educating patients, they will then have the opportunity to become active participants in their own care.

## 5.2. Site Analysis

This section provides a detailed description and analysis of the Health Sciences Centre, its surrounding areas, as well as the specific site selected for the proposed dialysis facility.

### 5.2.1. Description of HSC Site

- Located in Central Winnipeg (see Figure 20).
- Surrounded by a densely populated residential area.
- Located on 32 acres of land (see Figure 21).
- Made up of numerous buildings connected together through a network of interior linkages and/or underground passages (HSC b) (see Figure 23).

- Hospital is surrounded by buildings that assist in HSC daily function, including:
  - Administration offices
  - Temporary living quarters
  - Maintenance facilities
- The HSC has three main focuses:
  - Teaching: University of Manitoba – Faculty of Medicine, Dentistry, Pharmacy and the Northern Medical Unit (see Figure 23).
  - Research: Affiliation with CancerCare Manitoba, SIAM building.
  - Healing: General Hospital along with CancerCare Manitoba, the Psychhealth Centre, the Children’s Hospital, the Rehabilitation, and the Respiratory Hospital and Manitoba Clinic.

Figure 20. Location of HSC within the City of Winnipeg. Used with permission by Google Maps – April 21, 2007

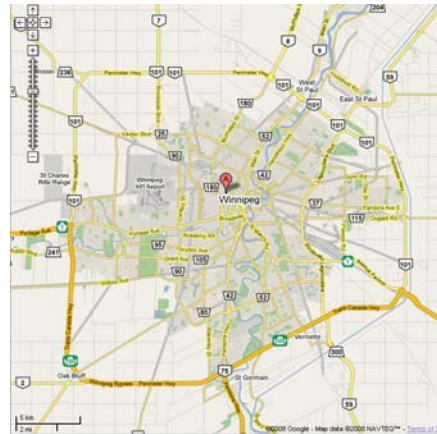
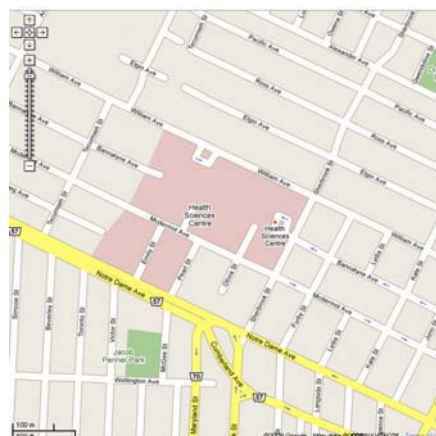


Figure 21. Health Sciences Centre Winnipeg and surrounding area. Used with permission by Google Maps – April 3, 2007



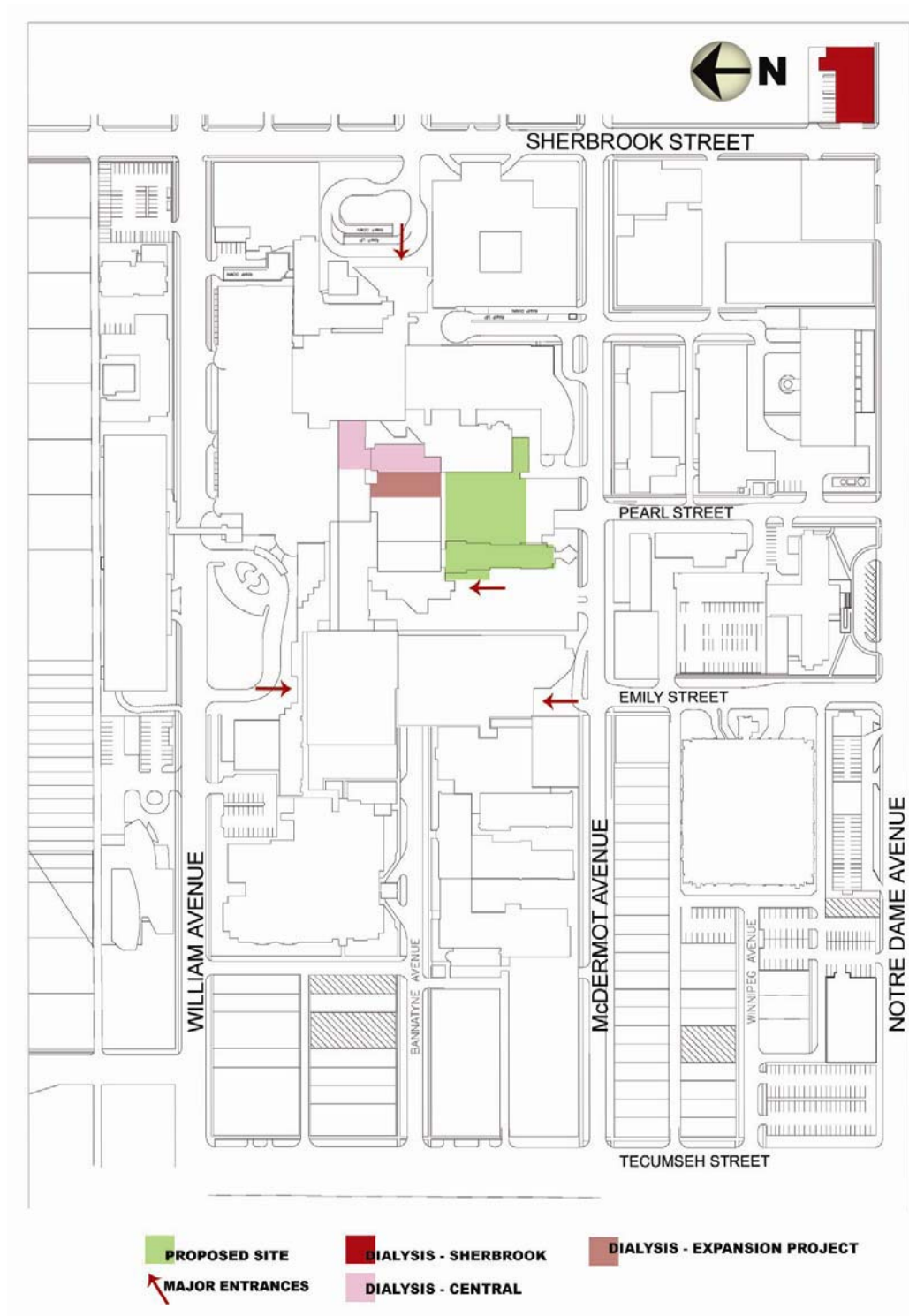


Figure 22. Existing dialysis sites (Sherbrook & Central). Health Sciences Centre.  
 Used with permission by Health Sciences Centre Winnipeg



Figure 23. Building analysis, Health Sciences Centre Winnipeg.  
Used with permission by Health Sciences Centre Winnipeg

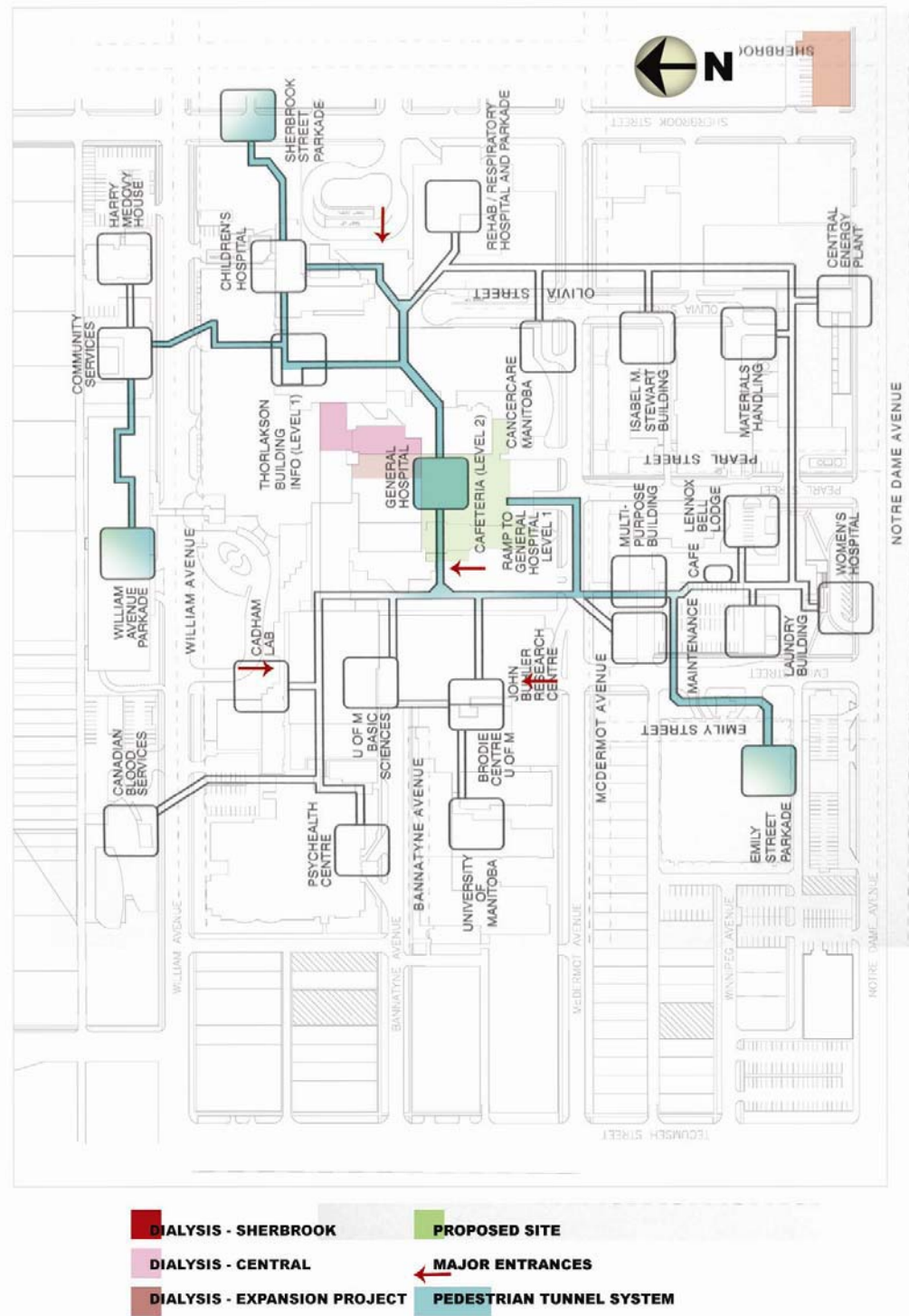


Figure 24. Pedestrian tunnel system, Health Sciences Centre Winnipeg.  
Used with permission by Health Sciences Centre Winnipeg



### 5.2.2. Adjacent buildings:

North building: General Hospital: Neurosurgery Clinic and offices, Adult ambulatory clinic, diagnostic imaging lab space (K. Beek, personal communication, August 13 2007)

East building: General Hospital: Offices, Locker Rooms, Radiopharmacy Laboratory, Clinics: Oral Surgery and Allergy, Conference space and condemned upper level (K. Beek, personal communication, August 13 2007)

West building: Parking and Brodie Centre (University of Manitoba)

South building: Maintenance and Multi-purpose Building

1. Maintenance building encompasses:
  - a. Facility Management Division
    - i. Maintenance Services
    - ii. Fire Safety
  - b. Security Services
2. Multi-Purpose Building encompasses:
  - a. WRHA e-Health Services
  - b. Capital Planning and Construction
  - c. Professional Association of Residents and Interns of Manitoba
  - d. Section of Orthopedic Surgery
  - e. Ultrasound Services

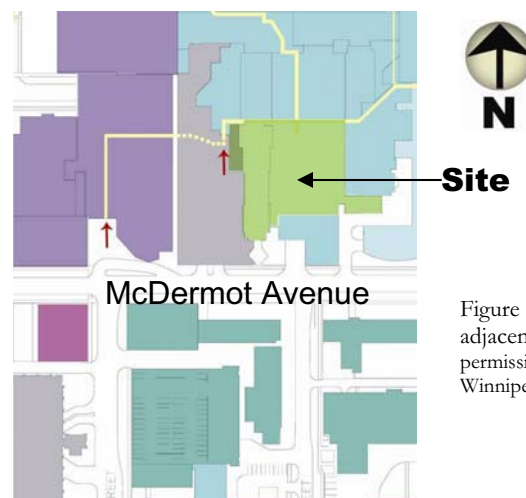


Figure 25. Selected site and adjacent buildings. Used with permission by Health Sciences Centre Winnipeg

### 5.2.3. Wind Patterns

- Prevailing **North** Westerly winds.
- Secondary winds from **South** West.
- Site somewhat sheltered from winds by the University of Manitoba buildings to the West of the site as well as the General Hospital to the East (see Figure 26).

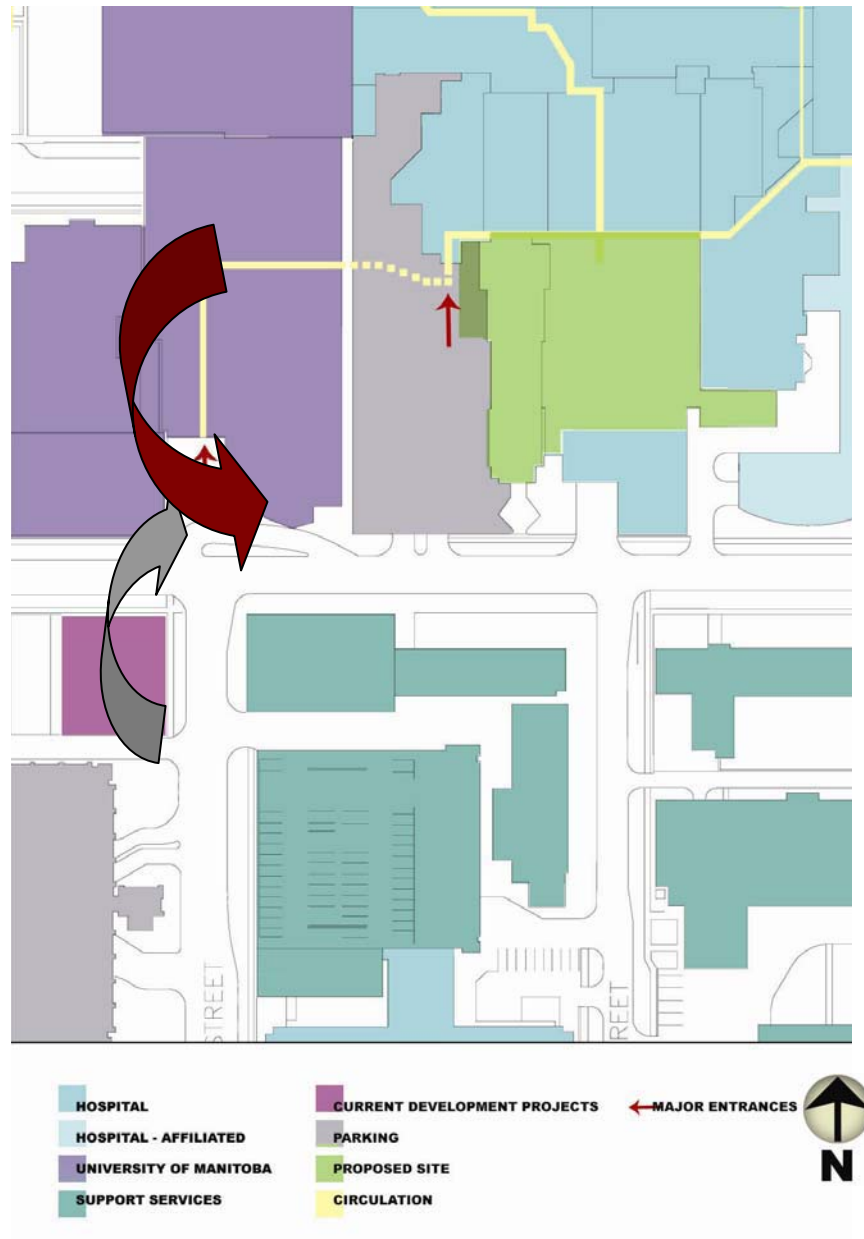


Figure 26. Wind Patterns.

Used with permission by Health Sciences Centre Winnipeg

#### 5.2.4. Shadow Studies of Adjacent Buildings

Winter Shadows:

Winnipeg receives approximately 8 hours of sunlight on the shortest day of the year (typically December 22). The sun's highest point during this time reaches only 16.7 degrees above the horizon therefore casting longer shadows throughout the day (see Figure 27) (time and day.com, 2007).

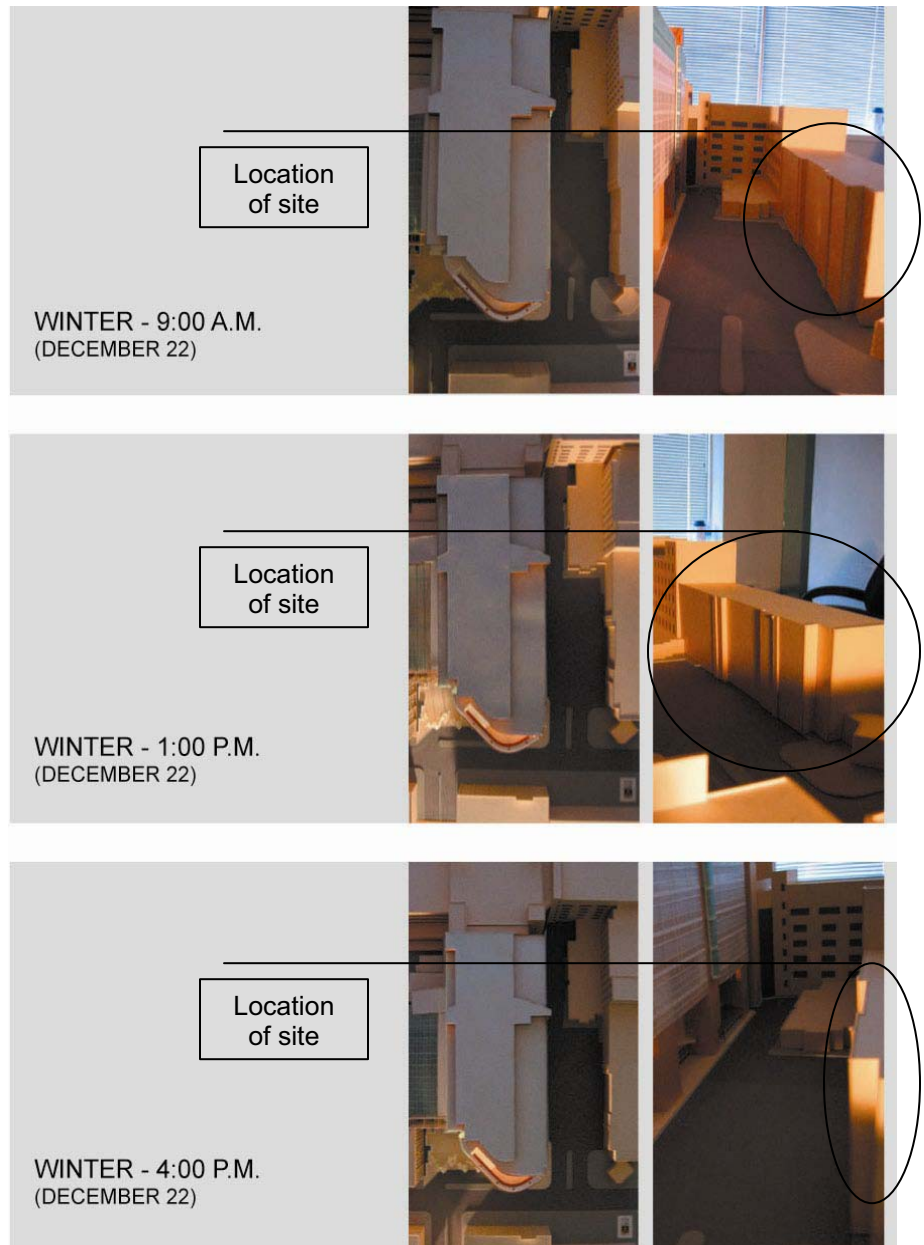


Figure 27. Model created by Stantec Architecture (formerly GBR Architects).  
Used with permission by Stantec Architecture

### Spring/Fall Shadows:

Unlike the winter months, days in spring and fall receive 12 hours of daylight. During this time the sun will rise, at its highest, to 39.3 degrees above the horizon, in turn creating shorter shadows (see Figure 28) (time and day.com, 2007).

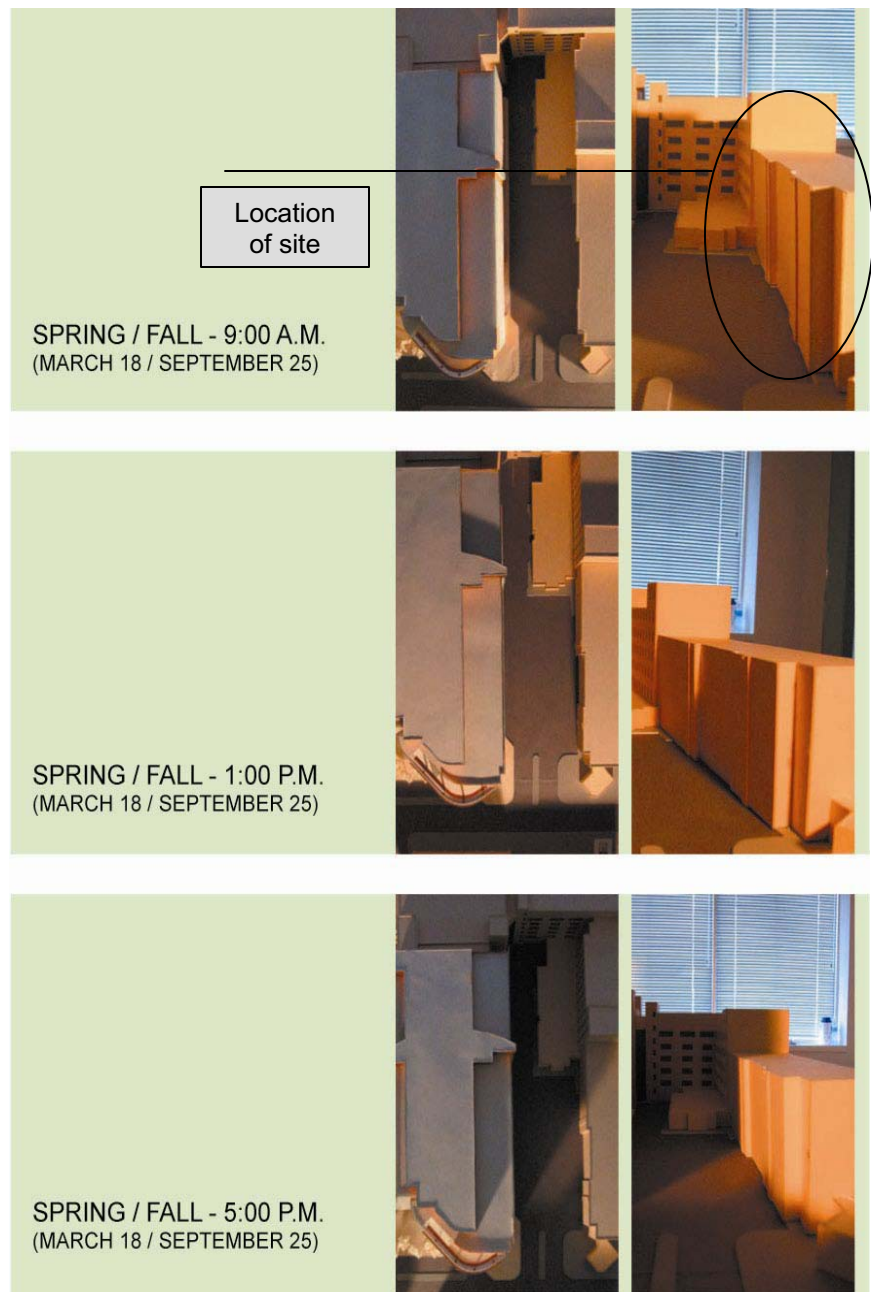


Figure 28. Model created by Stantec Architecture (formerly GBR Architects).  
Used with permission by Stantec Architecture

### Summer Shadows:

The longest day of the year in the northern hemisphere is June 21, with 16.4 hours of daylight. The sun's peak height reaches 63.6 degrees above the horizon, creating the shortest shadows of the year (see Figure 29) (time and day.com, 2007).



Figure 29. Model created by Stantec Architecture (formerly GBR Architects). Used with permission by Stantec Architecture

Shadow studies revealed that the site receives natural daylight year round and would offer beneficial daylight penetration at any given time throughout the day.

### 5.2.5. Views and Vistas

Refer to figure 31 and figure 32 for A and B site views.

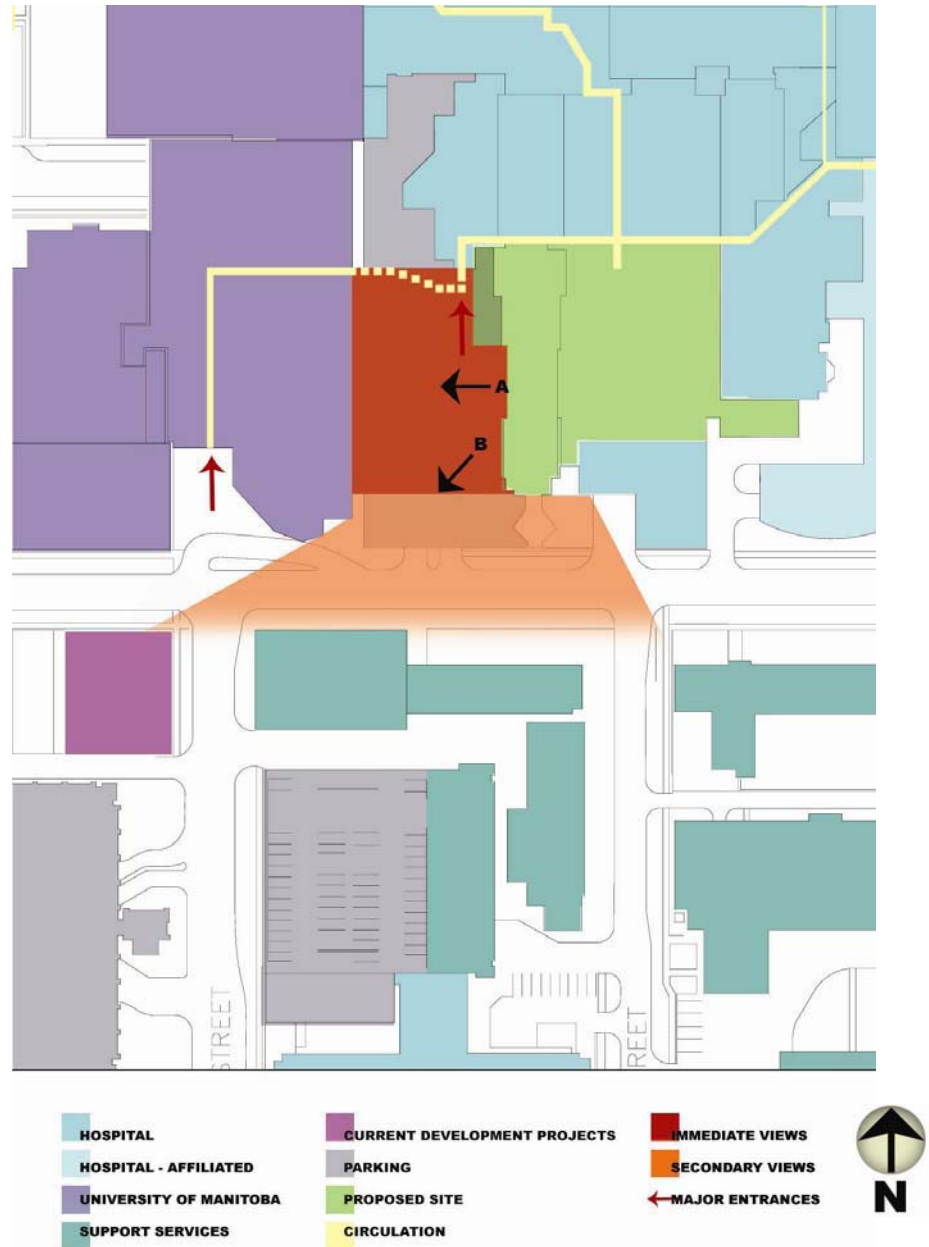


Figure 30. Site Views. Health Sciences Centre.  
Used with permission by Health Sciences Centre Winnipeg



## Views:

- Immediate Views: Entrance, Parking, Brodie Centre (University of Manitoba)



Figure 31. West facing views to Brodie Centre.  
Used with permission by Health Sciences Centre Winnipeg

- Secondary Views: McDermot Avenue, Maintenance and Multi-purpose buildings, New Faculty of Nursing (University of Manitoba)



Figure 32. South facing views to McDermot Avenue and Planning department.  
Used with permission by Health Sciences Centre Winnipeg

### 5.2.6. Pedestrian and Vehicular Access including public transit

#### Pedestrian access:

- Pedestrians moving to and from the University of Manitoba and the General Hospital do not have an interior connected corridor and therefore must travel outdoors.
- Pedestrian traffic is particularly heavy as it is a major thoroughfare, regardless of weather conditions (see Figure 33).

Vehicle access or pathways including transit:

- Vehicular traffic along McDermot Avenue is steady. The site will take advantage of the adjacent parking area in order to use it as a “drop off” point for patients and their families, enabling them to access the new dialysis location.
- Transit stops do not currently exist along McDermot Avenue, however because the buildings are interconnected (in yellow), patients can travel indoors to the nearest bus stop destination (see Figure 23 & 24).
- The pedestrian tunnel system also allows patients, visitors, and staff to travel from parking areas to the dialysis clinic, while being sheltered from the elements.

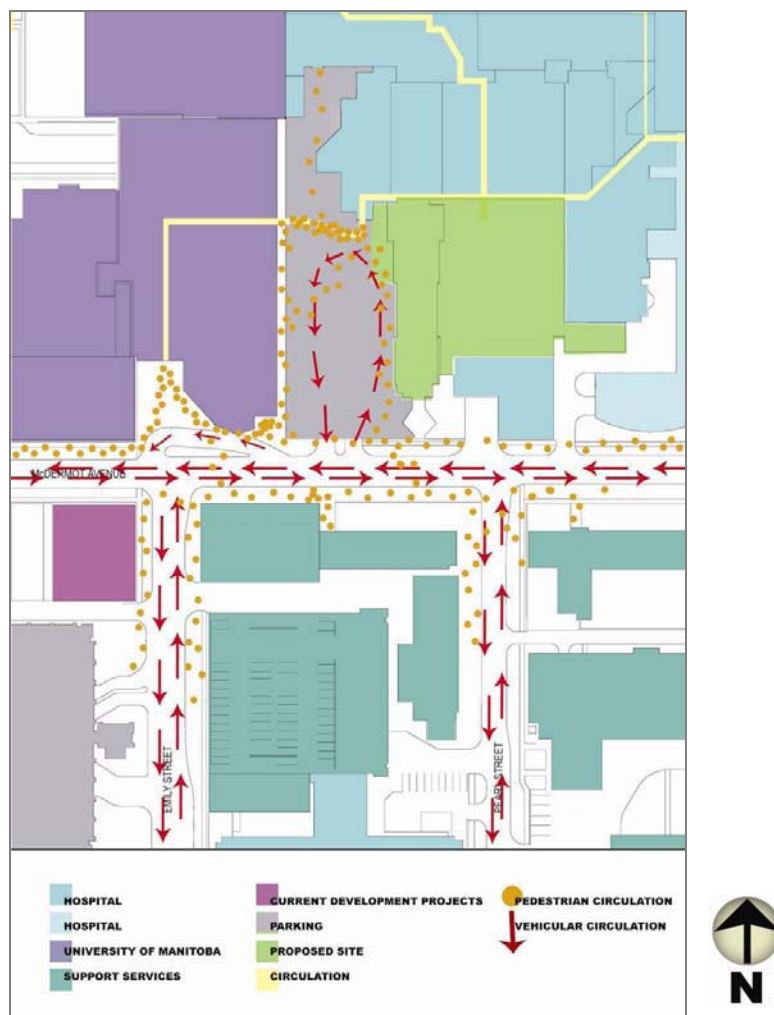


Figure 33. Pedestrian and Vehicular activity.

Used with permission by Health Sciences Centre Winnipeg



### 5.2.7. Recent trends and future plans within the proximity of the project site

- The University of Manitoba is relocating the Faculty of Pharmacy from the Fort Gary campus to the Bannatyne location (see Figure 34):
  - New location: Emily Street and McDermot Avenue
  - Presently under construction
  - Population density will increase substantially



Figure 34. Future site of the Faculty of Pharmacy. Used with permission by Health Sciences Centre Winnipeg

- An additional parkade is currently in the tender phase (see Figure 23):
  - This will be specifically constructed for HSC staff to lessen the current strain on patient parking areas.
  - Total capacity: 1,202 stalls (R. Lagman, personal communication, May 17 2007).
  - Parkade will be mirrored to the west of the Emily Street parkade (see Figure 35).



Figure 35. New parkade to be mirrored west of the Emily street parkade. Used with permission by Health Sciences Centre Winnipeg

- The HSC dialysis clinic will be commencing a 3.6 million expansion project to the central location (see Figure 22) (T. LeBlond, personal communication, April 24 2007):
  - An additional 10 beds will be provided (J. Evans, personal communication, June 22 2007; D. Franklin, personal communication, June 14 2007)
  - Offices, administration, and technical service areas will be relocated to the expanded space (H. Ferguson, personal communication, April 20 2007).
  - This expansion will allow for greater flexibility when patients from satellite locations arrive (J. Evans, personal communication, April 4 2007 & June 22 2007).



Figure 36. Central dialysis unit (GA-6 & GB-6).  
Used with permission by Health Sciences Centre Winnipeg

### 5.2.7. Site Opportunities and Constraints

Upon review of the two existing HSC dialysis facilities, Central and Sherbrook (see Figure 22), it is clear that it would be beneficial to have the units joined on one site to mitigate the lack of space available, and inconvenience to patients, visitors, and staff members. Because of the fluctuation and relocation of departments with the HSC, the programme site was chosen because of the following benefits:

- Attached to the hospital in order to accommodate patient transfers.
- Easy access due to its location on the main floor.
- Direct access to a parking lot and drop off zone for convenience for patients and visitors, Handi-Transit and Medi-Transit services.
- Adjacent to a major traffic corridor, providing access to any department within the General Hospital.
- Next to a vertical circulation corridor that leads to a second floor cafeteria (GH-2)
- Near first floor amenities (Guildy's coffee bar, Courtyard café, and the Corner Store).
- Connected to a pedestrian tunnel, allowing patients and visitors to travel from parking (Emily Street Parkade) to dialysis, while being sheltered from the elements.
- Predominant west facing views with some east and south views.
- Creating one clinic space eradicates the need to have staff or taxis move patients from one location to the other, providing opportunities to increase functional efficiency as well as increase communication and flexibility.

Although no bus stops are currently located on McDermot Avenue, a possible solution would be to work with Winnipeg Transit to reroute buses through the site. Because of the above mentioned advantages, it has been determined that this site is the most suitable for this particular project.

### **5.3. Building Analysis**

The following section examines the current structure selected for the new dialysis unit, along with the opportunities and constraints it possesses.

### 5.3.1. Description of Building and its Main Features

Buildings GF and GH:

- Building GF (see Figure 22, 37 and Figure 39):
  - Year constructed: 1899
  - Total square footage: 17,490
  - Five Storey building
  - Formally known as the Jubilee Wing for Queen Victoria
  - Architects: Mr. H. McCowan
    - Clerk: Charles Burgess
  - Mechanical: T.V. Irving
  - Electrical: MacDonald Brothers
  - Construction: Masonry, brick, wood, and plaster
  - Original occupant: Surgical unit with a total of 75 beds.
    - 54 public
    - 9 semi-private
    - 12 private (P. Powell, personal communication, October 31 2007)
  - Current occupants: Offices.
    - Medicine
    - WRHA transport
    - Emergency
    - Spiritual Care
    - Home care
    - Transplant and Surgery (K. Beek, personal communication, August 8 2007)
- Building GH (see Figure 37 and Figure 39):
  - Level 1 and 2 – year constructed: 1961
  - Level 3 to 8 – year constructed: 1965
  - Total square footage: 8,644
  - 8 Storey Building

- Architects: Moody, Moore, and Partners (MMP)
- Contractor: Trident Construction
- Construction: Pre-cast concrete and open web steel joists
- Wall construction: Concrete, non combustible material
- Original purpose: Service area (P. Powell, personal communication, October 31 2007)
- Current occupant: Diagnostic Imaging (K. Beek, personal communication, August 8 2007)

### **5.3.2. Building Opportunities:**

- The HSC is currently exploring replacement of certain buildings on site due to their deplorable condition and age (this includes GF) (T. Leblond, personal communication, April 24 2007).

### **Building Constraints:**

- A closely spaced column grid in GH-1 makes planning difficult.
- No daylight or views available from GH-1.

### 5.5.3. Building Analysis

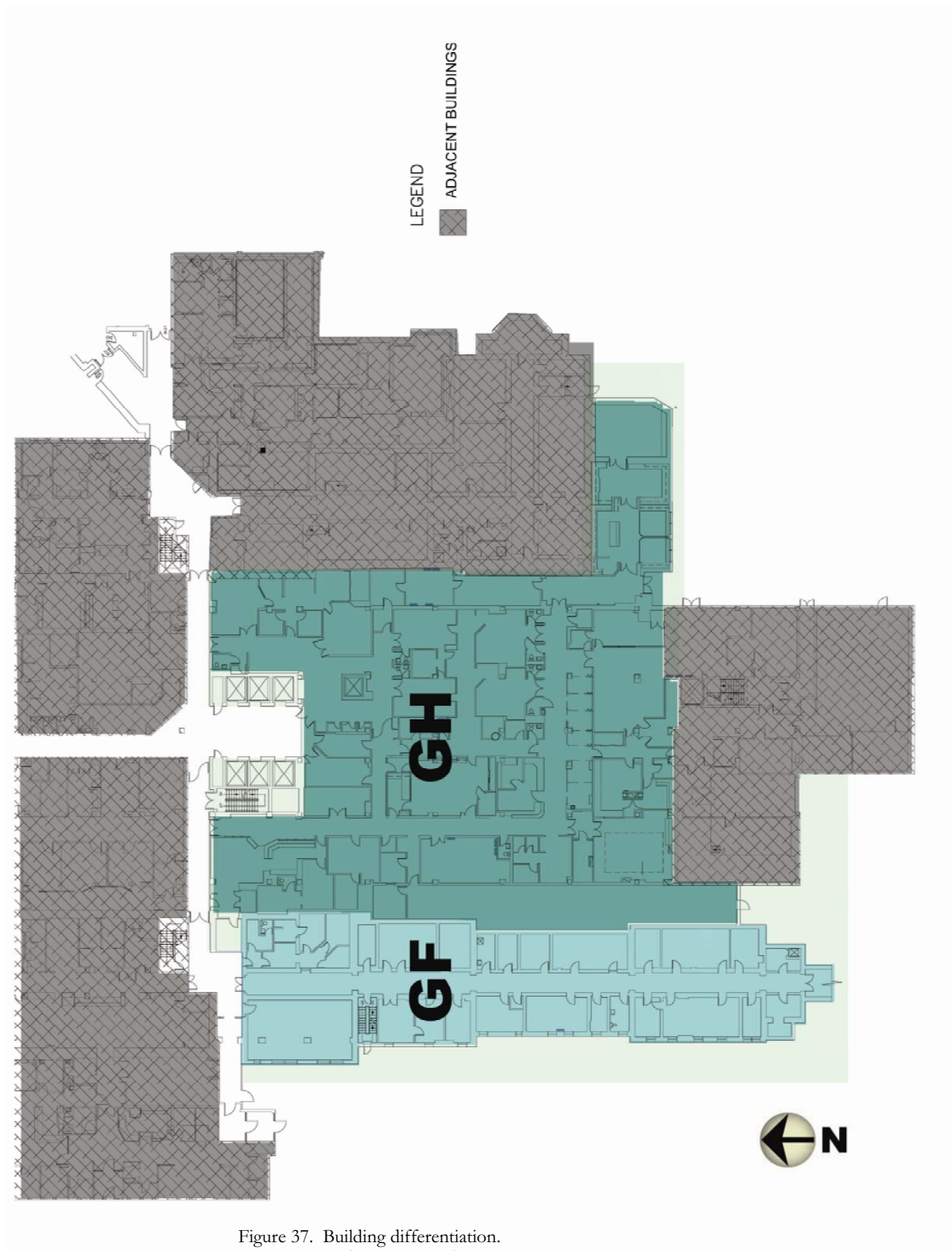


Figure 37. Building differentiation.  
Used with permission by Health Sciences Centre Winnipeg

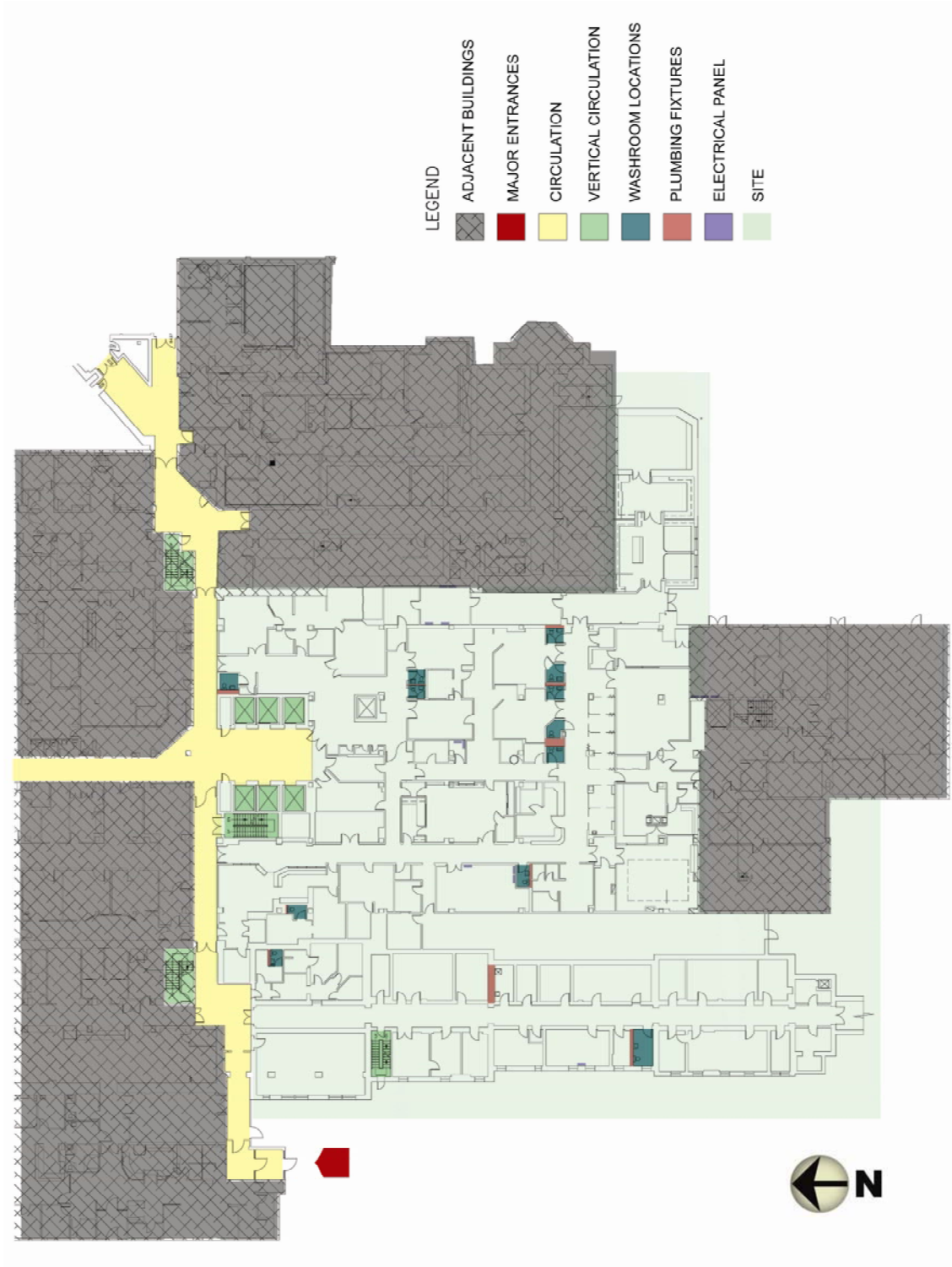


Figure 38. Building analysis.  
Used with permission by Health Sciences Centre Winnipeg





Figure 39. Site – south facing from McDermot Avenue.  
Used with permission by Health Sciences Centre Winnipeg



Figure 40. Adjacent parking and Site (located on the right).  
Used with permission by Health Sciences Centre Winnipeg



## 5.4. Human Factor Analysis

This section researches and establishes the client(s) along with the primary and secondary users of the space. As the HSC is now governed by the Winnipeg Regional Health Authority (WRHA), all decisions are directed by this body.

### 5.4.1. Client Profile(s)

The clients within this project include numerous people/organizations:

1. The Winnipeg Regional Health Authority
2. The Health Sciences Centre Winnipeg
3. The Manitoba Renal Program
4. Manitoba Health

#### 1. Winnipeg Regional Health Authority (WRHA)

Purpose:

- “...to promote and protect health and well being by delivering and managing health services in the Winnipeg Region. We will continue to improve health by leading and evaluating the quality of Winnipeg’s health services and by building partnerships with the community. We are committed to providing safe care and preventing harm to patients” (Winnipeg Regional Health Authority [WRHA] b).
- To provide caring, excellence, innovation, collaboration, and accountability to the public (WRHA b).

**Description:**

- Made up of health care providers and management professionals who coordinate, manage, and deliver funds to health care projects in Winnipeg.
- The Board of Directors reports directly to the Minister of Health.
- Receives funding from the provincial government each year (WRHA a).
- Total population it serves: 646,733 (WRHA b).
- The WRHA is responsible for 200 health services, facilities, and programs. Examples include:
  - 4 community hospitals
  - 2 tertiary hospitals
  - 3 long term care health centres
  - 39 personal care homes and,
  - 20 community offices (WRHA a).

**History of Organization:**

- Established in December 1999.
- One of twelve Regional Health Authorities in Manitoba.
- Coordinates health services in a designated region.
- The WRHA has divided Winnipeg into 12 areas (WRHA a).

**2. Health Sciences Centre Winnipeg (HSC)****Purpose:**

- “...to enhance the health of the residents of Manitoba and the surrounding regions through programs of patient care, education and research and, while doing so, to respect and advance the well being and dignity of the individual” (HSC b).

- To provide quality, respect, integrity, compassion, public accountability, and responsible fiscal management (HSC c).

#### Description:

- The largest healthcare referral, teaching, and research centre in Manitoba.
- Serves residents from Manitoba, North western Ontario, and Nunavut.
- Located on 32 acres of land in central Winnipeg.
- A major referral centre for complex health issues.
- An operating division of the WRHA.
- Affiliated with the University of Manitoba (U of M) and Cancer Care Manitoba.
- Accredited by the Canadian Council of Health Services (HSC a; HSC d).

#### History of Organization

- In 1973, the Legislative Assembly of Manitoba passed the Health Sciences Centre Act that brought together several Western health care institutions. The intent was to operate under a single administration and to create better hospital planning (HSC a).
- 2000:
  - The HSC merged with the Regional Health Authority (RHA) (HSC a).
  - The Board of Directors of the WRHA assumed governance of the HSC (HSC a).
  - The Legislative Assembly of Manitoba repeals the Health Sciences Centre Act and HSC becomes part of the division of the WRHA (HSC a).

### 3. Manitoba Renal Program (MRP)

#### Purpose:

- To provide early identification, treatment, and ongoing care.
- To offer adult clinical care and education concerning all aspects of acute and chronic renal or kidney disease.
- To provide a uniform standard of high quality care and equitable access to all therapies and resources.
- To develop renal health promotion, disease prevention outreach, provincial renal disease database, and research and development committee.
- To create patient/aboriginal advocacy committee and plan expanded dialysis service to mirror growth (Manitoba Renal Program [MRP] d).

#### Description:

- Offers renal care services across the province through the RHA.
- Works with Regional Health Authority (RHA) within Manitoba.
- Provides services to three main group of the population:
  1. General public
  2. Health Professionals (MRP b)
  3. Patients
- Made up of numerous healthcare professionals:
  - Physicians
  - Nurses
  - Dieticians
  - Social workers
  - Pharmacists
  - Renal technologists
  - Aboriginal liaison & Spiritual care providers

- Dialysis care technicians
- Family doctors
- Home care nurses
- RHA
- Occupational therapists
- Patient community health providers
- And others (MRP b)

#### History of Organization

- Mandated in 1998 by Manitoba Health under the WRHA and named the Manitoba Provincial Dialysis Program.
- A name change was made in 2002 to the Manitoba Renal Program to focus on two broad elements of care:
  1. Renal replacement therapy (RRT) for acute and chronic dialysis patients (MRP c).
  2. The development of Renal Health Outreach (RHO) responsible for:
    - Renal health promotion
    - Disease prevention
    - Management through education
    - Non dialysis clinical care (MPR c).

#### **4. Manitoba Health**

##### Purpose:

- “To lead a publicly administered sustainable health system that meets the needs of Manitobans, and promote their health and well-being” (Manitoba Health).
- Guiding principles are:
  - People centered
  - Evidence-Based
  - Shared Responsibility for Health

- Equity in the Provision of Services
- Accountability
- Population Health Approach (Manitoba Health).
- To optimize the health status of all Manitobans through prevention and health promotion (Manitoba Health).

Description:

- To foster innovation in the health system (Manitoba Health and Healthy Living).
- Works directly with the Federal Government and the RHA's.
- Provides financial support to the 12 RHA's.
- Develop mechanisms to assess and monitor quality of care, utilization and cost effectiveness, fostering behaviors and environments which promote health, promoting responsiveness and flexibility of delivery systems, and alternative and less expensive services (Manitoba Health and Healthy Living).

As such, all clients listed have similar missions; to provide and enhance health to patients and Manitobans through a variety of different programs. The intent of these common missions and the resources dedicated to education and treatment are the vehicles by which the government is expecting to maximize the health and well being of the people of Manitoba.

5.4.1.1. Organizational Structure of the Manitoba Renal Program

- MRP is a complex organization where all health care facilities in Winnipeg participate.
- Graphic organizational structure below indicates the relationship between the HSC, the WRHA and the MRP.

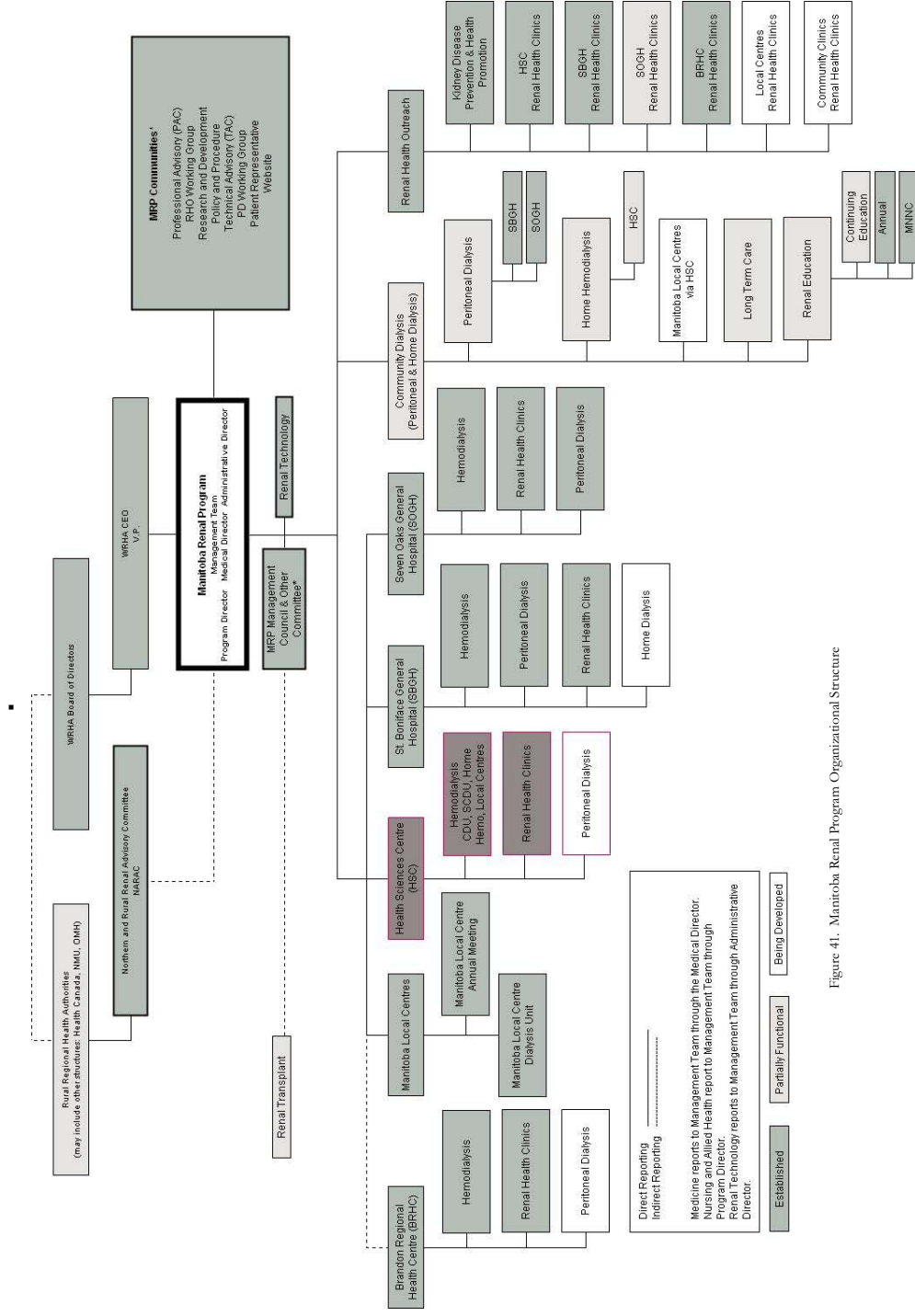


Figure 41. Manitoba Renal Program Organizational Structure

5.1.2.2 HSC – Renal Program: Matrix

- HSC dialysis operates from two physically separate locations (Central and Sherbrook units) and offers a variety of services to patients.
- Graphic organizational structure below indicates the relationship between the different facilities and services offered to users (Patient renal health centres, Patient community dialysis through local centres, Patient Central dialysis unit and Patient Sherbrook dialysis unit).

HSC Winnipeg Organizational Structure of Renal Program

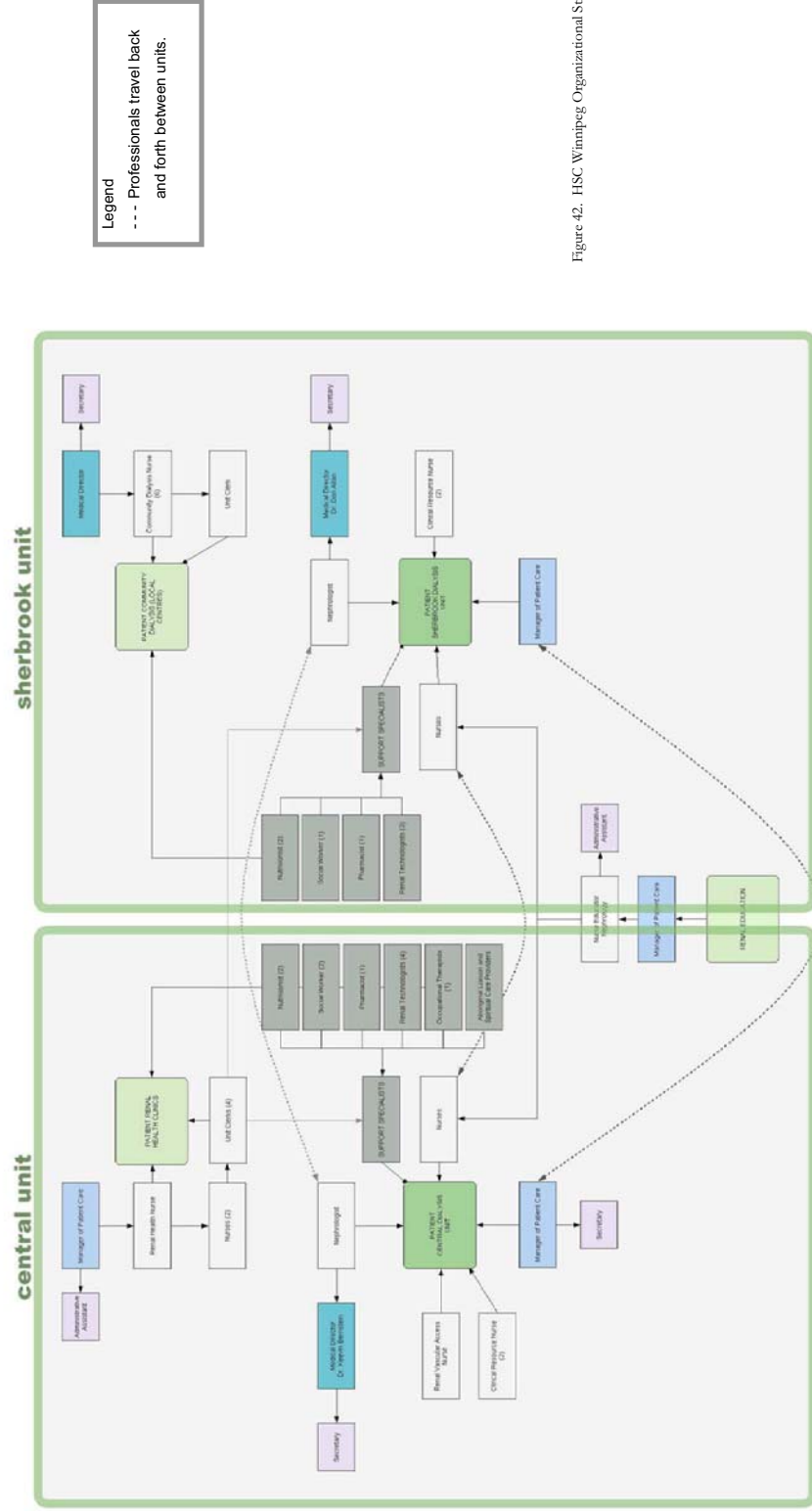


Figure 42. HSC Winnipeg Organizational Structure



## Client Profile(s)

### 5.4.1.2. Primary Users: Dialysis patients with ESRD.

- Three treatments weekly.
  - Monday, Wednesday and Friday or
  - Tuesday, Thursday and Saturday (C. Soulsby, personal communication, March 24 2006).
- Each session lasts approximately 3-5 hours per session (Y. Gagnon, personal communication, April 30 and May 1 2005; W. Whalley, personal communication, November 09 2004 & April 25 2005).
  - Treatment times:
    - 8:00 am
    - 1:00 pm
    - 6:00pm
  - Demographics:
    - Patients range in age from 20-90 years.
    - Average age of patients is 57 (from questionnaire).
    - The HSC dialysis caters to an older population (D. Franklin, personal communication, June 14 2007).
    - Manitoban dialysis patients often have other medical issues because on average, they are older and therefore have a lower rate in of home dialysis (D. Franklin, personal communication, June 14 2007).
    - Currently seven patients on home dialysis (R. Ross, personal communication, March 13 2007; D. Franklin, personal communication, June 14 2007).
  - The HSC dialysis is currently at maximum capacity, limited by the existing quantity of beds (D. Franklin, personal communication, June 14 2007).

- Current HSC dialysis stations:
  - Sherbrook stations: 23
  - Central stations: 26 (includes 5 isolation rooms)
  - Total stations available: 49
  - Patients treated a day: 147 (with 3 sessions)
  - Total patients treated: 294
  
- The HSC dialysis ten year projection:
  - 58 stations (including 8 isolation rooms) (D. Franklin, personal communication, June 14 2007).
  - 58 stations would cater to a total of 348 patients.
  - Each year there is an increase of 5 new patients (D. Skwarchuk, personal communication, August 20 2007).
  
- Causes of kidney disease:
  - Diabetes mellitus
  - High blood pressure (hypertension)
  - Glomerulonephritis (nephritis - inflammation of the filters in the kidney which clean the blood)
  - Autosomal dominant polycystic kidney disease (genetic disease characterized by the growth of numerous cysts in the kidneys)
  - Urinary tract obstruction
  - Reflux nephropathy
  - Drug and medication induced kidney problems (the Kidney Foundation of Canada, 2006)
  
- Functional needs of patient treatment areas:
  - 110 sq. ft minimum per patient
  - 1 wheelchair (weak – lack of energy)
  - 1 bed or reclining chair

- 1 hemodialysis machine
- Waiting room
- Storage space – personal items
- Storage space – mobility aids
- Lighting controls situated near beds to control lighting levels
- Access to nearby washroom facilities
- Psychological needs:
  - Privacy
  - Nature
  - Positive Distractions

#### 5.4.1.3. Secondary Users: Specialized Staff (The Interdisciplinary Team)


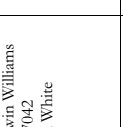




- The interdisciplinary team consists of:
  - Nephrologists
  - Nurses
  - Dieticians
  - Social Workers
  - Pharmacists
  - Renal Technologists
  - Occupational Therapists
  - Dialysis Care Technicians
  - Aboriginal Liaison
  - Spiritual Care Providers
- Functional areas:
  - Nurses station
  - Conference room
  - Lunch room
  - Quiet room
  - Offices
  - Technicians service area
  - Administration area
  - Photocopy room
  - Storage space
  - Staff washroom
  - File storage area





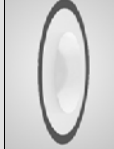









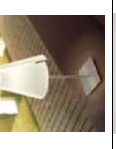






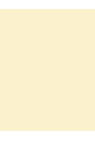


(For functional needs of each area listed, see section 5.5)

### 5.4.2.3. Tertiary Users: Maintenance Staff, Clean up crew

- Functional area:
  - Utility room
  - Housekeeping room

### 5.5. Functional, Aesthetic, Technology, Material, and Lighting Requirements

Reception		Spatial Atmosphere and Character										Technology Requirements					
Purpose		Furniture, Fixtures, Equipment, and Accessories					Lighting					Mechanical		Electrical			
[Application] / [Material]		Material Specifications		Material Specifications		Material Specifications		Material Specifications		Material Specifications		Furniture Specifications		Lighting Specifications			
[Application] / [Material]		Product	Image	[Application] / [Material]	Product	Image	Product	Image	Product	Image	Product	Image	Product	Image	Product	Image	
[Floor]	intermittently active through the day	Armstrong Natural Creations Arbor Art TP011 Wild Cherry - dark		[Wall] Paint	Sherwin Williams SW 7042 Shoji White		Warm natural tones to aid in the reduction of stress and anxiety patients may be experiencing.	Natural materials wherever possible should be used: stone and wood.	View to waiting room.	Desired Atmosphere	Spatial Quality	Mechanical	Electrical				
[Floor]	social	Wilson Art 10734-60 Lumber Maple		[Wall] Paint	Sherwin Williams SW 6417 Tupelo Tree		Natural light incorporated as much as possible, ambient light and direct/indirect lighting.	Warm natural tones to aid in the reduction of stress and anxiety patients may be experiencing.	used for pre-treatment and post-treatment	calm	influenced by natural light	Decorative luminaire	voice/data outlet				
[Floor]	semi-public	Cambria Coswell Cream 0810		[Wall] Accent	3 Form Seaweed Glass		direct/indirect lighting.	and wood.	allows for spiritual growth and emotional support	educational	allows for spiritual growth and emotional support	Lithonia Lighting Candeco PDGF	telephone outlet				

Waiting Rooms, Atrium and Major Traffic Corridor														
Purpose		Furniture, Fixtures, Equipment, & Accessories					Spatial Atmosphere and Character					Technology Requirements		
		Chair	Table	Bench seating	Work surface	Tackboard	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical
<ul style="list-style-type: none"> <li>intermittently active through the day</li> <li>social</li> <li>semi-public</li> </ul>		42	5	10	3	1	1	Warm natural tones to aid in the reduction of stress and anxiety patients may be experiencing.	Natural materials wherever possible should be used: stone and wood.	View and access to nature is critical. View key in reducing stress and anxiety.	<ul style="list-style-type: none"> <li>calm</li> <li>warm</li> <li>educational</li> <li>inviting</li> <li>comfortable</li> <li>memorable</li> </ul>	<ul style="list-style-type: none"> <li>used for pre-treatment and post-treatment</li> <li>influenced by natural light</li> <li>allows for spiritual growth and emotional support</li> </ul>	<ul style="list-style-type: none"> <li>med gas</li> </ul>	<ul style="list-style-type: none"> <li>voice/data outlet</li> <li>power outlet (120V)</li> <li>telephone outlet</li> <li>med gas outlet</li> </ul>
[Application] / Material		Material Specifications					Furniture Specifications					Lighting Specifications		
		Product	Image	[Application] / Material	Product	Image	Product	Image	Product	Image	Upholstery	Image	Product	Image
[Floor]	Armstrong Natural Creations Arbor Art TP011 Wild Cherry - dark		[Wall] Cultured Stone	Cultured Stone		[Soft Seating] Krug Jordan chair JOR3-1WOD (29W x 30.5D x 34.5H)		Design Tex Samba 2654-105 Linen		[Decorative luminaire] Lithonia Lighting Candeco PDGF				
[Floor]	Armstrong Natural Creations Arbor Art TP010 Wild Cherry - medium		[Wall] Phenolic Panel	Wilson Art 10734-60 Lumber Maple		[Soft Seating] Krug Jordan chair JOR3-2WOD (52W x 30.5H x 34.5H)		Design Tex Samba 2654-505 Sea Spray		[Wall] Sconce Leucos Lighting Celine P				
[Floor]	Shaw Contract Group Mimic 59426 Effervescence 24330 59425 Parody		[Wall] Paint	Sherwin Williams SW 6147 Shoji White		[Soft Seating] Krug Jenny		Momentum Textiles Efflorescence 09105028 Refresh		[Table] Leucos Lighting Linda T1-T2 Satin Amber				
[Floor]	Shaw Contract Group Mimic 59426 Effervescence 24330 59424 Etch		[Wall] Paint	Sherwin Williams SW 6417 Tupelo Tree		[Soft Seating] Steelcase Jenny		Design Tex Samba 2654-801 Dove		[Downlighting] Low Voltage Gotham CAL 9				
[Floor]	Basaltic Medium Roundstone		[Wall] Paint	Benjamin Moore CC-200 Vellum		[Side Table] Krug Millennium (68"O-24"Dia. (24dx x 21H))		Light Maple						








										<p>[Multi-purpose chair] Knig Connections Moonbeam AC-68635 CARibbean #16 (23.25W x 21D x 32.25H)</p> <p>[Table] Steelcase Groupwork (42dia.)</p>		<p>Arc Com Woven Connections Moonbeam AC-68635 CARibbean #16</p> <p>Light Maple</p>			
--	--	--	--	--	--	--	--	--	--	---	--	---	--	--	--

**Kitchenette**


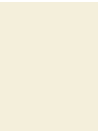






Purpose				Furniture, Fixtures, Equipment, and Accessories						Spatial Atmosphere and Character					Technology Requirements		
[Application] / Material	[Application] / Material	Product	Image	Lighting			Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical					
				Uniform lighting required.	Natural tones	Natural material (or wood grain or millwork).						Views to waiting room.	• functional • accessible • inviting	• supports patients needs	• water hookup	• power outlet (120 V)	
Material Specifications			Furniture Specifications			Lighting Specifications											
[Application] / Material	[Application] / Material	Image	Product	Material	Image	Product	Image	Upholstery	Image	Product	Image	Product					
[Floor]		Armstrong Natural Creations Arbor Art TP010 Wild Cherry - medium	Image	[Wall] Cultured Stone	Cultured Stone	Image	[Multi-purpose chair] Knig Connections Moonbeam AC-68635 CARibbean #16	Image	[Decorative luminaire] Lithonia Lighting Candeco PDGF	Image							
[Millwork]		Wilson Art 10734-60 Limber Maple	Image	[Wall] Phenolic Panel	Wilson Art 10734-60 Limber Maple	Image	[Table] Steelcase Groupwork (42dia.)	Image	White Table top	Image							
[Millwork] Counter top (Quartz)		Dupont Magellan Green	Image	[Wall] Paint	Sherwin Williams SW 6147 Shoji White	Image											






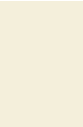

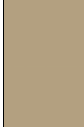
Treatment Area – Semi-Private, Private and Isolation Rooms													
Purpose		Furniture, Fixtures, Equipment, and Accessories				Spatial Atmosphere and Character				Technology Requirements			
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical
<ul style="list-style-type: none"> <li>intermittently busy</li> <li>cleaning of the blood</li> <li>sitting or lying down</li> <li>semi-private / private</li> <li>used 24 hours a day with starting treatment times of:                             <ul style="list-style-type: none"> <li>8:00 am</li> <li>1:00 pm</li> <li>6:00 pm</li> <li>11:00 pm (overnight)</li> </ul> </li> </ul>	Recliner Bed Chair Table Clock Garbage Sharps container Storage	Artwork Plant Hemodialysis Machine IV Pole Television Audio DVD player	63 50 50 50 50 50 50	A variety of light to be incorporated into this space: Patient Flexible ambient light, task lighting for reading etc...and natural daylight. Staff: Uniform, direct/indirect lighting is required	A color palette that emits warmth, relaxation, calmness and sunlight. Orange and yellows are incorporated to aid in blood circulation and reduce the coldness a patient may feel while dialyzing.	Natural materials (or natural looking materials) should be incorporated wherever possible (e.g. wood) and also adhere to infection control requirements (e.g. antimicrobial fabrics).	<ul style="list-style-type: none"> <li>Optional views to nature.</li> <li>Natural light should penetrate the space to enhance comfort levels.</li> <li>Views to art.</li> </ul>	<ul style="list-style-type: none"> <li>relaxing</li> <li>soothing</li> <li>peaceful</li> <li>meditative</li> <li>spiritually evoking</li> <li>emotional comfort</li> </ul>	<ul style="list-style-type: none"> <li>permits positive distractions and flexibility</li> <li>interaction with staff and visitors</li> <li>influenced by natural light</li> <li>allows for contemplation (spiritual or religious)</li> </ul>	<ul style="list-style-type: none"> <li>biocarb line</li> <li>Reverse Osmosis (RO) line</li> <li>med gas lines</li> <li>water line</li> </ul>	<ul style="list-style-type: none"> <li>data outlet</li> <li>emergency power outlet</li> <li>power outlet (120V)</li> <li>pillow speaker connection</li> <li>light switch for ceiling light</li> <li>telephonic outlet</li> <li>medical vacuum outlet</li> <li>med gas outlet</li> <li>cable outlet</li> <li>nurse call button</li> </ul>		
Material Specifications													
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Product	Image	Product	Image	Upholstery	Image	Product	Image
[Floor] Resilient sheet flooring	Johnsonite Turbott Accent Finishes Wood Cabreuva CW30434		[Wall] Vinyl Wall Covering	Bolta Antoinette, Type II Diplomat BB-AT-07		[Soft Seating] Krug Sleeper Jordan sleeper JORG-SLAWOD1 (35.5W x 34.5D x 36.5H)		[Soft Seating] Krug Jordan sleeper JORG-SL2UPH2 (55W x 34.5D x 36.5H)		Architex Thive Clary Save		[Recessed] Fluorescent Lithonia Lighting RT5	
[Floor] Rubber-1	Nora Systems Inc. Norament 925 Strada 4752		[Wall] Vinyl Wall Covering	Bolta Antoinette, Type II Palace BB-AT-05		[Soft Seating] Krug Millennium 680 O-24 Dia. (24dia x 21H)		[Side Table] Krug Millennium 680 O-24 Dia. (24dia x 21H)		Architex Thive Clary Save		[Wall] Sconce Leucos Lighting Celine P	
[Floor] Rubber-2	Nora Systems Inc. Norament 925 Strada 4753		[Wall] Paint	General Paint CL 2741W Biscotti		[Treatment Chair] Jordan JORG-RCWOD2 (29.5W x 35D x 45.5H)		[Treatment Chair] Jordan JORG-RCWOD2 (29.5W x 35D x 45.5H)		Light Maple		[Table] Lamp Leucos Lighting Linda T1	
[Floor] Rubber-3	Nora Systems Inc. Norament 925 Strada 4754		[Wall] Paint	General Paint CL 2675D Mommia		[Treatment Bed] Hill-Rom VersaCare		[Treatment Bed] Hill-Rom VersaCare		Maharam Scuba 464930 002 Cocoon			
[Millwork]	Wilson Art 10734-60 Lumber Maple		[Door]	3Form Hydrangea Thatch									







[Millwork] Counter top (Quartz)	Cambria Coswell Cream 0810		[Door]	3Form Gingko Thatch									
[Wall] Accent Cultured Stone	Cultured Stone		[Door]	3 Form Antique Fleur									
[Wall] Accent	Gage Corporation Inc. Gage vertical surfacing GC113(C/NS)		[Door]	Lumincor Botanicals									
			[Privacy Curtain]	Are-Com Sanctuary AC-33010 Herb #1									








Treatment Area – Assessment												
Purpose	Furniture, Fixtures, Equipment, and Accessories			Spatial Atmosphere and Character						Technology Requirements		
	Chair	Tackboard/whiteboard combo	Scale	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical	
<ul style="list-style-type: none"> <li>intermittently used throughout the day.</li> <li>patients are weighed, temperature and blood pressure taken.</li> </ul>	3	3	3	General indirect illumination to soften area.	Warm and neutral tones.	--	--	<ul style="list-style-type: none"> <li>calm</li> <li>restful</li> </ul>			<ul style="list-style-type: none"> <li>power outlet (120V)</li> </ul>	

Treatment Area – Training and Development											
Purpose		Spatial Atmosphere and Character						Technology Requirements			
Furniture, Fixtures, Equipment, and Accessories		Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical		
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Upholstery	Image	Product	Image	Lighting Specifications	
<ul style="list-style-type: none"> <li>used regularly</li> <li>semi-private</li> </ul>	Work surface Chair Treatment chair Task chair Storage – upper & lower Garbage Recycling Artwork Plant	1 Whiteboard 1 Clock 1 Hemodialysis machine 1 Computer 1 Keyboard tray & hard drive sling 1 Television 1 DVD/VCR 2 Telephone 1	Indirect lighting to provide general and uniform illumination for training purposes. Ambient lighting should also be considered to soften environment.	Warm natural tones be incorporated to emit a relaxing atmosphere.	Natural materials (or materials) should be incorporated wherever possible (e.g. plastic laminate to mimic natural wood). Adherence to infection control requirements must also be considered (e.g.: antimicrobial fabrics).	--	• welcoming • educational • friendly • relaxing	• allows for spiritual consideration and emotional support	• biocarb line • R.O. line	• voice/data outlet • power outlet (120V) • med gas outlet • cable outlet • medical vacuum outlet • pillow speaker connection • emergency power outlet	
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Upholstery	Image	Product	Image	Lighting Specifications	
[Floor] Resilient sheet flooring	Johnsonite Tarkett Acczent Finishes Wood Cabreuva CW30434		[Wall] Paint	General Paint CL 2741W Biscotti		[Task chair] Krug Dorso chair DOS1-M2011M (24.5W x 22.5D x 42.5H)		[Recessed] Fluorescent Lithonia Lighting RT5			
[Millwork]	Wilson Art 10734-60 Lamber Maple		[Wall] Vinyl Wall Covering	Bolha Antoinette Type II Palace BB-AT-05		[Soft Seating] Krug Jordan chair JOR3-1WOD (29W x 30.5D x 34.5H)	Architex Thrive Clary Sage	[Wall] Sconce Leacos Lighting Celine P			
[Millwork] Counter top (Quartz)	Cambria Goswell Cream 0810					[Treatment Chair] Jordan JORG-RCWOD2 (29.5W x 35D x 45.5H)	Maharam Scuba 464930 002 Cocoon				



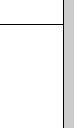
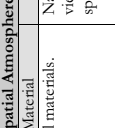



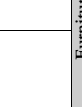


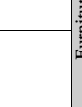
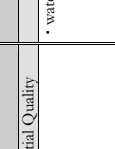
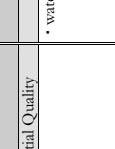
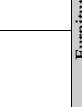
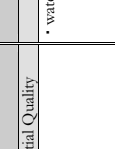
Treatment Area – Exam Room													
Purpose		Spatial Atmosphere and Character						Technology Requirements					
Furniture, Fixtures, Equipment, and Accessories		Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical				
		Direct/indirect illumination with wall sconce to soften environment.	Warm natural tones to be used in order to emit a relaxing atmosphere (soft yellow).	Natural materials	--	organized welcoming soothing soft	allows for emotional, physical, spiritual mental support and contemplation	med gases water hookup	voice/Data outlet cable outlet power outlet (120V) nurse call button telehealth data outlet				
		Material Specifications			Furniture Specifications			Lighting Specifications					
[Application] / Material	Image	[Application] / Material	Product	Image	Product	Image	Upholstery	Image	Product	Image			
<ul style="list-style-type: none"> <li>private</li> <li>quiet</li> <li>used sparingly</li> </ul>	<ul style="list-style-type: none"> <li>Exam table</li> <li>Work surface</li> <li>Storage – upper &amp; lower</li> <li>Stool</li> <li>Garbage</li> <li>Glock</li> <li>Plant</li> <li>Glove dispenser</li> </ul>	1 1 1 1 1 1 1 1											
[Floor] Resilient sheet flooring		[Millwork] Counter top (Quartz)	Cambria Coswell Cream 0810		[Task chair] Steelcase Exam Stool (24.5W x 22.5D x 42.5H)				Wall Sconce Leucos Lighting Celine P				
[Millwork]		[Wall] Paint	General Paint CL 2741W Biscotti						[Recessed] Fluorescent Lithonia Lighting RT5				
		[Wall] Paint	General Paint CL 2675D Mommia										

Treatment Area – Nurses' Station														
Purpose		Furniture, Fixtures, Equipment, and Accessories					Spatial Atmosphere and Character					Technology Requirements		
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical	
<ul style="list-style-type: none"> <li>• full of activity</li> <li>• semi-public</li> <li>• used 24 hours a day with starting treatment times of:               <ul style="list-style-type: none"> <li>• 8:00 am</li> <li>• 1:00 pm</li> <li>• 6:00 pm</li> <li>• 11:00 pm (overnight)</li> </ul> </li> </ul>	Work surface	18	Uniform illumination provided for tasks.	Inviting and calming atmosphere: warm and neutral tones.	Natural materials (or natural looking materials) should be incorporated wherever possible (e.g.: wood) and also adhere to infection control requirements (e.g.: antimicrobial fabrics).	A view to the patient is critical.	<ul style="list-style-type: none"> <li>• inviting</li> <li>• friendly</li> <li>• peaceful</li> </ul>	<ul style="list-style-type: none"> <li>• permits for emotional and physical support as well as the potentially for spiritual growth</li> </ul>	- -				<ul style="list-style-type: none"> <li>• voice/data outlet</li> <li>• power outlet (120V)</li> </ul>	
	Garbage	18												
	Clock	11												
	Glove dispenser	18												
	Med cart	18												
	Computer	18												
	Keyboard tray and hard drive sling	18												
	Telephone	18												
	Hand wash sink	19												
	Soap dispenser	19												
Paper towel dispenser	19													
			Material Specifications					Furniture Specifications					Lighting Specifications	
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Material	Product	Image	Product	Image	Upholstery	Product	Image	
[Floor]	Nora Systems Inc. Norament 925 Strada 4752		[Millwork]	Wilson Art 10734-60 Limber Maple				[Task chair] Steelcase Think Chair (24.5W x 22.5D x 42.5H)		Design Tex Samba 2654-801 Dove		[Decorative luminaire] Lithonia Lighting Candeo PDGF		
[Floor] Rubber-2	Nora Systems Inc. Norament 925 Strada 4753		[Millwork] Counter top (Quartz)	Dupont Corian Matterhorn								[Recessed] Fluorescent Lithonia Lighting RT5		
[Floor] Rubber-3	Nora Systems Inc. Norament 925 Strada 4754		[Wall] Paint	Sherwin Williams SW 6147 Shojo White										
			[Wall] Paint	Sherwin Williams SW 6417 Tupelo Tree										


Treatment Area – W.C.											
Purpose			Spatial Atmosphere and Character						Technology Requirements		
Furniture, Fixtures, Equipment, and Accessories			Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical	
	Mirror	5	Indirect lighting to provide general and uniform illumination. Cove lighting to soften environment.	Inviting and calming atmosphere: warm and neutral tones.	Safety floor required	--	<ul style="list-style-type: none"> <li>• calm</li> <li>• control</li> </ul>	--	<ul style="list-style-type: none"> <li>• emergency power outlet</li> <li>• power outlet (120V) nurse call button</li> </ul>		
	Garbage	5									
	Toilet	5									
	Hand wash sink	5									
	Soap dispenser	5									
	Paper towel dispenser	5									
	Grab bar (24" & 36")	10									
Material Specifications			Material Specifications			Furniture Specifications			Lighting Specifications		
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Product	Image	Upholstery	Image	Product	Image
[Floor] Resilient sheet flooring	Mannington Assurance II		[Wall] Paint	Sherwin Williams SW 7042 Shoji White						[Cove] Fluorescent Side mounted strip light Lithonia Lighting SM	
			[Wall] Paint	General Paint CL 2725D							

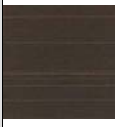






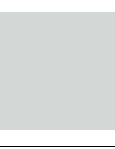

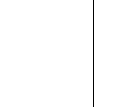
Treatment Area – Technician Area											
Purpose		Spatial Atmosphere and Character						Technology Requirements			
Furniture, Fixtures, Equipment, and Accessories		Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical		
• semi-private • responsible for fixing hemodialysis machines across the Province of Manitoba.	Work surface	9	Warm and neutral tones.	Water resistant materials to be used in this area (e.g.: stainless steel)	- -	• calm • control		• biocarb line • R.O. line • water line	• voice/data outlet • power outlet (120V) • medical vacuum outlet		
	Storage – upper & lower	9									
	Task chair	9									
	Garbage	9									
	Clock	2									
	Tackboard	9									
	Whiteboard	2									
	Hand wash sink	1									
Soap dispenser	1										
Paper towel dispenser	1										
Hemodialysis sink	8										
Material Specifications		Furniture Specifications						Lighting Specifications			
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Product	Image	Upholstery	Image	Product	Image
[Floor]	Mannington Biospec 15 163 Golden Oak		[Wall] Paint	General Paint CL.2725D Dissent		[Task chair] Steelcase Think Chair (24.5W x 22.5D x 42.5H)		Design Tex Samba 2654-801 Dove		[Recessed] Fluorescent Lithonia Lighting RT5	
[Wall] Paint	Sherwin Williams SW 7042 Shoji White		[Wall] Paint	General Paint CL. 2845A Network							



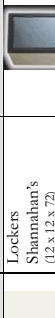




Treatment Area – Office and Administration											
Purpose		Spatial Atmosphere and Character								Technology Requirements	
Furniture, Fixtures, Equipment, and Accessories		Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical		
[Application] / Material	Product	[Application] / Material	Product	Image	Product	Image	Upholstery	Image	Product	Lighting Specifications	
<ul style="list-style-type: none"> <li>private</li> <li>used primarily during daytime hours</li> </ul>	Work surface	24	Whiteboard	8	<ul style="list-style-type: none"> <li>A variety of light to be incorporated into this space (natural lighting and direct/indirect).</li> <li>A color palette that emits warmth, relaxation, calmness and sunlight.</li> <li>Natural materials (or natural looking materials) should be incorporated wherever possible (e.g.: wood)</li> <li>View to nature</li> <li>Natural light should penetrate the space to enhance comfort levels.</li> <li>calm</li> <li>control</li> <li>permits positive distractions</li> <li>interaction with staff</li> <li>influenced by natural light</li> <li>allows for contemplation</li> </ul>	<ul style="list-style-type: none"> <li>voice/data outlet</li> <li>power outlet (120V)</li> </ul>	<ul style="list-style-type: none"> <li>voice/data outlet</li> <li>power outlet (120V)</li> </ul>	<ul style="list-style-type: none"> <li>voice/data outlet</li> <li>power outlet (120V)</li> </ul>	<ul style="list-style-type: none"> <li>voice/data outlet</li> <li>power outlet (120V)</li> </ul>	<ul style="list-style-type: none"> <li>voice/data outlet</li> <li>power outlet (120V)</li> </ul>	
	Chair	24	Clock	8							
	Storage – upper & lower	24	Computer	24							
	Conference table	2	Telephone	29							
	Conference chairs	40	Keyboard tray & hard drive sling	24							
	Plant		Photocopier	1							
	Artwork		Printer	3							
	Garbage	29	Projector	2							
Recycling bin	29	DVD/VCR	2								
Tackboard	8										
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Product	Image	Product	Image	Product	Image
[Floor]	Shaw 63309 Café Hightlights		[Wall] Paint	Sherwin Williams SW 7042 Shoji White		[Task chair] Steelcase Think Chair (24.5W x 22.5D x 42.5H)		Decorative luminaire Lithonia Lighting Candeco PDGF			
[Millwork]	Wilson Art 10734-60 Limber Maple		[Wall] Paint	General Paint CLC 1246W Threadbare		[Soft Seating] Steelcase Jenny		Designtex Samba 2654-106 Latte			
[Millwork] Counter top (Quartz)	Dupont Magellan Green		[Wall] Paint	General Paint CL 2982W Dish Water				Designtex Samba 2654-401 Balsam			
[Wall] Surface Finish	Armourcoat Modular wall system Flow		[Wall] Paint	General Paint CL 2675D Mommia							

Treatment Area – Lunch Room												
Purpose	Spatial Atmosphere and Character										Technology Requirements	
	Furniture, Fixtures, Equipment, and Accessories	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical			
<ul style="list-style-type: none"> <li>used throughout the day</li> <li>semi-private</li> </ul>	Table	4	Refrigerator	2	Indirect light and ambient light to be incorporated in order to produce a soothing environment (oasis).	Warm, calming, relaxing environment: combination of warm and neutral tones.	Natural materials.	Natural light and views to atrium space.	<ul style="list-style-type: none"> <li>peaceful</li> <li>serene</li> </ul>		<ul style="list-style-type: none"> <li>water hookup</li> <li>voice/data outlet (120V)</li> <li>power outlet (120V)</li> <li>cable outlet</li> </ul>	
	Chair	17	Microwave	2								
	Seating/ loveseat	2	Water cooler	1								
	Storage – lower & upper	1	Computer	3								
	Work Surface	1	Keyboard & Hard drive sling	3								
	Coffee Table	1	Television									
	Lounge chair	4	Telephone	2								
	Garbage	2	Handwash Sink	1								
	Recycling	2	Soap dispenser:	1								
	Artwork	3	Paper towel	1								
Plant	5	Dishwasher	1									
Whiteboard/Tackboard combo	1											
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Product	Image	Upholstery	Image	Product	Image	
[Floor]	Armstrong Natural Creations Arbor Art TP011 Wild Cherry – dark		[Wall] Paint	Sherwin Williams SW 7042 Shoji White		[Multi-purpose chair] Krug Corfu chair COR2-31C (23.25W x 21D x 32.25H)		Clear Maple		[Wall] Scence Leucos Lighting Celine P		
[Millwork]	Wilson Art 10734-60 Limber Maple		[Wall] Paint	General Paint CL 2675D Mommia		[Table] Steelcase Groupwork (42 in dia.)		White table top		[Decorative luminaire] Lithonia Lighting Candeo PDGF		
[Millwork] Counter top (Solid Surface)	Dupont Slate					[Soft Seating] Steelcase Jenny		Design Tex Samba 2654-401 Balsam				
								Design Tex Samba 2654-106 Latte				
						[Soft Seating] Krug Sloane SLO3-30 (77.25W x 30.5D x 30.75 H)		Momentum Textiles Efflorescence 09105028 Refresh				



																	
									[Occasional Table] Krug Virtu VIR4-24D-21-1 (24D x 21H)								

Treatment Area – Quiet Room										Spatial Atmosphere and Character								Technology Requirements			
Purpose		Furniture, Fixtures, Equipment, and Accessories								Spatial Atmosphere and Character								Technology Requirements			
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Product	Image	Color	Lighting	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical						
• used often • quiet • for individual use or small group.	Chair		4	Uniform flexible lighting (ambient lighting) required in order to provide patients and visitors with a comfortable, enveloping atmosphere.	A calming and natural environment required. Therefore, green tones representing nature is preferable.	Natural materials (or natural looking materials) should be incorporated wherever possible (e.g.: wood).	A view to the warm and comfortable waiting area is required (e.g.: atrium space).	• tranquil • timeless	• permits for meditation and reflection.	- -											
	Loveseat		1																		
	Side table		3																		
	Coffee Table		1																		
	Gabage		2																		
	Artwork																				
	Plant																				
	Tackboard		2																		
	Clock		2																		
Material Specifications										Furniture Specifications				Lighting Specifications							
[Application] / Material	Product	Image	[Application] / Material	Product	Image	Product	Image	Product	Image	Product	Image	Upholstery	Image	Product	Image						
[Floor]	Shaw Prisma Tile 63309 Café Highlights		[Wall] Paint	Sherwin Williams SW 7042 Shoji White		[Soft Seating] Krug Sloane SLO3-30 (77.25W x 30.5D x 30.75H)		[Table] Lamp Leucos Lighting Linda T1		[Wall] Paint	[Soft Seating] Krug Sloane SLO3-10 (54.25W x 30.5D x 30.75H)	Design Tex Samba 2654-106 Latte		[Table] Lamp Leucos Lighting Linda T1							
[Wall] Surface Finish	Armourcoat Modular wall system Flow		[Wall] Paint	General Paint CL 2982W Dish Water		[Occasional Table] Krug Virtu VIR4-24D-21-1 (24D x 21H)		[Floor] Lamp Leucos Lighting Linda T2													

Staff Area – Locker Room													
Purpose		Furniture, Fixtures, Equipment, and Accessories					Spatial Atmosphere and Character					Technology Requirements	
[Application] / Material	[Application] / Material	Product	Image	[Application] / Material	Product	Image	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical
<ul style="list-style-type: none"> <li>used intermittently throughout the day</li> <li>semi-private</li> <li>staff storage</li> </ul>		Bench		3	Uniform, general illumination (recessed fluorescent)	Warm, calming, relaxing environment: combination of warm and neutral tones.				tranquil	permits for meditation and reflection	- -	power outlet
		Garbage		2									
		Artwork		1									
		Mirror		1									
		Tackboard		1									
	Lockers		104										
Material Specifications													
[Application] / Material	[Application] / Material	Product	Image	[Application] / Material	Product	Image	Product	Image	Product	Image	Upholstery	Product	Image
[Floor]		Mannington Commercial Biospec 15159 Balsa		[Wall] Paint	Sherwin Williams SW 7042 Shoji White		Lockers Shannah's (12 x 12 x 72)					[Recessed] Fluorescent Lithonia Lighting RT15	
[Floor] W.C. & Shower combo		Mannington Commercial Mannington Assurance II 16321 Wasabi		[Wall] Paint	General Paint CL 2725D Dissent								
				[Wall] Paint	General Paint CL 2845A Network								

<b>Staff Area – W.C.**</b>										
Purpose	Furniture, Fixtures, Equipment, and Accessories				Spatial Atmosphere and Character				Technology Requirements	
	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical		
<ul style="list-style-type: none"> <li>used intermittently throughout the day</li> <li>semi-private</li> <li>staff storage</li> </ul>	Uniform, general illumination (recessed fluorescent)	Warm, calming, relaxing environment: combination of warm and neutral tones.			tranquil	permits for meditation and reflection	--	power outlet		
	4									
	4									
	4									
	4									
	4									

<b>Staff Area – Soiled Utility**</b>										
Purpose	Furniture, Fixtures, Equipment, and Accessories				Spatial Atmosphere and Character				Technology Requirements	
	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical		
<ul style="list-style-type: none"> <li>used throughout the day</li> </ul>	General illumination required.	Warm white	Wall protection and slip resistant sheet flooring required.	--	functional and accessible	--	water line	--		
	6									
	2									
	2									
	4									
	2									

<b>Staff Area – Clean Utility*</b>										
Purpose	Furniture, Fixtures, Equipment, and Accessories				Spatial Atmosphere and Character				Technology Requirements	
	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical		
<ul style="list-style-type: none"> <li>used throughout the day</li> </ul>	General illumination required.	Warm white	Wall protection and slip resistant sheet flooring required.	--	functional and accessible	--	--	--		
	6									

<b>Staff Area – Med Supply*</b>										
Purpose	Furniture, Fixtures, Equipment, and Accessories				Spatial Atmosphere and Character				Technology Requirements	
	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical		
<ul style="list-style-type: none"> <li>used throughout the day</li> </ul>	General illumination required.	Warm white	Wall protection and slip resistant sheet flooring required.	--	functional and accessible	--	--	--		
	7									

<b>Staff Area – Dialysis Preparation</b>											
Purpose	Furniture, Fixtures, Equipment, and Accessories					Spatial Atmosphere and Character				Technology Requirements	
	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical			
<ul style="list-style-type: none"> <li>used throughout the day</li> </ul>	Work surface	1	General illumination required.	Warm white	Wall protection and slip resistant sheet flooring required.	--					
	Storage – upper & lower	1									
	Task chair	1									
	Clock	1									
	Whiteboard	1									
	Garbage	1									
	Hand wash sink	1									
	Soap dispenser	1									
	Paper towel dispenser	1									

<b>Staff Area – Water Treatment</b>											
Purpose	Furniture, Fixtures, Equipment, and Accessories					Spatial Atmosphere and Character				Technology Requirements	
	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical			
<ul style="list-style-type: none"> <li>semi-private</li> <li>purifies water</li> </ul>	Work surface	1	General illumination required.	Warm white	Concrete epoxy floor	--					
	Storage – lower	1									
	Task chair	1									
	Clock	1									
	Whiteboard	1									
	Water things	1									
	Hand wash sink	1									
	Soap dispenser	1									
Paper towel dispenser	1										

<b>Staff Area – Housekeeping**</b>											
Purpose	Furniture, Fixtures, Equipment, and Accessories					Spatial Atmosphere and Character				Technology Requirements	
	Lighting	Color	Material	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical			
<ul style="list-style-type: none"> <li>used throughout the day</li> </ul>	Wire shelving	2	General illumination required.	Warm white	Water resistant and slip resistant material.	--					
	Mop sink	2									
	Soap proportioner	2									
	Hand wash sink	2									
	Soap dispenser	2									
	Paper towel dispenser	2									
Housekeeping cart	2										

Staff Area – Concentrate Storage*										
Purpose	Furniture, Fixtures, Equipment, and Accessories		Spatial Atmosphere and Character					Technology Requirements		
			Lighting	Color	Wall protection required along with resilient sheet flooring.	View	Desired Atmosphere	Spatial Quality	Mechanical	Electrical
• solution storage	--	--	General illumination required.	Warm white		--	--	--	--	--

Note:

- \* All operational areas to be Mannington Commercial, Biospec Resilient Sheet Flooring (15163 Golden Oak), unless noted otherwise.
- \*\* Flooring to be Mannington Commercial Assurance II, slip resistance resilient sheet flooring (16305 Bisque-Sheet).

1. All walls within Operational Area (Soiled Utility, Clean Utility, Med Supply, Dialysis Preparation, Water Treatment, Concentrate Storage, and Housekeeping) to be General Paint CL 2741W Biscotti or General Paint CL 2675D Mommia.

## 5.6. Building Code, Access, and Life Safety Requirements

In order to undertake/erect any new construction or renovation in any healthcare facility in Canada, the Canadian Building Code must be referred to and complied with, as it illustrates the minimum requirements by law to ensure public safety. The subsequent information has been taken from the Canadian Building Code of Canada, 1995 Edition, for its relevance to this project.

### 5.6.1. Building Code Issues/Compliance

Classification:	3.2.2.28
Occupancy Classification:	Group B, Division 2
	Full-time Occupancy
	Sprinklered
Building Area:	Table 3.2.2.53
	1 Storey/Facing 1 Street
Actual Building Area	31,190 sq. ft
Fire Separation of	No fire separation is required between existing GH building and new addition (old GF).
Construction:	Non-combustible construction
	Floor Assemblies shall be fire separations with fire – resistance rating not less than 2h.
	Load bearing walls, columns, and arches shall have a fire-resistance rating not less than that required for the supported assembly.
Travel Distance	Travel distance to at least 1 exit shall not exceed 147.6 ft. (45M). Refer to Life Safety plan on page 135, Appendix A
Required Exits	Minimum of two required.
Exit Distance	1 exit shall not exceed 133ft (40M).

### 5.6.2. Universal Design Requirements

Accessible WC	Unobstructed Wheelchair Radius: 5'-0" (1500mm)
	Lavatory clearance: 30in (735mm)
	1 grab bar behind seat, 1 grab bar next to seat
Doorway Clearance	2'-0" (600mm) – if door is being pulled toward person
	1'-0" (300mm) – if door is being pushed outward
Door widths	42" in patient areas to allow for stretchers

## 5.7. Spatial Requirements and Analysis

Spatial requirements were established by combining Health Sciences Centre guidelines along with observing and investigating both Central and Sherbrook locations in order to understand their current allocation of space and future needs.

### 5.7.1. Floor Area Estimates

Area	Square footage requirement	Quantity	Total Quantity
<b>Patient Areas/Services</b>			
Treatment Area (sq. ft per station)	110	42	4,620
Isolation Room	160	8	1,280
Examination Room	150	1	150
Washroom	55	3	220
Washroom (Iso Room)	55	8	440
Kitchenette	260	1	260
Reception Area	110	1	110
Assessment Area	50	3	150
Waiting Room	550	2	1,100
Atrium	2950	1	2,950
Total Square Footage			11,280
Including 50% Circulation Space			5,640
<b>Total Square Footage</b>			<b>16,920</b>

<b>Support Area</b>			
Clean Utility	200	2	400
Soiled Utility	150	2	300
Concentrate Storage	500	2	1,000
Equipment Storage	100	2	200
Medication Supply	120	2	240
Training & Development	150	1	150
Nursing Station	30-110*	18	870
Housekeeping	110	2	220
Supply Room	200	2	400
Dialysate Preparation	550	1	550
Total Square Footage			4,330
Including 50% Circulation Space			2,165
<b>Total Square Footage</b>			<b>6,495</b>

<b>Staff Area</b>			
Offices	110	8	880
Administration	60	15	900
Conference Room	350	1	350
Locker Room	150	1	150
Lunch Room	200	1	200
Photocopy Area	100	1	100
Quiet Room	100	1	100
File Storage	35	1	35
Technician Area	900	1	900
Washroom	55	1	55
Total Square Footage			3,670
Including 35% Circulation Space			1,284.5
<b>Total Square Footage</b>			<b>4,954.5</b>

<b>Total Square Footage Required:</b>	<b>28,369.5</b>
<b>Total Square Footage Provided:</b>	<b>31,190</b>

\*Nurse stations adjacent to private and isolation rooms (total of 15) have a footprint of 30 sq. ft., while nurse stations in the semi-private area require a larger footprint of 110 sq. ft. (total of 3).



### 5.7.2. Spatial Adjacency Matrix

	Reception	Pre-waiting Room	Kitchenette	Patient W.C.	Atrium	Private Treatment	Nursing Station	Isolation Treatment	Nursing Station	Semi-Private Treatment	Nursing Station	Primary Nursing Station	Exam Room	Training and Development	Operational Areas	Housekeeping	Dirty Utility	Clean Utility	Med Supply	Equipment Storage	Bed and Chair Storage	Concentrate Storage	Dialysis Preparation	Water Treatment	Staff W.C.	Office/Administration	Locker Room	Staff Lounge	Staff Quiet Room	Conference Room	Post-Waiting					
Reception		x																														x				
Pre-Waiting Room																																				
Kitchenette																																				
Patient W.C.																																				
Atrium																																				
Private Treatment																																				
Nursing Station																																				
Isolation Treatment																																				
Nursing Station																																				
Semi-Private Station																																				
Nursing Station																																				
Primary Nursing Station																																				
Exam Room																																				
Training and Development																																				
Operational Areas																																				
Housekeeping																																				
Dirty Utility																																				
Clean Utility																																				
Med Supply																																				
Equipment Storage																																				
Bed and Chair Storage																																				
Concentrate Storage																																				
Dialysis Preparation																																				
Water Treatment																																				
Staff W.C.																																				
Office/Administration																																				
Locker Room																																				
Staff Lounge																																				
Staff Quiet Room																																				
Conference Room(s)																																				
Post-Waiting																																				

x Essential Adjacency                   ♦ Desirable Adjacency  
 Minimum/No Relationship           - Undesirable

### 5.7.3. Zoning and Circulation Analysis

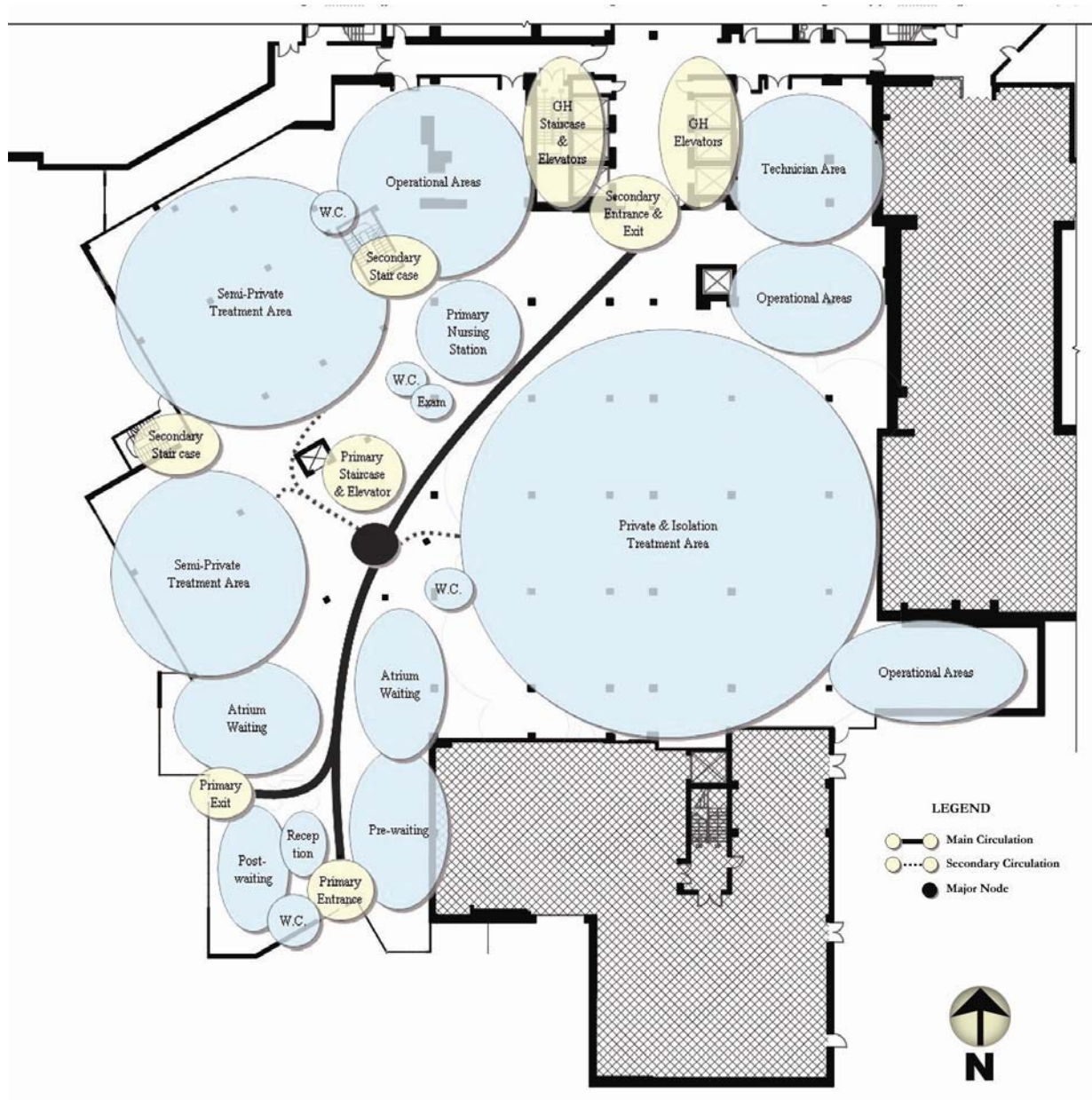


Figure 43. Main Floor Zoning and Circulation Analysis

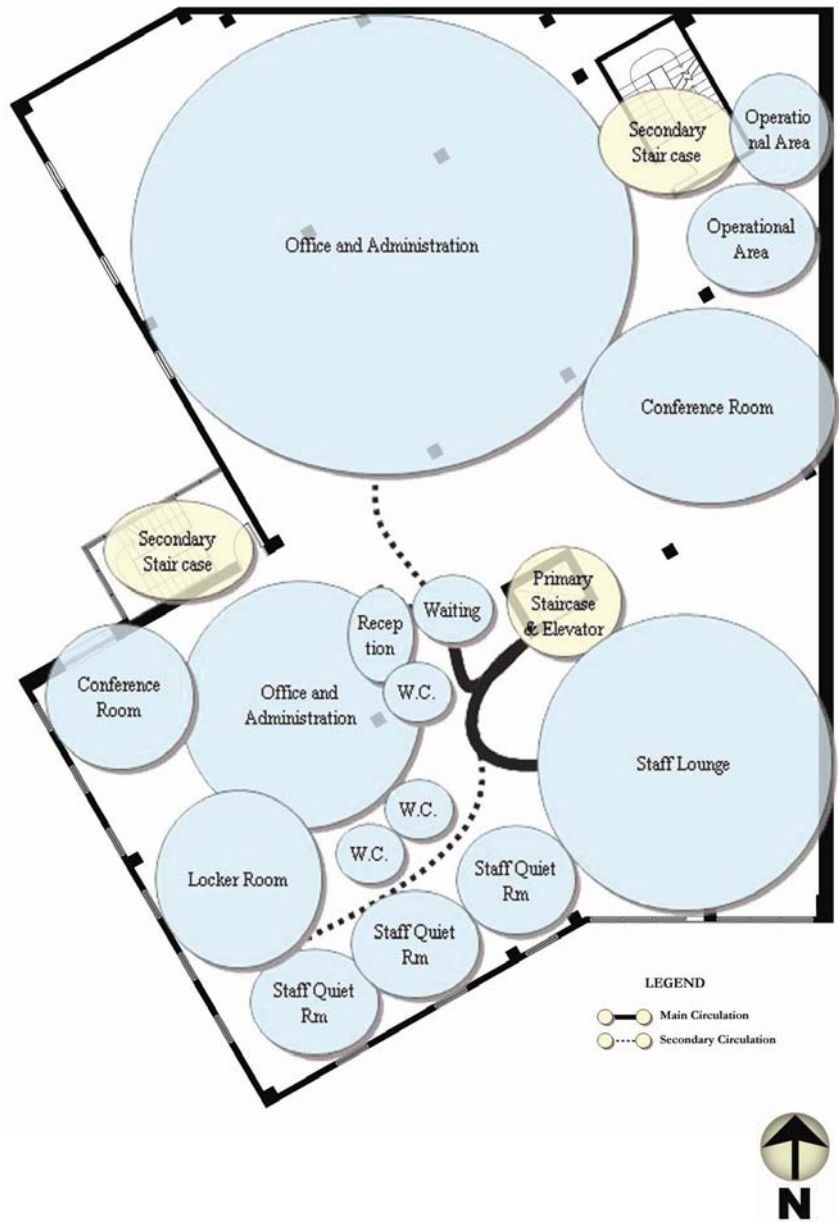


Figure 44. Second Floor Zoning and Major Circulation Analysis

## Chapter 6: Design

The final design, explained within this chapter, incorporates the investigations undertaken, the literature and precedents reviewed, and the programme documentation and analysis completed.

Several concepts informed the spatial design and atmospheric quality of the space. The following section describes the spatial concepts, design objectives, and the overall organization of this hemodialysis centre. The overall intent was to evoke a warm, welcoming, home-like, and comfortable environment by humanizing the environment.

### 6.1. Spatial Concept

Healthcare environments are complex, interconnected physical structures that cause its users to experience heightened stress levels as they attempt to move through a maze of corridors. For this reason, wayfinding strategies were considered an important feature of the design. Acting as the main artery, the pedestrian corridor connecting both primary entrances/exits was established by a curve that guides the users to their destination. Users must travel to the central node to enter treatment, eliminating confusion by channelling users to one specific area. This primary corridor offers wayfinding cues such as accent walls and tall sculptural elements that allow users to pause and/or interact through fixed and flexible seating before they enter treatment.

Merging with this main artery are a series of spaces that set the tone for the first spatial concept; creating a warm and welcoming milieu. Environments that emit warmth and possess welcoming characteristics, reduce stress and provide restoration, are a vital determinant of well-being. The influences of Kaplan and Kaplan's

(1989) theories of the restorative effects of nature have been incorporated in the design through the use of home-like characteristics and comfortable qualities.

In addition, the freedom of choice and control was another key concept and important feature within this centre. Based upon the theories of Roger Ulrich's (1990) Theory of Supportive Design, psychologically supportive elements were also considered. Therefore, this centre offers users the ability to control their desired level of social interaction within both waiting and treatment areas. Within the waiting areas (pre and post waiting and the atrium space), a variety of seating types were used, enabling the user to choose their desired level of social interaction. To accommodate intimacy, comfortable lounge chairs (bariatric and standard) were placed in a sociopetal<sup>4</sup> arrangement to encourage interaction and communication with others. For the single visitor or patient, seating was also provided near the focal point. This seating was arranged in a semi-sociofugal<sup>5</sup> pattern designed to encourage interconnectedness while discouraging interaction and communication with others. In keeping with the desire to provide a flexible environment and enable user choice, all the seating is free-standing to allow future rearrangement. The treatment stations were designed to offer patients access to technology, enabling them to enjoy audio books, music, television, movies, and the internet, while the nearby dimmer switch and adjustable thermostat allow personal environment of control.

Similarly, natural elements were incorporated throughout the design. These elements were considered positive distractions, termed by Ulrich. As dialysis patients struggle with physiological and

---

<sup>4</sup> A sociopetal furniture arrangement consists of freestanding seating that faces one another to ease communication between users.

<sup>5</sup> A semi-sociofugal furniture arrangement is comprised of side by side seating to discourage communication between users.

psychological stress, the benefits of nature alleviates the stress experienced. Within the waiting areas are two fireplaces, a water feature, and the most predominant natural components, the trees, are placed throughout the atrium space. In addition to providing positive distraction in the common areas, positive features were also incorporated throughout the treatment areas and stations by offering either, or in combination, a water feature, a fireplace, views to nature and natural light.

The environment was further humanized through an increase in privacy. The concept of privacy was imperative in this design. Through flexible seating arrangements, users have the choice for intimate discussions with family and friends or the opportunity for contemplation and rejuvenation. Privacy was further enhanced by providing different types of treatment stations (semi-private and private) that increase patient confidentiality and reduce feelings of exposure.

The dialysis centre was finished with a soothing colour palette using a combination of natural and natural looking materials that are visually warm and inviting. The notion of home was further promoted through the use of side tables, table lamps, and wall coverings.

## **6.2. Design Objectives**

The aim of this study was to determine how the built environment assists patients with ESRD to achieve a greater quality of life.

The questions answered in this document were:

1. How can the physical environment facilitate restoration and healing?
2. How can the environment enable spiritual development and renewal?

3. What type of design elements contribute to stress reduction?

The aim of this research-based design process was two fold: (1) to create greater awareness of therapeutic and restorative environments and their impact on people undergoing dialysis and (2) to promote and encourage facilities to design and build in this fashion thereby positively impacting the lives of dialysis patients.

### **6.3. Organization and Zones**

The centre was zoned to maximize daylight for users waiting and treatment areas, incorporate wayfinding strategies, reduce travel distances for staff, and increase privacy levels for patients and visitors.

The overall circulation of the space was designed to remove the institutional feel of healthcare environments and highlight one's journey to the destination. Secondly, pedestrian circulation routes were designed to ease wayfinding, using clear, directional paths to minimize environmental complexity, as healthcare environments can be complicated, confusing, and stressful for new users due to a lack of familiarity.

The spatial organization of the centre is based on the most predominant element, the curvilinear shape, where the main circulation occurs, differentiating between the two treatment areas. To the upper left of the main circulation (see Figure 45), semi-private treatment areas are adjacent to support spaces encompassing housekeeping, clean and dirty utility, and storage and preparation rooms. Directly below and centrally placed for easy access between the two treatment areas, the main nursing station allows nurses to gather for group discussions and continuing education. Technicians who service the hemodialysis machines and dialysis preparation area

occupy the top right hand corner of this centre. Below and to the right of the circulation is the second treatment, encompassing private rooms and isolation treatment rooms. Similar to the first treatment area, separate support spaces are also situated adjacent to the treatment space.



Figure 45. Main Floor Organization

The central node not only joins both treatment areas but also provides vertical access to the second floor where the staff lounge, quiet rooms, locker rooms, and the administration area are stationed (see Figure 46). Directly below the central node, the atrium space, pre and post waiting rooms, including reception are strategically located near access to McDermot Avenue.





Figure 46. Second Floor

## 6.4. Design Features

In keeping with the themes and ideas identified in the previous chapters and the notion of patient-centered care, it is critical to provide users with options designed to reduce stress and create a home-like environment in order to maximize health benefits. There are a variety of environmental options available to patients within this facility, including:

- private & social seating areas
- kitchenette
- spiritually evocative spaces
- contemplative areas
- educational areas
- restorative areas

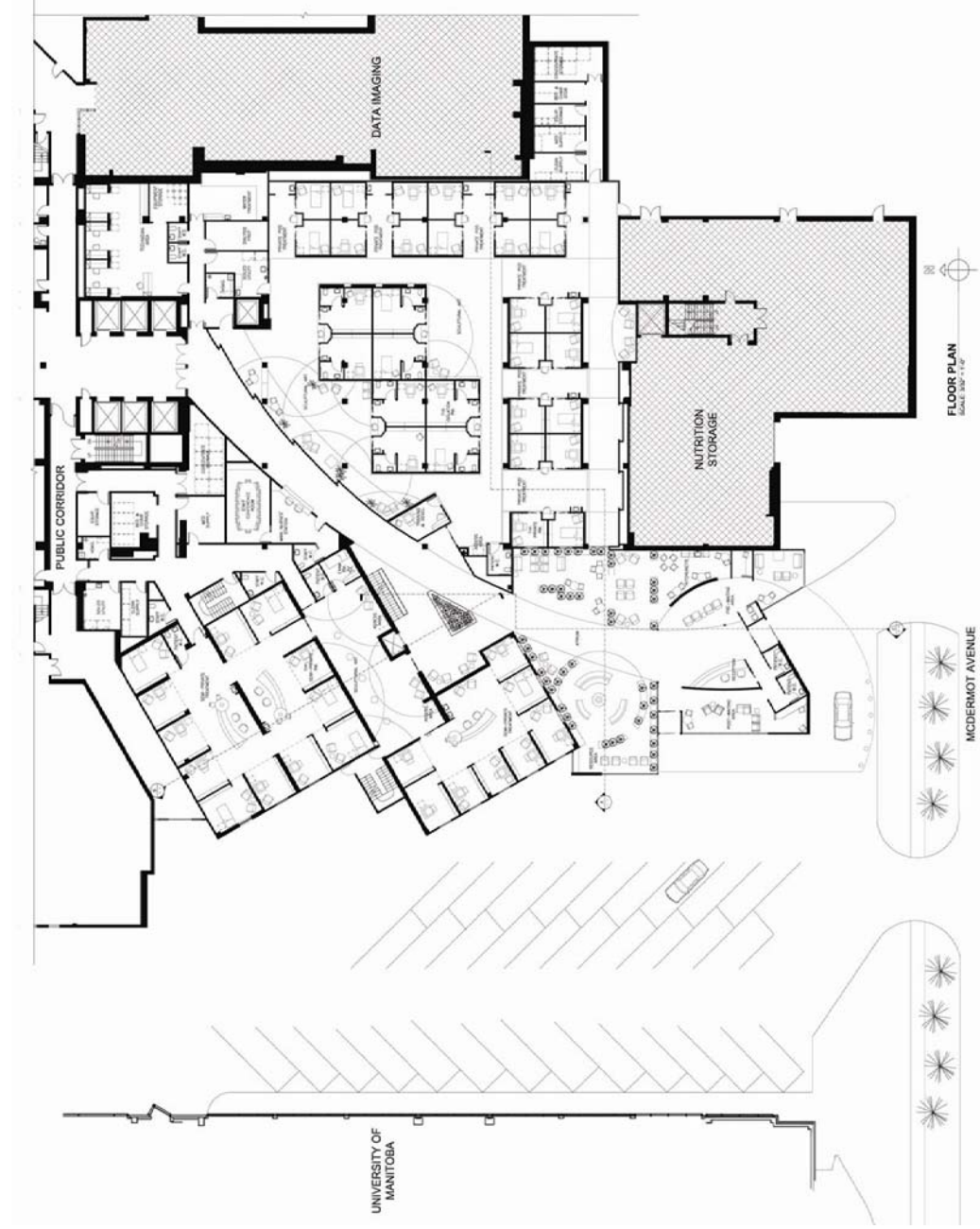


Figure 47. Floor Plan – Main Floor



Figure 48. Floor Plan – Second Floor



Figure 49. Exterior Elevation - South



Figure 50. Exterior Elevation - West



Figure 51. Section A





Figure 52. Section B



Figure 53. Section C





Figure 54. Perspective 1 - Interior Perspective - Atrium facing reception



Figure 55. Perspective 2 – Major node





Figure 56. Perspective 3 — Seating area adjacent to Isolation Pods



Figure 57. Private Treatment Pod



Figure 58. Semi-Private Treatment Pod



Figure 59. Isolation Room Treatment Pod





Figure 60. Floor Pattern – Main Floor



Figure 61. Floor Pattern –Second Floor



## Chapter 7: Conclusion

*Healing comes not only from modern technology, diagnosis, pharmaceuticals, and procedures; it also flows from an environment that encourages personal growth and development, positive attitudes, emotional well-being, healthy, human relationships, community, spirituality and, joy.*

*(Arneill and Frasca-Beaulieu, p. 177)*

Dialysis patients spend a great deal of time receiving treatment in an environment that is not currently conducive to holistic healing. Adapting to a rigorous dialysis schedule and dietary restrictions is difficult and many struggle to cope. For these patients, the hemodialysis centre becomes their second home and therefore should resemble one.

Through the implementation of privacy concepts, the integration of natural and spiritually evocative elements, positive distractions, and systems that enable patient control; rejuvenation, contemplation, and solitude are all able to take place. Spaces that integrate these concepts provide a thoughtfully designed restorative environment for people on dialysis. In turn, restorative environments can provide stress reduction, aid in coping with and acceptance of the disease, foster holistic healing, and most importantly, improve overall quality of life of its users.

## References

- Altman, I. (1975). *The Environment and social behavior: Privacy, personal space, territory, crowding*. Monterey, CA: Brooks/Cole.
- Arneill, B., & Frasca-Beaulieu, K. (2003). Healing environments; architecture and design conducive to health. In S. B. Frampton, L. Gilpin, & P. A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 163-190). San Francisco: Josey-Bass.
- Baldree, K. S., Murphy, S. P., & Powers, M. J. (1982). Stress identification and coping patterns in patients on hemodialysis. *Nursing Research, 31*(2), 107-112.
- Billings, A. G., & Moos, R. H. (1981). The role of coping responses and social responses in attenuating the stress of life events [Electronic version]. *Journal of Behavioral Medicine, 4*, 139-157.
- Blake, C. W., & Courts, N. F. (1996). Coping strategies and styles of hemodialysis patients by gender [Electronic version]. *ANNA Journal, 23*(5). 477-486.
- Burkhardt, M. A., & Nagai-Jacobson, M. G. (2002). *Spirituality, living our connectedness*. Delmar, NY: Albany.
- Burkhardt, M. A. (1994). Environmental connections and reawakened spirit. In E. A. Schuster & C. L. Brown (Eds.), *Exploring our environmental connections* (pp. 287-306). New York: National League for Nursing.
- Carpman, J. R., & Grant, M. A. (1993). *Design that cares: Planning health facilities for patients and visitors* (2nd ed.). USA: American Hospital Publishing, Inc.
- Carver, C. S., Scheier, M. F., Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*(2), 267-283.
- Cohen, S., Evans, G. W., Stokols, D. & Krantz, D. S. (1986). *Behavior, health and environmental stress*. New York: Plenum Press.
- Cohen, F., & Lazarus, R. S. (1983). Coping and adaptation in health and illness. In D. Mechanic (Ed.), *Handbook of health, health care, and the health professions*. New York: The Free Press.

- DeGraff, A. H., & Schaffer, J. (2008). Emotion-focused coping: A primary defense against stress for people living with spinal cord injury [Electronic version]. *Journal of Rehabilitation*. Retrieved August 3, 2008, from [http://findarticles.com/p/articles/mi\\_m0825/is\\_1\\_74/ai\\_n25378304/print?tag=artBody;col1](http://findarticles.com/p/articles/mi_m0825/is_1_74/ai_n25378304/print?tag=artBody;col1)
- Dossey, B. M., Keegan, L., & Guzzetta, C. E. (2000). *Holistic nursing: A handbook for practice* (3rd ed.). Gaithersburg, MD: Aspen.
- Edgman-Levitan, S. (2003). Healing partnerships; the importance of including family and friends. In S.B. Frampton, L. Gilpin & P.A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 51-69). San Francisco: Josey-Bass.
- Epstein, Y. M. (1982). Crowding stress and human behavior. In G. W. Evans (Ed.), *Environmental stress* (pp. 133-148). New York: Cambridge University Press.
- Ford, C., & Gilpin, L. (2003). Informing and empowering diverse populations. In S.B. Frampton, L. Gilpin, & P.A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 27-49). San Francisco: Josey-Bass.
- Frampton, S.B. (2003). Introduction: The emergence of patient-centered care and the planetree model. In S.B. Frampton, L. Gilpin, & P.A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. xxv-xxxix). San Francisco: Josey-Bass.
- Frankenhaeuser, M. (1980). Psychoneuroendocrine, Approaches to the study of stressful person-environment transactions. In H. Selye (Ed.), *Selye's guide to stress research, Vol. 1*. New York: Van Nostrand Reinhold.
- Galanter, M. (2005). *Spirituality and the healthy mind: science, therapy, and the need for personal meaning*. New York: Oxford University Press.
- Gerlach-Spriggs, N., Kaufman, R. E., & Warner, S. B. Jr. (1998). *Restorative gardens: The healing landscape*. London: Yale University Press.
- Gilpin, L. (2003). The importance of human interaction. In S.B. Frampton, L. Gilpin, & P.A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 3-26). San Francisco: Josey-Bass.

- Graham, S., Furr, S., Flowers, C., Burke, M. T. (2001). Religion and spirituality in coping with stress. *Counseling and Values, 46*, 1-13.
- Gurklis, J., & Menke, E. (1988). Identification of stressors and use of coping methods in chronic haemodialysis patients [Electronic version]. *Nursing Research, 37*(4), 236-239.
- Handzo, G., & Wilson, J. C. (2003). Spirituality, inner resources for healing. In S.B. Frampton, L. Gilpin, & P.A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 89-104). San Francisco: Josey-Bass.
- Hartig, T. (2007). Three steps to understanding restorative environments as health resources. In C. Ward Thompson, & P. Travlou (Eds.). *Open spaces: People spaces* (pp.163-179). New York: Taylor & Francis Routeledge.
- Health Sciences Center. (n.d.a.). *Our history*. Retrieved January 17, 2006, from <http://www.hsc.mb.ca/corporate/history.htm>
- Health Sciences Centre. (n.d.b.). *Mission statement of the Health Sciences Centre*. Retrieved January 17, 2006, from <http://www.hsc.mb.ca/corporate/mission.htm>
- Health Sciences Centre. (n.d.c.). *Values of the Health Sciences Centre*. Retrieved January 17, 2006, from <http://www.hsc.mb.ca/corporate/values.htm>
- Health Sciences Centre. (n.d.d.). *2005-2006 HSC annual report*. Retrieved March 20, 2007, from [http://www.hsc.mb.ca/corporate/annual\\_reports.htm](http://www.hsc.mb.ca/corporate/annual_reports.htm)
- Hyman, C. (2002). *Richard Lazarus, UC Berkeley psychology faculty member and influential researcher, dies at 80*. Retrieved July 24, 2008, from University of California, Berkeley Campus News Web site: [http://www.berkeley.edu/news/media/releases/2002/12/04\\_lazarus.html](http://www.berkeley.edu/news/media/releases/2002/12/04_lazarus.html)
- Kaiser, L. (2003). Holistic hospitals: Planetree on the spiritual frontier. In S.B. Frampton, L. Gilpin, & P.A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 293-304). San Francisco: Josey-Bass.
- Kaplan, R. M. (2000). Promoting wellness: Biomedical versus outcomes models. In M. Schneider Jamner, & D. Stokols (Eds.), *Promoting human wellness: New frontiers for research, practice, and policy* (pp. 44-77). University of California Press.

- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge University Press.
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework, in *Journal of Environmental Psychology*, 15, 169-170.
- Katz, D. (2003). Integrating complementary and alternative practices into conventional care. In S.B. Frampton, L. Gilpin, & P.A. Charnel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 147-161). San Francisco: Josey-Bass.
- Kidney Foundation of Canada (Winter, 2007). *Facing the Facts*. Retrieved April 17, 2007, from [http://www.kidney.ca/files/Kidney/aFacing\\_the\\_Facts\\_Winter\\_2007.pdf](http://www.kidney.ca/files/Kidney/aFacing_the_Facts_Winter_2007.pdf)
- Kidney Foundation of Canada (2006). *Living with Kidney Disease* (4th ed.). Retrieved April 17, 2007 from <http://www.kidney.ca/page.asp?intNodeID=20262>
- Kliwer, S. P., & Saultz, J. (2006). *Healthcare and spirituality*. United Kingdom: Radcliffe.
- Laubmeier, K. K., Zakowski, S. G., & Bair, J. P. (2004). The role of spirituality in the psychological adjustment to cancer: A test of the transactional model of stress and coping [Electronic version]. *International Journal of Behavioral Medicine*, 11(1), 48-55.
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.
- Lazarus, R. S., (1993). From psychological stress to the emotions: A history of changing outlooks [Electronic version]. *Annu. Rev. Psychol.*, 44, 1-21.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.
- Logan, S. M., Pelletier-Hibbert, M., & Hodgins, M. (2006). Stressors and coping of in-hospital haemodialysis patients aged 65 years and over [Electronic version]. *Issues and Innovations in Nursing Practice*, 56(4), 382-391.
- Lok, P. (1996). Stressors, coping mechanisms and quality of life among dialysis patients in Australia [Electronic version]. *Journal of Advanced Nursing*, 23, 873-881.

- Manitoba Health. (n.d.). *Manitoba health's vision, mission, and goals*. Retrieved August 9, 2007, from <http://www.gov.mb.ca/health/vision.html>
- Manitoba Health and Healthy Living. (n.d.). *Annual report 2006-2007*. Retrieved October 30, 2007, from <http://www.gov.mb.ca/health/ann/200607/annrpt0607.pdf>
- Manitoba Health News Releases. (2004, August 6). *Garden Hill renal health and treatment unit news release*. Retrieved August 19, 2007, from <http://www.gov.mb.ca/chc/press/top/2004/08/2004-08-06-02.html>
- Manitoba Health News Releases (2004, November 19). *St. Anthony's hospital renovation moves forward*. Retrieved August 19, 2007, from <http://www.gov.mb.ca/chc/press/top/2004/11/2004-11-19-02.html>
- Manitoba Health News Releases. (2005, August 29). *Premier announces \$1.75 million in upgrades to the Flin Flon general hospital*. Retrieved August 19, 2007, from <http://www.gov.mb.ca/chc/press/top/2005/08/2005-08-29-01.html>
- Manitoba Health News Releases. (2006, September 29). *Construction to begin on Thompson general hospital dialysis redevelopment*. Retrieved August 19, 2007, from <http://www.gov.mb.ca/chc/press/top/2006/09/2006-09-29-02.html>
- Manitoba Health News Releases*. (2007, April 19). *Misericordia Health Centre to undergo \$17.5 million redevelopment*. Retrieved August 19, 2007, from <http://news.gov.mb.ca/news/index.html?archive=2007-04-01&item=1483>
- Manitoba Renal Program. (n.d.a.). *About kidney disease*. Retrieved Mar 20, 2007, from [http://www.manitobarenalprogram.ca/about\\_kid/default.asp](http://www.manitobarenalprogram.ca/about_kid/default.asp)
- Manitoba Renal Program. (n.d.b.). *About us*. Retrieved Mar 20, 2007, from <http://www.manitobarenalprogram.ca/pages/aboutus.asp>
- Manitoba Renal Program. (n.d.c.). *Our history*. Retrieved Mar 20, 2007, from [http://www.manitobarenalprogram.ca/pages/aboutus\\_history.asp](http://www.manitobarenalprogram.ca/pages/aboutus_history.asp)
- Manitoba Renal Program. (n.d.d.). *Our mission, vision & goals*. Retrieved Mar 20, 2007, from [http://www.manitobarenalprogram.ca/pages/aboutus\\_mission.asp](http://www.manitobarenalprogram.ca/pages/aboutus_mission.asp)
- Marcus, C. C., & Barnes, M. (1996). Plenary Session: Understanding & Applying the Therapeutic Benefits of Gardens. In S. O. Marberry (Ed.), *Symposium*

- on Healthcare Design: Vol. 8. Journal of Healthcare Design* (pp. 23-29). Martinez, CA: Eusey Press.
- McSherry, W. (2006). *Making sense of spirituality in nursing and health care practice: An interactive approach*. Philadelphia: Jessica Kingsley.
- National Kidney Foundation (2004, December 31). *Facing the Facts*. Retrieved April 17, 2007, from [http://www.kidney.ca/files/Kidney/aFacing\\_the\\_Facts.Winter\\_2007.pdf](http://www.kidney.ca/files/Kidney/aFacing_the_Facts.Winter_2007.pdf)
- O'Brien, M. E. (1982). Religious faith and adjustment to long-term hemodialysis [Electronic version]. *Journal of Religion and Health*, 21(1), 68-80.
- Pederson, D. M. (1999). Model for types of privacy by privacy functions [Electronic version]. *Journal of Environmental Psychology*, 19, 397-405.
- Pedretti, E., & Soren, B. J. (2006). Reconnecting to the natural world through an immersive environment [Electronic version]. *Canadian Journal of Science, Mathematics and Technology Education*, 6, 83-96.
- Pearlin, L. I., & Schooler, C. (1978). The structure of coping [Electronic version]. *Journal of Health and Social Behavior*, 19, 2-21.
- Planetree. *Healthy Communities*. Retrieved May 20, 2008, from <http://www.planetree.org>
- Queensland Health (June 2000). *Changing models of care framework*. Retrieved June 12, 2008, from [http://www.health.qld.gov.au/publications/change\\_management/Care\\_Framework.pdf](http://www.health.qld.gov.au/publications/change_management/Care_Framework.pdf)
- Reinke, K., & Ryczek C. (2003). Nutrition; the nurturing aspects of food. In S.B. Frampton, L. Gilpin & P.A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 71-88). San Francisco: Josey-Bass.
- Saegert, S. (1976). Stress-inducing and reducing qualities of environments. In H.M. Proshansky, W.H. Ittelson, & L.G. Rivlin (Eds.), *Environmental Psychology: People and their Physical Surroundings* (2nd ed.). (pp. 218-223). New York: Holt, Rinehart and Winston.
- Scopelliti, M., & Giuliani, M.V. (2004). Choosing restorative environments across the lifespan: A matter of place experience [Electronic version]. *Environmental Psychology*, 24, 423-437.
- Seyle, H. (1974). *Stress without distress*. New York: Signet Books.

- Sheridan, M.J. (2008). The spiritual person. In E.D. Hutchinson (Ed.), *Dimensions of Human Behavior, Person and Environment* (3rd ed.). (pp. 183-224). Los Angeles: Sage.
- Siegel, K, Anderman, S. J., & Schrimshaw, E. W. (2001). Religion and coping with health-related stress [Electronic version]. *Psychology and Health, 16*, 631-653.
- Sohn, R. (2007). Patient-centered. *Oncology Issues, January/February*, 40-43.
- Stapleton, S. (2000). Powerlessness in persons with end-stage renal disease. In J. Fitzgerald Miller (Ed.), *Coping with chronic illness: Overcoming powerlessness* (pp. 215-263). Philadelphia: F. A. Davis Company
- Nurture by Steelcase (2007, April 25). Patient-centered care, the results are in. In *The nurture report*. Retrieved May 20, 2008, from : [http://nurture.steelcase.com/volume\\_i\\_issue\\_2\\_archives\\_NurtureReport.aspx?f=19746&c=46440](http://nurture.steelcase.com/volume_i_issue_2_archives_NurtureReport.aspx?f=19746&c=46440)
- Stewart-Pollack, J., & Menconi, R. (2005). *Designing for privacy and related needs*. New York: Fairchild.
- Stewart, M., Brown, J. B., Donner, A., McWhinney, I. R., Oates, J., Weston, W. W. et al. (2000). The impact of patient-centered care on outcomes [Electronic version]. *Journal of Family Practice, 49(9)*, 796-804.
- Stokols, D. (2003). The ecology of human strengths. In L. G. Aspinwall & U. M. Staudinger (Eds.), *A psychology of human strengths: Fundamentals questions and future directions for positive psychology* (pp. 331-343). Washington: American Psychology Association.
- Sptaz, M., & Storby, D. (2003). Human touch; the essential of communicating caring through message. In S. B. Frampton, L. Gilpin, & P. A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 105-116). San Francisco: Josey-Bass.
- Time and Day.com. *Sunrise and sunset in Winnipeg*. Retrieved April 21, 2007, from <http://www.timeanddate.com/worldclock/astronomy.html?n=265&month=6&year=2007&obj=sun&afl=-11&day=1>
- Timmers, L., Thong, M., Dekker, F. W., Boeschoten, E. W., Heijmans, M., Rijken, M., & Weinman, J. (2008). Illness perceptions in dialysis patients and their association with quality of life [Electronic version]. *Psychology and Health, 23(6)*, 679-690.

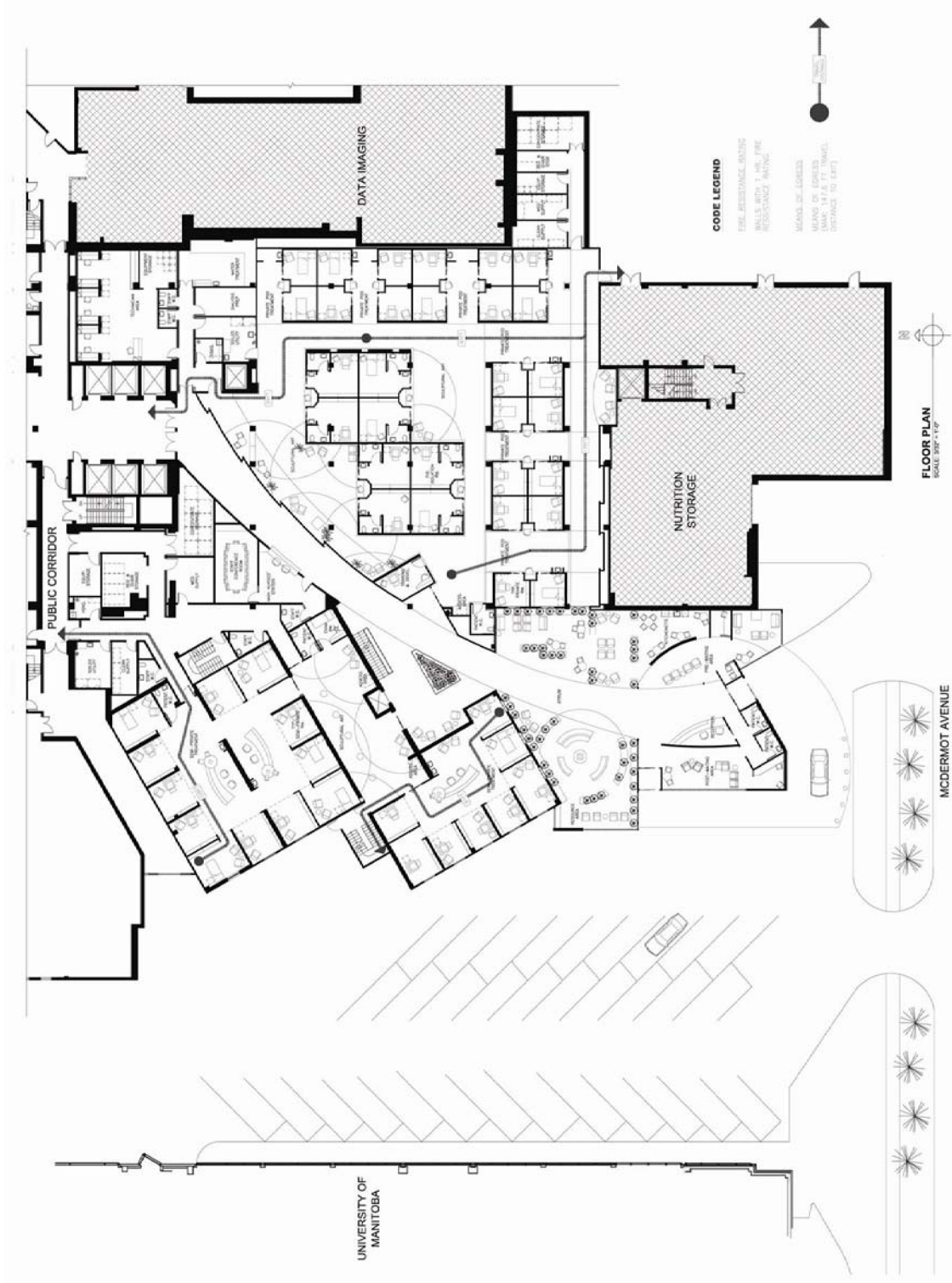


- Ulrich, R. S. (1990). Effects of healthcare interior design on wellness: Theory and recent scientific research. In S. O. Marberry (Ed.), *Innovations in healthcare design; selected presentations from the first five symposia on healthcare design* (pp. 88-104). New York: Van Nostrand Reinhold.
- Ulrich, R. S. (1999). Effects of gardens on health outcomes: theory and research. In C. C. Marcus, & M. Barnes (Eds.), *Healing gardens, Therapeutic benefits and design recommendations* (pp. 27-86). New York: John Wiley & Sons.
- Ulrich, R., & Gilpin, L. (2003). Healing arts: Nutrition for the soul. In S. B. Frampton, L. Gilpin & P. A. Charmel (Eds.), *Putting patients first: Designing and practicing patient-centered care* (pp. 117-146). San Francisco: Josey-Bass.
- Ulrich, R., Quan, X., Zimring, C., Joseph, A., & Choudhary, R. (2004). The Role of the physical environment in the hospital of the 21<sup>st</sup> century: A once-in-a-lifetime opportunity. Report to the Center for Health Design for the Designing the 21<sup>st</sup> Century Hospital project.
- University Hospital of Columbia and Cornell. *End stage renal disease (ESRD)*. Retrieved August 20, 1997, from the New York-Presbyterian Web site: [http://www.childrensnyp.org/mschony/fp/health/urology\\_endstage.html](http://www.childrensnyp.org/mschony/fp/health/urology_endstage.html)
- Walsh, J. (2008). The psychosocial person. In E.D. Hutchinson (Ed.), *Dimensions of human behavior, person and environment* (3rd ed.). (pp. 149-184). Los Angeles: Sage.
- Welch, J. L., & Austin, J.K. (2001). Stressors, coping and depression in haemodialysis patients [Electronic version]. *Journal of Advanced Nursing*, 33(2), 200-207.
- Winnipeg Regional Health Authority (n.d.a). About us. Retrieved March 20, 2007, from <http://www.wrha.mb.ca/about/aboutus.php>
- Winnipeg Regional Health Authority (n.d.b). Mission, vision & values. Retrieved March 16, 2007, from <http://www.wrha.mb.ca/about/mission.php>
- Wright, R., Sand, P., & Goodhue, L. (1966). Psychological stress during hemodialysis for chronic renal failure. *Annals of Internal Medicine*, 64, 611-621.
- Young, C., & Koopsen, C. (2005). *Spirituality, health, and healing*. New Jersey: Slack.

Zimring, C. (1982). The built environment as a source of psychological stress: Impacts of buildings and cities on satisfaction and behavior. In G.W. Evans (Ed.), *Environmental stress* (pp. 151-178). New York: Cambridge University Press.

## **Appendix A:**

**[Life Safety Plan]**



## **Appendix B:**

**[University of Manitoba Ethics Approval]**



UNIVERSITY  
OF MANITOBA

OFFICE OF RESEARCH  
SERVICES  
Office of the Vice-President (Research)

CTC Building  
208 - 194 Dafoe Road  
Winnipeg, MB R3T 2N2  
Fax (204) 269-7173  
www.umanitoba.ca/research

**APPROVAL CERTIFICATE**

23 February 2007

**TO:** **Monique Gougeon** (Advisor C. Karpan)  
Principal Investigator

**FROM:** **Wayne Taylor, Chair**  
Joint-Faculty Research Ethics Board (JFREB)

**Re:** **Protocol #J2007:019**  
**"Exploring Culture, Spirituality and Human Wellness: Re-designing the  
Renal Dialysis Unit at the Health Sciences Centre"**

Please be advised that your above-referenced protocol has received human ethics approval by the **Joint-Faculty Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

**Please note:**

- if you have funds pending human ethics approval, the auditor requires that you submit a copy of this Approval Certificate to Kathryn Bartmanovich, Research Grants & Contract Services (fax 261-0325), including the Sponsor name, before your account can be opened.
- if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.

The Research Ethics Board requests a final report for your study (available at: [http://umanitoba.ca/research/ors/ethics/ors\\_ethics\\_human\\_REB\\_forms\\_guidelines.html](http://umanitoba.ca/research/ors/ethics/ors_ethics_human_REB_forms_guidelines.html)) in order to be in compliance with Tri-Council Guidelines.

*Bringing Research to Life*



CTC Building  
208 - 194 Dafoe Road  
Winnipeg, MB R3T 2N2  
Fax (204) 269-7173  
[www.umanitoba.ca/research](http://www.umanitoba.ca/research)

UNIVERSITY OF MANITOBA | OFFICE OF RESEARCH SERVICES  
Office of the Vice-President (Research)

**AMENDMENT APPROVAL**

09 March 2007

**TO:** Monique Gougeon  
Principal Investigator

**FROM:** Wayne Taylor, Chair  
Joint-Faculty Research Ethics Board (JFREB)

**Re:** Protocol #J2007:019  
**"Exploring Culture, Spirituality and Human Wellness: Re-designing the Renal Dialysis Unit at the Health Sciences Centre"**

---

This will acknowledge your e-mail dated February 9, 2007 requesting amendment to the above-noted protocol.

Approval is given for this amendment. Any other changes to the protocol must be reported to the Human Ethics Secretariat in advance of implementation.

*Bringing Research to Life*

## **Appendix C:**

**[HSC Ethics Approval]**





Health Sciences Centre  
Winnipeg

Office of the Director of Research

Dial Direct 204-787-2404  
Fax 204-787-4547

March 9, 2007

Ms Monique Gougeon  
Principal Investigator

Dear Ms Gougeon

**RE: EXPLORING CULTURE, SPIRITUALITY AND HUMAN WELLNESS: RE-  
DESIGNING THE DIALYSIS UNIT AT THE HEALTH SCIENCES CENTRE.**

**ETHICS #: J2007:019 RIC #: RI07:021**

The above-named protocol, has been evaluated and approved by the HSC Research Impact Committee.

The Department of Research wishes you much success with your study.

Sincerely

Karen Shaw-Allan  
Research Protocol Officer  
Health Sciences Centre

cc: Director of Research  
Ancillary Services, Finance Division

M57 - 820 Sherbrook Street, Winnipeg, Manitoba Canada R3A 1R9

[www.hsc.mb.ca](http://www.hsc.mb.ca)

An operating  
division of the



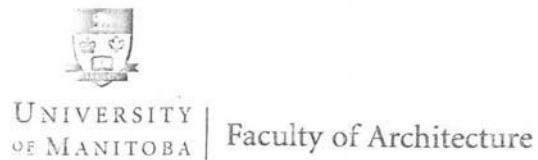
Affiliated  
with the



UNIVERSITY  
OF MANITOBA

## **Appendix D:**

**[Information Letter to HSC Dialysis Head Nurse]**



AP-04

Department of Interior Design  
201 Russell Building  
Winnipeg, Manitoba  
Canada R3T 2N2  
Telephone (204) 474-9458  
Fax (204) 474-7532

Dear Head Nurse:

My name is Monique Gougeon and I am a graduate student in the Department of Interior Design at the University of Manitoba.

I am conducting a study to complement the published articles concerning dialysis treatment and would like your patients input. I am developing a hypothetical space that would meet both physical and mental needs of family and patients.

If patients agree to partake in this study, they will be asked to fill out a questionnaire of 2 pages that takes approximately 5 minutes to complete.

The questionnaire is anonymous and all responses will be used for the sole purpose of the study. Patients name will not appear on the questionnaire or in the study.

If you have any questions or concerns, please feel free to reach me at the following telephone number and address, or my supervisor, Dr. Cynthia Karpan at (204)

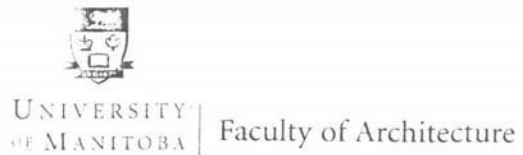
Thank you,

Monique Gougeon

## Appendix E:

**[Participants' package]**

Cover Letter, Patient Consent Form, and Questionnaire



AP-03

Department of Interior Design  
201 Russell Building  
Winnipeg, Manitoba  
Canada R3T 2N2  
Telephone (204) 474-9458  
Fax (204) 474-7532

Dear Madame/Sir:

My name is Monique Gougeon and I am a graduate student in the Department of Interior Design at the University of Manitoba.

I am conducting a study to complement the published articles concerning dialysis treatment and would like your input. I am developing a hypothetical space that would meet both the physical and mental needs of family and patients.

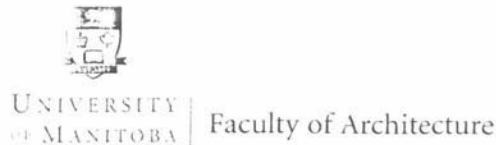
If you agree to partake in this study, you will be asked to fill out a questionnaire of 2 pages that takes approximately 5 minutes to complete.

The questionnaire is anonymous and all responses will be used for the sole purpose of the study. Your name will not appear on the questionnaire or in the study.

If you have any questions or concerns, please feel free to reach me at the following telephone number and address, or my supervisor, Dr. Cynthia Karpan at (204)

Thank you,

Monique Gougeon



AP-05

Department of Interior Design  
201 Russell Building  
Winnipeg, Manitoba  
Canada R3T 2N2  
Telephone (204) 474-9458  
Fax (204) 474-7532

Consent Form

Research Project Title: Exploring Culture, Spirituality and Human Wellness: Re-designing the Renal Dialysis Unit at Health Sciences Centre.

Researcher: Monique Gougeon, Graduate Student from the University of Manitoba in the department of Interior Design.

*This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.*

- I. The purpose of this research is to gather information on dialysis patient's experience at the Health Sciences Centre and their Spirituality. This information will be used to design a hypothetical environment that takes into account spiritual, cultural and human wellness.
- II. You will be asked a few questions regarding demographics, experience dialyzing and spirituality and how it plays a role in your experience when visiting the dialysis centre.
- III. Any information received from you will be kept anonymous. You will not be identified when the results are discussed.
- IV. Information concerning the research finding and how the information gathered from the interview will be shared with the interviewee. A copy of the Executive Summary will be mailed to the interviewee if requested by providing her or his mailing address on the questionnaire.

*Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researches, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.*

Researcher: Monique Gougeon  
(204)

Supervisor: Dr. Cynthia Karpan  
(204)

This research has been approved by the Joint-Faculty Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at (204) 474-7122, or e-mail [margaret\\_bowman@umanitoba.ca](mailto:margaret_bowman@umanitoba.ca). A copy of this consent form has been given to you to keep for your records and reference.

\_\_\_\_\_  
Participants Signature Date

\_\_\_\_\_  
Researcher Signature Date

Questionnaire

Demographics

1. Gender (please check one): male  female
2. Age: \_\_\_\_\_ years old
3. What city and province do you reside in? city: \_\_\_\_\_ province: \_\_\_\_\_  
(if the city is Winnipeg, please go to question 3A, otherwise proceed to question 4).  
3A: Did you move to Winnipeg to accommodate your dialysis treatment? Y N
4. What mode of transportation do you use to get to and from your dialysis treatments? (circle all that apply).  
a. Personal vehicle      c. Other: \_\_\_\_\_  
b. Public transit  
(If you have answered a or c, please proceed to question 4A, otherwise go to question 5).  
4A. Do you require parking? Y N
5. What caused your kidney disease?  
a. Type 2 diabetes  
b. High blood pressure (hypertension)  
c. Other: \_\_\_\_\_  
d. Unknown  
(if you have circled response d please go to question 6, otherwise proceed to question 5A).  
5A. Is your response to question 5 a result of family medical history? Y N
6. What is your ethnicity?  
a. African American      h. Latin American  
b. Arab      i. Native (First Nations, Métis, Inuit)  
c. Caucasian      j. South Asian (East Indian, Pakistani, Sri Lankan etc.)  
d. Chinese      k. South East Asian (Cambodian, Indonesian, Laotian, Vietnamese etc)  
e. Filipino      l. West Asian  
f. Japanese      m. Other: \_\_\_\_\_  
g. Korean



Experience

7. Length of time per treatment? \_\_\_\_\_
8. What provides you physical comfort while receiving dialysis? (select all that apply)
- a. Sitting
  - b. Lying down
  - c. Blanket
  - d. Pillow
  - e. Other: \_\_\_\_\_
9. What provides you with emotional comfort while receiving dialysis? (select all that apply)
- a. Reading
  - b. Sleeping
  - c. Talking to your neighbour
  - d. Watching Television/Movie
  - e. Radio
  - f. Darkness
  - g. Light/Sunshine
  - h. Other: \_\_\_\_\_
10. Do you dialyze yourself, or require assistance from a nurse? \_\_\_\_\_
11. How would you rate the hospital environment in terms of providing adequate privacy on a scale to 1-10 (1 = poor; 10 = excellent)
- 1    2    3    4    5    6    7    8    9    10

Spirituality

12. Do you feel spiritual through: (circle all that apply)
- a. Music
  - b. Nature
  - c. Images
  - d. Prayer
  - e. Other: \_\_\_\_\_
  - f. None
13. For each item circled in Question 12, indicate below whether the activity is best suited in a public or private area.
- a. Music – private / public
  - b. Nature – private / public
  - c. Images – private / public
  - d. Prayer – private / public
  - e. Other: \_\_\_\_\_ - private / public

AP-01

If you wish to receive an executive summary of the practicum results, please indicate your address and a copy of the executive summary will be mailed to you:

---

---

---

---

---

## **Appendix F:**

**[Executive Summary]**

December 1, 2008

Dear participant,

In the month of March 2007, I spent time in the two dialysis units at Health Sciences Centre Winnipeg (HSC); Sherbrook and Central, handing out a questionnaire. The purpose of this research was to gather demographic, experiential and spiritual information from dialysis patients. The data collected was used to inform the hypothetical design of an interior environment that supports the needs of dialysis patients receiving treatment at the Health Sciences Centre.

Attached is a copy of the executive summary as per your request, I hope you will find the summary useful. The information provided was most valuable and I thank you for taking the time in this matter.

If you should have any further questions about this study and wish to discuss this further, please feel free to contact me via phone or email.

Regards,

Monique Gougeon, B.Env D., M.I.D.  
XX XXXXXXXX XXX,  
XXXXXXXXXX, XXXXXXXXX  
XXX XXX  
Phone: (XXX) XXX-XXXX  
Email: XXXXXXXXXXXXXXXX@XXXXXX.XX

Dialysis at Health Sciences Centre (HSC) is comprised of two units, distinctively separate from one another yet part of the same organization. With the rapid increase of End-Stage Renal Disease (ESRD), HSC has had to adapt and expand in ways that have not been conducive to the health and well-being of its patients. The purpose of the survey administered through mid March of last year was to get a better understanding of the function and needs of patients.

## **Results**

---

### **Demographics**

A total of 62 questionnaires were administered within both dialysis units, therefore having questioned 22% of HSC's dialysis population (36 participated from Sherbrook and 26 users from Central). Ages varied from 20 to 90 years of age, however the predominant age group was from 45-65.

The majority of the dialysis population surveyed reside in the city of Winnipeg, however, a few patients commute to the city in order to receive treatment. It was found that the majority (56%) of users utilized Handi-Transit services to get to and from treatment. The second highest mode of transportation used was personal vehicles.

A diverse population exists within the province of Manitoba and this can also be seen within the hospital environment, HSC dialysis is no different and encompasses a wide variety of people. The two (2) major groups are of Caucasian and Native (First Nations, Métis, Inuit) descent (see Figure 1).

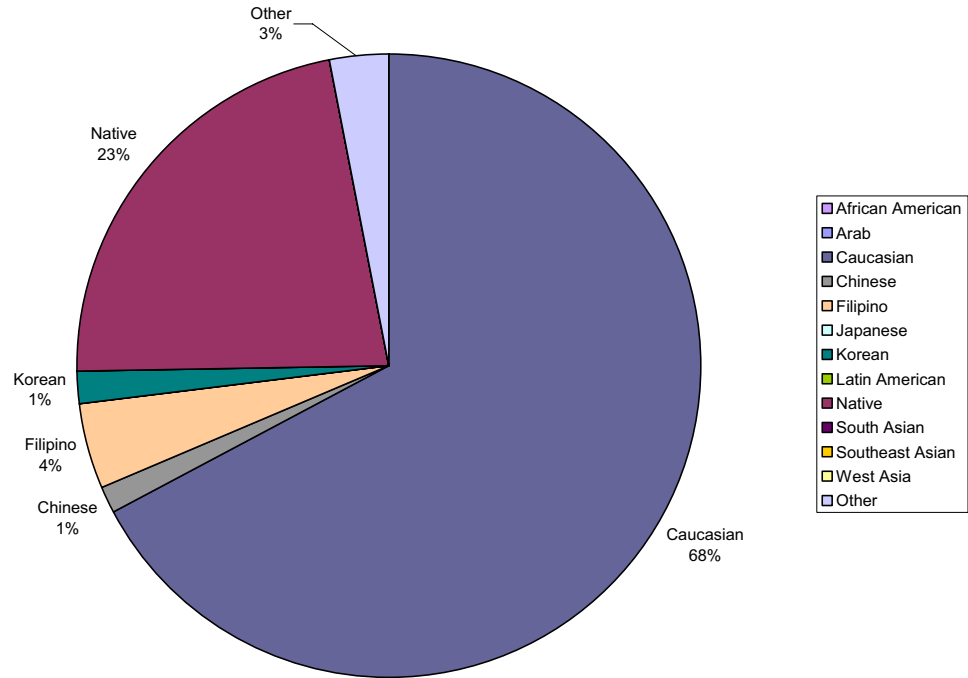


Figure 1. Ethnic diversity

### Experiential

With an average treatment of 3.8 hours per session, much time is spent within this environment. The physical comfort preferred among patients was equally distributed between pillow, blanket and lying down (see Figure 2). Yet, in terms of emotional comfort, patients occupied their time by watching television/movie. (see Figure 3).

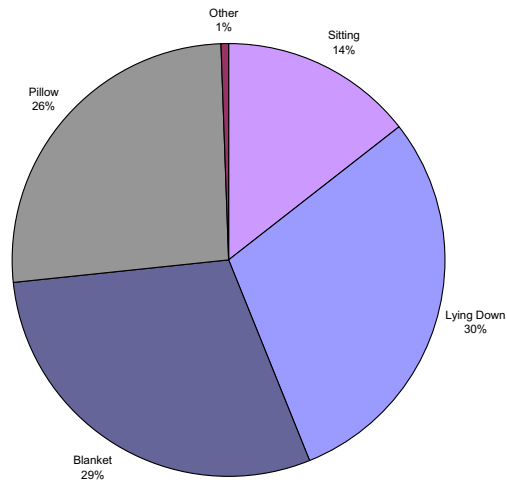


Figure 2. Physical Comforts

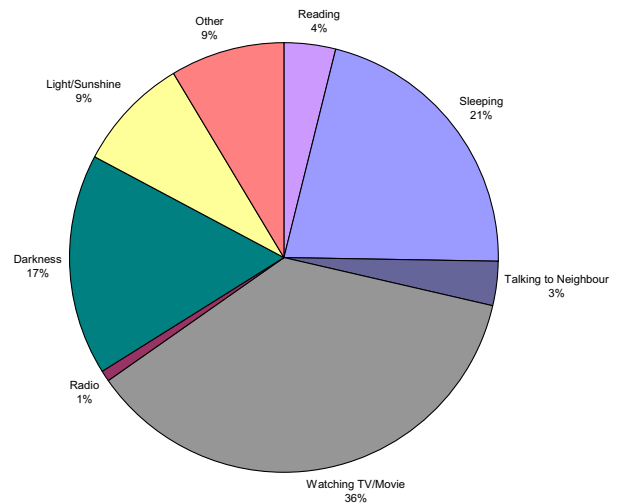


Figure 3. Emotional Comforts

In terms of privacy, the average response to whether the hospital environment provided adequate privacy was 7.0 (0 being poor and 10 being excellent). Although the average was 7.0, responses included both extremes (as high as 9, as low as 2).

### Spiritual

Spirituality can be interpreted through many different methods, yet users felt spiritual most through: Prayer (31%), Nature (23%), and Music (22%) (see Figure 4).

When asked if these activities were private or public functions, equal response were given to all categories with the exception of Prayer which was predominantly viewed as a private activity. (see Figure 5).

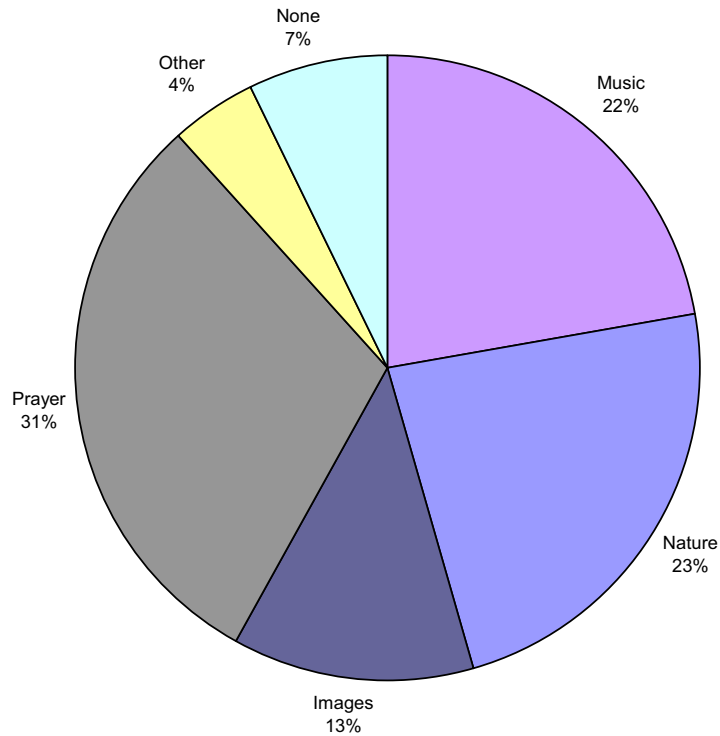


Figure 4. Spiritual preferences

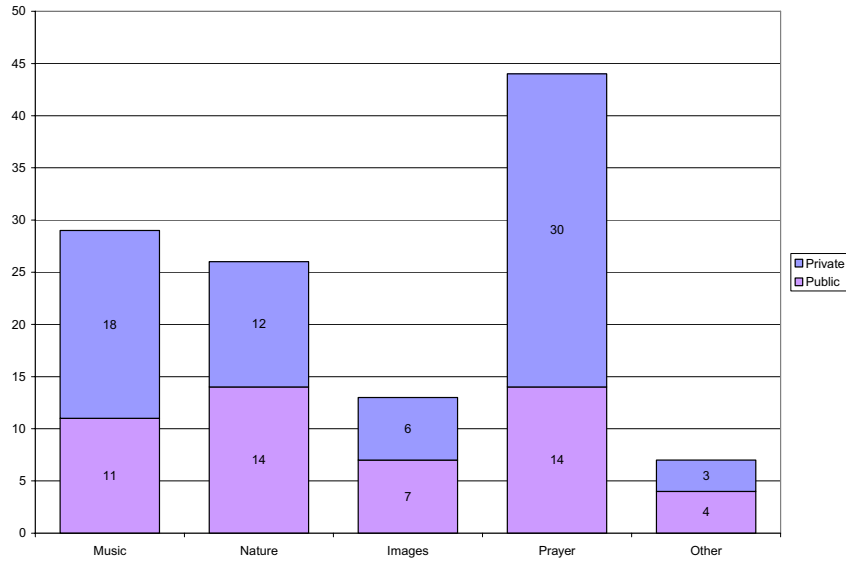


Figure 5. Private vs. Public spiritual preferences

The aim of this research-based design process was two fold: (1) to create greater awareness of therapeutic and restorative environments and their impact on people undergoing dialysis and (2) to promote and encourage facilities to design and build in this fashion thereby positively impacting the lives of dialysis patients.

Through the implementation of privacy concepts, the integration of natural and spiritually evocative elements, positive distractions, and systems that enable patient control; rejuvenation, contemplation, and solitude are all able to take place. Spaces that integrate these concepts provide a thoughtfully designed restorative environment for people on dialysis. In turn, the restorative environment can provide stress reduction, aid in coping with and acceptance of the disease, foster holistic healing, and most importantly, improve the overall quality of life for its users.

Attached are a few perspectives of the final design.





Atrium facing reception



Corridor leading into treatment area