

"BREAKING OUT OF THE MODERNIST CLOISTER":

**A Restorative Approach to
Community Health Care Facility Design**

by

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Abstract.

The aim for this project was to explore a more restorative manner of health care facility design that would manipulate the environment in order to reduce stress, prevent illness, and promote wellness. 'Restorative Design' has been applied in the public realm but is not commonly seen on the hospital landscape. Regional hospitals across Canada are created almost entirely for function. Recent studies on the potential impact of design, however, may prove beneficial in reducing hospital stays, reducing absenteeism, increasing productivity, and, quite simply, improving the health of the community. This project looked at available data, studies, and expert opinions and attempted to develop a framework for restorative design as applied to the hospital landscape.

Four global principles for restorative design were identified (legibility, inherent familiarity, accessibility, and access to natural elements). The project then went further to try and delineate specific needs for specific groups. Visitors, staff, patients, and the surrounding community were all considered integral parts of the open space and figured highly in the final design and program. Both global and specific needs for stress reduction were translated into several very specific design implications that could be translated into design and programming.

The project explored unconventional, "restorative" means of evaluating the success or failure of design moves. Most notably, an unconventional large open space was laid out for several reasons: it provided the best chance for enhancing biodiversity on the site, it was accessible (visually and/or physically) by a variety of users and its creation offered several programming possibilities. A proposal was put forth for shared management of the open space with a local volunteer stewardship group as a way to offset costs as well as enhance a sense of community ownership.

It is important to note that only one vision for this hospital site has been proposed here. The developed principles and design implications, however, may be taken and applied to any given site (public or private) to develop a landscape that actively participates in the healing process.

The following document, made up of both written text and graphic images, aims to explain and illustrate the design process and the design proposals put forth in this project. Several of the original drawings were done at much larger scales and many were illustrated in color. A CD-R version of this document has been submitted and may be useful to better visualize some of these graphics.

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CHAPTER I.

Challenging the Traditional Approach to Hospital Design

1.1. Preface.

The translation of art and science into meaningful physical form underscores the role of landscape architecture in modern design. Drawing from environmental, psychological and medical research, it is possible to create space that can profoundly influence the collective and individual human condition. While a commitment to advancing aesthetics and style remains a strong component of landscape architecture, there is significant opportunity to design for fundamental social, ecological, and economic health and sustainability.

Recognition of the ability of environment to influence, negatively or positively, health and well-being has resulted in a surge of inquiry over the last forty years into the potential for restorative design. Restorative design takes the position that manipulation of environmental cues can reduce stress, promote well-being, and assist in healing both the physical and psychological being. Increasing awareness of the powerful effect of stress has triggered significant research into means by which form of place can reduce and manipulate stressors, and subsequently ameliorate human condition.

Stress is necessary to sustain life. Both positive and negative demands (external and internal) intertwine to create a dynamic state of being. Problems arise as a result of over-exposure to stress without opportunity for respite and restoration. Stress is both additive and cumulative. Unrelenting and prolonged, a state of crisis is reached and symptoms (physical and/or psychological) appear.

Stress is considered a major contributing factor not only to mental illness, but many physical conditions. Coronary artery disease, cancer, respiratory disorders, multiple sclerosis, diabetes, rheumatoid arthritis, alcoholism, drug abuse, and family discord and violence have all been linked directly or indirectly to stress. The economic burden of increased stress is revealed in increased health insurance outlays, burnout, absenteeism, and reduced productivity.

Hospitalized patients experience considerable stress. "Apart from the pain and other pressures associated with illness, major stress is produced by poorly designed healthcare facilities that typically are noisy, invade privacy, or interfere with social support" (Ulrich, 1992). The issue of stress in the health care facility is not limited to patients. Staff members (faced with lack of control and high responsibility) are also victim to high measures of daily stress, often leading to burnout and illness (Ulrich 1992). Addressing the needs of staff, in particular caregivers, in the hospital environment will necessarily have a strong impact on patients.

Stress reduction is the primary goal of restorative design. Applied to both public and private situations, restorative design utilizes the knowledge of shared human preferences for certain conditions and environments to create spaces that maximize comfort, security and

familiarity. Kaplan and Kaplan's model of restorative environments (1998), Ulrich's theory of supportive design (1992), E.O. Wilson's description of the human need for contact with nature (1993), and Appleton's theory of fundamental landscape preferences (1975) are but a few of the significant works giving form and direction for restorative design.

Application of restorative design principles to health care facilities has been significant in the areas of paediatrics, geriatrics (Mooney and Nicell 1992), psychiatry (Paine 1998) and surgery/cardiac (Ulrich 1979, 1984). A unique health care facility challenge that has been largely avoided, however, is the design for multiple users as found in community or tertiary hospitals. Guidelines for siting and design of larger facilities are almost exclusively limited to the built form as it relates to function (Cooper Marcus and Francis 1998).

"What is needed is a shift in thinking that requires hospital designers to re-examine the hospital environment in the same way that designers of playgrounds, mental health care facilities, and housing for the elderly might do. How can these spaces be designed and managed so as to maximize benefits to the intended users?" (Cooper-Marcus and Francis, 1998, p. 314).

The creation of form that provides a variety of options for stress reduction, that spans the wellness-illness continuum, and that recognizes a diversity of users (patients, visitors, workers, and community members) is the focus of this inquiry. The goal of design will be to vision a health care environment that is holistic and healing at the broadest sense and that provides shared opportunities for stress reduction for hospital staff, neighboring community members, as well as patients and visitors.

1.2. Introduction.

The awareness by designers of the power of landscape to be restorative to the human condition has resulted in a revisitation of the manner in which schools, senior's facilities, and psychiatric hospitals are designed. Private homes and gardens are more and more the centre of "therapeutic design". Western community hospitals, however, remain in the image that has plagued them for fifty plus years. Inward-looking and disconnected from the community, hospitals remain a frightening destination for most of society (Cooper Marcus and Francis, 1998). Token healing gardens are retrofitted for specific patient populations (as economics permit), but, society is slow to re-image the modern day hospital in a manner that is humanistic and socially relevant. An inwardly focused design works contrary to desires to move health care into the community to be embraced in a larger way by individuals and by communities. Designing for the promotion, maintenance and enhancement of health on the grounds of health care facilities demands a stronger connection with the surrounding community in order to disrupt the prevailing image of hospital as a place to house the sick. Modern day sensibilities and limitations require a more integrated, sustainable and democratic use of space; in this case a space that has limitless opportunities to benefit all members of the public as they fluctuate across the wellness-illness continuum.

Our modern history of hospital siting and design has focused an inordinate amount of time and energy on building footprints and inward-looking programs. The hospital landscape is largely inaccessible, secondary, "decorated" grounds. This thesis suggests this to be a waste, not only of potential public green space, but, more importantly, of missed opportunities to bring communities and individuals together in an environment where the things that divide us melt under the weight of those that connect. It is the contention of this inquiry that the entire grounds of the facility should be designed as a restorative landscape at the outset; a restorative landscape that maximizes the power of natural and community resources, and provides benefit to all members of society, at any stage of wellness.

Not only have we missed opportunities to connect hospitals with schools, churches, and various community amenities, but also the potential (particularly in rural/suburban areas) to couple hospital site design with conservation efforts is overlooked. Health care facilities, with their often-generous tracts of land, can be designed to foster regional desires for habitat protection, stream reclamation, and landscape protection and enhancement. Site-specific analysis of all proposed sites (and for sites reviewed for retrofitting) may reveal possibilities to connect hospital space with bird migration routes, for example, adding not only the restorative capabilities of the garden, but to the betterment of the environment at large.

Situated in the midst of most communities, a health care facility should stand as a precedent and an example of restorative site planning and design. Heightened used of hospital environs by community members should increase not only stewardship of the landscape, but also the sense of being "caretakers of our neighbors". If one's only exposure to those aging, suffering, struggling, or dying is a quick glimpse out the car window, how can community empathy possibly be enhanced? In contrast, if patients share space with schoolchildren, daily joggers, and caretakers of habitat and landscape, the opportunities for interaction, understanding, and action will necessarily increase.

1.3. Project Goal and Objectives.

a) Following the belief that :

1. Design of the environment can have a powerful impact on individual and collective health and well-being;
2. Health care facilities should be designed as holistic, restorative landscapes, not patchworks of isolated and introspective spaces, and
3. Health care facilities should be designed as a component of the larger community, recognizing natural and social interrelationships;

the goal of this project is to design and program a community health care facility that supports and enhances the health and well-being of all users.

b) Objectives.

- To understand existing restorative design principles and objectives.
- To understand the evolution of community hospital design.
- To identify principles of restorative design that may be applied to health care facility design.
- To illustrate, through design and programming, a vision for application of restorative design principles to the case study hospital site.

1.4. Project Approach.

This project began with the observation that hospitals, by design, act contrary in efforts to heal and promote health. This observation is the result of the author's 17 years working in the health care field as a registered nurse (primarily in emergency and trauma care, cardiac and intensive care, cancer, infectious diseases, and acute burns). An ever-present barrier to good care was and continues to be the physical environment of the hospital itself.

The author accepts that a strength of this project is this voice that draws from two worlds—health care and design. The author also accepts that this voice has inherent biases based on strong personal experience and so will rely heavily on the information supplied by multiple experts from varied disciplines (literature review):

- Behavioural Sciences
- Ecological Sciences
- Environmental Psychology
- Landscape Architecture
- Medical Sciences
- Planning

Following the literature review, an effort will be made to delineate certain principles of restorative design that could be used to explore a more successful approach to hospital design. This initial part of the project aims to create an overall framework for design. These theoretical findings and assumptions were used to create a conceptual plan for the proposed hospital site.

Design process and methodology is illustrated in Figure 1-1 on the following page.

1.5. Site Introduction.

In June of 2001, the Ministry of Health gave the green light to a new regional hospital to be built in Abbotsford, British Columbia. This municipality, the 5th largest in British Columbia is located approximately 40 miles east of Vancouver. Fifteen years in the planning, the estimated date of completion for the new hospital is 2004. A 300-bed regional acute care hospital is being planned (in conjunction with a new regional cancer care clinic) in an effort to relieve the stress on tertiary centres in Vancouver, and to bring health care closer to home for the growing population of the Central Fraser Valley. The hospital site sits adjacent to the Trans-Canada Highway on a 10.4 ha lot currently surrounded primarily by residential and institutional buildings.

DESIGN THESIS METHODOLOGY
"Exploring the Restorative Hospital Landscape"

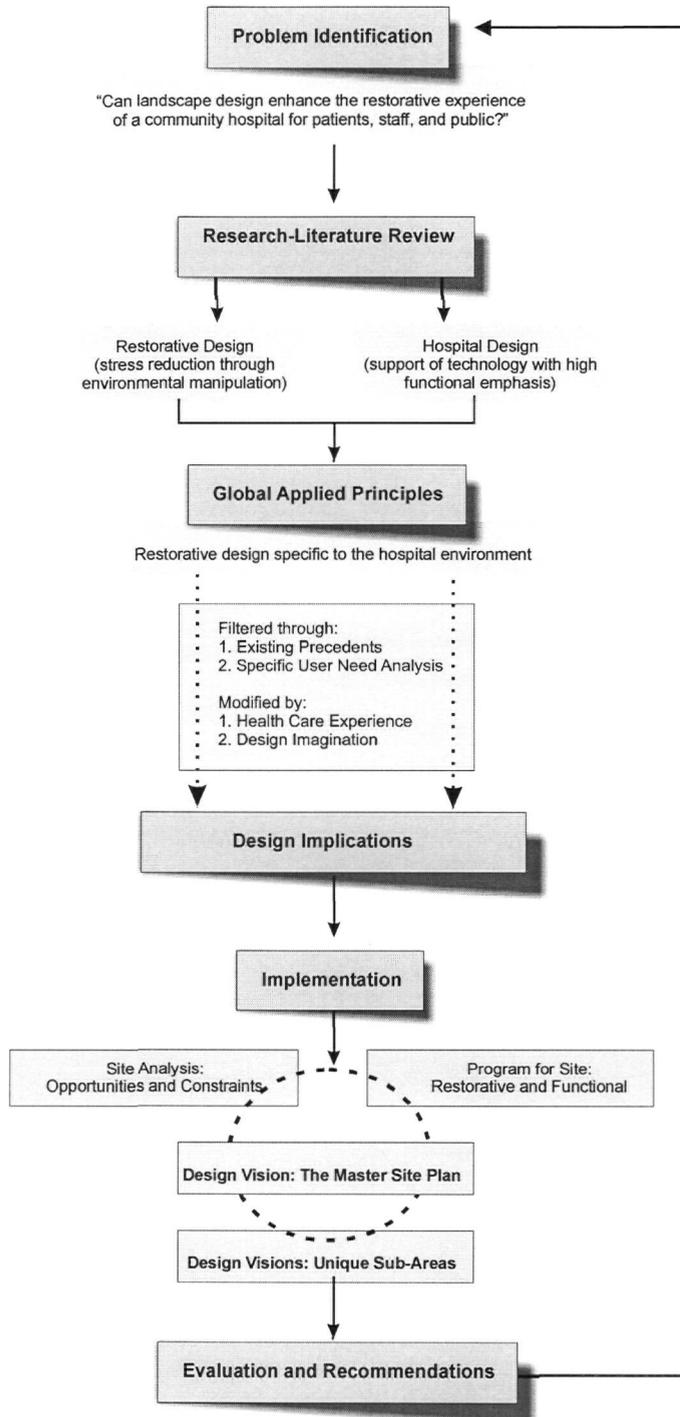


Figure 1-1 Design Methodology Flow Chart

CHAPTER II.

Restorative Design: Literature Review

2.1. Definition.

Restorative design utilizes the healing power of landscape to improve the human condition. A restorative, therapeutic approach to a place assumes a perceived impairment of physical, mental or emotional well being and a desire, through design, to mend, renew, and/or heal. This approach to design accepts the widespread existence of stress in daily life and its potentially hazardous effects on health and well being. Designing in a manner that reduces stress and promotes well being is the primary objective.

"ther·a·peu·tic" 'pyü-tik"	Function: adjective Etymology: Greek <i>therapeutikos</i> , to attend, treat Date: 1646 Definition: PROVIDE/ASSIST IN A CURE, take part in healing process
"re·store" "ri-'stOr"	Function: transitive verb Etymology: from Latin <i>restaurare</i> to renew, rebuild Date: 14th century Definition: GIVE BACK, RETURN, to bring back to a former, original state

The hospital is utilized as a place of healing, a place to cure and mend. It also serves, for many, as a place to spend final years in comfort with the help of others. Patients have the responsibility to learn both from caregivers and from their inner selves independence in the face of newly diagnosed diseases or injuries. They have the responsibility to find wholeness out of broken pieces when faced with tragedies and medical hardships. Families and visitors affected by interactions with loved ones must find a new sense of balance in order to cope with tragedy or increased responsibilities. Health care providers, faced with crises in management, staffing, and patient numbers must somehow draw strength from the hospital environment (Cooper-Marcus and Barnes, 1999).

It should be noted that restorative design is poorly understood by the public and, as well, by many designers. The assumption is that the goal is simply to create a serene atmosphere suitable for tranquility and harmony. The assumption is that restorative design is primarily concerned with gardens and greenery. While these may be important elements in the design, the active design for stress reduction involves far more complex issues, and touches on a variety of design issues including, but not limited to:

- urban and rural design, community management and planning, sustainability issues, road and built environment construction, open space landscape preferences.

Restorative health care facility design aims to create an environment that actively assists health care providers, visitors, and patients in

relieving stress, increasing comfort, reducing fears, and facilitating a sense of well-being across groups of users. The restorative landscape may occur naturally or may be designed, with varying degrees of intervention visible (Kaplan, Kaplan and Ryan, 1998). Key elements of restorative design, as derived from a review of available literature, are outlined below.

A restorative landscape requires the presence of certain significant elements, most notably:

- **Inherent Familiarity:** Designing for the restorative place demands recognition that across cultures, humans have an inherent connection to certain landscape types and forms. These archetypal landscapes can be utilized to create a place that is fundamentally comfortable, familiar, and healing (Condon, 1988).
- **Legibility:** A legible design allows the user to know instantly where he/she is in the world, and to feel comfort in that knowledge. This includes simple wayfinding and sense of safety and security, but also involves a greater sense of place and belonging, as will be discussed (Kaplan, Kaplan and Ryan, 1998, Lynch, 1960).
- **Natural elements:** As the research will show, physical and visual access to nature (vegetation, habitat, water, etc.) has significant restorative properties (Kaplan, Kaplan and Ryan, 1998, Kellert and Wilson, 1993, Ulrich 1992, et al.).
- **Accessibility:** Both perceived and actual accessibility are required for a design to be truly restorative. Accessibility includes universal design principles. It also includes issues of visual versus physical access (Lewis, 1996). Access by surrounding community members should be addressed as a means of enhancing social support (Ulrich, 1992). A restorative hospital site enables on-site access for patients, visitors and staff as well as a strong social and environmental connection to its surroundings, thereby enhancing the possibility for social support and a sense of belonging (Ulrich, 1992).

2.2. Inherent Familiarity: The Archetypal Landscape.

The geographer Jay Appleton, in The Experience of Landscape, identified a fundamental preference in landform type: the prospect-refuge scenario. Landscapes that allow simultaneously an opportunity to see as well as hide are pleasing and comfortable. Ideally occurring in combination, prospect (mountain, sea) and refuge (cave, forest) were considered important givers of power to the individual (Appleton, 1975).

Certain landform configurations serve as archetypes, still eliciting preference although largely void of their primary function. Prospect and refuge, important when man lived as predator and prey, remains highly desirable. The universal attractiveness of parkland or lawn is said to evolve from the savannah, man's early habitat (Fleissner et al, 1999). Situated on the edge of a forest, man was secure in the knowledge that retreat into the woods was possible, as was exploration into the savannah for hunting and gathering. The fertile river valley, as the cradle of early civilizations, is seen to give a region power and ability and

abundance. Meadows, ravines, caves, and hillsides are all landform archetypes capable of eliciting various fundamental emotional responses.

Christian Norberg-Schulz, an architectural theorist, referred to domain, path and node as archetypal elements of human settlement (Norberg-Schulz, 1985). Kevin Lynch, an urban theorist, wrapped his assessment of archetypal form around the task of legibility and imageability; by identifying districts, paths, nodes, edges, and landmarks he was primarily concerned with wayfinding and memory (Lynch, 1960). Stephen and Rachel Kaplan (environmental psychologists), along with Robert Ryan (landscape architect), explained preference in terms of information gathering (Kaplan, Kaplan and Ryan, 1998).

The shared belief of these authors is that man is innately drawn to certain landscapes: optimal conditions become hardwired in our collective brains and exposure elicits an expected response. Attempting to "create" therapeutic spaces without the recognition of powerful inherent preferences sets up an impossible task for a designer.

Patrick Condon, landscape architect and professor at the University of British Columbia describes the volumetric open space, or clearing, as being perhaps the earliest constructed landscape (Condon, 1988). Allowing built structures (and/or mature trees) to create true spaces with depth and form is in sharp contrast to what Condon describes as the "typical Cubist leftover spaces created by situating modern buildings in the centre of landscapes" (Condon, 1988). Humans prefer and are more comfortable in landscapes that have recognizable volume and are not merely edges (Condon, 1988). Carving out settlements in the heart of forests, western ancestors were able to surround themselves with natural buffers while creating an inward focused community. Early Medieval hospitals directed views and activity toward an internal cloister space, protected from the harsh realities of the outside world (Fairbrother, 1956). Essentially closed to the community, these clearings, or volumetric spaces were designed to maximize protection from external social and natural elements. Views were purposefully focused inwards (Fairbrother, 1956).

A sheltered and protected space, whether formed by natural or built forms, continues to be sought out by humans seeking retreat in a variety of forms: the fenced backyard, the mountain cabin, the sheltered ski lodge and the courtyard house. Housing communities are often designed around a central, cloistered space. Private, internal spaces within gardens are favored. While the inwardly focused clearing does not meet the needs of all users at all times, it does present as a significant form for introspection, reflection, and interaction.

A contrast to the sheltered clearing is the image of the open pastoral landform, derivative of hunting and gathering as well as farming traditions. Highly preferred across cultures by humans, this landscape offers comfort on a variety of levels. Apart from the inherent prospect-refuge experience, evidence of stewardship in the pastoral landscape also increases preference (Sheppard, 2001). The knowledge that this is a landscape that can support life appeals to our biophilic nature (Kellert and Wilson, 1993).

2.3. Legibility: The Preferred Landscape.

In With People in Mind: Design and Management of Everyday Nature (1998), Kaplan, Kaplan and Ryan describe the great human contradiction: we need to know, but we don't want to know everything. Humans need to understand. We understand environments that are coherent (orderly) and legible (containing memorable components that help with orientation). Humans want to explore. We want to explore environments that are complex (richness of elements) and mysterious (the promise that more is out there to discover).

People care deeply about information and the need to know. Confusion is rejected; exploration is embraced. Restorative environments are those that restore fatigued mental states through an appropriate balance of understanding and mystery. It is important to note, however, that the levels of information required by individuals vary greatly with past experience, age, circumstances in life and stages of health (Kaplan, Kaplan, and Ryan, 1998). In the hospital setting, a range of "understanding" is required in design. Users under high levels of stress require simple, secure, and easy to read environments. A common error in design, however, has been to engulf the hospital in simplicity and transparency. Not recognizing the need for humans to explore (physically and/or visually) has resulted in designs that under stimulate, thereby heightening feelings of depression, loneliness, and hopelessness (Ulrich, 1992). Hospital users (patients, staff, and visitors) require choices and options for wonderment, fascination, and visual/physical exploration (Ulrich 1992). This balance of legibility is a significant challenge for the restorative design.

Taking advantage of familiar, local patterns, forms and elements has been pointed to as a potential means of creating familiarity and legibility. Examination of the local, or the vernacular, offers insight into preferential forms for potential users of a space.

"...But above all, work on the site, stay on the site, let the site tell you its secrets" (Alexander et al, 1977, p. 463)

What of this region makes this place unique? What of this neighborhood exudes energy and life? What on this site references places of reparation, rejuvenation, and reclamation? The life-making and -perpetuating ability of the site and its context may be found in the minutiae, the details, the ordinary, and the overlooked.

Understanding the language of local life as exhibited in landforms, built typologies, vegetation and function of space enables the designer to create spaces that exude familiarity and comfort. Beautiful landscapes are not necessarily comforting: they may be perceived simply as recreational spots. Use of the everyday landscape can, however, create a beautiful as well as comforting and threatening image. "Thoughts stray to the normal, fundamentally reassuring relationships and interactions of our lives" (Hough, 1990, p. 23).

The vernacular has traditionally been described as "forms that grow out of the practical needs of the inhabitants of a place and the constraints of site and climate" (Hough, 1990, p. 34). Identifying this local "language" of landscape and building enables the presence of legible, understandable elements in the design. Through use of the vernacular, levels of

legibility can be altered depending on users and surrounding function. A high-stress treatment area, overloaded with the unknown, in which the patient suffers fear and loss of control, may dictate an adjacent area that takes full advantage of local vernacular to create a known, comfortable place of reprieve. To be able to sit in a garden or room that "looks just like home" prior to chemotherapy is preferable to lining up in hallways or lounges that look "just like a hospital". In contrast, patients confined to beds or wards would benefit from views that offer intrigue or mystery to contrast with monotonous institutional walls. Wonderment over distant pathways or secret gardens below is preferable to pondering the number of ceiling tiles or watching the clock between pain medication dosages.

Achieving this balance of understanding with mystery is a primary goal of designing for comfort and legibility. It is not enough to simply surround the users in familiar, easy to comprehend patterns (for example, the easy to read urban grid system). Designers need to ensure a significant amount of "mystery" in the landscape in order to allow imaginations to wander, fascination to build, and exploration (mental or physical) to occur. In With People In Mind, mystery is explained as the promise that more information is available as one travels farther into the scene (Kaplan, Kaplan and Ryan 1998, A pathway that winds off into the distance to an unknown destination offers gentle mystery. A roadside embankment thick with underbrush with no obvious entrance offers heightened mystery, verging on fear. Evidence of familiar, vernacular human signs (paths, benches, fence posts) intrigue the viewer by creating a sense of comforting mystery and the knowledge that others have come before.

2.4. The Call to Nature: The Living Landscape.

E.O.Wilson states "the urge to affiliate with other life forms is to some degree innate" (Kellert and Wilson, 1993). This "biophilia" is supported by a variety of researchers and theorists, Kaplan being perhaps the most well known voice. Humans have a fundamental preference for "living landscapes", alive with the evidence of biological processes. Landscapes that feature water, food, birds and animal habitat, or open pastures suitable for livestock give a sense of being able to support life. We are reminded of our connection to the earth, and of its life-giving properties. Medieval hospital garden designers recognized the benefit of birds and water in the healing landscape (Fairbrother, 1956). Modern day researchers have afforded us quantitative evidence of the healing value of such elements (Kaplan, Kaplan and Ryan 1998, Gold 1986, Ulrich 1979/1984/1992, et al).

Bringing legitimacy and urgency to the benefit of integrating the natural environment with hospital settings is mounting evidence that physiological and psychological status of patients (and staff) is highly responsive to their surroundings. Dr. Roger Ulrich (environmental psychologist) at the College of Architecture, Texas A & M University, College Station, Texas, has focused much of his career tracking patient responses to various environmental design features. Ulrich works closely with health care professionals to measure such patient markers as:

- Psychological reactions (mood, well-being),

- Physiological reactions (blood pressure and pulse, muscle tenseness, levels of stress hormones, brain wave activity, skin conductivity), and
- Behavioral indicators (frequency of verbal outbursts, sleeplessness, alcohol and drug abuse, degree of compliance with therapies, requests for assistance from nursing staff, and length of hospital stays).

Ulrich has observed that traditional design often works counter to both patient and care provider needs (Ulrich, 1992). Striving to meet the goals of functional efficiency, cost containment, and codes, designers have created "hard" and institutional-like spaces when what is needed, according to Ulrich, is a place that offers support and comfort. Patients are under varying degrees of stress. Situated in a foreign environment and often facing reduced physical capabilities, painful and/or unknown (frightening) treatments and an uncertain future, they can become overwhelmed with a sense of helplessness and feelings of anxiety and depression. Ulrich has reported a decrease in stress indicators following exposure to "positive distraction", primarily natural elements.

With his colleague Russ Parsons, Ulrich has showed that absence of "positive distraction" and subsequent sensory deprivation can have deleterious health effects for the hospitalized patient and caregiver. Their work has shown that not only can restorative design reduce stress but that its very absence can increase stress and cause harm.

Positive distraction providing the most benefit is identified as:

1. Natural elements such as trees, plants, and water;
2. Happy, laughing or caring human faces (opportunities for programming), and
3. Birds, small habitat and domesticated animals (Ulrich and Parsons, 1992).

Continuous exposure to stress has the potential over time to cause permanent damage, interfering with self-coping mechanisms and, in the extreme, further depressing immune systems, making them more vulnerable to illness. The incidence of nosocomial (hospital-derived) infection and illness has traditionally been linked to cleanliness and procedures, but current thought shows a significant link to stress by situations and surroundings (Ulrich, 1992).

While the traditional concern in hospitals is for the patient population, it should be noted that staff are not immune to the effects of stress and anxiety. Working in difficult, emotional situations and often with little control or reprieve, caregivers experience high rates of stress-related illness with ensuing lost workdays and reduced productivity (Ulrich, 1992). Caregivers under stress directly impact on patient well being given the close, dependent relationship.

A "nature restoration hypothesis" has been proposed that natural views of trees and other plants tend to reduce stress and anxiety. Informal, natural, woodland type settings are preferred for their restorative benefits (Kaplan, Kaplan and Ryan 1998, Gold 1986, Ulrich 1979/1984/1992). The use of water in healing landscapes is evident throughout our documented history. Recent studies indicate a measurable improvement in physiological well-being as a result of negative ions in

the surrounding moving water molecules (Parsons, 2000). The restorative benefit of interfacing bird and animal habitat with patients is also well documented. Despite his strong work in the area of visuals, Ulrich joins other researchers in noting an increased therapeutic benefit if physical interaction, in particular with domesticated animals, is facilitated (Ulrich, 1992, Lewis, 1996).

Research into association with companion animals has shown positive healing results. Clinical trials have indicated an improved 5-year survival rate post myocardial infarct for patients with close companion animal contact (Bustad, 1987). In healthy individuals (control subjects), this same research showed lasting reduction in sympathetic (flight or fright) responses. In short, stress reduction through interaction with animals occurs regardless of stage of health. Caring for other living things is an important tool for warding off the inevitable helplessness and hopelessness that threatens to accompany ill health (Beck and Katcher, 1984). The reciprocal nature of the relationship allows people to be rewarded by feeling needed. Many times the act of feeding an animal is often the first real connection that a child makes with care giving, and the development of empathic responsibilities within the social world. As a person ages, the role of care giving changes. With the elderly person, a task as simple as setting out some crumbs for the birds may be enough to continue or rekindle positive, empathic feelings that come with providing care for another living being.

2.5. Physical & Visual Connections: The Accessible Landscape.

The accessible landscape is one that permits and encourages movement and exploration (visual and/or physical) by a wide range of users. Ensuring a high level of real and perceived comfort of movement for patients, staff, and visitors enhances the restorative benefits of the landscape (Centre of Universal Design, 1997).

Ideally, design should be equitable and democratic. The same means are provided all users: identical when possible/equivalent when not. The widely accepted principles of universal design ensure that no single user is made to feel like an afterthought (Centre of Universal Design, 1997). A balance of easy wayfinding and access with opportunities for challenge and mystery should be incorporated in the design for all users, accommodating a wide range of individual preferences and abilities. The Principles of Universal Design are outlined in Appendix I.

Providing options and choices of movement within the landscape (within small gardens as well as within the larger open space) is important to give users a sense that the space was designed with them in mind. Patrick Mooney, landscape architect and professor at the University of British Columbia, well known for an influential 1992 study that measured Alzheimer's patients responses to the exterior environment (Mooney, 1992) is quoted as stating that "giving people choice gives them dignity" (Stevens, 1995). A restorative landscape not only allows entry, but encourages exploration (Kaplan, Kaplan and Ryan, 1998).

Access to and through a landscape is also dependent on a sense of safety and security. Designing for real and perceptual security without resorting to widespread target hardening (lock and key) presents a unique

challenge. Crime Prevention through Environmental Design (CPTED) is a means of exploring this challenge that was developed in the 1960's for use by architects, city planners, landscape architects, interior designers, and law enforcement personnel. CPTED contends that by designing the physical environment in a manner that positively influences human behaviour, it is possible to create a climate of safety at a community or site level. As a 24-hour facility, the hospital requires a design strategy that allows for safe passage by staff and visitors to and from cars/buses/buildings/programs at every hour of the night. The principles of CPTED contend that, while there are occasions in which locked gates and fences become necessary, much can be done to heighten safety and security through manipulation of the external environment and its components (RCMP, 2002). CPTED hinges on the belief that if a place appears under good stewardship and measures are taken to promote legitimate activity, this will have the dual impact of discouraging unwanted behaviour and heightening existential security. The CPTED principles are outlined further in Appendix II.

Designing for accessibility and security should not be limited to the site level. At the broader, open space planning, scale, clustering hospitals with schools, community parks, daycares, and civic buildings increases visibility and accessibility. The connection of schools and seniors' housing seems a logical and sustainable method of crossing age barriers and breaking down destructive mythologies. A more concerted effort to program "private" hospital grounds for use by the public (and, likewise, to facilitate use of surrounding amenities by hospitals) would have the added benefits of enhancing stewardship and offsetting long-term maintenance costs. Connecting hospital open space programs with community greenways, cycling routes or pedestrian walkways will enhance stewardship, positive use and a sense of belonging.

If an open space is to satisfy the needs of the community at large, the physical form becomes an important consideration (Wright, Braithwaite and Forster, 1976). Too often public open space is designed as patchy, disconnected units with little continuity: a soccer field at the end of a block, a fenced school yard, an isolated skateboard park, a distant bicycle trail. For open space to be successful it must be close and accessible. "Whenever possible, these smaller spaces should be linked to larger park areas through the use of open space corridors to form a complete network system of open space within the community" (Wright, Braithwaite and Forster, 1976, p. 40).

Accessibility: An Evaluation Process.

Private places are often filled with remarkable staircases and grade changes that, although visually appealing, are inaccessible to a large portion of our population: the aged and mobility impaired. Public space designers too often take the unimaginative route of integrating obvious ramps and paths that are not only lifeless, but that draw attention to the fact that the less-abled are "different". Confidence and comfort are chipped away every time a less-abled person is "told" by designers that they are different, and require special equipment only for them, and special entrances only for them. If unique equipment is required to enable users, a design that traverses ability should be utilized. The challenge for hospital design is to create a place that combines desired

elements of entrance, transition, and movement without second-thought additions for access.

Questions to be asked during the design process may include:

- Is the place accessible to all people, regardless of age or ability? Are paths accessible for walkers, wheelchairs, persons with limited mobility, and the very young to very old? Does the design create special places on the site that relegate the less able to status of observer only?
- Are pathways connected in such a manner as to allow short, protected walks (patients requiring health care provider supervision) as well as more expansive walk experiences (psychiatric patients)?
- Are ground plane features -plantings, water features- accessible (for touch, sight, and smell)? Garden features may include vertical structures with plantings that climb up to people. Beds may be raised for hands-on interaction. Are color palettes accessible to those with limited vision? Color massings are more visible to aged retinas.
- Are there areas easily accessible by hospital staff that permit the combination of landscape and therapy programs (physiotherapy, cardiac rehabilitation programs, occupational therapy, horticultural therapy, etc)?
- Is there sufficient above ground support for users, and places to rest? The lack of rest stops and/or hand supports can create unpleasant and uncomfortable experiences for users that will prevent repeat use.
- Does the design accept that all areas of the hospital grounds must be accessible to emergency caregivers, fire services and maintenance workers?
- Is accessibility negated by exposure? Are open areas protected from the elements? Several conditions or stages of health demand extra protection from ultraviolet light exposure (psychiatric, pregnant, paediatric, cancer, burns, etc).

Conclusion.

Wrapping a hospital landscape in restorative benefits while still maintaining a functional, realistic program is the challenge for designers. Despite the increasing abundance of restorative design theory and data, modern hospital precedents all too often get lost behind the purely functional, leading to lifeless, cold, controlling places filled with signage that compound rather than reduce stress (Ulrich, 1992). The expanding field of restorative design seeks to take advantage of the healing power of landscape in order to improve human condition. Four primary elements have been identified as contributing in a large way to the restorative nature of a place: inherent familiarity, legibility, natural elements, and accessibility. Finding ways to incorporate these elements into a design, whether in the public or private realm, will facilitate stress reduction and healing for humans at all stages of the health continuum. In the hospital environment, this means improved well being for patients, staff, and visitors as well as visiting community members taking part in outpatient programs, volunteer/stewardship programs or recreational opportunities.

CHAPTER III.

Inquiry into Status of Hospital Design

Introduction.

Many acute care health care facilities are designed according to a cookie cutter image of the functional institution situated on a generally lackluster tract of land. Function and economics continue to be the overriding motivators behind any new facility with little to no exploration into imaginative or creative design solutions, despite the growing body of research into restorative design (Cooper Marcus and Francis, 1998). A review of the literature (or lack thereof) reveals a submissive tolerance of the status quo on the part of designers. Society has rejected the image of large-scale, block social housing and yet we continue to build similar blocks to "house" the sick. Programs aimed at health prevention, maintenance and promotion, based within the confines of existing modernist hospital structures, struggle under the weight of the surrounding architecture and "dead" landscape space.

The increasing awareness of the effect of exterior environment on health would seem to demand a strong attention to landscape design for health care facilities. This, however, has not been the case. In an issue of Landscape Architecture that focused on "Healing Gardens" (January 1995), Roger Ulrich is quoted as follows: "Interior designers have taken the lead and architects are coming up to speed. That's not been the case for landscape architects" (Dannenmaier, 1995). In the seven years since that statement was made, it is arguable that landscape architects continue to lag behind in terms of both inquiry and design.

Claire Cooper Marcus, an important voice calling for a revisitation of tired hospital design guidelines, laments the difficulty of affecting change in a system that is unwilling to allocate funds for unquantified benefits to patient recovery (Cooper Marcus and Francis, 1998). As discussed in the previous chapter, these benefits are being quantified by an increasing amount of research.

Understanding the direction, or arguably lack of direction, for health care facility design by landscape architects demands an awareness of the historic evolution and the current factors affecting change and growth.

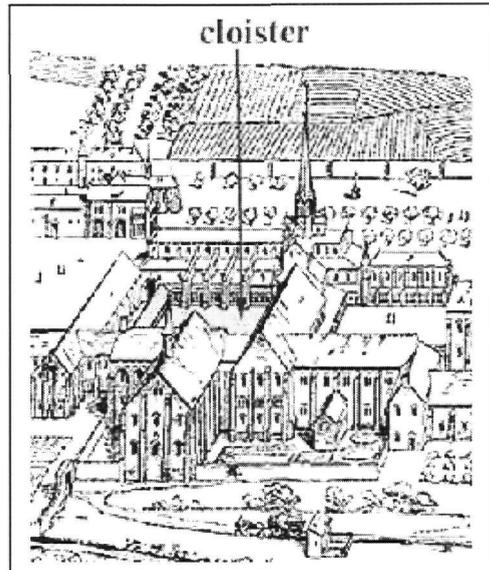
3.1. History of Hospital Design: An Overview

(a) Monastic Cloisters: Early Recognition of Landscape Power.

Historically, the first western "hospitals" took great advantage of their physical layout, assuming a strong connection between the healing process and the natural environs. The early Benedictine monasteries situated patient care rooms around a central cloister garden with easy views to the physics gardens planted with roses, lilies, sage, rosemary and other herbaceous plants used to concoct early cures (Fairbrother, 1956). The

connection between rehabilitation and a view to life-giving nature was deemed vital and necessary. These early medieval hospitals generally featured a healing walkway, designed and choreographed to provide specific restorative experiences along the way: exposure to water, to wildlife, to fall color, to spring blooms. Water was an important and vital component of medieval monastic gardens. In the earliest cloisters, the centrally located well was used for sustenance, bathing and religious purposes. The central location also eased the labor of irrigation. Over time, these water features took on greater prominence and decoration with the lines between symbolism, function, and aesthetics blurring (Fairbrother, 1956).

Walks in the connecting gardens were prescribed as diligently as were crushed herbs and ill-tasting tonics. "The experience of walking around the edges of the garden, enjoying it from the covered space, smelling the fragrance of herbs, feeling the warmth of the sun, and hearing the trickle of a central water feature contributed to the serenity of these sanctuaries" (Parsons, 2000, p. 5).



The Dark Ages moved the study and practice of science and technology behind monastic walls. Medicine and, subsequently, care of the sick and dying fell to the religious orders. Physic gardens, referring to the combined planting of flowers and medicinal herbs, became a central and important component of the monastic garden space. Throughout the Middle Ages, monasteries gave sanctuary to native plants and introduced herbs. The Abbey of St. Gall in Switzerland (AD 830) is characterized by Ruth Wrensch in The History of Herbs as a vital protector of special and medicinal plants, preventing mass depletion and extinction of several species (Wrensch, 1992). It is recorded that the monastery of St. Gall had a medical herb garden, rooms for 6 sick people, a pharmacy, and special lodging for a physician. This is considered the first Western

example of a hospital (Mayeaux, 2000). Under the Benedictine order, monasteries quickly expanded the trend and by the 10th Century many monasteries in Europe had attached hospitals (Mayeaux, 2000).



An important building in medieval monasteries was the early isolation hospital with an attached chapel, bathhouse, kitchen, rectory and medicinal garden. The physician's house was located nearby

with its own physic garden of essential medicinal herbs, new introductions, and several small sick rooms for the acutely ill.

Medicinal plants such as sage, fennel and rosemary, were situated outside the infirmary widows and entrances in order to encourage patients to connect the "cure" with nature and therefore a higher power (Wrensch, 1992). The use of "man-made" medicine was given religious approval through this ever-present and very visual connection with the earth. Fragrant and visually aesthetic flowers and shrubs were included in the early physic gardens. Debate over possible medicinal use of roses, lilies, peonies, and gladioli may hide the possibility that medieval man simply felt the sensorial impact itself was worthy of inclusion in a healing garden.

As originators of Botany, the early Greek states produced tremendous writings on common plants and specified or hypothesized medicinal purposes (Wrensch, 1992). Behind medieval monastic walls, this field of Botany became one and the same with the field of Medicine. Plants were mandatory in the attempt to cure any illness. Indeed, there were remedies for many complaints not treated today. Medieval herbal concoctions existed not only for such complaints as fever, headache, insomnia, and more serious illnesses, but also for "immoderate laughing, forgetfulness, excessive crying, and fleshy lust" (Fairbrother, 1956). Written manuscripts produced during the Middle Ages outline specific planting schemes and arrangements of buildings, indicating a strong belief in the power of landscape to affect outcome of patient care. This perceived power is further illustrated in written instructions for patient programs and activities.

"The sick are encouraged to spend time in the orchard, breathing the scent of fruit and flowers, so that their senses can be refreshed.

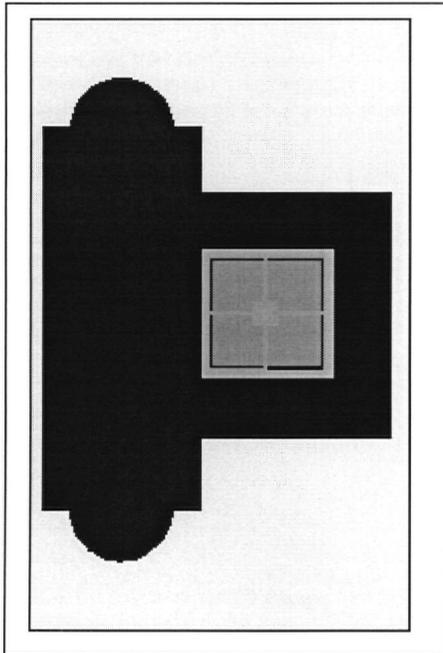


Figure 3-1: Mass-Void for Monastic Cloister Design

Where the orchard ends, the garden begins. Here too a lovely prospect presents itself to the infirm brethren; they can sit on the green edge of the great fountain, and watch the little fishes challenging one another, as it were, to war-like encounters, as they meet and play in the water." (Talbot, Alice-Mary. n.d.)

It is interesting to note that a study conducted by Cooper Marcus and Barnes (1995) revealed very similar requisites for healing gardens as those utilized in early monastic cloister gardens: greenery, fragrance, bird sounds and privacy (Cooper Marcus and Barnes, 1995).

The cloister design of these first hospitals had a purpose: to direct patients and healers toward the cures of nature. The connection between mind and spirit and body was clear. The connection between man and nature was clear. Monastic reforms following the 11th C saw a dramatic decline in gardens produced by non-secular entities. And, certainly, as the

domain of health care found its way to a medical profession infatuated with the provability of science and technology, natural settings for treatment diminished.

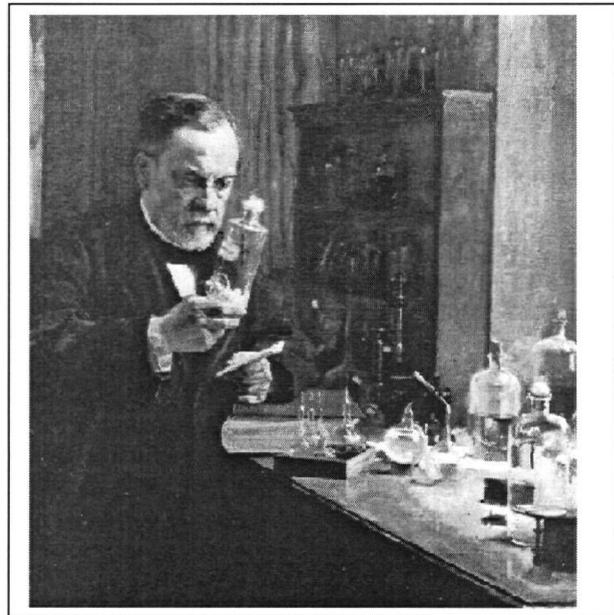
(b) Community-based Treatment: Hospital as Death House.

Prior to the mid 19th Century, the focus of health care was decidedly home and community-based. With good reason, patients were treated outside the hospital as much and for as long as possible. The role of the hospital was primarily to prolong life and ease the pain of dying. Admission to hospital rarely included a discharge to home: the concept of designing for "healing" was largely non-existent. Hospitals were forbidden, segregated dark corners of the community (Cooper Marcus and Francis, 1998).

The radical revision of medical theory and practice that followed the discovery of germ theory gave hospital designers an entirely new focus and purpose. It became possible to treat, and even cure illness and injury rather than simply prolong life. Health care, rather than palliative care alone, was born.

Nurse Florence Nightingale put forth the concept of antiseptics in 1859 in her "Notes on Hospitals". She showed that hospital mortality rates were three to five times higher for hospitalized patients than those who had been treated at home. Her work with reform of sanitation and cleanliness in hospitals spurred a new awareness that the form of structure in which health care was undertaken was vital (Bynum, 1994).

The discovery of bacteria by Louis Pasteur revolutionized the medical field, and with it, the image and requirements of the hospital as place. As the "architect of germ theory", his discovery of vaccinations found immediate success in the treatment of such devastating illnesses as anthrax, chicken pox, and cholera. Robert Koch continued this inquiry and in 1882 was able to prove the infectious nature of the tuberculosis bacillus, another important milestone. Now, individuals could understand that they became sick for a reason, not just by chance. And, most importantly, that health care could prevent, treat, and cure illness (Bynum, 1994).



(c) The Birth of "Health Care": Design Reform.

The realization that everyday persons could actually recover from the ravages of infection and injury brought new reform to the design of facilities for patients. The value of creating a homey experience replete

with fresh air, sunlight, proximity to nature and strong indoor - outdoor relationships found its way to late 19th C hospitals.

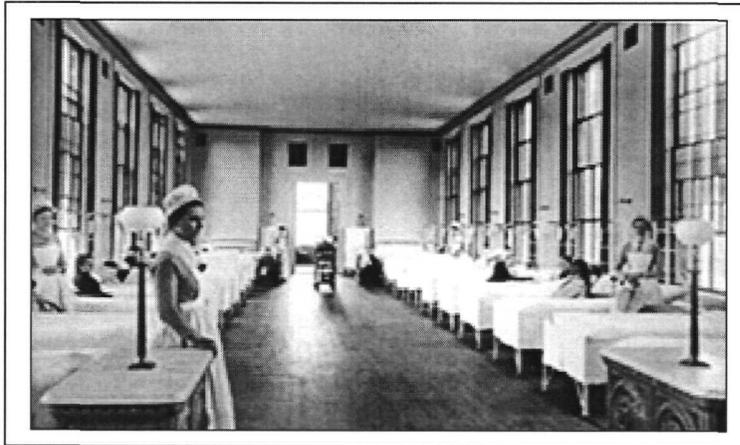


Figure 3-2: Pavilion style hospital. In the early 20th C., wheeling patients outside the pavilion for "afternoon sun and fresh air" was considered a mandatory nursing function.

Generally two-three storey buildings connected by open walkways, this "pavilion-style" dominated new hospital construction well past the major world wars. It is no small wonder that the desire to surround the ill with lush exposure to nature coincided with attempts by park designers (most notably, Frederick Law Olmstead) to "heal" the public with spacious, heavily designed parks.

Turn of the century reforms are perhaps most evident in British Columbia on the grounds of Riverview (Psychiatric) Hospital in Port Coquitlam, B.C.



Figure 3-3: Image of Riverview Psychiatric Hospital grounds, Port Coquitlam, B.C.

Early administrators of this large provincial psychiatric facility saw, in 1912, an opportunity to create a unique facility that would benefit not only patients but the community as well (City Trees, 2001). The design included built structures as well as a working farm, gardens, orchards and an arboretum of over 1800 trees. With the help of patients, they created a living heritage by planting trees from seven continents. Today, with buildings closed or in limbo, Riverview has a greater role as a backdrop for the film industry than as an

institution for psychiatric care, but there is little doubt that the site is a unique gem to be protected. Riverview's trees comprise western Canada's most significant arboretum and the site is a vital link in a green corridor between the Fraser River and Burrard Inlet with outstanding habitat and educational value.

Unfortunately, these reforms to hospital design did not survive past the Second World War. A western world dealing with rapid changes in technology put health care reforms secondary to cost-efficiency and functionality.

"In acute care hospitals, the design emphasis shifted towards saving steps for physicians and nurses, and away from attention to the environments patients experienced. Gardens disappeared, balconies and roofs and solariums were abandoned, and landscaping turned into entrance beautification, tennis courts for the staff, and parking lots for employees and visitors. The prestige of the big city teaching hospitals with their gardenless patient environments set the styles for all the others" (Gerlach, Kaufmann and Warner, 1997).

(d) Modernist Domination: The Health Care "Machine".

Certainly the modernist fascination with the machine affected more than hospital design. It is curious, however, that while the form of modernism has been soundly rejected in other areas of public design it continues to mold the way in which communities perceive and approach health care.

Early skyscraper designers battled with European Bauhaus adherents to create the perfect monuments to technology and man's power over nature. Expensive, monumental, enclosures of space, these buildings were copied in a hundred cities and more, not only as office towers but in the modern design of all commercial and public structures, including supermarkets, motels, and institutions. While on the one hand, perfect expressions of medical science's desire to thwart and dominate nature, they stand as the purest contradictions of the very fundamentals of health care. Disconnected and segregated they loom dangerously over the community with acres of concrete, stone and glass. The living nature is relegated to a struggle for life in geometrically spaced gratings. In the Modernist world, more is more. More is power. More is better.

Jane Jacobs launched an attack on modernist city planning and design in her book The Death and Life of Great American Cities (Jacobs, 1961). She criticized the modernist abandonment of the traditional relationship of houses, sidewalks, and street and their replacement with high-rise apartment blocks set in 'parks'. These new forms of design broke down the traditional control of criminal behaviour and destroyed the sense of community identity and stewardship. The ability of residents to watch the street and the presence of people using the street diminished as built structures turned inwards and upwards.

Case in Point: Social Housing.

Several sociologists have agreed that the end of the modernist domination in public architecture and construction occurred in 1972 when the crime-infested, vandalized, urine-soaked Pruitt-Igoe housing development in St. Louis was blown up. Once standing as a classic example of social engineering, the realities of life in this modernist structure caused its

demise: high crime, the difficulty of policing, raging substance abuse, spiraling levels of morbidity and mortality among residents.



The *Pruitt-Igoe* towers, in East St. Louis, consisted of 11 story-high buildings with grounds on the first floor for community activities. Because the grounds were common and disassociated from units, residents could not identify with them. The complex never achieved more than 60% occupancy and was destroyed only 10 years after construction (Brossman et al, 2001). Pruitt-Igoe was replaced with duplexes, row houses and single-family structures. A renewed social sense of responsibility in the late 60's-70's resulted in a rejection by many designers and planners of the modernist typology once thought the tool for social change in impoverished communities.



Unfortunately, this belief in the ineffectiveness of modernist architecture and landforms is slow to cross into the realm of health care facility design. Pruitt-Igoe versions of community hospitals exist across the North American landscape.

Above- Figure 3-4: Demolition of Pruitt-Igoe modernist social housing structures in 1972.
<http://www.eslarp.uiuc.edu/>

Left- Figure 3-5: Prototypical modernist hospital structure, current day.

3.2. Current Trends Affecting Health-care Facility Design.

After a decade of slow growth, health-care design and construction is poised to expand substantially in this first decade of the new millennium. The baby boom generation, now ranging in age from 35 to 55 years, is influencing a wave of new and remodeled facilities. Several factors are influencing, or are poised to influence, the shape of future health care facility design.

"Another building boom in health care will occur within the next five years, expanding capacity to meet the needs of the Baby Boomers and their aging parents." - *Futurescan 2001: A Millennium Forecast of Healthcare Trends 2001-2005*

3.2.1. Expanding Definition of Health

The World Health Organization, the United Nations specialized agency for health, was established on 7 April 1948. WHO's objective is the attainment by all peoples of the highest possible level of health.

- "Health is a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity. Health involves emotional, social (cultural, environmental), and physical well-being and is determined by the social, political, and economic context of lives as well as by biology" (World Health Organization, 1948).

Over the past twenty-five years, the understanding of what is meant by health has evolved and continues to evolve. The WHO constitutional definition has not been amended since 1948, however, in 1986, the WHO further 'refined' its definition in the following manner:

- "Health is seen as a resource for everyday life, not the objective of living; it is a positive concept emphasizing social and personal resources, as well as physical capacity" (World Health Organization, 2002).

The Federal Ministry of Health in Canada adheres to this definition in prepared documentation regarding promotion of public health as well as programming of institutional treatment. Social isolation, poverty, ethnicity/cultural diversity are all noted as significantly related to quality of health. Social support during times of illness or wellness has, in particular, been recognized as vital to health promotion.

- "All families who are having and rearing children need support--from friends, relatives, neighbours, and more formal services. For parents, particularly women, who are isolated and facing a number of other stresses, support is invaluable" (Health Canada, 2002a).

Health Canada is also becoming more open in acknowledging that the natural environment is a key influence on health.

- "Many factors, including family history, social or financial status, physical environment and personal lifestyle choices influence individual health. By making Canadians more aware of dangers to their health, protecting them from avoidable risks and encouraging them to take a more active role in their health, Health Canada fosters a

healthier population and contributes to a more productive country" (Health Canada, 2002b).

This holistic definition describes the ideal state on which health policy, programs and dollars should be focused. Acceptance that health is more than just the absence of disease is a significant move towards more community-based programs as well as higher levels of public participation in the planning of health care facilities. "Healthy Community" programs are becoming integral parts of the municipal wheel.

3.2.2. Acceptance of Therapeutic Research

In 1988, an informal, annual forum of professionals was created to explore how the design of the physical environment can positively contribute to the quality of health care. The goal was to enhance awareness of the impact environment has on health as well as actively envision new, creative possibilities for the health care landscape. In November of 1993, Leland R. Kaiser, Ph.D. (a professional consultant and self-professed 'futurist') was the keynote speaker for the sixth symposium entitled "Design: Contributing to the Quality of Health Care". He observed that health care facilities have traditionally been designed to encourage passivity and non-involvement, and to reinforce the idea of sickness over regeneration. Too often, Kaiser stated, the hardware—the machines, the diagnostic devices, even the doors (with their "keep out" messages everywhere) set the tone of a treatment area in a way that cannot help but make patients define themselves as "...sick, dependent, and far removed from everything that seems comfortable and nurturing" (Centre for Health Design, 1997).

Kaiser focused his priorities for reform on the need to involve communities, including patients in the planning and design phase. He encouraged designers to become 'advocates' for the hospital landscape. At this same conference, the formation of 'The Centre for Health Design' was announced, a non-profit organization established to guide and direct the symposium's activities and spread the message of reform to a broader audience (Centre for Health Design, 1997).

The Centre continues to this day with over 25,000 members (design professionals, health care executives, practitioners and product manufacturers) committed to the use of design to improve the quality of health care. Annual speakers range from Ralph Nader, Dr. Patch Adams, landscape architects Marni Barnes and Claire Cooper Marcus, futurist Russell Coile and other high profile individuals (Centre for Health Design, 1997).

A strong emphasis is on the advancement of evidence-based design, such as the work being done by Roger Ulrich and others. "Evidence-based design is research-informed and its results not only affect patient medical outcomes, but also staff satisfaction and facility operations. It looks at building design not only as the physical space, but includes the total sensory environment of sight, sound, touch, and smell" (Centre for Health Design, 2002).

"We are convinced that with more persuasive information as to their benefits, many more hospital staff would encourage the use of outdoor spaces for healing and stress reduction" (Cooper Marcus and Barnes, 1995).

3.2.3. Emergence of informed consumers

The current British Columbia government is "discussing" the possibility of closing and/or modifying several community hospitals in the province. Hospitals, in kind, are responding with vigorous defenses. The implication for designers in both instances is a need to create hospitals that are wanted, are welcoming, and that give evidence at first glance of their "healing capacity". In the new health care environment, hospitals and health systems may discover a need for simple competition on quality, exemplary facilities and centers of excellence. A hospital's very survival may be dependent on how well it competes in the "market".

3.2.4. Changing Demographic

An aging demographic in North American, coupled with health care technology that is expanding life expectancy is changing the face of our communities. As well, medical advances are transforming acute illnesses into chronic illnesses with near to normal life expectancy. Disability that often accompanies chronic illness (heart disease, arthritis, diabetes, AIDS, CHF, etc.) must be accommodated for in the design of public and private spaces.

The field of health-care design is also responding to society's increasing cultural diversity. This is already evidenced physically in signage, the use of icons and symbols for communication. Creating spaces that address the complex needs of a wide range of users will be an increasing challenge.

3.2.5. Industry consolidation/Changing Decision-Makers

In the American system, the independent free-standing hospital is unique. In the face of current financial challenges, health-care facilities are resorting to consolidations, acquisitions and mergers to achieve their goals, and are creating a corporate health-care model. Canada is faced with its own challenges as governments vacillate between regional and centralized models of control.

The threat of privatization of health care in Canada will have significant impacts on new hospital design. The site of this thesis project is a unique political test case in British Columbia. Private rather than public contractors are being utilized in the early stages of construction (demolition, at this point) with significant ensuing uproar within public sector unions. Discussion has also revolved around the possibility of sharing responsibility for the hospital operations between the government and private sector.

3.2.6. Consumerism and Retailing

In the coming years, a continued rise in the population, combined with the idiosyncrasies of older and better educated baby boomers, will drive the demand for health-care facility construction. Physicians will be confronted by information-laden patients who have done their research on the Internet and will want to cross-reference with medical experts. The hospitals of the future will provide areas where doctors and patients together can utilize electronic access to the latest medical knowledge.

At the same time, baby boomers are a group of individuals who seek personal choice and a sense of control over their environments. They are not satisfied with sharing a room with 2 or more other patients. An increase in the demand for private rooms, and rooms that enable family members to sleep over will change the architecture of hospitals.

Retailing is becoming key to the delivery of health care. The inclusion of commercial opportunities within the hospital complex is attractive to patients as well as health care professionals. Visitors to the hospital also take advantage of pharmacies, convenience stores, restaurants and coffee shops within the hospital complex. A greater focus on the power of retail outlets to draw "clients" will expand the existing, traditional amenities: cafeterias will become cafes open to the public, the traditional gift shop will feature local work by artists and craftspeople, and visitor business centers and child-care services will be provided. Finally, hospitals increasingly will be valued for connecting to their communities in ways similar to the police and fire departments. Community-centered hospitals will reach out to serve their patients and neighbors, contributing directly to their surroundings. Lecture halls once reserved for teaching and medical rounds will be the site of community instruction on health care issues (Futurescan, 2000).

3.2.7. Human Capital: Rising Competition

The current shortage of both doctors and nurses is not a short-term problem. A tight labor market and the aging of the workforce make "human capital" all the more scarce and valuable. Incentives to recruit new professionals alone cannot solve this problem. Health-care designers will be required to envision facilities that can provide excellent care with less staff. As well, providers will compete by design to make new facilities more attractive for staff recruitment and retention. This will apply not only to on-site amenities but off-site connections as well (easy access to transit, ease of parking, nearby recreational facilities, etc.). Canadian nurses recruited to work in American hospitals report great satisfaction in the purposeful design of spaces for their professional and personal use, e.g. running tracks on-site, gym facilities, staff gardens, 24-hour restaurants.

3.2.8. Emergency Preparedness

Hospitals have long been equipped with emergency preparedness protocols and disaster coordination programs. Since September 11 of 2001, however, the increased fear of bioterrorism has added new elements of concern: early detection, preparedness, and response. The designer's role in this process will be to plan strategically with the client for responding both operationally and physically to an emergency. This is not a new role but it will likely take on more urgency since recent events. CPTED (Crime Prevention through Environmental Design) issues that address personal as well as communal safety will be paramount in design.

3.2.9. Flexibility and Redundancy

Canada spends about 9% of its GNP on health care, compared with 14% in the U.S. The rapid rise in health care expenditures since the early 1980s is primarily a result of rising drug costs and the provision of more complicated medical interventions and technologies (Health Canada, 2001).

Hospitals are increasingly faced with the need to update, and renovate in order to accommodate for new/expanded technologies.

The design of new hospitals must incorporate high degrees of flexibility. What could be an inpatient procedure today may be an outpatient procedure in the (near or far) future. Any permanent change to the landscape of a health care facility should be able to respond to radical change in programming in the future.

Conclusion.

A strong connection with the natural environment characterised some of man's earliest ventures into hospital design. Monastic cloister hospitals relied heavily on the fruits of the landscape to supply healing sights, sounds, smells and experiences. As dependence on technology and science for treatment of illness grew, reliance on the environment, the landscape, and nature itself was quickly and definitely displaced. The environment became little more than inaccessible outdoor space, functional yet without healing properties. Despite an increasing trend towards community-based programs and an expanding definition of health, hospitals continue, in many cases, to stand as examples of modernist dominance of man over nature. An evolving population, however, has begun to demand changes in the manner in which health care is delivered. An economic crisis in health care delivery demands that any proposals for altering the design of facilities should be reasonable, realistic, economical, and sustainable, as well as restorative for all intended users.

CHAPTER IV:

Applied Restorative Design: Principles and Implications

Introduction.

Therapeutic design incorporates principles that aim to reduce stress, promote wellness, and actively facilitate the healing process. Restorative principles are not limited to design of health care facilities, however this inquiry finds its focus in the hospital setting. Designing in a way that enhances health and well being for patients, visitors, staff and visiting community members is the goal of these principles. Restorative design is often mistakenly thought of as designing for the meditative, quiet garden. In cases this may be true. A truly restorative design, however, is one that allows diversity in behavioral and experiential programs, allowing each user to move within and beyond their own comfort level dependent on unique needs.

The approach to restorative design proposed here involves two major stages. Firstly, the landscape is viewed in its entirety and global restorative principles are applied. This is done either through the creation of new spaces and features or simply by the enhancement of identified opportunities. The second stage involves a review of the intended users of the site and their specific needs for restoration. This approach should create a hospital landscape that has a restorative "foundation" as well as opportunities for development of user specific spaces.

A flowchart that simplifies this process is featured at the end of this chapter on page 43.

4.1 Global Restorative Principles & Design Implications

The four following principles, drawn directly from preceding literature review, are global in that they can be applied to any site, public or private, in the effort to design for stress reduction. These global principles all have at their core an ability to reduce both physical and physiological stress. The ultimate goal of design would be to create a place that is, in a connected and holistic manner, archetypal, preferential and compatible, living and accessible. Additional considerations for unique spaces will be dependent on specific users and/or objectives of space.

The four identified global principles are:

- Design for the Archetypal Landscape.
- Design for the Compatible Landscape.
- Design for the Living Landscape.
- Design for the Accessible Landscape.

4.1.1 Principle #1: Design for the Archetypal Landscape.

Across cultures, humans have an inherent connection to certain landscape types and forms. These archetypal landscapes can be utilized to create a

place that is fundamentally comfortable, familiar, and healing (Condon, 1988, Appleton, 1975).

Example: Looking out over a fertile pasture with the comfort of a forest at one's back: prospect beyond, refuge behind.

Design Implications:

1. Therapeutic design should be an early component of facility design and programming to influence:
 - open space configurations-avoidance of leftover open space
 - siting decisions-possible viewsheds
 - indoor/outdoor relationship (thereby influencing architectural form and configuration as well as interior design).
2. Retain (and if necessary, create) open space archetypes of higher preference (the Savannah, the valley, the meadow, the pastoral, prospect and refuge scenarios);
3. Retain (and if necessary, create) simple yet powerful natural elements (the single tree, the allee, the bosque, the clearing).
4. Recognize that a pasture as open space will have higher restorative value than a mowed play field or built open space.
5. Use existing or new trees and berms to enhance feelings of enclosure and comfort.

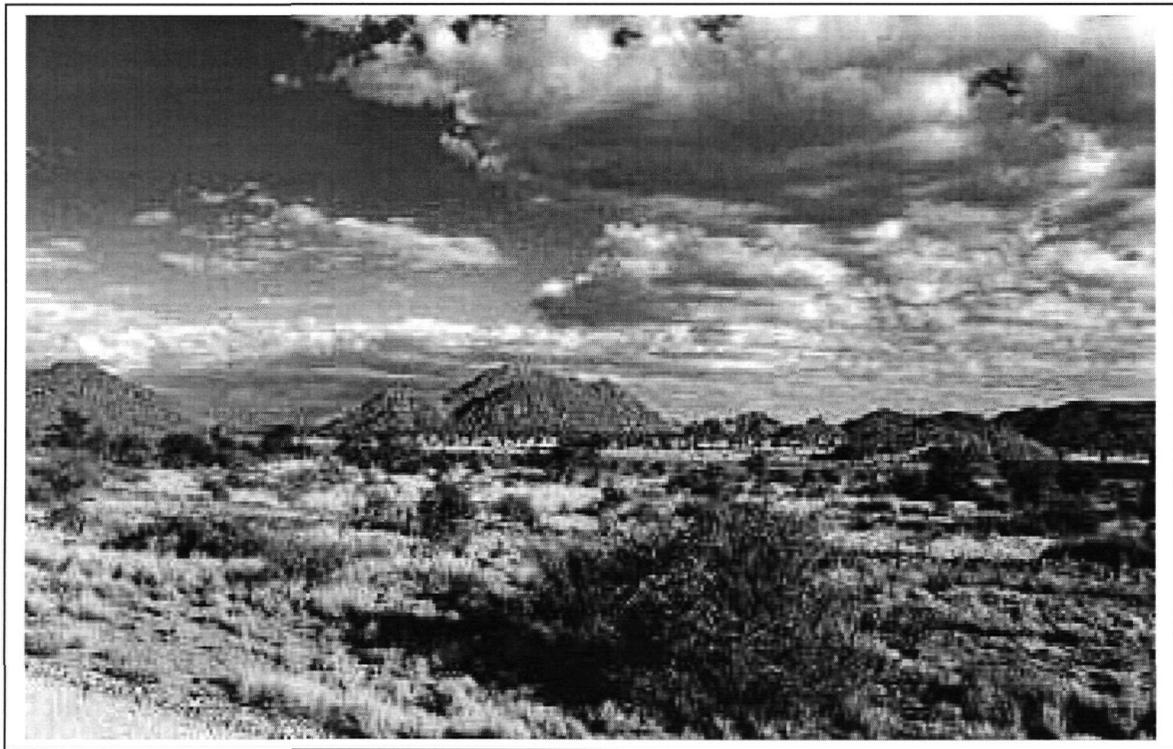


Figure 4-1: African Savannah Landscape. The savannah hypotheses predicts that those landscapes where humans spent time in their evolutionary past are inherently preferred.

The savannah provides what is needed for survival: trees that give protection from the sun and can be climbed to avoid predators; long, unimpeded views; and frequent changes in elevation to allow for orientation (Fleissner et al, 1999).

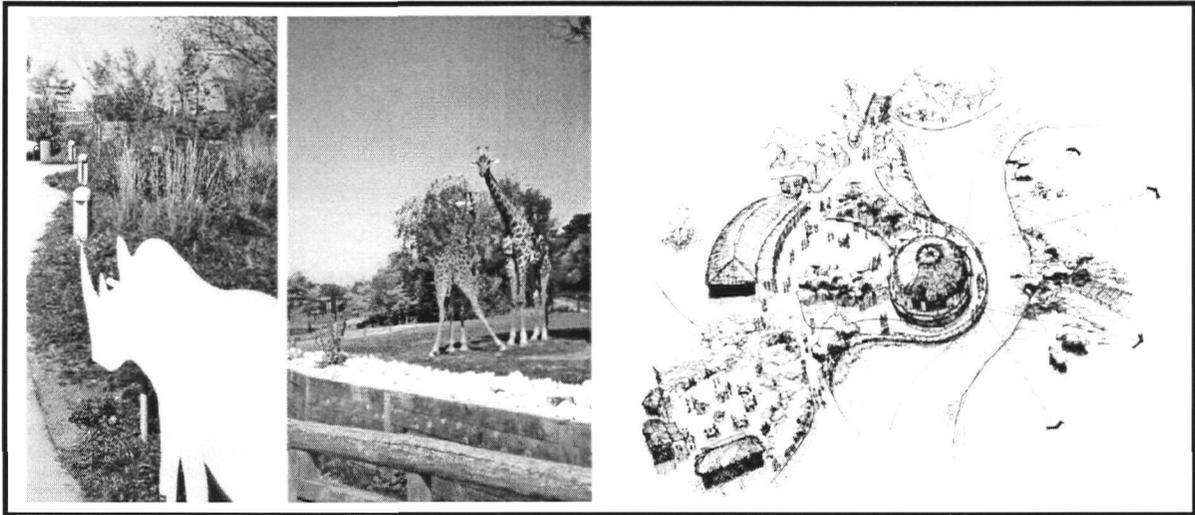


Figure 4-2: African Savannah Project at Toronto Zoo. This design by the LA firm of Marshall Macklin Monaghan Ltd. was chosen as a recipient of a National Merit Award in 2000 by CSLA. The intention was to take advantage of the human preference for open landscapes while at the same time providing important species habitat ((National Merit Awards, 2000).

4.1.2 Principle #2: Design for the Compatible Landscape.

Humans are most comfortable when they recognize and understand instantly where they are in the world. This is balanced with opportunities for fascination, wonderment, and mystery. In times of high stress, understanding should be high. At other times, a sense of the need to explore is desired (Kaplan et al, 1998). A design that fosters a sense of control by offering choices and options for and against exploration promotes stress reduction and wellness (Ulrich, 1992). The creation of a compatible landscape allows the user to interact according to his/her comfort level at any given time. This differs from the Archetypal Landscape in that interventions are more specific to the region, the program, and the identified users and their needs.

Example—High Understanding: Easy wayfinding in and out of the hospital complex.

Example—Opportunities for Mystery and Wonderment: A view to a path that winds mysteriously out of sight.

Design Implications:

1. Facilitate Control and Choices

- Design rooms and windows to allow visual access outside for bed patients;
- Balance options for privacy with options for public experiences (open or closed, alone or together);
- Provide privacy for staff as well as patients;
- Make gardens or grounds accessible to patients;
- Give users control over exposure to outdoor elements (sun-shade, noise-quiet, urban-rural);

- Give users control over level of participation in program elements (to watch, to lead, to follow, to join in);
 - Create a design that maximizes safety (real and perceptual). Refer to Appendix II for CPTED Principles
2. Facilitate Range of Understanding-Mystery
- Partially obscure or frame views to open spaces using glass atriums, windows, doors to promote mystery = filtered understanding;
 - Ensure views to a wide range of activities in open space. (Examples include: passive and active recreation, teaching sessions, maintenance activities such as pruning and mowing, and animal grazing).
3. Facilitate Understanding.
- Use an ordering system for the design that clearly identifies paths, nodes, edges, and landmarks in order to promote wayfinding and memory;
 - Use local customs, traditions, and aesthetics (in design or programming) that increase a sense of home and belonging. This may range from small scale design for site furniture to large regionally significant landscapes patterns (local grid lines, crop patters, rural or urban typologies);
 - Provide views to regional landmarks, large and small, that tell a story of place and orient users to their whereabouts;
 - Use easily understood artwork and structures on site.

Persons under stress show a higher preference for regionally familiar forms, shapes, images and prototypes. This is also noted in reactions to artwork. Built structures, art, and site furnishings are more effective in reducing stress if designed using easily understood natural images and forms (versus abstract or ambiguous form/content) (Ulrich 1992).

The site of this project, Abbotsford, British Columbia, has already shown an awareness and acceptance of this preference for regional artwork.

The Abbotsford Downtown Business Association launched a "Bench Art Project" in 1998. In conjunction with new streetscaping in the historic downtown area, this project was designed as a means to celebrate culture, history and dreams of the community. Local artists were commissioned to create publicly accessible art that would be both familiar and pleasing. Natural and regional forms dominate in the chosen benches.

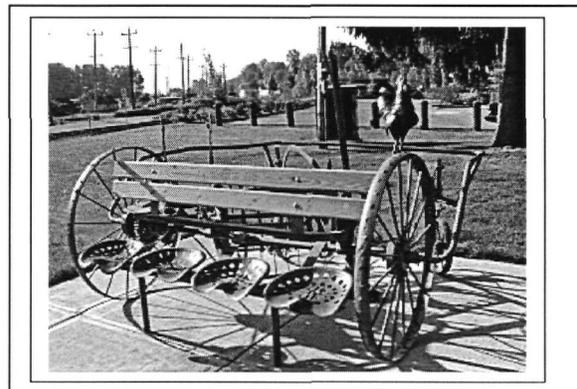


Figure 4-3: Abbotsford Bench Art Program.

4.1.3 Principle #3: Design for the Living Landscape.

Humans find great comfort in physical and visual access to nature-vegetation, habitat, water, and pets. A landscape that shows evidence of its ability to support life reduces stress, satisfies man's need to nurture, and reduces feelings of helplessness and hopelessness (Kellert and Wilson, 1993, et al). A landscape high in natural, living elements is effective in eliciting positive feelings and blocking worry (Ulrich 1992). Landscapes alive with, not only evidence of birds and animals but also, human stewardship (human signs) increase comfort (Kaplan, Kaplan, and Ryan, 1998).

Examples:

- A woodland garden that promotes biodiversity of birds and habitat.
- An edible landscape of orchards, gardens or crops.
- A maintained and well-used garden tool shed.
- An outdoor space in which patients can walk pet therapy dogs (or visiting pets).
- A body of water accessible (visually and physically) by humans and habitat.

Design Implications:

1. Open space planning should consider needs of birds and mammals as well as humans in order to enhance biodiversity:
 - Enhance or create specific habitats for regional birds/mammals - consider greenbelt typology, vertical stratification, planting that attracts birds/insects/mammals near human spaces;
2. Views to human and habitat "daily activity" should be maximized (humans: gardening, maintenance-animals: grazing, foraging, nesting);
3. Opportunities to participate in hands-on gardening/stewardship should be facilitated;
4. Use domesticated animals in open spaces ("sheep to mow grass");
5. Water bodies and features should be included throughout the design for benefits to both humans and wildlife;
6. "Edible Landscapes" (orchards, berries, community gardens) should be considered whenever possible to attract both humans and wildlife;



Figure 4-4: Restorative Interaction with Nature Accepted in Art.

Cassatt, Mary
Young Women Picking Fruit
1891/92
Oil on canvas
132 x 91.5 cm
Carnegie Museum of Art, Pittsburgh

7. Design for strong indoor/outdoor relationships (bringing nature inside): atria with greenery, roof gardens, indoor water fountains, aquariums, etc.
8. Provide choices for degree of participation with natural setting.
 - Although Wilson (1993) has shown a greater therapeutic benefit if users are privy to "hands-on" experiences, the research of Ulrich and Parsons (1992) shows a definite reduction in stress resulting from simple visual exposure to above elements. Hospital users should be given choices along a hierarchy, ranging from:
 - Views to nature
 - Views to humans/animals in nature
 - Participation (passive) in natural setting: e.g. outdoor gardens with comfortable seating, etc.
 - Participation (active) in natural setting: e.g. gardening, running/walking, animal care, etc.

4.1.4 Principle #4: Design for the Accessible Landscape.

Humans are most comfortable in a landscape that is both visually and physically accessible and that recognizes the diversity of needs and abilities. Recognition of all user groups and their diverse needs creates a more inclusive and accessible design (Centre of Universal Design, 1997, Cooper-Marcus and Francis, 1998). A truly restorative hospital site enables on-site access for patients, visitors and staff as well as a strong social and environmental connection to its surroundings, thereby enhancing the possibility for social support and a sense of belonging (Ulrich, 1992). Welcoming community members to the hospital site may increase not only stewardship of the land, but also the sense of being "caretakers of our neighbours". As patients share space with schoolchildren, daily joggers, and community gardeners, the opportunities for interaction, understanding, and support increase.

Examples:

- A hospital site that welcomes visitors to its cafeteria.
- An open space shared by patients, local schoolchildren, visiting families, staff, community gardeners and recreationalists.

Design Implications:

1. Consider comfort and needs of wide range of users on site: patients, visitors, staff, and range of public users:
 - Design for all users, regardless of age or ability - Refer to Appendix I for "Universal Design Principles";
 - Involve as many users, in early planning stages, as possible;
 - Provide convenient/inviting overnight accommodations for family members;
 - Provide comfortable indoor/outdoor visitor waiting areas with movable seating;

- Provide a variety of necessary on-site amenities for users (shops/restaurants);
 - Design outdoor spaces specific for staff members.
2. Encourage community use of hospital site:
- Design a friendly and welcoming street face;
 - Design a hospital cafeteria that invites local community to visit and use;
 - Encourage outdoor programs that foster patient /visitor/community member social interaction;
 - Encourage outdoor programs that integrate rather than segregate hospital from immediate context (Example: sharing open space with immediate neighbors);
 - Design and program in a manner that will actively promote responsible and caring stewardship of landscape by community:
 - Opportunities for interpretive trails, educational programs, and spontaneous place-making on site may enhance appreciation and protection of resources by community,
 - Sustainable on-site practices may be utilized to enhance healing experience (on-site water collection as habitat-attracting marshland) and to create desired community destination worthy of protection.



Figure 4-5:
Creekfield Lake Nature Trail in Houston, Texas.

This kilometer long trail in Brazos Bend State Park was designed to maximize accessibility.

The trail was designed to be suitable for all types of disabilities.

The trail itself is smooth asphalt with a graded flat surface. Parking blocks line the side to keep users from veering off trail. Displays along the path are designed for the sight impaired with information printed in large type and in Braille. Audiotapes are also made available. Park benches have no side handrails so wheelchair users can easily transfer across. Small raised sections of pavement signal an upcoming display without impeding wheelchairs.

The trail is successful at showing a wide range of design features available to expand the equitable nature of a park (Bondi, 2000).



3. Consider physical connections to community destinations and amenities:
- Provide easy access to hospital by foot, car or bus;
 - Ensure easy access to hospital by ambulances and persons in medical crisis;
 - Connect on-site walking trails to larger recreational routes;
 - Plan location of hospital open space in consideration of adjacent uses/resources.

4.2 Specific User Requirements and Design Implications.

While it is accepted that within the patient, staff, and community populations there will be diverse needs and abilities, an assumption is made that all individuals will benefit from stress reducing design. Given that, the preceding global principles and design implications should apply to all users. This second stage of the process encourages an in-depth evaluation of all intended users and their specific needs for unique and diverse spaces and opportunities.

The scope of this project does not allow an in-depth evaluation of all user group needs. A general discussion of the various groups and possible specific design implications is outlined below. This is not intended to be inclusive but rather a means of idea generation for design.

4.2.1 Patients and Visitors - Diverse Needs

Patient groups have been divided into 7 primary categories that will facilitate visual, behavioural, functional and experiential programming and design:

- # 1. Critical Care.
- # 2. Outpatient Treatment/ Diagnostics.
- # 3. Outpatient Teaching/Follow-up.
- # 4. Inpatients- Medical/Surgical.
- # 5. Extreme Ages.
- # 6. Hospital Long-Stay.
- # 7. Psychiatry/ Mental Health.

Family members and visitors are considered to be part of the "patient group". This follows a strong belief that when a member of the family (immediate or extended) is ill, that the entire family experiences stress, fear, anxiety and grief. For example, a patient confined to an Intensive Care Unit bed is highly dependent on caregivers. In many ways, the family member who sits vigil is equally if not more dependent on the hospital, its staff, and its design. A patient will sometimes, at a peak of stress, submit to the caregivers as a means of relieving stress and worry. Family members must continue to cope and so require special attention.

**Note: The following discussion draws strongly from the author's experience/education as a registered nurse-certified emergency nurse (bedside, research, teaching, and management) in both urban/rural hospitals. It is also drawn from conversations with other caregivers (registered nurses, practical nurses and physicians) in the Vancouver region.*

Patient/Family Grouping #1: Critical Care.

Examples: Emergency, Intensive Care Unit, Coronary Care Unit, Surgical Units (O.R., Post-Anaesthetic Recovery Room, Critical Care Recovery)

Discussion.

This group experiences immediate and high stress and requires a high level of legibility, simplicity, and functional considerations. A high potential for boredom associated with long waits, however, mandates access to views, programs and outdoor space. A strong risk for sensory deprivation is present due to confinement to bed. Length of hospital stay ranges from days to months, depending on illness/injury. Prolonged stays generally include transfer to less acute area of hospital.

Design Implications.

1. Visitors/family members require strong consideration in design. For example:
 - Entrances and exits should be clearly marked and circulation between services should be direct and simple. Waiting areas (indoors or outdoors) should be within close proximity.
 - Cafeterias should be in close proximity for easy access and quick retreat/refuge.
 - Access to basic retail/commercial as well as comfortable overnight facilities should be available.
 - The 24-hour nature of critical illness demands design elements that promote a sense of safety, security, and understanding during day and night. Pathways and outdoor spaces require lighting and simple wayfinding with attention to principles of CPTED (refer to Appendix II) to allow visitors 24 hour escape.
2. Confinement to beds demands that windows be low enough to provide visual access outdoors, height, presence of positive distraction, regional cues to promote sense of place.
3. Strong views to nature, animals, positive programming should be maximized, especially for patients suffering from stress-related illness (e.g. coronary artery disease).

Patient/Family Grouping #2: Outpatient Treatment/ Diagnostics.

Examples: Radiology, Day Care Surgery, Outpatient Cancer Care Clinic

Discussion.

A fear of the unknown and potential for long waiting times creates a strong need for stress reduction. Depending on the feared or actual diagnosis, a loss of control and feelings of helplessness and hopelessness may be significant. Length of hospital stay ranges from hours to occasional overnight stay.

Design Implications.

1. Access to outdoor spaces should be close and easy.
2. Strong visual positive distraction (views to nature/pets/play) are needed to combat helplessness/hopelessness.
3. Physical access to positive distraction should be possible: e.g. nature (fragrant plantings, touchable plantings, bird/butterfly

- attracting plantings, access to outdoor walking routes), programming (commercial, cafeteria).
4. Providing options for easy refuge/escape and choices in movement/activity will combat loss of control.
 5. Potential for sensitivity to ultraviolet light (chemotherapy/radiation) demand shady garden spaces as an option.
 6. Potential for impaired skin integrity demands comfortable seating outdoors, sheltered from elements (sun/wind).
 7. Potential for impaired mobility (weakness or disability) demands frequent rest stops in open areas, handrails, and universal design. (see Appendix I)
 8. Consideration of visitor and support person needs required (also subject to waiting/fear of unknown).

Patient/Family Grouping #3: Outpatient Teaching/Follow-up.

Examples: Healthy Heart, Diabetes Clinic, Asthma Clinic, CHF Monitoring, CVA Rehabilitation, Health Promotion Programs

Discussion.

Teaching/learning and repeat visits are a strong component and therefore require special consideration in programming spaces. Patients may move through the continuum of ability (in either direction) and therefore options and diversity are required. The length of hospital stay is generally less than one day, but may occur several times weekly, monthly, or yearly. It is also important to note that entrance into one of these programs often follows an acute stay in hospital (e.g. following new diagnosis of diabetes or recent myocardial infarction).

Design Implications.

1. Ensure presence of connections between acute care portion of hospital and outpatient programs to enable patients early introduction to follow-up.
2. Provide connections between wellness programs for outpatients and specialized inpatient units in order to enhance follow-up and compliance with after-care treatment. This will also streamline movement by staff between the programs (e.g. cardiologists can visit acute patients in Coronary Care as well as patients returning for stress tests). Examples of Acute Programs to Connect with Wellness Programs are: Healthy Heart program-Coronary Care Unit; Physiotherapy programs-Surgical units; Diabetic Teaching Centre-Medical units.
3. Provide a welcoming community street face to reduce the stress inherent in attending a hospital site and increase accessibility/awareness.
4. Provide access to larger open space for independent exercise programs.
5. Provide access to communal open space for programs with support staff (physiotherapists, occupational health, horticultural therapists, etc.).
6. Consider avoidance of allergens in planting (e.g. avoidance of London Plane-*Platanus X Acerifolium*).
7. Include programs suitable for hands-on interaction with nature (e.g. bird-feeding or watching, gardening, caretaking, fruit picking).

8. Provide options for movement in the space to challenge persons during rehabilitation (e.g. wheelchair accessible paths to forest hiking trails to bicycle paths).
9. Provide connections to community resources/amenities for field trips- programs (e.g. grocery stores for winter walking programs, local recreation facilities, schools).

Patient/Family Grouping #4: Inpatients- Medical/Surgical.

Examples: Neurology, Vascular, Orthopedics, Renal, Maternity, Infectious Disease, Respiriology.

Discussion.

Patients in general medical-surgical wards encompass a tremendous variety of abilities, needs and ages. Their length of hospital stay may range from one night to several months.

Design Implications.

1. Both mobile patients and those confined to bed share a need for physical and visual access to outdoors: rooftop/outdoor gardens should be easily accessible by wheelchairs and stretchers with consideration of window height and placement.
2. Consider outside views in siting programs within the hospital. For example, the dialysis unit (with potential for long hook-up times) should offer a view that has interest, nature, and intrigue. Views to areas with mystery in outdoor open space would be appreciated.
3. Provide temporal changes in outdoor views: over days, seasons. For example, a program of bringing in rural pasture animals to "mow" open lawns would create special days of interest for patients confined to bed/hospital.
4. The increase in fear, frustration, anger, and boredom with prolonged hospital stays demands visual and physical access to distraction.
5. Loss of control increases with prolonged stays, demanding the inclusion of options and choices of spaces: a sunny cafeteria space (indoor-outdoor) versus a shady, sheltered refuge.
6. Younger inpatients may desire places to meet with friends where noise will not disturb other patients.
7. Patients may desire places with "extent" for meeting with family, friends, volunteers, and pets. Extent is described as a place away, a place to forget if only for a short time that current home is the hospital (Kaplan, Kaplan, and Ryan 1998). A waterside picnic area under canopy trees, for example, with views oriented away from the hospital might be designed for family gatherings.
8. Creative design of indoor spaces with strong connections to outdoor gardens might be designed for telephone nooks. Cellular phones remain banned in the majority of hospitals, and so the "pay telephone nook" becomes a well-used place.

Patient/Family Grouping #5: Extreme Ages.

Examples: Paediatric population and geriatric population.

Discussion.

A particular requirement for this grouping is the need for supervision and safety, combined with positive distraction. The length of hospital stay may range from day(s) to week(s) for paediatric patients. For geriatrics

patients, it may range up to several months, while awaiting placement in an extended care facility.

Design Implications.

1. Supervision and safety are required.
 - Outdoor programs should be accessible, defensible and in plain view of caretakers.
2. Positive distraction through both design and programming is required to prevent sensory deprivation.
 - For geriatric patients that may be waiting for placement, the hospital becomes an interim home. This may be the population that suffers most from over designing hospitals for function and legibility. The absence of positive distraction and stimulation has disastrous effects on the fragile elderly population. A strong reliance on programming to provide stimulation (music therapy, pet therapy, horticultural therapy, and pastoral care) presents as a significant risk factor in an age of budgetary restraints and cutbacks. The role of the designer will be to aggressively design places that facilitate easy access to programs, e.g. by providing built raised garden beds and pathways accessible to wheelchairs and persons with impaired walking skills. Designing access to outdoor spaces for persons confined to hospital beds will be an important challenge for the designer.
3. Consider the creation of space that can be used by both geriatric and pediatric populations (separate and together).
 - An option may be to combine gardens/play areas for both groups of patients. Placing these two groups in close proximity allows them to offer support, learning and positive distraction. Play can be combined with rehabilitative efforts. For example, persons learning to walk again (e.g. following a cerebrovascular accident) or learning to use wheelchairs require a variety of surfaces and materials for "practice" (gravel, rubber, concrete, sand, turf, etc.). These materials can be used to create a garden that is playful yet instructive for both sets of patients.

Patient/Family Grouping #6: Hospital Long-Stay.

Examples: Palliative Care/Extended Care. May also include a variety of medical conditions that require prolonged hospital stay for treatment (e.g. renal dialysis, complicated cardiac recoveries, etc.)

Discussion.

The hospital environment becomes home to these users, who may seek a variety of programs for comfort. Length of stay may be days to years. Consideration of visitor and family member requirements will be vital.

Design Implications.

1. These patients have a strong need for imageability and legibility in this hospital place that becomes "home". Access to a diversity of programs will be beneficial. Facilitating the spontaneous creation of place making (allowing for discovery) will also be important. For example, along with defined spaces, it will be important that patients have opportunities to find their own special corner, path, or tree on the hospital landscape.
2. Opportunities for spiritual and emotional interactions between patients, staff, and community should be available: e.g. a multi-denominational chapel/area for prayer should be within easy access.

3. Creating an environment that encourages community participation (volunteer groups and individuals) promotes social support. Measures taken throughout the hospital site to encourage community involvement and volunteerism will benefit this group.

Patient/Family Grouping #7: Psychiatry/ Mental Health.

Discussion.

A diverse group of varied ages and abilities, the psychiatric population will benefit highly from efforts at reducing stress. Stress is, in most cases, a significant factor in mental illness. Their length of hospital stay varies from days to weeks, depending on the type and severity of illness. Length of stay will also be dependent on the type of psychiatric treatment programs offered by the proposed hospital.

Design Implications.

1. Provide strong natural views outside locked wards/quiet rooms.
2. Avoid abstract art/forms in the landscape that might increase stress or fear.
3. Provide well-defined, highly legible walking paths.
4. Provide opportunities for privacy as well as social interaction.
5. Provide legible wayfinding to private spaces, to public café/coffee shops, and to outdoor programs.
6. Provide an outdoor space for patients to utilize that can be supervised by staff.
7. Consider need for comforting, safe, outdoor area that can be supervised and is secure (e.g. "locked garden") for patients involuntarily admitted to hospital under Mental Health Act. At the very least, these patients should have strong views to nature.
8. Define a smoking area that is well lit for 24-hour use, defensible and provides a pleasing atmosphere.
9. Define a smoking area that is visible by patients from within the ward. This will act to decrease stress if patients are made aware of the presence of a nearby smoking area.

Research Focus: Schizophrenia & Smoking Behaviour.

Some readers of this project may find it unusual that there is such specific emphasis being placed on the design of smoking areas. A brief review of available medical research, however, details the importance of enabling this behaviour for the psychiatric population, and, in particular, for schizophrenic patients.

Patients with schizophrenia have an extremely high prevalence of smoking. A 1986 US study found 88% of these patients were smokers compared with only 33% in the general population (Hughes, et al, 1986). The increase in dopamine release induced by smoking has been hypothesized as being helpful in alleviating some of the positive schizophrenic symptoms (delusions, hallucinations, paranoia, etc.) Therefore, schizophrenics smoke in an attempt to self medicate. Smoking also interacts with neuroleptic treatment (a common drug treatment for schizophrenics, includes the drugs Haloperidol and Chlorpromazine). Neuroleptic plasma levels are reduced causing higher doses to be prescribed and, subsequently, leading to higher incidence of side effects (Goff, et al, 1992). One study actually showed that patients smoke more when treated with the neuroleptic Haloperidol than during a medication-free state (McEvoy, et al, 1995).

In summary, smoking cigarettes has proved beneficial in reducing both the ill effects of the disease and the powerful side effects of the drugs used to treat schizophrenic patients. Yvonne Savard, an Emergency Psychiatric Clinician at Langley Memorial Hospital (Langley, B.C.) made the following statement in a conversation with the author (in May of 2002):

"The act of smoking helps them to filter out the negative thoughts that attack their minds and, in turn, they are much easier to deal with and much more open to treatment".

Most hospitals in the Lower Mainland of British Columbia have very liberal smoking rules for their patients. Areas provided for smoking, however, are generally windowless lounges or back door entrances. This project proposes to design a more hospitable open space for smoking.

4.2.2 Staff and Volunteers

Staff and volunteers in hospitals require opportunities for stress reduction, for social gatherings, for education, and for meal and break taking. In particular, caregivers (nurses, physicians) require easy and immediate access to areas that offer brief respite. Emergency staff, for example, in many larger cities across North America are victims of extreme stress several times during 12-16 hour shifts. These stressors include violence from patients and visitors, dealing with death and dying, exposure to infectious diseases, etc. In personal conversations, a large number of nurses claim regular physical/verbal abuse in the workplace. Despite this, with staff shortages, breaks have become little more than stolen minutes outside the ambulance bay door.

Several studies across a variety of workplaces (e.g. healthcare, office buildings) have found that staff members have strong feelings about the presence of windows and available views. Natural views are most preferred. Studies conducted on caregivers in hospitals show that employees with views to nature experience less stress and report better health and higher levels of job satisfaction than comparable groups who lack such views (Leather et al., 1997). The highest degrees of stress were found in environments with no windows at all (Leather et al., 1997). For the economically conscious employer, improved health and higher satisfaction should translate into fewer sick days, injuries and leaves of absence as well as higher productivity (Leather et al., 1997).

An absence of windows is the current accepted status quo in a majority of emergency rooms in the Lower Mainland of British Columbia. If windows are present, they are placed above head level and are screened with drapery/blinds (with the excuse of a need for privacy and security). Illumination, night and day, is generally by harsh fluorescent overheads. Natural lighting is rarely considered. Many caregivers and patients will complain of a sense of disorientation to time due to the cocoon-like nature of the environment.

Consideration of hospital staff members as important users of the design creates several possibilities and responsibilities:

1. Early involvement in design and planning of the built structure should include consideration of window placement and access to natural views for staff who are confined to working indoors for several hours at a time.

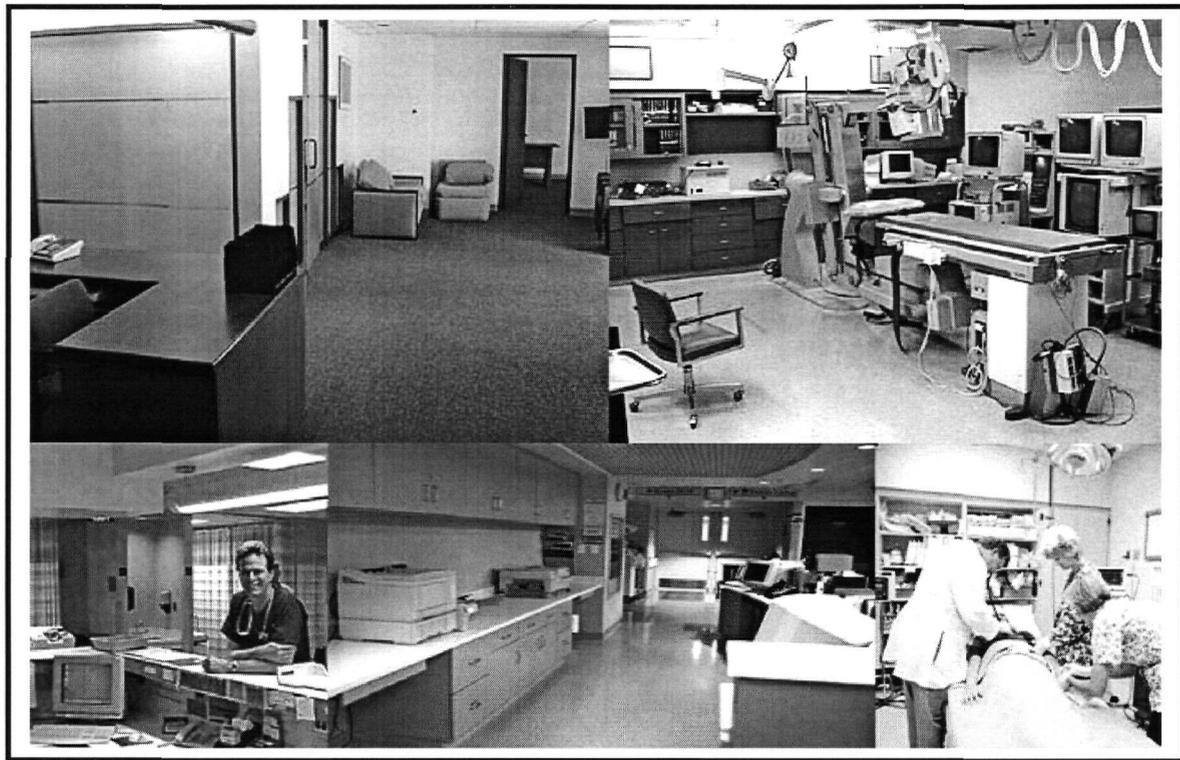


Figure 4-6: Prototypical Windowless Emergency Wards.

2. Physical access to the outdoors should be considered with possibilities for easy, quick access for short or long retreats.
3. The designer will need to pay special attention to the creation of spaces that promote a feeling of "being away" and of "extent" (Kaplan, Kaplan, and Ryan 1998). Lookouts with views to significant landmarks or large open space may be designed.
4. The designer should also pay special attention to the creation of quick refuge areas for staff only that are accessible and defensible 24 hours a day. Spaces should be designed that enable staff to be human and cry, swear, smoke or laugh away from the public-patient eye.
5. Programming for recreation before, during and after work should be included. For example, a defined running track on the hospital grounds may be used to relieve stress during longer breaks.
6. Larger, open spaces to be utilized for teaching and social gatherings will be important as well. An unfortunate development in many hospitals is the gradual relegation of teaching rooms to basements and windowless rooms. Indoor-outdoor relationships and views should be considered in early siting and programming.
7. Security, safety, and functionality are important issues for staff working extended hours. Easy and safe access from parking to hospital entrances is especially vital for evening and night staff. Grouping parking together along a well-lit axis enables staff to walk together and facilitates monitoring of staff by security personnel. Given the high numbers of staff who work extended hours, designs and programs for after dark become an important element.
 - Administration: Monday to Friday, business hours
 - Patient Care and Treatment (physicians/nursing): extended hours (24 hours)
 - Support Services(security, cleaning, secretarial, medical records, laboratory, radiology, etc.): extended hours (24 hours)

- Volunteers (both regular and ephemeral programs): extended hours
8. In the landscape design, facility maintenance staff/gardeners will also be important users. Spaces should be designed for a range of maintenance requirements.

4.2.3 Community Members

Welcoming the community at large onto the site will potentiate stewardship of land as well as social support. The visiting public will have specific needs for programs not usually considered on a hospital landscape. These programs will include (but not be limited to):

1. Welcoming entrance: significant street face and high visibility;
2. Accessible pathways not dominated by autos or ambulances that enable joggers, cyclists, pedestrians, dog walkers, and possibly equestrians to use the site;
3. Open areas for community play;
4. Public washrooms and public rest areas: coffee shop, café, retail;
5. Gardening sheds for community programs;
6. Meeting areas on site that encourage public users to stay versus simply pass through the landscape;
7. Physical connections to larger community amenities (greenway corridors, trail systems, etc.).

Conclusion.

Following a framework of restorative design should create a health care facility that people want to visit, during times of illness or wellness. It should be a place in which people feel comfortable; a place that is familiar; a place that is alive with food, water and plant and animal life; a place that people can and want to explore. At the same time, however, the health care landscape must respond to very specific needs of specialized users. It must be functional. It must be safe. It must be easy to use. The challenge will be to create a restorative landscape without compromising functionality. Creating a place that allows harmony of nature and technology will be the goal of the design.

An overall design that facilitates restoration should be applied to the hospital landscape with specific interventions applied whenever possible to meet the needs of specific populations. At the very least, the design should provide a framework for unique and specific places that may then be built as economics allow. For example, the design may program an open space to be shared by the extended care and the paediatric wards. Actual construction of this garden that combines rehabilitation with play may require future fundraising by the community and the hospital in order to become a reality. Providing the space and the infrastructure for this and other gardens or open spaces increases the likelihood that they will be constructed.

Applied Restorative Design: A Tiered Approach

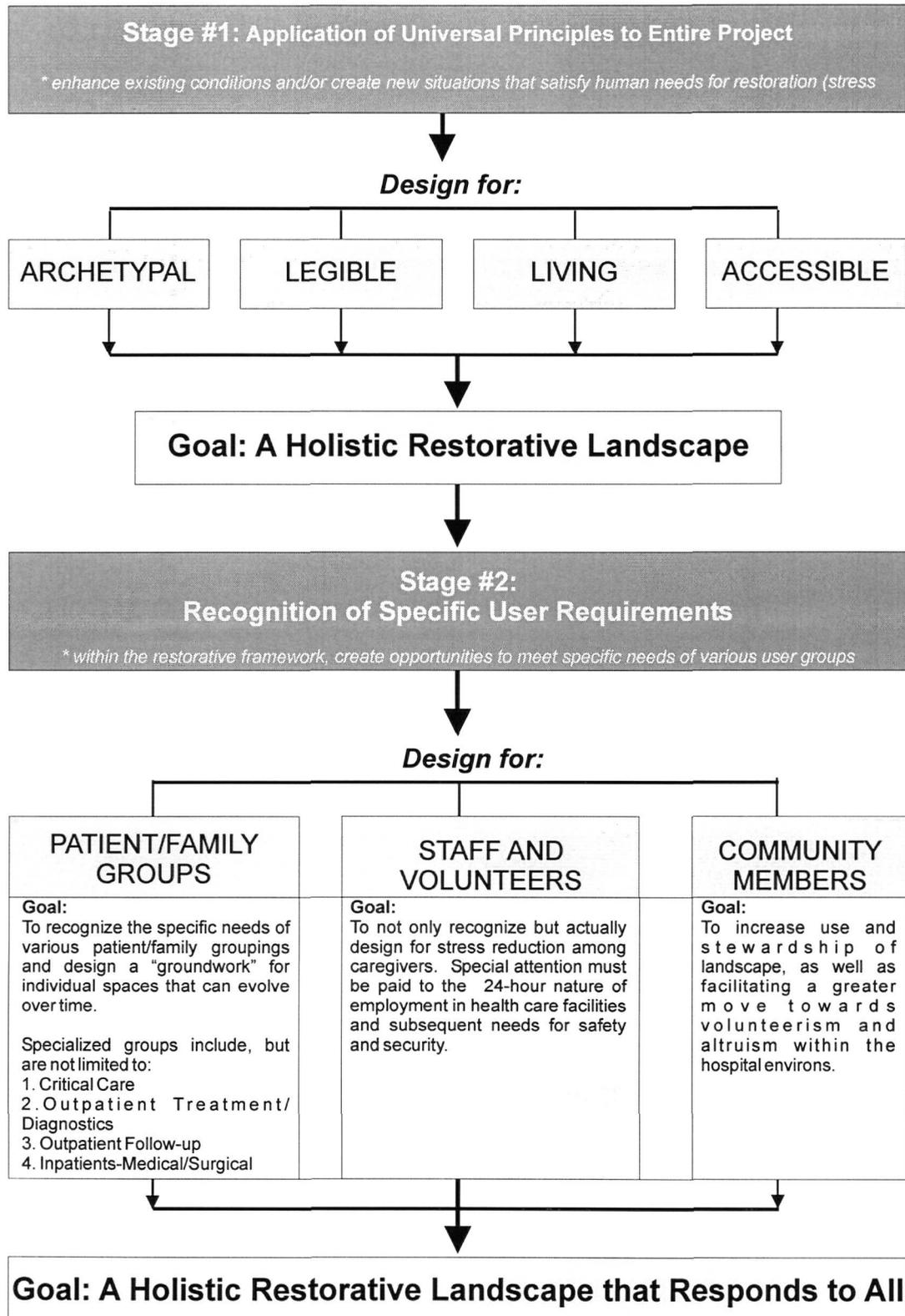


Figure 4-1: Approach to Applied Restorative Design (Hospital Landscape)

CHAPTER V.

Public Process: A Discussion

5.1 The Planning Phase.

"Any attempt to create a new approach to public land or building design will fail miserably if the public is not consulted and does not have a sense of ownership, stewardship, or claim in the project." (Sommer, 1983, p. 122)

It is accepted that the scope of this project does not permit the public input that would be required for the successful design of a community facility. Planning for a hospital landscape would require full and active participation from a wide cross section of the population.

Actual interest groups involved in the process would require specific research for each individual site. Interest groups that would be called on to assist planners and designers would ideally include (but not be limited to):

- government officials (municipal, provincial and federal),
- health care (physicians and nursing),
- local business associations,
- representatives from different levels of local schools (university, secondary and elementary),
- wildlife and environment stewardship groups,
- churches and volunteer groups, and
- various recreation interest groups.

The accepted form of decision making in a democratic world is voting. All citizens would have say in where and how a health care facility is constructed. The demanding and complicated procedure that precedes a vote, however, is that of goal setting (Steiner, 1991, p. 23). "Goal formulation requires public participation" (Wright, Braithwaite, and Forster, 1976).

A major challenge in involving public interests in the decision-making process is to ensure that decisions and goal setting are based on accurate and complete data. The public may concede to the tried and true only for lack of a better approach. How does one ensure that the public not only has a voice in the hospital design, but is also made aware of the expanding and specialized body of research that directs restorative design? If community members are made aware of the advantages of designing for familiarity, compatibility, biodiversity and accessibility, it may be assumed that heightened pressure will be put on public representatives to change current traditions of construction and, more importantly, of resource allocation.

An initial exposure to the restorative design approach may feature the use of preference testing of key potential users. This would involve showing visualizations of regional and archetypal landscapes to users in order to determine preference (and to build justification) for the ensuing design.

Designers may well propose restorative landscape manipulation, but without public support, designs are easily slashed to a mere remnant of their original intention as a means of saving dollars. An adaptation of a model put forth by Ray McNair in 1981 and elaborated by Frederick Steiner in 1991 is proposed here as a means of ensuring early and continued involvement by community interests. This model demands and facilitates an interactive process between planners, designers and the public.

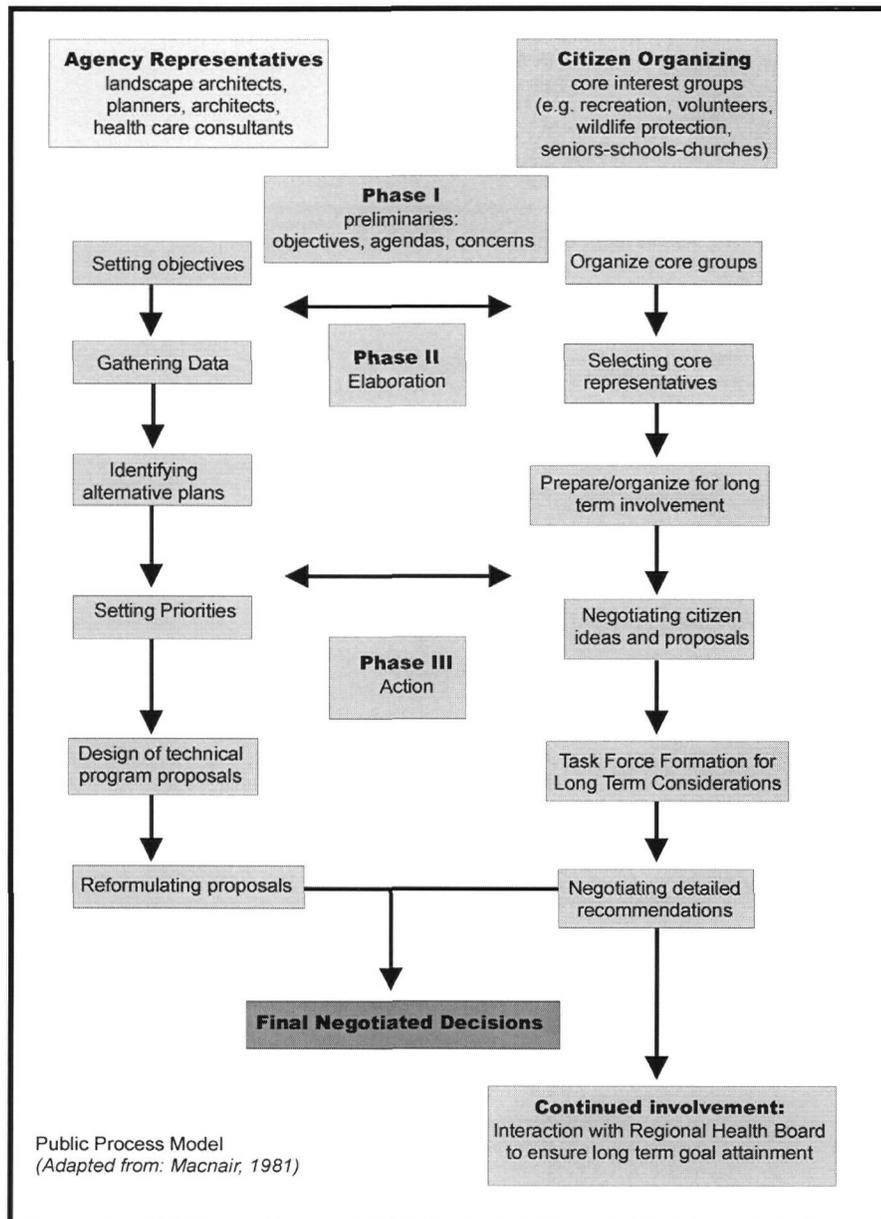


Figure 5-1: Model for Public Involvement

The model suggests moving the public process away from the traditional open public forum, often criticised as being ineffectual and a nuisance (Steiner, 1991). Rather, key personnel with both project and community interests are brought together in an atmosphere that encourages sharing of ideas, goal setting and decision-making.

5.2 Site-Specific Programs.

In times of financial constraint, it is unrealistic to expect health care budgets to be allocated in a large way on landscape upkeep. However, it may be possible to attract and encourage organized community groups that are now present in most cities, large and small. Locally and regionally directed volunteer/interest groups exist as powerful potential resources.

Examples drawn from the City of Abbotsford, B.C. (locally and regionally) may include, but certainly not be limited to:

- Central Fraser Valley Naturalist Society,
- Local 4-H Clubs,
- Monika's Wildlife Shelter & Friends,
- Local groups/individuals with interest in the areas of heritage tree protection, native planting promotion, habitat protection, etc.,
- City of Abbotsford "Adopt-A-Street",
- City of Abbotsford "Adopt-A-Park",
- Neighborhood Block Watch,
- British Columbia Senior's Peer Network,
- Alzheimer's Society of B.C. Field Support Staff and Volunteers,
- Abbotsford Hospice Society,
- Abbotsford Big Brothers-Big Sisters,
- Ducks Unlimited Canada-local chapter,
- Langley Environmental Partner's Society,
- Abbotsford Peer Support for Senior's.

Involving the local community groups in an early phase of planning will increase the chance of designing a site that will be the subject of active and concerned stewardship.

This design proposal will include exploration into the development of a local community group that will take a specific interest in the care and maintenance of the hospital landscape. As has been stated, the idea of creating hospital open space that promotes community use and care as a means of advancing volunteerism and altruism is an important goal of this exploration.



Figure 5-2:
Volunteers monitoring habitat
in constructed stream-marsh.

CHAPTER VI.

Marshall Road Location: Existing Conditions

6.1 History of Existing Project.

On March 10, 2001, the provincial government gave approval to construct a new regional hospital in the Fraser Valley of British Columbia. A 350-bed acute care hospital will be combined with a new regional cancer centre to serve residents of the eastern Fraser Valley. The proposed site for the complex is a 10.4 ha parcel of land on Marshall road in Abbotsford owned by the Fraser Valley Regional Health District. The intention of this new facility is not only to relieve pressure on tertiary care centres in Vancouver, but, more importantly to allow local residents to receive improved health care closer to their homes. The new hospital will replace an aging facility that no longer meets the needs of the community. "Together, 'this new facility' will provide a phenomenal improvement in health care and new services not now available in the region. Health authorities and providers need to be able to plan and deliver services for patients within their own region." (BC Cancer Society, 2001)

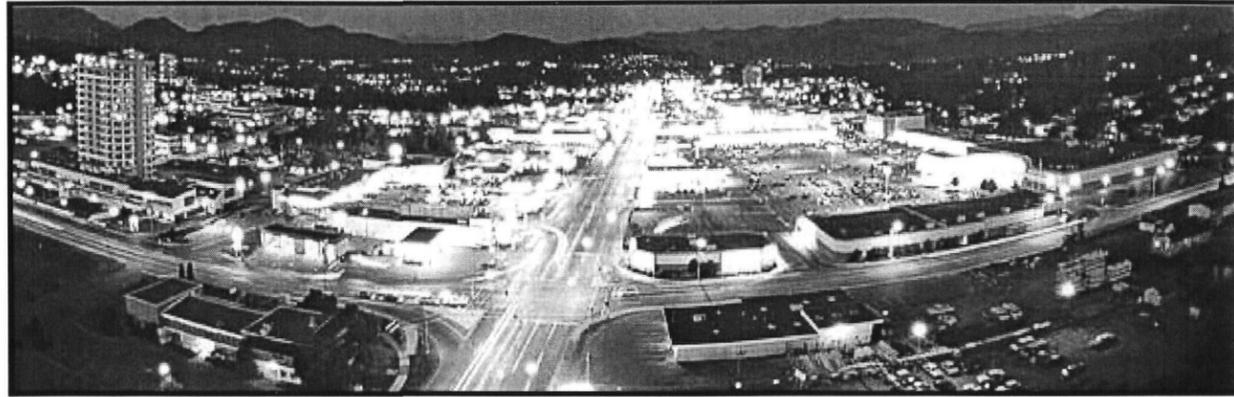


On December 12, 2001, the provincial government announced a restructuring of the province's health care system. The Fraser Valley Health Region was merged with two other Health Regions (Simon Fraser Health Region and South Fraser Health Region) to become the larger Fraser Health Authority. The impact this

Project Timeline.

- 1986: ■ Options explored for upgrade to local health services.
- 1990: ■ Construction of new facility recommended.
- 1991: ■ Marshall Road property purchased by Fraser Valley Regional Hospital District (FVRHD). Site previously used as provincial Veterinary laboratory (and chicken experimentation site).
- 1997: ■ Working drawings completed; Project placed on hold by provincial government.
- 2000: ■ B.C. Ministry of Health requests review of project; addition of Cancer Agency to acute care hospital plan.
- 2001, June: ■ Ministry advances funds (FVRHD agrees to 40% share capital costs).
- 2001, Sept.: ■ Hazardous material removal and demolition contracts awarded. (private versus public).
- 2002, Oct.: ■ Expected date of new working drawings.
- 2004: ■ Expected date of project completion at estimated cost of \$240-million.

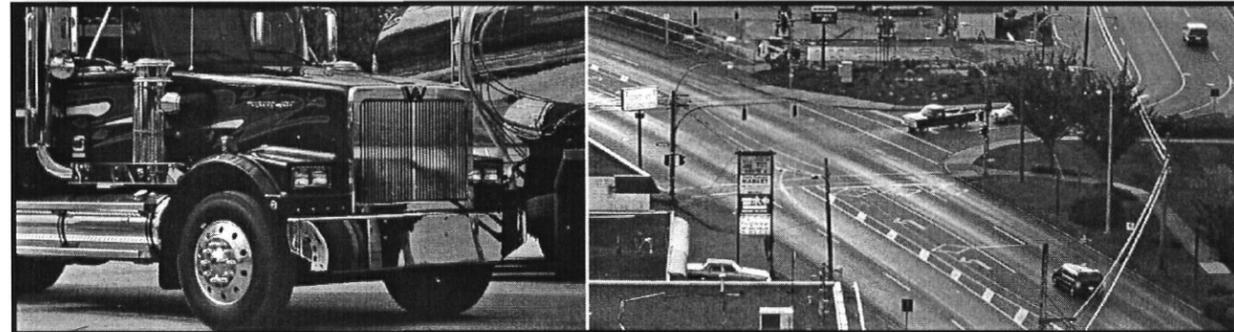
Source: FVHR Project Home Page, 2001. <http://www.hsg.bc.ca/Projects/FVHC/>



Accessible Landscape: Automobile Focused.

Primary road access to Abbotsford is provided by the Trans-Canada Highway (#1) running west to Vancouver and east to Hope. Built in the 1960s, the highway allows for easy and rapid access to surrounding communities. Highway 11 provides the north-south link to Mission (14 km) and the U.S. Border (3 km) at Sumas, Washington. Freight rail service is provided by CP Rail, CN, and Southern Railway of B.C. The local airport provides daily flights to national locales.

Despite proximity to major highways, it is significant that 82% of the working population are employed either in or directly adjacent to the City of Abbotsford (City of Abbotsford, 2002).



Proximity to the Trans-Canada Highway and easy access to surrounding regions will be significant in defining the hospital's catchment area and in allowing it to serve as a major trauma centre for highway related accidents.

Bicycles on the Bus

- Thanks to the following organizations which have provided bus-mounted bike racks for the Central Fraser Valley Transit System:
- Fraternal Order of Eagles
 - Seven Oaks Mall
 - University College of the Fraser Valley
 - Wenting Bicycles

Despite accessibility to and through the area by major highways, transit service is limited. Hospital users will have high automobile dependence. This will impact on the amount and type of parking that will be required for the hospital design. Many suburban and rural areas are not serviced by buses, although there is a local increase in Park-and-Ride facilities as well as bus-mounted bike racks.

A local bus route (#5-North Poplar) currently passes by the hospital site, with hourly stops during business hours. An extension of hours and increased number of buses will be required for the hospital.

Origins.

Following word of the Fraser River Gold Rush, thousands of non-British citizens swept into the territory. In order to assert their claim on British Columbia, the British Government sent the Royal Engineers to survey the area in 1858.



Figure 6.1: Downtown 1907.
Photo courtesy M.S.A. Museum.

As reward for their services, the engineers were offered land at minimal prices. In 1891, Canadian Pacific Railway built a line from Mission to Sumas, Washington intersecting the only roadway through the valley, the Old Yale Road. A station setup at this point would become the Village of Abbotsford. It was incorporated in 1924 and became a city in 1995 with the amalgamation of the districts of Abbotsford and Matsqui.

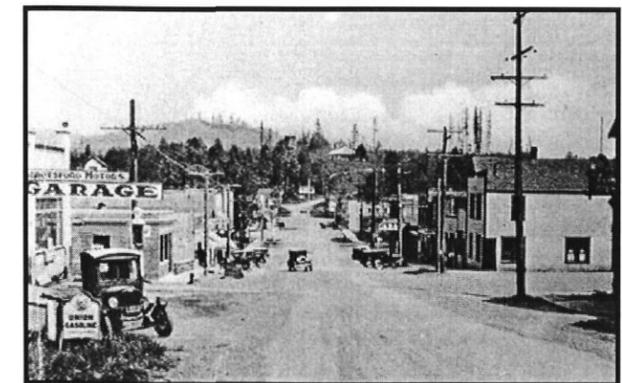


Figure 6-2: Downtown 1930.
Photo courtesy M.S.A. Museum.

6.2 Analysis:

Regional Context

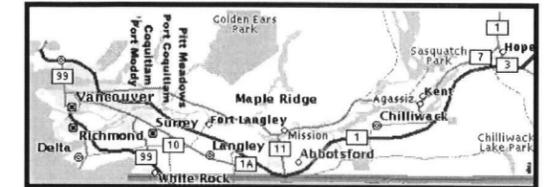


Figure 6-3: Relationships to Local Municipalities.

The City of Abbotsford is located in the centre of the Fraser Valley of British Columbia, approximately 70 km from downtown Vancouver to the west and Hope to the east. With a population of 119,818 (2001 Canada Census), it is the fifth largest municipality in B.C.

Abbotsford covers 359 square km (138 square miles), about 86% of which is part of the Agricultural Land Reserve and is some of the most productive farmland in Canada.



The majority of residents live in the urban core, surrounded by farmlands and rural communities. Abbotsford is viewed as a true "city in the country" for this reason.

"Abbotsford has continued to urbanize without sacrificing its rural roots." Abbotsford Chamber of Commerce, 2001.



Above-Figure 6-4: "Manzana Apple Farms", Abbotsford.

Below-Figure 6-5: Winter Raspberry Canes, Abbotsford.

In 1999, 12 million kilograms of raspberries, 90% of the total grown in B.C., came from Abbotsford and directly brought \$21.4 million to the economy. In the same year, 4.6 million kilograms of blueberries generated \$9.5 million.

Scattered throughout the region are also producers of saskatoon berries, red currants, gooseberries and blackberries. Grass and corn are grown in large tracts, primarily to service the livestock (dairy cattle, equestrian) industry (City of Abbotsford, 2001).



Edible Landscapes.

The edible landscape is highly recognized and cherished in this region. The urban core of Abbotsford is approximately 32 km (20 miles) from the Pacific Ocean in White Rock and about the same distance to mountainous sites. The combination of sunshine and precipitation has resulted in an evergreen valley. Enjoying one of Canada's mildest climates, with a long frost-free season, mild winters and warm summers, Abbotsford has good, fertile soil conditions.

These conditions have resulted in the area becoming the "berry capital" of B.C., with edible landscapes spread across the valley floor.

Photo courtesy M.S.A. Museum.



Figure 6-6: Baling Hay in Abbotsford, 1941.

Significant Views.

Mountain views are an integral part of wayfinding and legibility in this valley landscape. Major peaks include Golden Ears, Mount Baker, and Sumas Mountain. A significant visual landmark is Mount Baker to the southeast, visible on clear days.

Large expanses of farmland are situated within minutes from the urban core. These open spaces are generally closed to public use but exist as significant visual resources.

Source: City of Abbotsford, 2002.

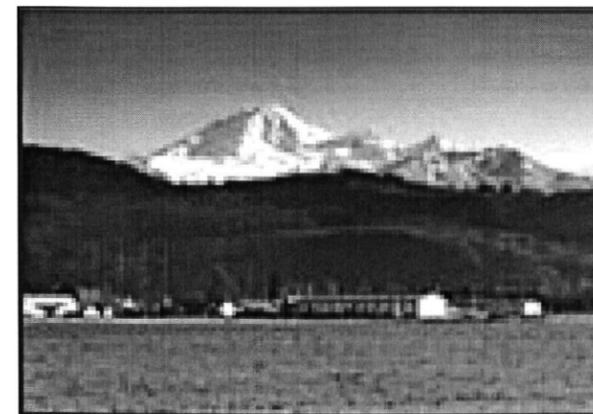


Figure 6-7: Farm near Sumas Highway Exit.

Urban-Rural Harmony.

Rural activities continue to be a significant part of the Abbotsford economy despite a growing diversity of businesses: food processing, aerospace, manufacturing, finance and retail. Farm receipts total more than \$300 million annually (City of Abbotsford, 2001).

Source: City of Abbotsford Home Page, 2002.

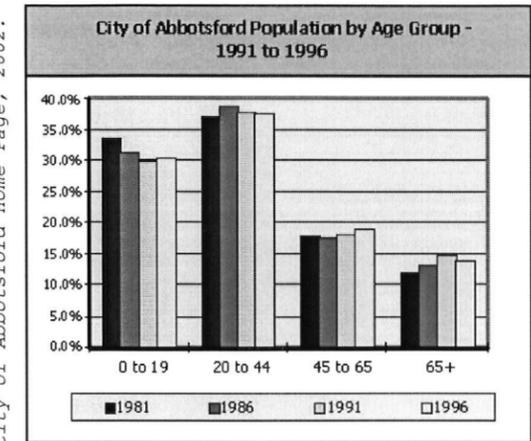


Figure 6-8: Population by Age

Growing, Diverse Community.

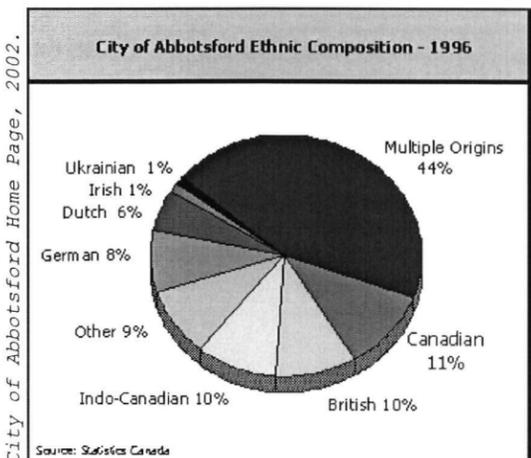
The 2001 census figures just released in March of 2002 indicate a 9.2% increase in population for Abbotsford since 1999. This is in contrast with 4.9% for the entire province.

Despite a national trend towards aging communities, the census for Abbotsford revealed a minor drop in the percentage of population over 65 and an increase in the under 19 group.

The implication for Abbotsford is that the City will have to continue providing services and facilities to service a family oriented community (City of Abbotsford Home Page, 2002).

Figure 6-9: Cultural Diversity

Source: City of Abbotsford Home Page, 2002.



Source: Statistics Canada

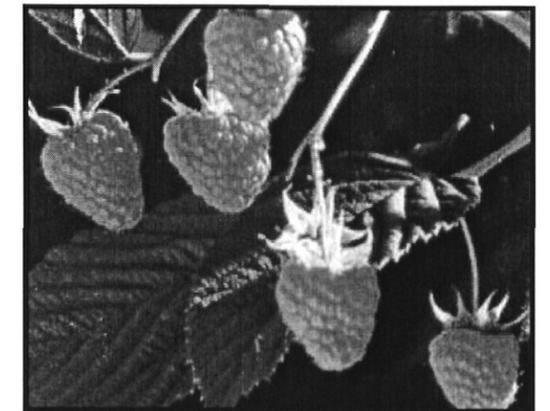


Looking North over Abbotsford City: Rural-Urban Harmony.

Trans-Canada Highway visible in foreground running east to west.

The large green open space just north of the Trans-Canada (outlined in dashed line) is the planned hospital site. Mill Lake, a significant destination site for active and passive recreation is situated in the middle ground. Dotted lines with arrows show potential connection routes from the hospital site.

Figure 6-10: Aerial View over Proposed Site, 2001. (Source: Fraser Valley Web Site, available at URL <http://www.seethefraservalley.com/abbots/abbots.htm>)



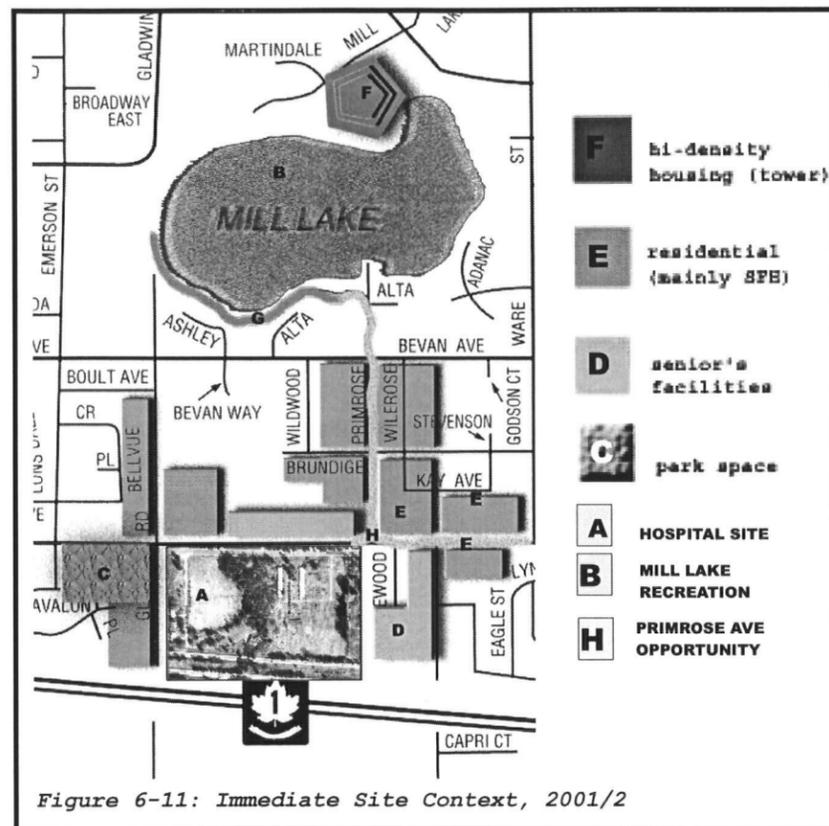
Regional Context: Summary.

Strengths.

1. Population "home-based": residents work and play close to home.
2. Tradition of harmony between urban and rural interests.
3. Diverse population in terms of culture, age, and socioeconomic status.
4. Tradition of community involvement in local projects: examples are "Adopt-A-Street" and "Adopt-A-Park".
5. Proximity to Trans-Canada Highway and to surrounding centres.
6. Significant and spectacular open space views: Mt. Baker, Sumas Mountain, agricultural fields.

Weaknesses.

1. Significant rural areas in region with inadequate transit service: high automobile dependence.
2. Sprawling layout of parks and recreation facilities in area: competition for users.
3. Growing population: potential for urban-rural conflict and degradation of existing open spaces.



Good Neighbors.

Building height and mass will need to be minimized in order to fit in with the neighborhood character (maximum 4 storey). Consideration of the neighboring seniors' facilities in programming (visually and physically) will allow the hospital design to be more inclusive and serve the greater community.

Trans-Canada Highway as Noise Barrier.

The proximity of the Trans-Canada Highway will be advantageous in terms of wayfinding to and from the hospital, as well as simply lives saved by quicker access to highway traumas. For on-site users of the hospital space, however, measures to decrease the noise effects of the

highway will be necessary. Some degree of noise protection is currently in place due to an elevation in grade along the western edge and a constructed 2 metre berm along the eastern edge of the site. Noise calculations will be required during siting and design of the buildings and open space.

Recreational Connections.

A small park (Highland Park) is located across Gladwin to the west of the site. This area currently has children's play facilities. A more significant recreation site exists two blocks north of the site at Mill Lake. Mill Lake is a major local destination point for recreational activities that range from jogging and cycling to more passive bird watching. Just west of the lake is a large indoor and outdoor recreational site (Centennial Park) accessed from the hospital site down Gladwin Road.

Accessible Views.

Given the presence of the protective berm between the site and the highway, the potential for creating significant interior viewsheds is great. As well, the site is privy to significant off-site views that will be particularly vital to users of the higher hospital floors. Maintaining views to the rural, pastoral land south of the highway will be important. The value of this view as a restorative opportunity may well influence future zoning decisions. At present, this land is under ALR (Agricultural lad Reserve) and is protected. As mentioned previously, views to Mount Baker (directly southeast of site) are highly treasured by local residents. Currently, the elevation of the central knoll allows a good view to this landmark even without the benefit of building height.



Figure 6-12:
Highland Park to east of site.



Figure 6-13:
Menno Home and Hospital to north of site.



Figure 6-14:
Low-rise residential surrounds site.



Figure 6-15:
Trans-Canada (#1) Highway to south of site.

6.3 Analysis:

Site Context.

The proposed hospital site is situated in Abbotsford, British Columbia directly adjacent the Trans-Canada Highway on a 10.4 hectare (25 acre) tract of land. It is surrounded by single family, low-rise residential and low-rise (maximum 4 storey) senior citizen care facilities. To the south are large expanses of rural farmland and to the north, the urban core of Abbotsford. Access to the site may be gained from either Clearbrook or MacCallum highway exits (5 minutes driving east and west from the site).

Significant Factors to be Considered:

- 6.3.1 Potential for Recreational Connections (Highland Park, Centennial Park, and Mill Lake, in particular).
- 6.3.2 Proximity of Trans-Canada Highway and need for protection.
- 6.3.3 Potential for Significant Viewsheds off-site (Mount Baker as most significant).
- 6.3.4 The Senior Connection: Neighbors as Important Resources.

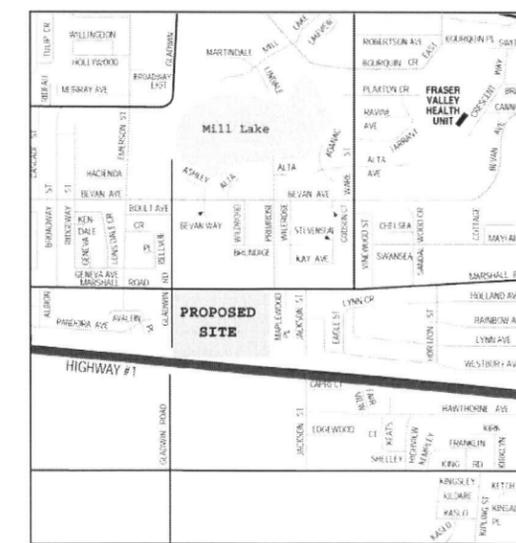


Figure 6-16: Street Context



Figure 6-17: Visualization Sketch of Primrose Avenue amendments. Sidewalks, street trees, lighting, benches, decorative paving and signage are all possible interventions. The images to follow display existing conditions.



Figure 6-18: Marshall Road looking east.



Figure 6-19: Primrose Avenue looking north to Mill Lake viewing point.

Consideration of Street Conditions.

Access to and from the site (to Mill Lake Primrose connection or elsewhere) will require movement along the sloping **Marshall Road** that borders the North edge of the site (as pictured on top left). This roadway will be the front door for the hospital site and considerations for street treatment will be necessary. Existing conditions are rural (mature Douglas Fir and unmanaged underbrush). There are existing 1.5 metre sidewalks that would require widening for dual wheelchair access. Managing the steep grade of this road will also be a consideration. Maintaining a rurally appropriate street edge while at the same time acknowledging the urban nature of a regional hospital will be required.

Primrose Avenue (shown at bottom left) is the current main access from the site to Mill Lake. This flat route is two rural blocks along low-rise residential housing. The street is poorly maintained at present and has no street trees or sidewalks. Users en route to the Mill Lake view point generally travel down the center of the road.



Figure 6-20: Mill Lake Viewpoint. This constructed viewpoint at the end of Primrose Avenue overlooks the southern edge of Mill Lake and connects to a recreational trail that encircles the lake.



Figure 6-21: Mill Lake Trail. Several opportunities to link this trail to hospital programs exist. For example, a staff running route that moves through the hospital and connects to Mill Lake could be used for after work stress reduction. Much of this trail is paved and/or gravel and is of a flat grade, facilitating wheelchair use. Issues of lighting would need to be addressed (safety and security).

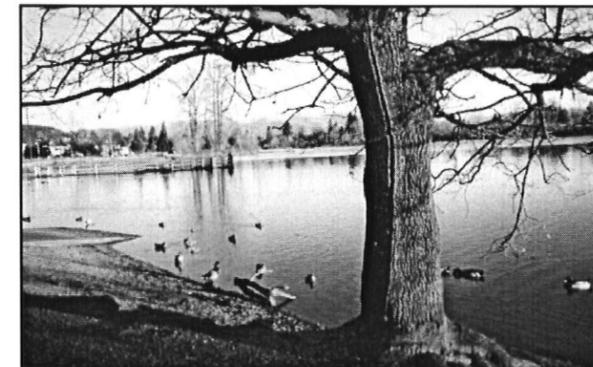
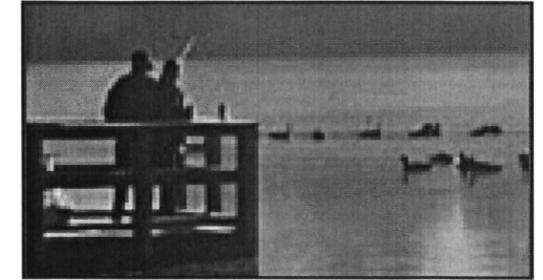


Figure 6-22: Mill Lake. This is a significant local resource for both passive and active recreation. Local bird habitat include Mallard and Wood Ducks, Canada Geese, Hooded Mergansers, and Great Blue Heron.

6.3.1 Context Focus: Mill Lake Access



A viewpoint for Mill Lake has been constructed at the end of Primrose Avenue, a residential street on the eastern portion of the site. This route is well-used by residents of the seniors's facilities to access a trail that surrounds Mill Lake. A more sloping route to the lake is available down Gladwin (western portion of the site).

Opportunities:

- ✘ Enhance Primrose Walkway (create a "Wellness Walkway") for community members and hospital users.
- ✘ Create a loop connection through the hospital site that connects with the Mill lake walking and cycling trail.
- ✘ Utilize Mill Lake as an off-site yet accessible restorative water feature for hospital site through connections.
- ✘ Enhance habitat movement by creating a more cohesive green connection to open spaces through use of street trees.



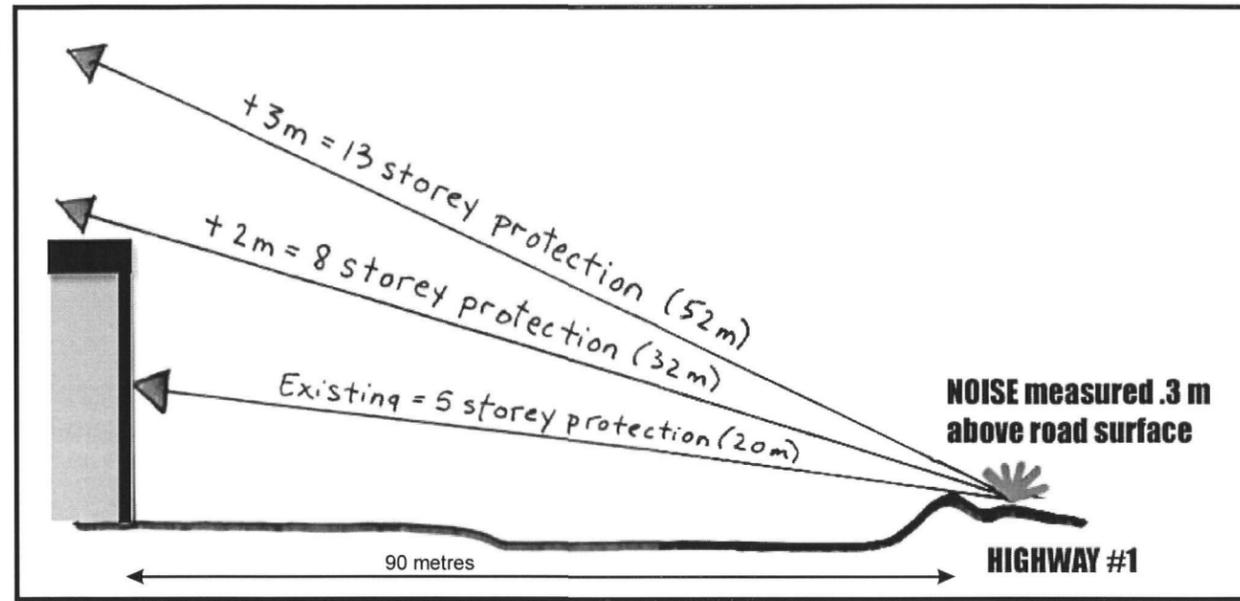


Figure 6-23: Sound Protection assessment.

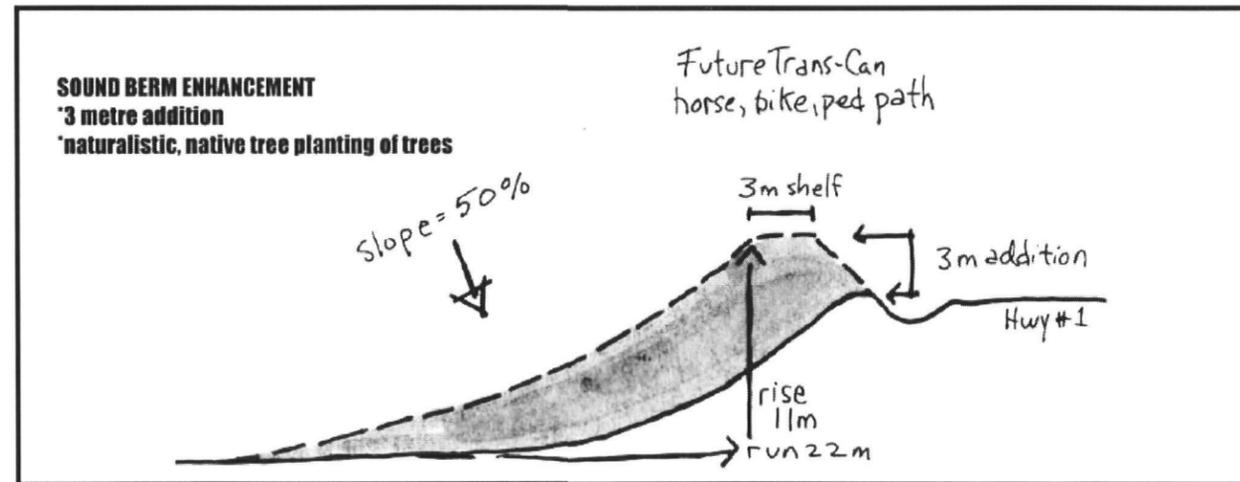


Figure 6-24: Sound Berm Construction.

Cut and Fill: Rough Calculations.

Calculations are conceptual only to show potential for berm creation.

- **Fill Required:** 160m(L) X 22m(W) X 3m(D)
=10,560 m³ (volume)
- **Potential fill** from Underground Parking construction = 3,219 m³
- **Potential fill** from Stormwater Pond/Marsh Construction (required by City of Abbotsford)
- = 170m X 30m X 8m = 40,800 m³

**Resulting excess fill can be marketed to provide funds for project.



Figure 6-25: Proposal for "Trans-Canada Green".



Figure 6-26: Current south eastern berm (as viewed from Marshall Road).

Sound Buffering.

The existing 2 metre high berm along the southeastern portion of the site has been examined for ability to provide sound protection for a high storey hospital building. This will be especially important for those patients who require long term hospital stays. Constant noise from daily rush hour traffic will be prohibitive to restoration.

Calculations show that an increase of 2 metres will provide noise protection to a height of 52 metres (approximately 11-13 storeys), if the built form is set 90 metres from highway. This enhanced berm should be planted with a mixture of dense mixed trees to enhance the sense of enclosure for the hospital open space. This is in keeping with the concept of volumetric space and creating archetypal spaces in which people feel most comfortable (Condon, 2001).

A proposal is made to create a berm surface that can have future potential as a recreational trail, including equestrian use (minimum 3 metre shelf). A continuous green corridor currently runs along private and public property (industry and farms). Developing a suitable berm trail on the hospital site could facilitate future efforts to expand this link (see Figure 6-25).

Interim protection will require a high fence between the highway and the berm. The fence will be planted with fast growing shrubs and vines, thereby creating an important hedgerow link for habitat.

**6.3.2 Context Focus:
Trans-Canada Highway**

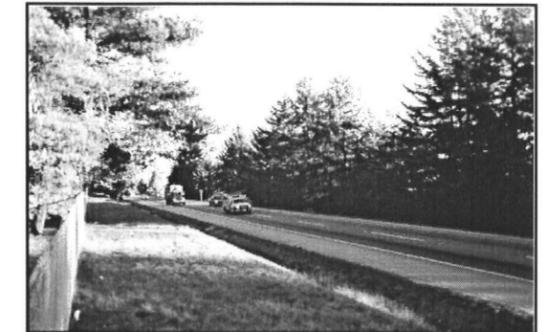


Figure 6-27: View of Trans-Canada Highway along southern edge of site.

This major commuter way presents visual, auditory, and physical barriers to the proposed hospital site. The proximity of the Trans-Canada Highway will be advantageous in terms of wayfinding to and from the hospital, as well as simply lives saved by quicker access to highway traumas.

For on-site users of the hospital space, measures to decrease the noise, if not the visual effects of the highway will be necessary. Existing protective conditions include a six-foot high chain link fence, a 2 metre berm and a lining of mature Douglas Fir trees.

Noise analysis was done in order to determine optimal conditions for building siting, building height, and enhancement of berm (if required). This data is included here.



Figure 6-28: Existing site berm as viewed from highway.

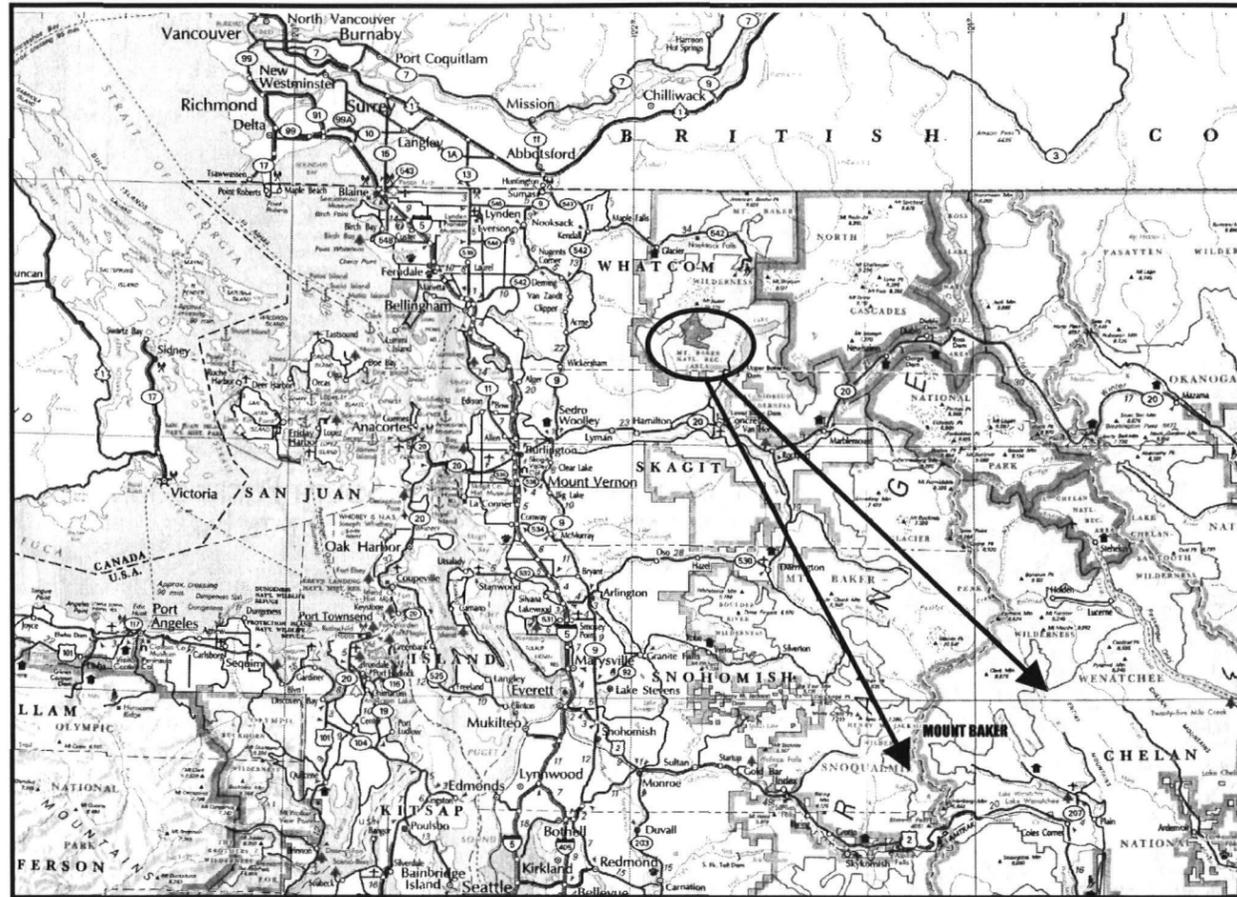


Figure 6-29: General Viewshed Mapping to Mount Baker Visual Landmark.

6.3.4 Context Focus: Seniors as Neighbours

The presence of two large senior's facilities (Mayfair and Menno) adjacent to the site present as a strong opportunity. Programming and development of access routes should include these users. The potential for senior's with cognitive disorders (Alzheimer's, dementia, etc.) using this site also heightens the demand for safety and security. Pathways will need to be clear with simple wayfinding and measures to protect against accidents will be required in the design.

Special opportunities present in terms of cafes, restaurants (cafeteria) and meeting /greeting places. The use of open space for activities that can be shared by seniors's of all abilities will be important in the design.

Safety in the 24-hour environment.

This will be an important issue not only as a result of staff working all hours, but also due to the potential for high use by seniors with potential for cognitive impairment. Safety will be maximized with lighting and easy way finding from buildings to parking lots, main streets (bus connections) and evening garden/restreat spaces. Principles of Crime Prevention through Environmental Design (CPTED) will be followed whenever possible (see Appendix II). Examples will include:

- Visible plantings/details/furniture that require a minimum of upkeep;
- Spaces intended for use by the public versus those restricted to hospital patients/staff clearly identified with real or symbolic boundaries;
- Entrances and exits clearly marked with sidewalks and lighting;
- Safety features used in areas of potential danger to persons with impaired cognitive abilities (e.g. around water bodies, roadways);
- Visual access around and through buildings maximized to discourage intruders and improve wayfinding;
- Landscaping in sensitive areas (high use after dusk) adheres to "groundcover-canopy strategy" with shrubs below eye level. Eye level is considered from a wheelchair position.

These measures to promote safety and security (both real and existential) will be advantageous not only to surrounding seniors but to staff, patients and families as well.

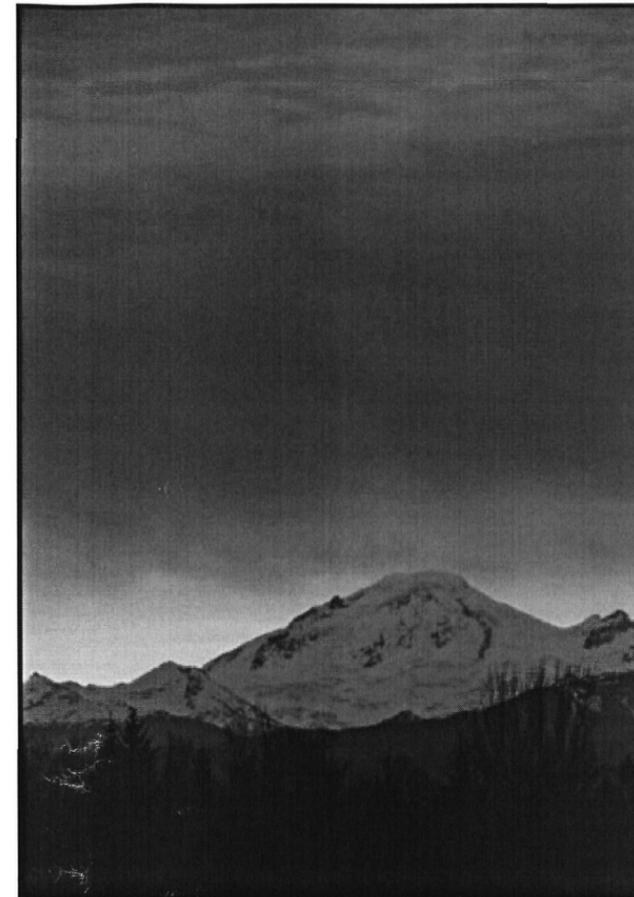


Figure 6-30: Mount Baker-a regionally cherished (and well-photographed) visual landmark.

6.3.3 Context Focus: Accessible Regional Views

For many users of the hospital, confinement to the building will be an issue (staff, patients, and visitors). Given the presence of the protective berm between the site and the highway, the potential for creating interior restorative viewsheds is great. The presence of surrounding viewing potentials is particularly important for users of upper hospital floors.

Views to the rural, pastoral land across the highway to the south will be important. Maintaining the integrity of this view may influence future zoning decisions. At present, this land is under ALR (Agricultural land Reserve) and is marginally protected. As mentioned previously, views to Mount Baker (directly southeast of site) are highly treasured by local residents. The existing elevation of the central portion of the site enables a good view to this landmark even without the benefit of building height.

The map pictured on this page shows the southeast location of Mount Baker in relation to the site. Given the flat river valley land in between the site and this landmark, extensive viewshed mapping was not required, however, orientation of views will be a major consideration in the design.



Mount Baker presents as a picturesque landmark even in the presence of foreground industry (in this case, one of several car junkyards in the area).

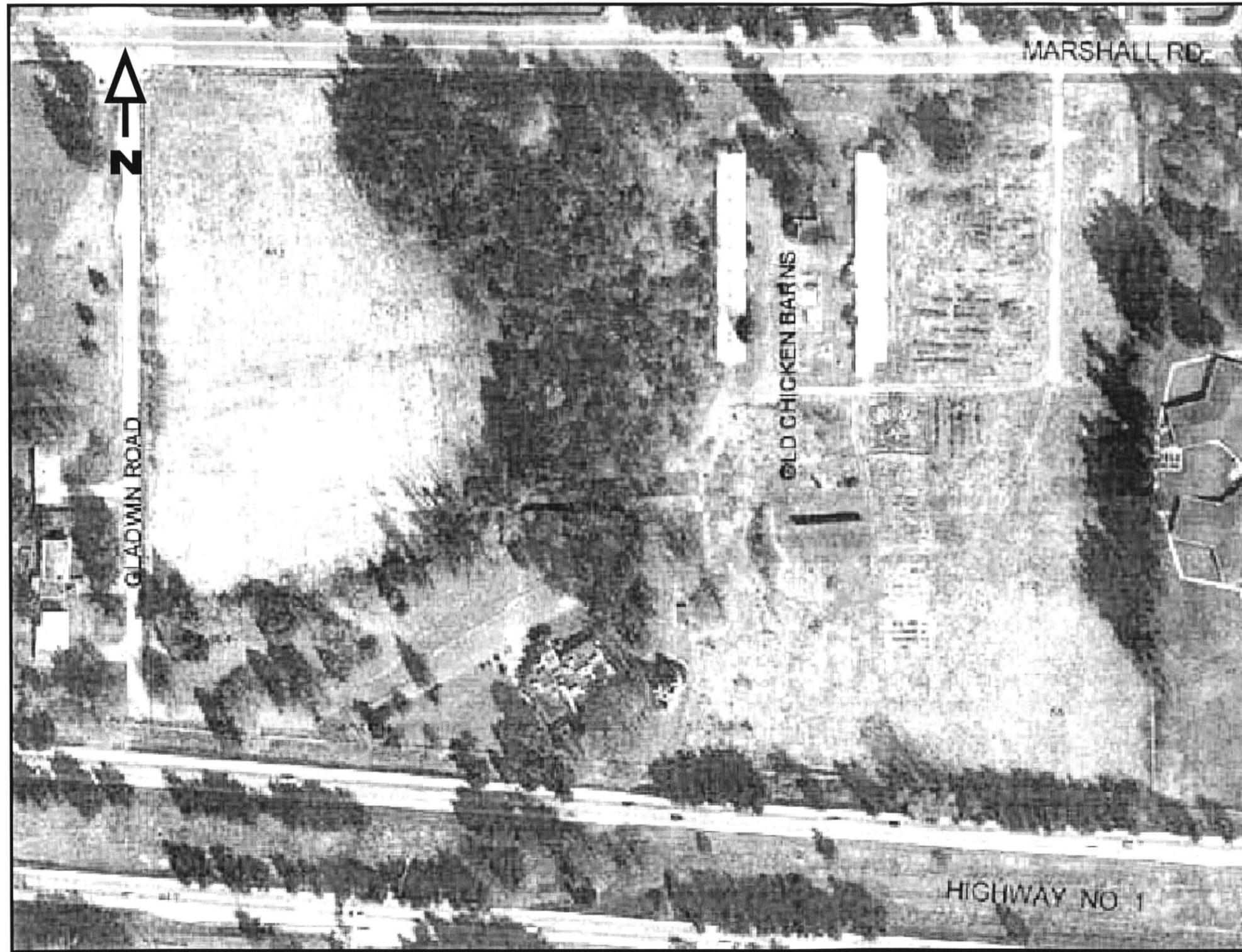
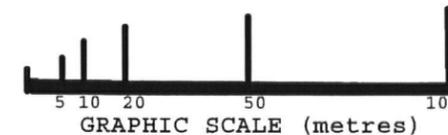


Figure 6-31:
 Ortho Map of 10.4 hectare proposed hospital site, 2001-prior to building demolition
 (courtesy of City of Abbotsford).



6.4 On-Site Conditions

6.4.1 Methodology.

Given the restrictions on access to the site (high perimeter fencing, demolition activity in progress), analysis was challenging and assumptions had to be made. Methods used included:

- Use of aerial photography (supplied by City of Abbotsford as well as private sources),
- Use of contour information obtained from City of Abbotsford,
- Use of data gathered by initial site analysis and planning team, Resource Planning Group (located at FVRH Project Home Page),
- Limited ground-truthing, using photography from all available viewpoints,
- Few ventures onto the site after hours,
- Discussions with local residents regarding conditions of soil, water drainage and general conditions,
- Research into regional conditions affecting this area,
- Personal knowledge of the area and its conditions.

The site was observed over the span of several months: October through March. This enabled a fuller interpretation of denseness of vegetation through the seasons as well as a cursory evaluation of the effect of the British Columbia rainy season on the site landscape.

A generalized analysis of on-site conditions is presented here as well as a summary of opportunities based on the restorative design literature.

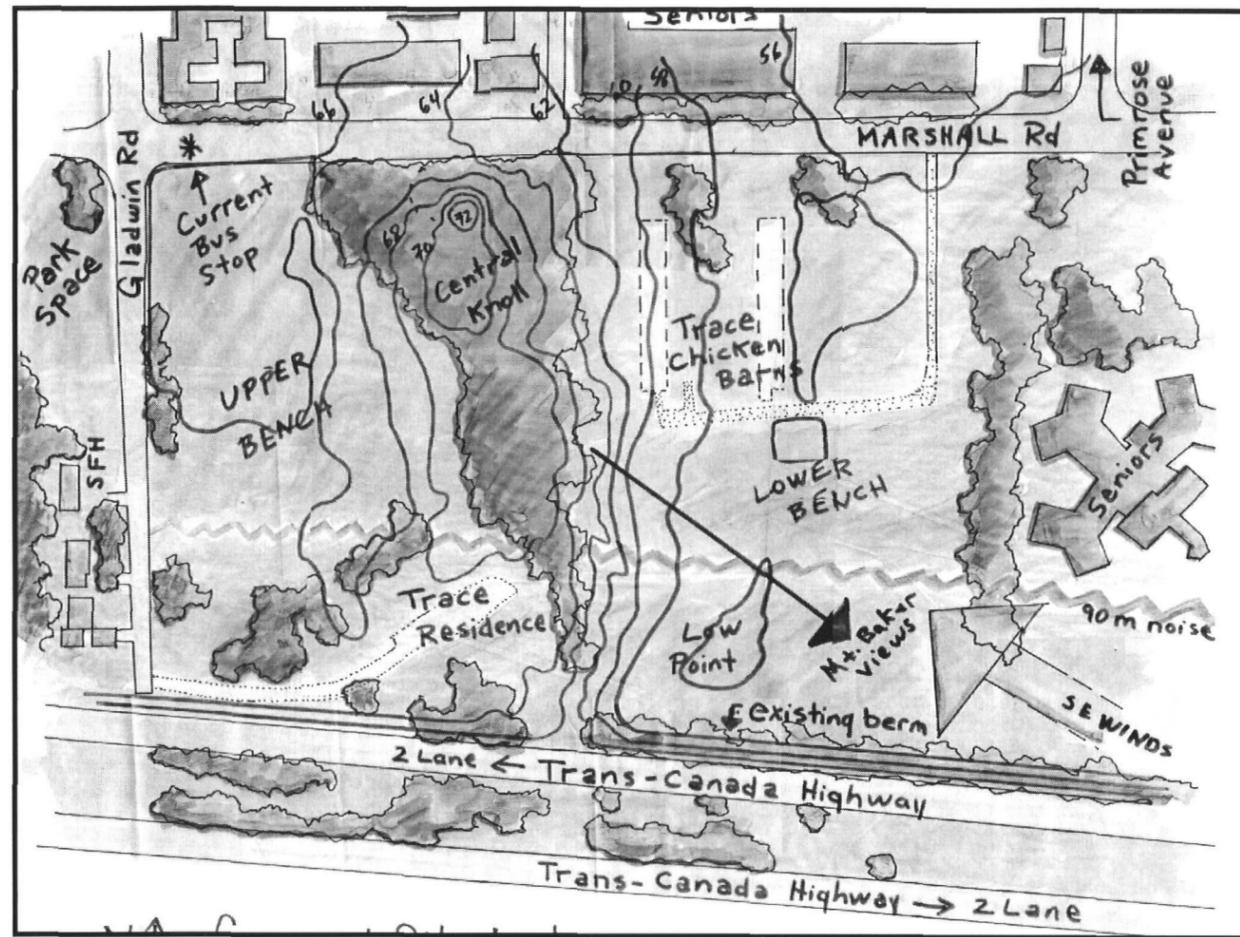
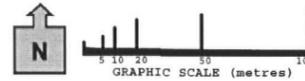


Figure 6-32:
ANALYSIS MAP- Summary of site conditions, 2001.



Significant Viewsheds

- Exterior: Mt. Baker is visible to southeast from upper knoll; rural agricultural fields are visible across the highway to the south.
- Interior: a current potential exists for interior woodland views in the Douglas Fir knoll and open pastoral views behind the highway berm.

Topography.

- Two flat plateaus surround a man-made treed knoll in centre of site: peak of knoll at 72 metre above seal level, lowland at 55 metre above sea level. This suggests a significant challenge for grading the site to accommodate universal accessibility.

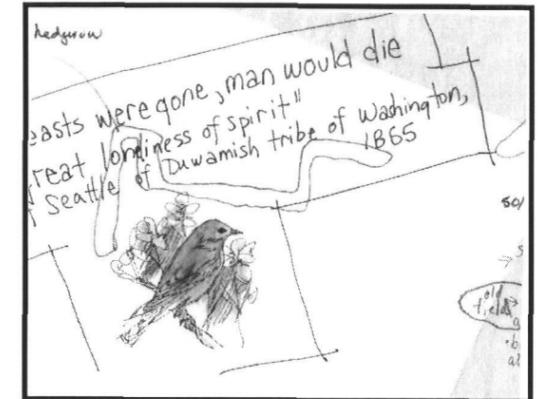
Vegetation

- Primarily Douglas Fir, second growth (60-70 metres in height) is identified at edges of property and at apex of treed knoll. Deciduous cottonwood, alder, scrub, decaying/damaged coniferous trees and unmanaged *Rubus discolor* (Himalayan blackberry) are on slopes of the knoll. Views and access into the knoll highly limited by scrub and *Rubus discolor*. Small pockets of abandoned, cultivated orchard species noted on northeastern and southwestern portions of site (e.g. Hazelnut).



6.4.2

Summary of On-Site Conditions.



Soils.

- This area is characterized by sandy, loamy soil that is generally well draining.

Water/Drainage

- No significant water bodies are noted on the site. Current drainage is either subsurface or directed into ditches at edge of Trans-Canada Hwy (along south end of site).

Wildlife

- Habitat for small mammals (evidence of voles) and raptors is noted in the open pastures. No significant bird or animal life was noted in the largely coniferous knoll. No obvious signs of larger habitat (deer, coyote) were seen although these animals have been spotted in nearby open spaces and are prevented access to the site by current protective fencing.

Human Trace

- Traces from old roads and chicken barns are evident due to very recent demolition. There are no remaining built forms.

Elements (climate, wind)

- Significant winds in this area are from southeast in winter.

Noise

- Noise from highway is audible throughout the site and is greater at peak travel times and on rainy days.

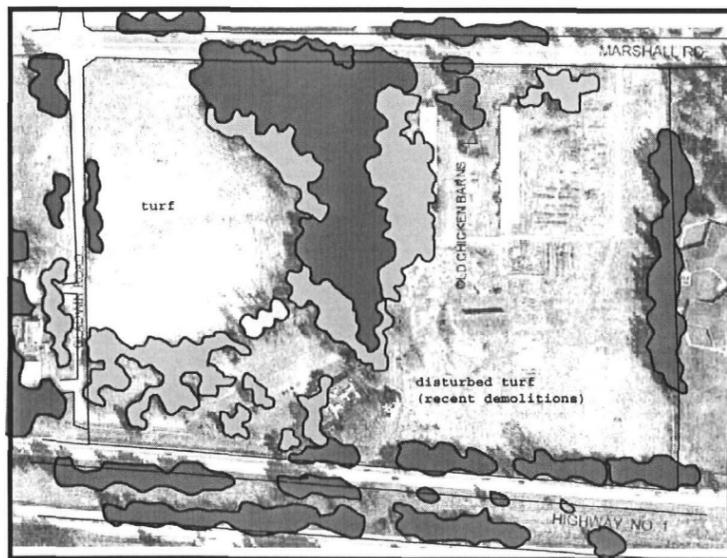


Figure 6-33: ANALYSIS MAP- Vegetation Analysis, 2001-2002.

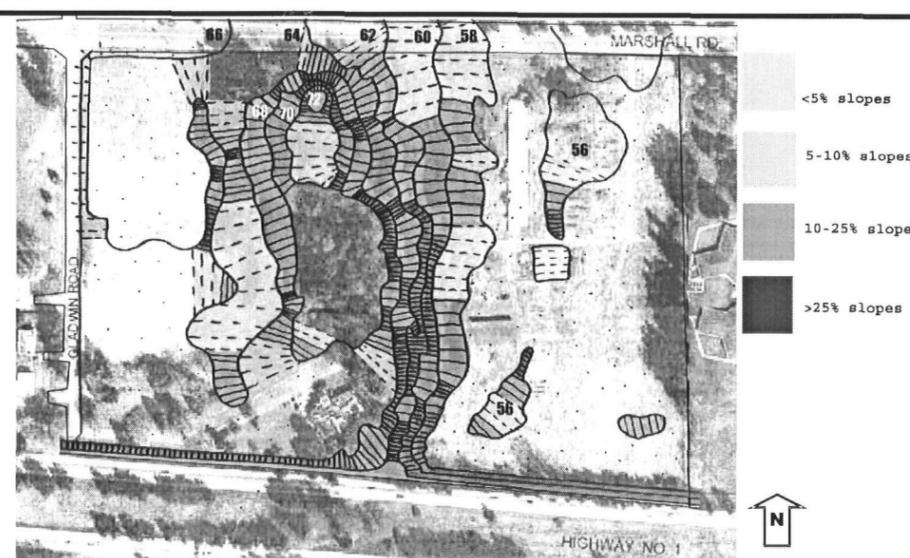


Figure 6-34: ANALYSIS MAP- Topography Analysis, 2001.

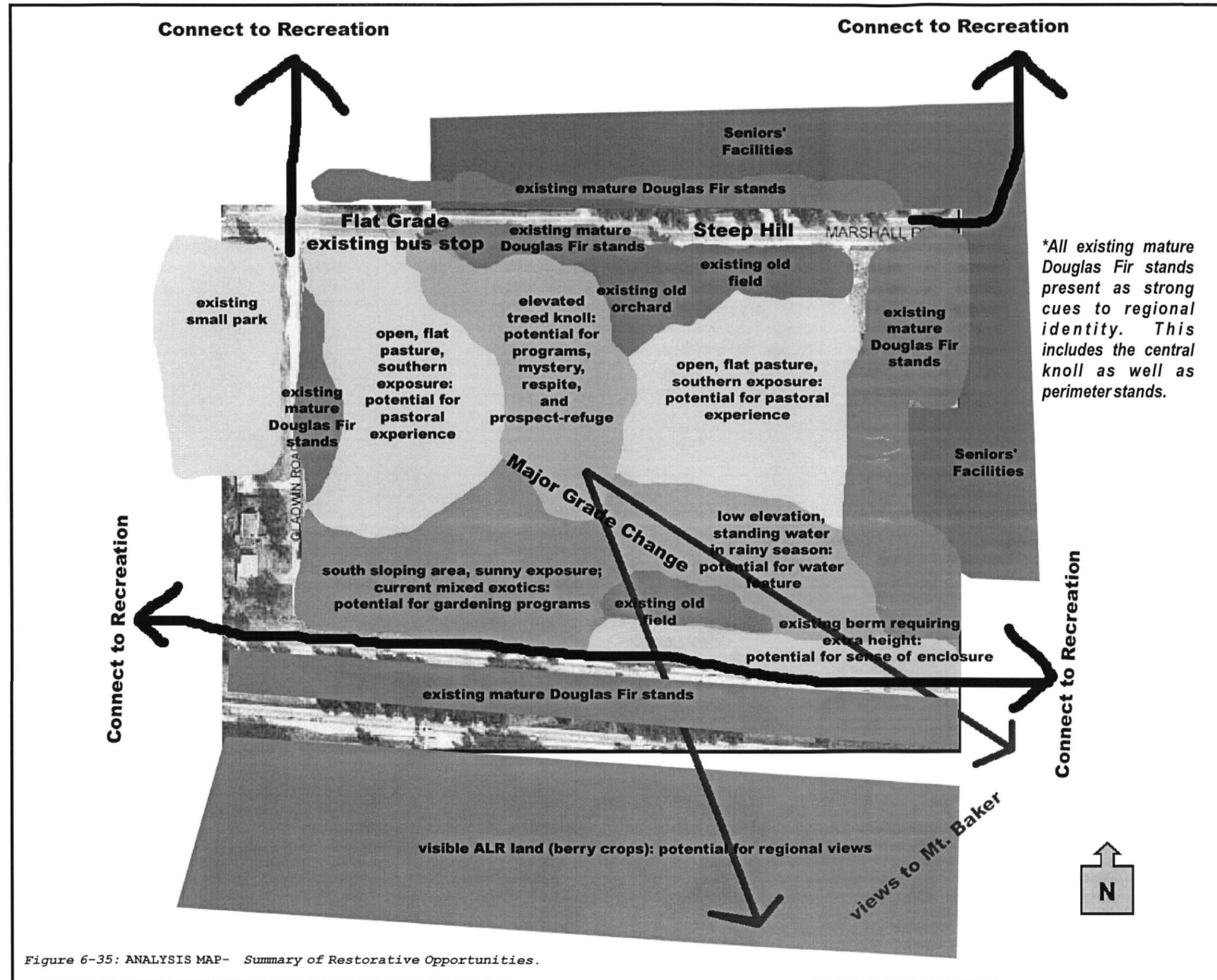


Figure 6-35: ANALYSIS MAP- Summary of Restorative Opportunities.

6.4.3 On-Site Conditions: Restorative Opportunities.

This graphic overlay explores the opportunities and constraints of the existing site conditions relative to the principles outlined in Chapter IV. An attempt is made to identify areas that may be enhanced and/or protected in order to achieve a landscape that is archetypal, compatible, living, and accessible. A 'Critical Area Map' follows on page XX that highlights very specific elements that will help direct the site layout and the eventual design and programming of the hospital.

In the following chapter, the final scheme is analyzed from all the various viewpoints, using these analysis maps to guide decisions for protection and/or enhancement of landscape areas. Both functional and restorative 'requirements' were used to guide this final design.

1. Opportunities & Constraints: Archetypal Landscape.

Two primary areas are identified as potentials for an open pastoral experience, the upper west corner and the south to south-east portion of the site. Currently very flat areas, these will also serve as prime locations for constructing the built form. Given that enhancement (an increase in height and planting mass) is required along the southern berm, the southern pasture may prove to be the most appropriate place to protect and enhance the wide-open feel of a pasture.

In contrast, the southwestern corner of the site is situated on an elevated plateau and does not require a berm. Subsequently, this area may prove the sunniest space for gardening activities to occur.

The central treed knoll is considered worthy of protection for several reasons already discussed (habitat enhancement, areas for prospect-refuge, regionalism, aesthetics, and wayfinding). A challenge will be to salvage this site without allowing the built form (hospital buildings and parking lots) to demolish these mature, highly recognizable trees.



Figure 6-36: *Central treed knoll on proposed hospital site, November 2001.*

A small park to the west of the site also offers views to an open space preferred by humans and may be included in the open space program, particularly for viewing opportunities if buildings and windows are oriented in that direction.

The grade change along the site may facilitate the construction of a water body (lake and/or marsh) in which users will find comfort. The importance of water in the restorative landscape has been discussed in previous chapters.

2. Opportunities & Constraints: Compatible Landscape.

Protecting and enhancing current views to regional landmarks (ALR land, surrounding peaks) will enhance the sense of belonging. Ensuring that these views are kept open and not made inaccessible by inappropriate built program placement will be important.

Another issue to be considered is the creation of a welcoming, legible front entrance. The currently well-used corner of Gladwin and Marshall (with an existing bus stop) presents as an opportunity. Use of this corner as the main entrance would allow the large space on the eastern portion of the site to be developed for open space programs accessible not only by the hospital but also

Douglas Fir that currently border the site are retained, it will be important to ensure a maintenance plan that ensures the balance between mystery and legibility are not disrupted. Currently, these stands do not exist as impenetrable barriers.

3. Opportunities & Constraints: Living Landscape.

A review of current habitat types and potential habitat types will enable the designer to attract birds and small mammals in a natural manner. By enhancing and protecting those areas already suitable for different types of birds and mammals, the site will have a higher likelihood of filling with life and signs of life. The rough overlay shown here in Figure 6-35 identifies existing landscape types that may be protected (open pasture, treed knoll, old fields, etc.). This does not rule out, however, the active design and creation of new habitat areas that will more aggressively attract birds and animals. In particular, bringing water features (large and small) onto this site will be advantageous to a large number of species. The proposed final plan for the design will attempt to protect and/or create as many 'natural habitats' as possible.

For example, retention of the inner forest knoll will provide habitat for raptors (feeding) and, if supplemented with appropriate edge plantings and a tiered understory structure will enhance the interior bird and wildlife population. Another example may be the retention of existing open pasture as a means of introducing domesticated animals onto the site, for permanent or temporal use (sheep, cows, horses, etc.).

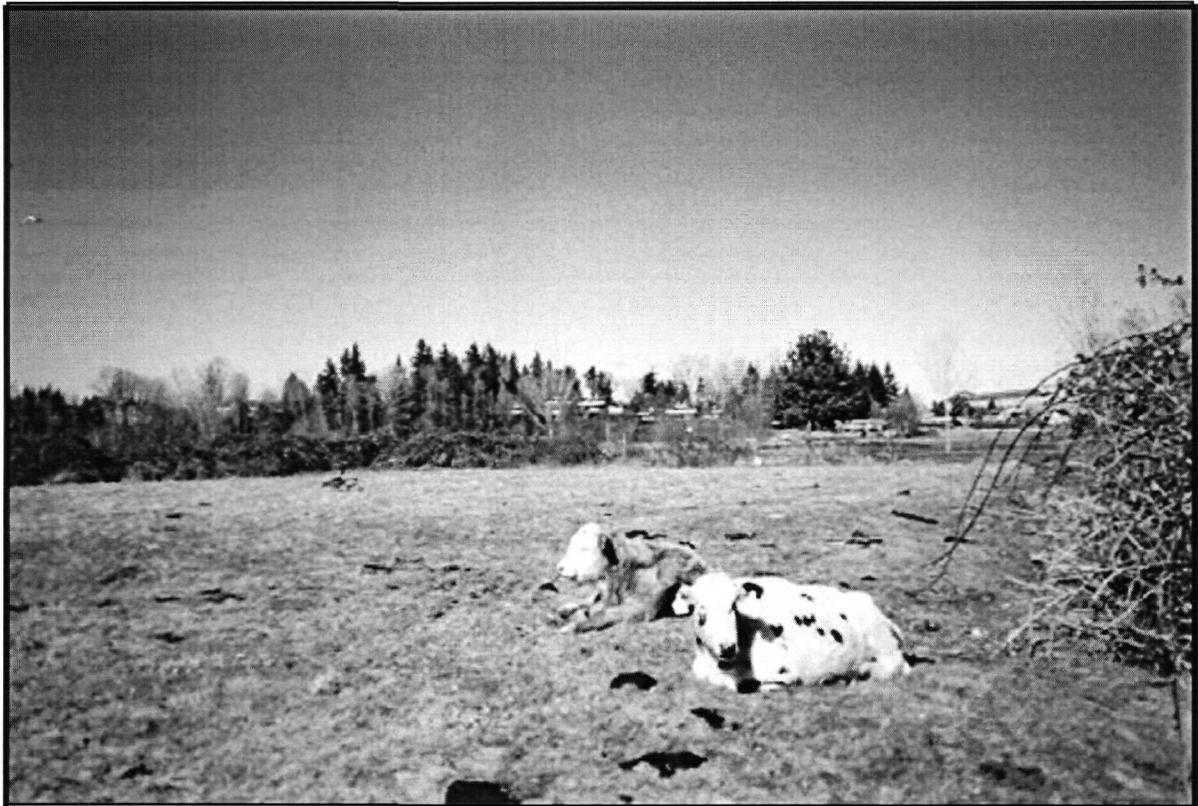


Figure 6-37: Cow pasture on Primrose Avenue, one rural block from hospital

This issue of habitats for biodiversity will be explored further in the following chapter.

The other element of the living landscape is humans working, playing and exploring in the physical open space. Sunny southern exposures lead to opportunities for community and/or hospital-based gardens, walkways and other outdoor programs. As identified, the sloping, southern portion of the site presents as a viable place for these activities to occur. A danger will be the construction of a large built program that may block sunlight.

Living Landscape Focus: Potential for Rural-Edible Landscaping.

As discussed in previous chapters, patients (and staff and visitors) will feel more comfortable (and encounter less stress) if surrounded by regionally familiar programs or plantings. An edible landscape on the hospital site will not only give evidence of life (the living landscape) but will also be a familiar and regional site, easily understood by local residents. The sunny, southern exposure of much of the site and the good groundwater drainage would indicate a potential to grow and harvest regional crops such as raspberries, blueberries, strawberries, corn, grass for hay, etc. Creating an edible landscape on the site will have the added benefit of providing important habitat for certain types of birds and wildlife.

Introducing community gardens or orchards onto the site will also increase the possibilities for community interaction on the hospital grounds.

On a purely aesthetic level, edible landscapes (in particular blueberry and raspberry fields) create all-season interest and provide an appealing local alternative to mass plantings of exotic shrubs.



Figure 6-38: *Raspberry canes one rural block from hospital site.*

Living Landscape Focus: Potential for Greenway Connections.

Habitat loss and fragmentation are the most serious threats facing populations of birds across North America and around the world (Audubon Society, 2001). For several years, residents of the Fraser Valley have participated in what is

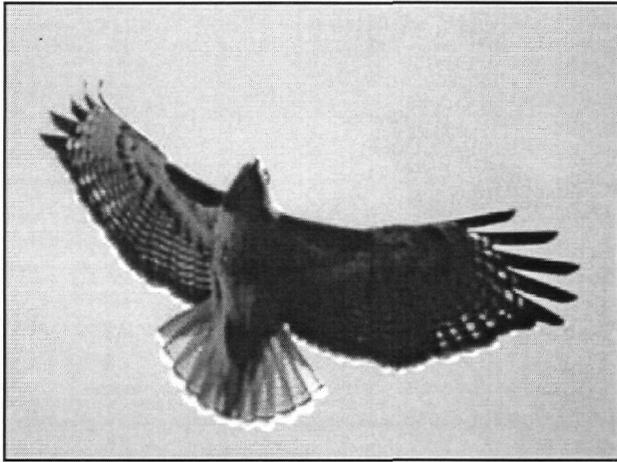


Figure 6-39: Red-tailed hawk.



Figure 6-40: Townsend warbler.

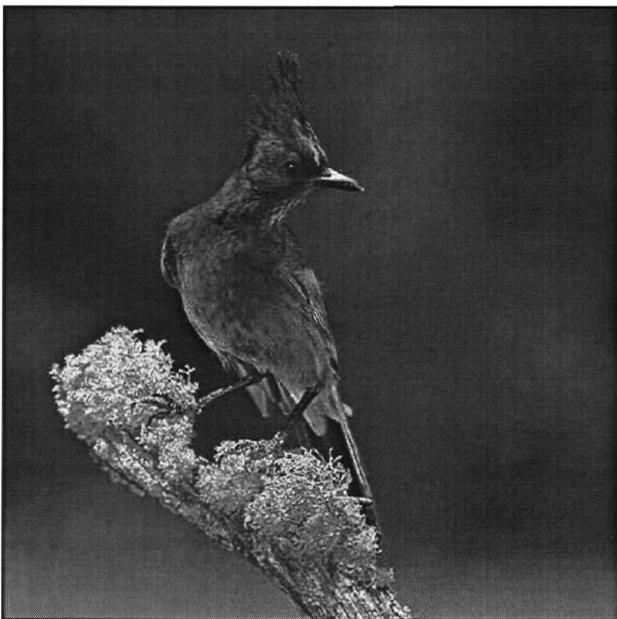


Figure 6-41: Stellar jay.

participated in what is becoming the large "business" of "back-yard" care of small birds. A multitude of specialty stores in the area offers seed, feeders and apparatus.

Each December 29 the Central Valley Naturalists co-ordinate the 'Audubon Christmas Bird Count' for the Abbotsford/Mission area. This is in participation with birding groups across Canada, the United States, Central and South America, the Caribbean, and several Pacific islands where North American breeding birds spend their winters.

Of the 93 bird species counted in this region last year, it is important to note that 38 were observed in gardens, including rare sightings of Townsend's warblers. This indicates a high degree of participation by local residents (Abbotsford-Mission Times Online, 2001).

"North America's Birds are in trouble. Through stressing action by people at the local, grassroots level, ordinary citizens are given an opportunity to protect globally important places and help save the birds that use them from decline and extinction (Audubon Society, 2001)."

The enclosed nature of the site (sandwiched between highway and urban core) inhibits the potential to join hospital open space with surrounding terrain-based habitat corridors.

One potential and vital greenway connection, however, is the now-existing continuous green that follows the length of the Trans-Canada Highway. This includes not only the center meridian but also the edges. This exists as a potential resource for both habitat enhancement and recreational purposes.

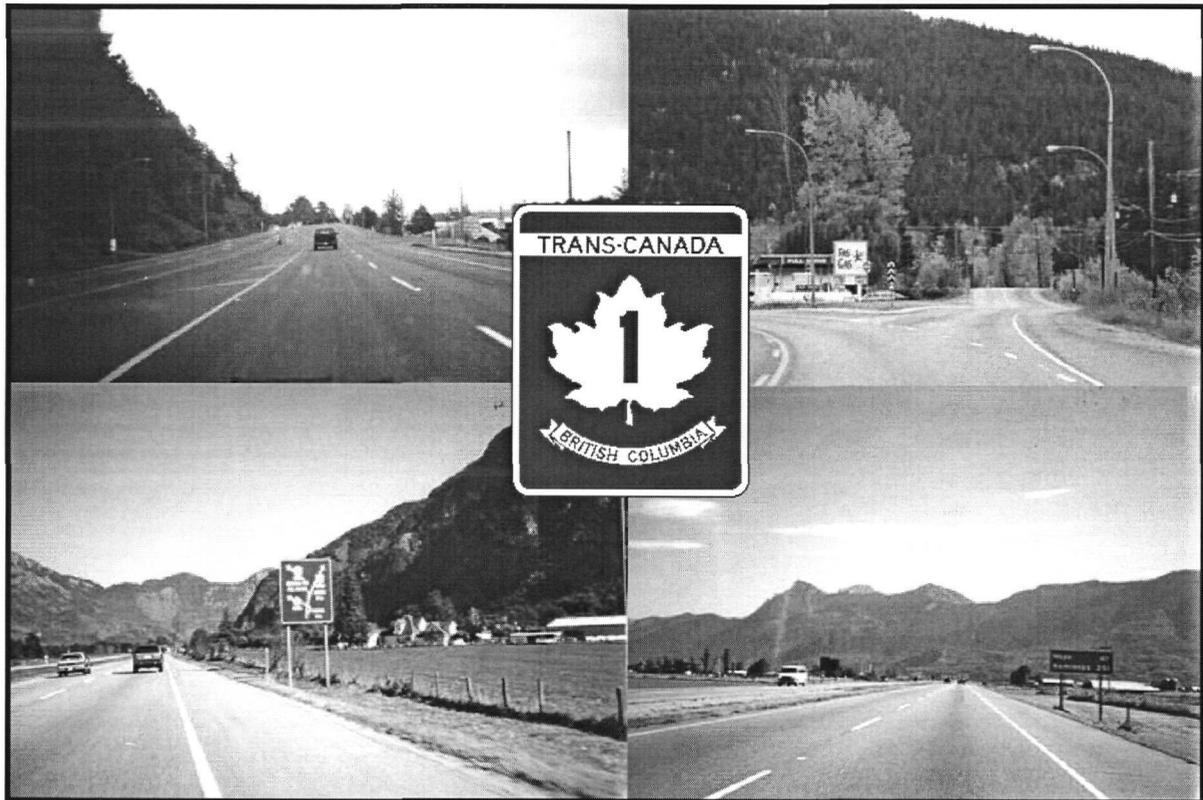


Figure 6-42: Views from the Highway: Potential Private-Public Green Corridor.

4. Opportunities & Constraints: Accessible Landscape.

Graded relatively flat on either side of the treed knoll, a Marshall Street entrance to the hospital site will be easily accessible by a range of users. A unique challenge will be creating an accessible open space in the protected berm area that deals with a 10-metre+ drop from apex to base. Paths that allow neighbors of all physical abilities (those with impaired mobility to those seeking a recreation challenge) to access and enjoy the site programs will require a creative approach to both grading and pathway design.

A legible, strong entrance will be required for persons arriving under great stress. Ambulance arrivals will require a separate entrance that is not closed off to the public but that will be a secondary route at best. Gladwin Road presents as a possibility for this access. Fire and other emergency vehicles will require a 3-metre minimum clearance around all built structures as well as access into the open space program areas. This may limit the choice of materials, as these pathways should be fully accessible during all seasons.

Satisfying the functional aspect of accessibility will need to be balanced with restorative requirements for a welcoming entrance and a promise of discovery beyond (a sense of mystery). This may require a separate entrance for recreation and community members that does not interfere with the urgent functional arrivals related to hospital programs.

1. Respond to existing topography and utilize to create open space and sense of enclosure:

- Use central elevated knoll (prospect position) to create viewing opportunities to surrounding peaks and farmland;
- Use flat pastures and low plateaus to create accessible open space program areas, large water feature(s) and a sense of the open savannah for viewers;
- Enhance existing berm to heighten sense of enclosure and to protect from highway noise;
- Grade site in a manner that enables a wide range of users to move throughout the site easily.

2. Maintain as many existing mature trees and/or landscape units as possible:

- Retain as much of mature, second-growth Douglas Fir in central knoll as possible and create programs that will allow the trees to be used as a physical as well as visual resource (trails, areas of refuge);
- Retain mature, second-growth Douglas Fir along east border of site in order to maintain sense of mystery that currently exists between hospital site and neighboring senior's facility;
- Retain as many ornamental and native mature trees within site, and intersperse with newly developed plantings and programs;
- Retain areas of old field/old orchard, recognizing their importance to local habitat (e.g. in particular, old field in southeast corner of site, and old hazelnut orchard in northeast corner);
- Recognize that some trees will need to be removed to make room for built structures (parking lots, roads, buildings). Priority will be placed on retaining mature Douglas Fir in central knoll and along site perimeters.

3. Decrease visual and auditory impact of Trans-Canada Highway:

- Increase height of existing berm according to sound calculations and need for enclosure;
- Recognize this as a major opportunity to create a restorative enclosure landscape form, by enhancing landform with vegetation;
- Design this area of the berm as a useable trail to act as a 'precedent' for future connections along the Trans-Canada Highway.

4. Facilitate views to significant regional landmarks:

- Promote southeast views to Mt. Baker via building orientation/orientation of roof gardens and terraces. Hospital buildings should be oriented primarily southeast to take advantage of sunny exposure as well as Mt. Baker views;
- Orientation of built structure should enable southern views to agricultural fields and regionally familiar activities (gardens/crops, etc.);
- Placement of open space programs should be done in consideration of views from hospital building. In particular, those hospital units that feature long-term stay or required bed rest should have enabled views to south and southeast features and landmarks.

5. Connect with neighbors and neighboring amenities in program and design development:

- Hospital building mass and height should be designed in consideration of the size of neighboring seniors' facilities (stepping of hospital buildings may be appropriate). As well, large open space should be located and designed to serve the hospital as well as these neighboring facilities;
- Connections to Mill Lake recreation site to the north should be considered in new road and entrance development, perhaps by creating a loop through the hospital that extends to connect with the Mill Lake loop;
- The design and programming should take advantage of the relatively isolated nature of the site (minimal to no restaurants, shops or coffee shops) in order to draw community members onto site.

6. Maximize potential for 'living landscape' in a sustainable manner. This will require:

- Enhancement and creation of preferred habitat landscapes for birds and mammals;
- Involvement of the local community in open space programming and management (proposal will be included in program development);
- Inclusion of maintenance requirements in design proposal;
- Development of water body on site according to stormwater collection requirements of proposed building.

6.5 Site-Specific Design Objectives

1. Existing topography will be used to create open spaces and a sense of enclosure.

2. A strong effort will be made to retain mature trees and landscape units.

3. The visual and auditory impact of the Trans-Canada Highway will be reduced.

4. Views to significant regional landmarks will be promoted.

5. Neighbors and neighboring amenities will be considered in all design moves.

6. A sustainable approach to design will guide the process.

Notes.

- Final grading will be shown on master plan of completed design.
- Retained trees will be marked on final plan. A biodiversity overlay will identify both retained and created areas for habitat.
- The enhanced berm will be constructed according to calculations shown.
- A general description of hospital program placement will be detailed in the next chapter. Program placement will be done according to both functional and restorative requirements.
- Sensitivity to neighbors will be illustrated in drawings that propose general building appearance and staggering of building heights. Large-scale cross-sections of the proposed built structure will be presented.
- Calculations for the pond and marsh to retain stormwater have been done using a rough estimate of changes to runoff.

CHAPTER VII

A Vision for Restorative Hospital Design: The Valley Health Centre (VHC)

7.1 Site Narratives

The intention of this project was to give an image and sense of the restorative hospital landscape. Experiential qualities of the design were a strong motivator for design decisions. The goal was to create a place that would be living, breathing, familiar, and accessible and would offer an appropriate blend of legibility and mystery. Considerations of the diverse intended users (hospital in- patients, out patients, visitors, staff members and community interests) led to the development of a design for a place that while globally restorative, offers unique opportunities along a continuum of needs and abilities.

7.1.1 The Patient's Experience

"Our arrival to the hospital was easy to understand...everyone arrives at the same central place off Marshall Road. My sister dropped me off and then continued on to the underground parking. I was automatically drawn towards the hospital's front glassed-in atrium. I could see reception inside but there were also views to a little forest tucked in behind the hospital building... My 2-bed room faced out over an almost farm-like area where I could see sheep grazing, kids picking fruit, and gardeners tying back raspberry canes. Mt. Baker loomed over the whole scene. Feeling pretty good today before my surgery I thought I'd go down and walk along the paths I could see winding in and out. I grabbed a drink and a magazine from the Community Café and headed out along the Orchard Walk..."

7.1.2 The Staff Member's Experience

"Since I usually arrive late at night and walk from the parking lot, I appreciate the well-lit pathway. It feels very safe. I can see the Emergency Entrance from my car. Last night I nearly exploded after some patient threw a tray at me. I almost felt like starting smoking again. Instead I escaped outside to our private garden and tried to pretend I was somewhere else. It actually made me feel better..."

7.1.3 The Public Experience

I moved into Menno Home a year ago when my arthritis got really bad and I couldn't get around without my wheelchair. Before they put up the new Valley Health Centre, there wasn't anywhere around for me to go on my own. I feel much more independent now. I try to leave Menno Home once or twice a week and wheel myself down the hospital's back lane to take lunch in their café. Even in bad weather, I can sit inside the cafeteria and enjoy the garden view and the view to the marsh. It's also great to be able to just sit and people watch (or birdwatch...or squirrel watch). Those of us who meet here,

particularly on sunny days, move the tables around so we can watch the people passing by and challenge younger people to games of chess.

They have a group of volunteers here that help take care of the gardens, bring in pets, talk to patients. Last week I helped man the booth selling apples..."

7.2 Introduction of Design and Program.

A program and design has been put forth in this project for the proposed site in Abbotsford, B.C., as discussed in Chapter VI. An effort has been made to combine the functional with the restorative in order to create a hospital landscape that is welcoming to all members of the community, regardless of individual health or well-being.

This hospital landscape has been designed differently from typical modern health care facilities. It is not like the typical urban hospital that thousands of people pass by daily on foot but dare not enter. It is not like the typical rural hospital that hundreds pass by daily in car without realizing its existence. This hospital site stands as a 25-acre (10.4-hectare) landscape designed to welcome the Fraser Valley community onto its grounds, regardless of ability, age or health status. It is a place where healing through technology and healing through nature occur simultaneously. It is a place where the environment works with rather than against the caregivers to reduce stress, cure illness, and promote well-being of patients. It is a place that recognizes that these caregivers are themselves facing crisis proportions of work-related stress and offers them refuge and retreat. The Valley Health Centre (VHC) strives to stand as a precedent for restorative design and a new vision for the future of health care design.

This project required telescoping between a variety of scales. The many facets of hospital design required a process that was at times loose and sketchy and yet at other times overly concerned with data, grading and calculations. The vision, or conceptual site plan, is presented and then explained through several analysis maps (key views, circulation, open space, biodiversity, etc.). Program elements are described with both text and with images.

The following page features an image of the final master plan. Through mapping, analysis, and written text, this design will be scrutinized and critiqued for its ability to adhere to the principles set out in this project. A combination of traditional, functional reference points are combined with more unique, restorative focused means of measurement. Two larger pullout versions of the master plan, with graphic scales, are included at the end of this chapter, showing proposed schemes for grading and vegetation retention.

Certain design elements referenced in this chapter may appear in the chapter to follow.

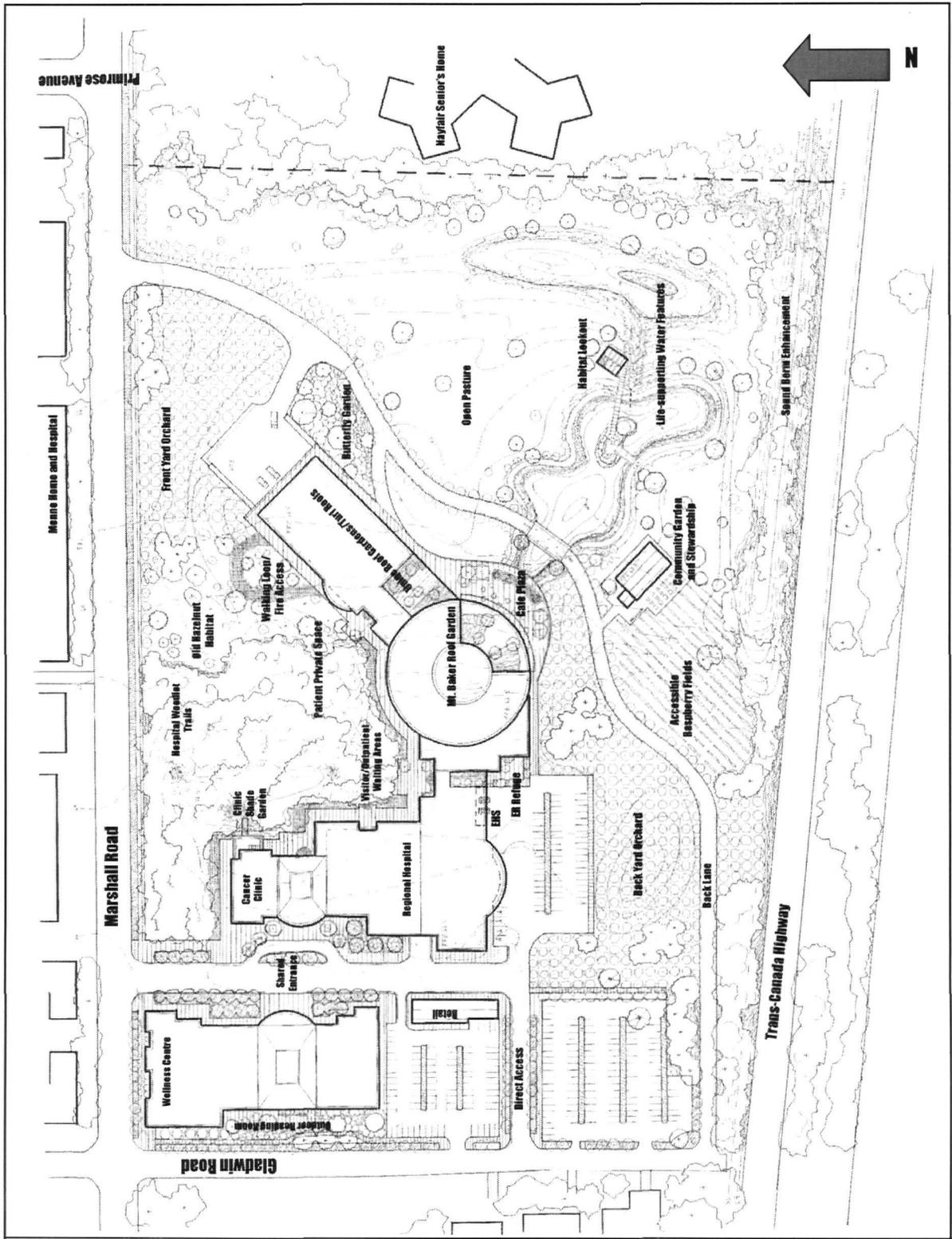


Figure 7-1: Master Plan for FVHC (Fraser Valley Health Centre). (Refer to Figures 7-21 and 7-22 for grading and vegetation schemes).

Reiteration of Project Goals: Holistic Restorative Characteristics.

Every landscape within the site is considered part of the whole. As an entity, this site design aims to incorporate the four following restorative characteristics:

1. Archetypal Landscape.

The landscape plan makes use of archetypal forms that are inherently familiar and comfortable: the open meadow, the protected clearing, and the prospect lookout (roof top gardens, berm lookouts). Significantly, a very large open space area hugged by a constructed, treed berm along the Trans-Canada Highway creates a strong sense of enclosure. Existing large open areas of pasture have been retained for their therapeutic value (human preference) as well as their value to certain types of habitat.

2. Compatible Landscape.

The landscape plan offers a range of choices for degrees of legibility with some areas very functional and legible (areas of high stress-e.g. Emergency entrance, main Entrance) and others offering more mystery and intrigue (areas for play or retreat-e.g. open shared space, private gardens). Throughout the landscape are clear indications of regional belonging: views to Mount Baker, views to mature Douglas Fir trees, views to local raspberry farms. The landscape is designed to promote a sense of security and control with lighting of sensitive areas, choices for movement (refer to Circulation diagrams that follow). Redundancy is an important feature of the pathways created on this site for two primary reasons: to give users a sense of control over their actions and to reduce the risk of entering into unsafe situations.

3. Life-supporting Landscape.

The living landscape proposed in this design features food, water, birds, animals, and farming. Biological diversity is facilitated through the creation of a wetland marsh, as well as plant choices and plant arrangements (linear connections, vertical stratification, and habitat attracting plants). A unique mode of analysis used to determine layout for both open space and built form paid attention to current or potential habitat values. Open space was evaluated for its worth as a life-giving force before, rather than after the "creation" of the design.

Attention to landscaping should extend off-site and up Primrose Avenue two rural blocks to connect to the rich and diverse Mill Lake. This intervention has been described previously in chapter VI. This now quiet route is currently accessible to patients in wheelchairs from neighboring senior's facilities. With the construction of a large hospital traffic will increase. For this reason, a street retrofit (with canopy street trees, wide sidewalk and rest stops) is proposed.

4. Accessible Landscape.

Movement into and through the landscape has been designed in an equitable manner so that all users, regardless of ability, feel welcomed. Patients in wheelchairs will have access throughout the living landscape (forest, marsh, and orchard) during all seasons along simple asphalt pathways graded to no more than 8%. In areas where a more natural appearance is

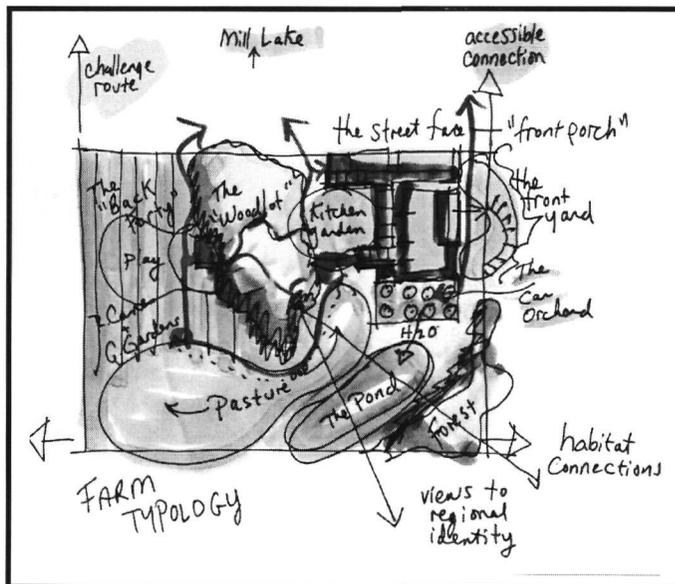
preferred, yet there is still a strong need for firm support under the weight of traffic (e.g. emergency vehicle routes and turnarounds), grass crete planted with Sweet Woodruff or Thyme has been suggested. Rest stops along major paths will be no farther apart than 200 metres (Mooney, 1999, p. 4). Visual access will be a strong consideration: from the streets/highways (Gladwin, Marshall and the Trans-Canada), from the neighbours (Menno Home and Hospital, Mayfair Senior's Home, and several nearby single family homes), and from inside the buildings (windows sited .7 metre from floor to enable views from beds).

Significant changes in grade on the site combined with a strong desire to maintain site-specificity and avoid the "blank slate approach" to design created an interesting, and oftentimes, frustrating exercise in grading. The resulting design, however, accomplishes the goals of accessibility and also creates interesting areas of peaks, lookouts, ravines and marshes.

The practical, functional side of hospital design reared its ugly head early on in the design process. By dealing with these issues head on, however, it has been possible to envision simple possibilities that are surprising in their simplicity and their ability to combine function with therapeutic benefit. For example, the design required a minimum 3 to 4-metre clearance around all building edges with a 13-metre turning radius for emergency vehicles. This challenge presented an opportunity to create instant, accessible outdoor spaces for pushing patients in wheelchairs and beds outside for fresh air.

7.3 Design Process

Having developed the goals for design and the program for the site, the challenge was to translate philosophy and vision into a workable solution. Early design exploration focused purely on the conceptual. Rough sketches were used to make sense of a large site and a complicated program. The



most effective approach discovered for this project was to move back and forth between the qualitative (pure imagination, instincts, and preferences) and a developed set of quantitative measures/mappings by which to rate the progress of the design. These measures will be discussed here (in text and graphic) in an effort to prove the validity of the final design. The design process was most successful when guided by the following tenets:

1. Sustainable Practices as a Mandatory Component of Design.

Accept the fundamentals of sustainable growth and development and allow them to help guide the design:

Figure 7-2: Example of one of multiple rough conceptual design sketches.

- Identify an open space typology that respects both humans and habitat through promotion of biodiversity,
- Take advantage of local bylaws that demand stormwater detention on-site to create a beneficial water body.

Measure: *Biodiversity Mapping.*

2. Site Layout: General considerations are strongly affected by site analysis.

Maintain respect for findings of site analysis and aim to keep valuable resources (site-specificity):

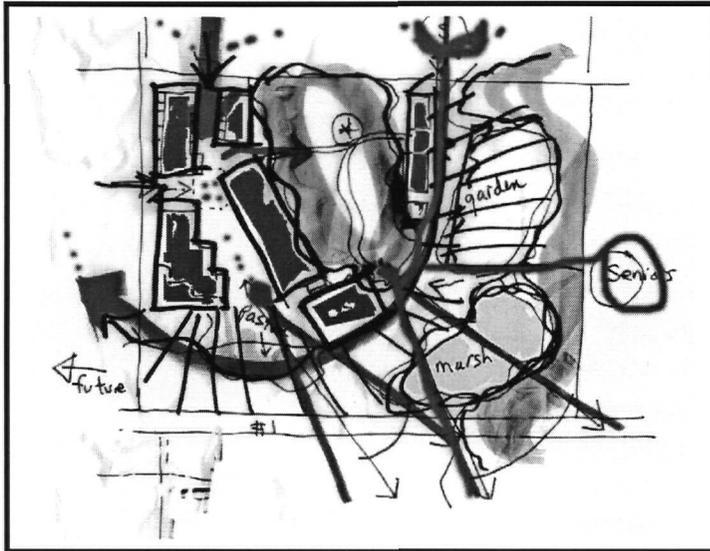


Figure 7-3: Example of one of multiple rough conceptual design sketches.

- Understand negative impacts on the site and find solutions that can be restorative as well as functional. For example, building a sound berm that blocks out noise from the highway has the added benefit of creating an area with a strong sense of comforting enclosure,
- Achieve a balance between the newly created and the preserved. For example, transitions between retained portions of the central treed knoll and other open spaces should be done in a harmonious manner (use native plants, balance open and closed areas, enable views into the treed knoll),

- Understand through local research what measures will be most effective in this region (physically, socially, economically, and culturally). For example, while an open space program that features edible landscaping might not 'fit' into a more urban area, it does coincide with local traditions and preferences,
- Develop a sense of pride for regional landmarks and develop a site plan which maintains key views to regional landmarks.

Measure: *General Layout Considerations Mapping and Built Program Delineation.*

3. Visual access to the landscape of high importance to all users of site.

Assess current key views to be protected and vision future views:

- Consider important indoor-outdoor visual relationships.

Measure: *Key View Mapping.*

4. Circulation requires a combination of legibility and mystery.

Understand and accept the importance of a foolproof circulation pattern that will not heighten stress levels:

- Treat perceived obstacles as challenges to find new solutions (clustered parking enhances safety and reduces cost of security, emergency access creates accessible surfaces for bed-patients).

Measure: *Circulation Mapping.*

5. Community Participation Integral to Project Survival.

Explore the potential for inclusion of community members in the design/program and its ultimate survival:

- Identify what roles they can and cannot play.
- Delineate areas within the design that will be particular to one or more user groups.

Measure: *open Space Organization and Management.*

7.4 Sustainable Practices: Required Component of Design

Sustainability is commonly referred to as living one's life in a manner in which the world will be protected for future generations (Earth Summit, 1992). In 1987, the World Commission on Environment and Development developed a definition of sustainability that was included in its findings, which became known as the Brundtland Report (Brundtland, 1987).

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

- The World Commission on Environment and Development, Brundtland Commission, 1987.

At the Earth Summit in Rio de Janeiro, 1992, this definition was affirmed and elaborated upon. "Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature" (Earth Summit, 1992).

For architecture and landscape architecture, this means "design that delivers buildings and communities with lower environmental impacts while enhancing health, productivity, community, and quality of life" (Callenbach, 1993).

Sustainability is not limited to impacts on the natural environment, but on individuals and the community at large as well. A common concept often referred to in sustainable design is the 'Green Triangle of Environment, Economy and Equity'. Social sustainability, environmental sustainability, and economic sustainability necessarily go hand in hand. "Any time you do something beneficial for one of them, you will almost inevitably do something beneficial for the other two" (Callenbach, 1993).

While the focus of this thesis project is to attempt to influence the health and well-being of those individuals in current contact with the hospital environment, it would be delinquent to proceed without concern for future resources. Steps taken in the design process have been with consideration of economic, social, and environmental sustainability. As discussed previously, a hospital landscape that is designed with the users in mind will affect the long-term health (economic and social) of users ranging from patients to staff to community members. Economic benefits have been hypothesized as deriving from a reduction in stress amongst staff and therefore a reduction in absenteeism, and higher productivity. Stress reduction in the patient and family populations should be reflected

in better response to treatment, shorter hospital stays, and less demands on caregivers (Ulrich, 1984).

Certain measures have been taken to heighten the "ecological sustainability" of this proposed design. In particular, efforts were focused in the area of habitat protection and enhancement. This will take form in three primary ways:

1. Analysis of landscape units within proposed site plan that may provide (now or in the future) benefit to birds, small mammals, insects, amphibians and other beneficial native creatures;
2. Collection of water run-off on-site in order to prevent further degradation of streams entering the fragile Fraser River system and its fluctuating salmon population;
3. Development of a program by which community members can actively participate in the land stewardship, thereby increasing awareness, volunteerism, and a sense of civic duty towards protection of regional landscapes. It is hoped that any program initiative will involve local schoolchildren to help further the awareness and education of youth.

While the above are stated as measures to promote sustainable and responsible protection of regional resources, each intervention will have the double effect of being restorative and therapeutic by nature. As discussed previously, exposure to nature has strong healing effects that are enhanced with any degree of participation. Hospital patients, staff and visitors receive restorative benefits through the act of simply viewing a stream, pond or marsh. The opportunity to actively monitor and count rises in bird, fish or mammal populations will only enhance this effect by increasing level of interaction with nature (Lewis, 1996).

7.4.1 Biological Diversity Enhancement.

Refer to Figure 7-5: Biodiversity Analysis.

Efforts to promote biological diversity (biodiversity) and prevent and/or slow down the continuing extinction of species offer significant restorative benefits by enhancing the "living" nature of the landscape (Kellert and Wilson, 1993). This task, however, is also considered by many experts to be perhaps the most significant ecological emergency by modern man from a purely ecological standpoint. E.O. Wilson describes our "mass extinction of species" as being the "most destructive global environmental change of all time" (Wilson, 1999).

An effort has been made to not simply attract animals and birds to this proposed hospital site but rather to enhance or in some cases, simply protect, habitat that is already vital to the survival of local species. Unfortunately, the choppy nature of suburban development has left few terrestrial resources that can be relied upon to create linear connections. Disconnected from its natural surroundings by the Trans-Canada Highway to the south and urban Abbotsford to the north, a concerted effort on site is required to enhance biodiversity.

Habitat (or ecosystem) may be generally referred to as a particular environment that allows a particular species to live and thrive (Harding, 1994). Man's disturbance of the landscape has disrupted the natural

progression of habitats for mammals, birds, insects and amphibians. Efforts to bring life onto a landscape will have the double benefit of producing restorative benefits for humans, and creating or returning habitat for creatures, promoting regional biodiversity.

The site was analyzed for potential or present ecosystems. Any identified spaces will be enhanced or protected, and in some cases, recreated. Planting styles and plant choices are dependent on their ability to attract living creatures. For example, whenever possible, vertical stratification, linear connections and an edible palette has been used. Plants (trees, shrubs, and groundcovers) that offer forage, nesting, movement, or lookout opportunities are maximized. Interventions or enhancements will range from colourful, sunny gardens designed to attract hummingbirds and butterflies to hedgerows created with a variety of native species that will be used for bird and small mammal movement and nesting. Red-listed species (considered high risk for extinction) will be recognized as needing high priority measures. For example, several hawks and owls are at risk in British Columbia (Harding and McCullum, 1994). Construction of hawk and owl friendly landscape typologies will be considered.

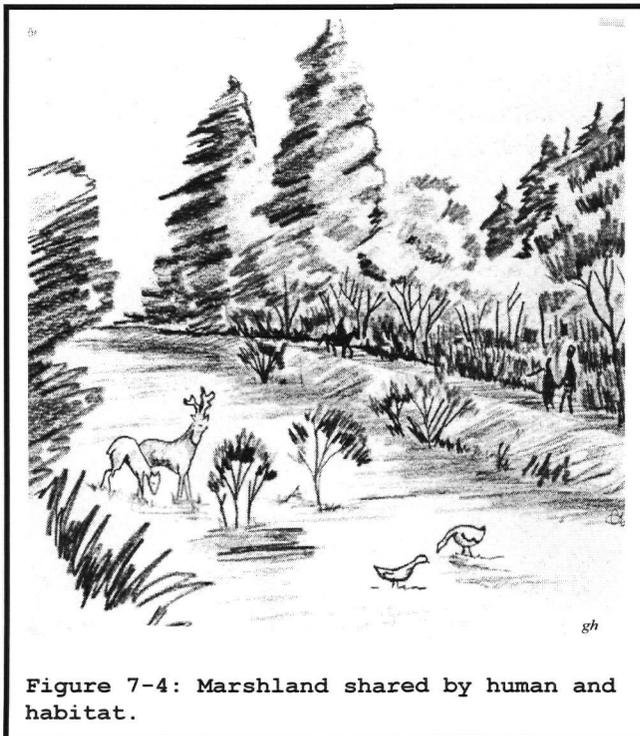
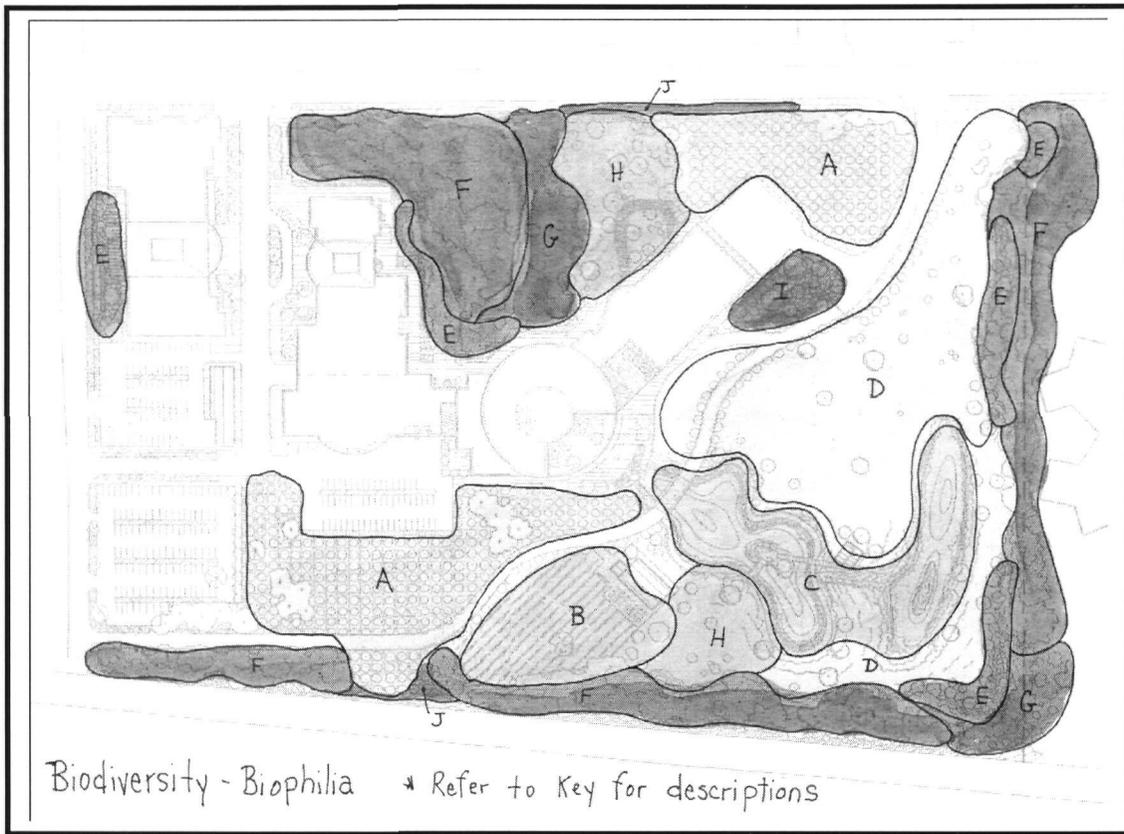


Figure 7-4: Marshland shared by human and habitat.

An open pasture edged by tall "lookout" trees (existing conifers) will provide forage space. An ephemeral mowing system versus regular lawn clipping will enhance forage potential. Allowing existing and "new" old fields to evolve naturally will also contribute. The site will also be managed to prevent further disruption to natural conditions. Invasive exotic plantings will be avoided. Despite the aesthetic and possible visual restorative benefits of exotic wild flowers, these plants disrupt and take the place of native flora (and, subsequently, disrupt the local habitat). Specific small-scale interventions to enhance existence of certain species may also be introduced (e.g. wood duck nesting boxes).

In the previous chapter on site analysis, several open spaces were identified as potentially restorative, either for their abilities to create archetypal experiences or their abilities to promote a landscape alive with birds, mammals and/or community members (e.g. gardening). Figure 6-35 outlined a basic preliminary assessment of the site in terms of restorative potential. The design proposed here makes use of several of those potentials, and makes a point of including new areas of habitat to enhance regional biodiversity. The following diagram is an assessment of the final proposed design in terms of its ability to enhance and protect habitat biodiversity on the hospital site. This is merely the first of several 'analyses' by which designs were evaluated.



-  Fruit Orchard
-  Garden (Edible)
-  Pond-Marsh
-  Pasture
-  Woodland
-  Conifer stand
-  Mixed tree stand
-  Old Field
-  Unique Plantings
-  Hedgerows



Figure 7-5: Biodiversity Analysis of Proposed Site Plan. Several significant open space types of high habitat value are identified as currently existing and/or possible to create with a minimum of effort. Designing for the protection of habitat results in a diversity of spaces also restorative to humans. The preferred open pasture provides sustenance for raptors and owls. Orchards and gardens for human cultivation attract small animals and birds. Sunny areas planted with bright reds and yellows attract hummingbirds. Old fields (abandoned orchards) are not only valuable due to their increasingly unique nature, but they also give strong ties to regional childhood experiences. The 10 identified habitat types in this proposed scheme offer a great mix of biodiversity, offering both social and ecological (and, if gardens prove fruitful, perhaps economical) sustainability.

7.4.2 Stormwater Collection.

Refer to Figure 7-7: Concept Plan Constructed Wetland on following page.

As well as promoting biodiversity and providing restorative benefits, a marshland will serve to collect on-site stormwater runoff. Enhancing the current low topography site and creating a marshland has multiple benefits for humans and for the environment. Wetlands in developed areas provide wildlife habitat, store and improve the quality of stormwater runoff, and prevent degradation of streams and loss of fish habitat farther down the system. The wetland should be as large as possible, in order to maximize:

- bird species that will be attracted,
- runoff storage and treatment capacity, and
- restorative wetland edge available.

It is possible, and is often the practice, to construct detention ponds that collect stormwater but do not attract birds and wildlife. A study by the National Institute for Urban Wildlife, however, showed that urban residents vastly preferred ponds or marshes designed purposefully to attract habitat (Link, 1999).

Detention Pond Design Considerations and Calculations.

For assessment of predevelopment stormwater calculations, the 10.4-hectare (25-acre) site was considered to be approximately twice as much area in flat pasture with well-drained soil as hilly woodland, also with well-drained soil. For post-development calculations, hard roofs and/or paving were estimated to take up 400m², with reductions in both hilly woodland and flat pasture. In actual fact, this number may be reduced by the addition of green roofs and roof gardens.

Within the built environment, practices that minimize stormwater runoff will be used encouraged. These are:

- ⇒ Outdoor parking lots designed with swales for water collection,
- ⇒ Turf roofs used to decrease runoff,
- ⇒ Roof runoff directed into planting beds or to larger marshland or accessible rain barrels to create "rain gardens" with multiple benefits.

Detention pond sizing was calculated for a 10-year storm, as the desired effect would be to have standing water in as much of the area as often as possible. The conceptual plan of the constructed wetland to follow gives an indication of the water feature design intention:

Depth of pond will vary from areas of emergent wetland and actual "island" to areas of standing water (lined pool). A fountain and waterfall extending from the plaza into the wetland will feature a circulating pump system for water. The 'stages' of the water feature will be:

- A lined pond will be created closest to the hospital and its programs and will be accessible by a level path,
- An unlined pond with gradations in depth will extend out into the open space landscape, and will also be accessible to the largest number of users (grade less than 6% and year-round materials for pathways),

- Farthest from the hospital and at the lowest point will be a shallow marshland construction that will serve primarily for bird/amphibian habitat enhancement. Visual access will be made available from a simply designed lookout point but physical access will be limited to volunteers.

Q=CIA I=1.2 (10 year storm 24h) A: 25 acres

Predevelopment		Post development	
C=	Hilly woodland C=.25 X 300m2 Flat pasture C=.10 X 700m2	C=	Roofs/paving C=.90 X 400m2 Hilly woodland C=.25 X 140m2 Flat pasture C=.10 X 460m2
Cave=	$\frac{(300 \times 2.5) + (700 \times 1.0)}{1000}$	Cave=	$\frac{(400 \times .90) + (140 \times .30) + (460 \times .10)}{1000}$
	= .15		= .5
So, Q=	$0.15 \times 1.2 \times 25 = 4.5 \text{ft}^3/\text{s}$	So, Q=	$0.15 \times 1.2 \times 25 = 4.5 \text{ft}^3/\text{s}$

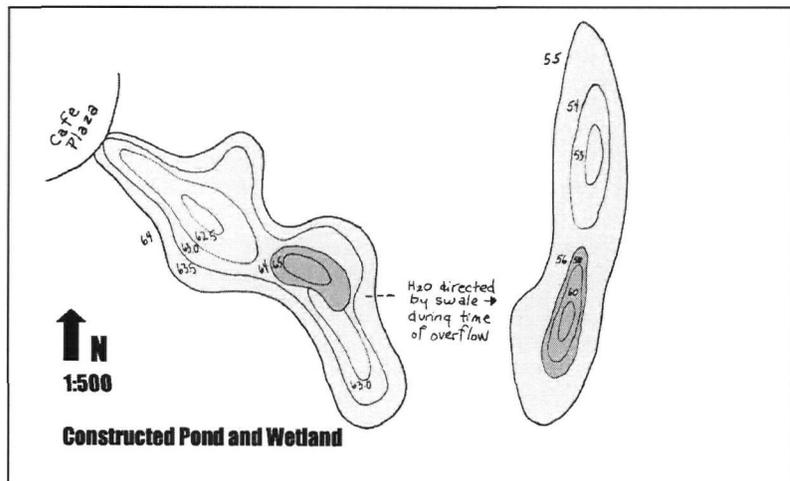
Detention Pond Sizing					
TIME	Post Development		Pre Development		NET STORAGE
	INFLOW		OUTFLOW		
min/sec	ft3/s	cumu ft3	m3/s	cumu ft3	ft3
5 (300)	27.5	8250	4.5	1350	6900
10 (600)	21	12600	4.5	2700	9900
20 (1200)	13.75	16500	4.5	5400	11100
30 (1800)	10	18000	4.5	8100	9900
40 (2400)	8.75	21000	4.5	10800	1-200
60 (3600)	6.25	22500	4.5	16200	6300
120 (7200)	4.35	31400	4.5	32400	-1000

Maximum Storage Volume Required= 11100 ft3 for 10 year-24 hour storm (Metric Conversion= 3219 m3)

Depth Calculation: $\frac{3219 \text{ m}^3}{\text{at } .9 \text{ m (average)}} = 3500 \text{ m}^2 \text{ in plan}$

Figure 7-6 (above):
Stormwater Detention
Calculations

Figure 7-7 (right):
Conceptual Plan of
Constructed Wetland



Community Involvement, Stewardship and Educational Programs are considered integral aspects of the ensured sustainability of any project.

These issues will be discussed later in this chapter in a discussion and proposal for Community Stewardship Involvement.

7.5 Hospital Program: Site Layout

Refer to Figures 7-8 through 7-13 (Site Layout General Considerations and Program Placements) on following pages.

At the time of this proposed design, the defined hospital program included:

1. A Regional Acute Care Hospital of 350 beds was planned. A wide variety of programs were anticipated including Emergency, Maternity, Oncology, Medical-Surgical, Intensive Care, and Geriatrics. A large Mental Health/Psychiatry program was planned.
2. A Cancer Clinic (outpatient treatment and diagnostics, including radiation therapy) was planned.
3. A Wellness Centre was planned. The program for the wellness centre is defined for this project as:
 - outpatient teaching, programs and follow-up,
 - staff recreation facilities,
 - teaching facilities for community and staff (including auditorium),
 - administration and staff services (payroll, human resources, etc.) will also be maintained in this structure.

The total area required for the built program is 62,000 square metres (Source: FVHR Project Home Page, 2001).

In order to design for specific users, an attempt to program hospital functions and locate important destinations has been made and is outlined in the footprint concepts that follow in Figures 7-5, 7-6, and 7-7. It would be expected that rather than placing programs and facilities in isolation, this task would best be done in consultation with the various staff members and experts in the individual fields.

A pavilion-style of construction combined with a central tower was chosen to maximize views to surrounding open space and regional landmarks. This style (long, linear buildings) also allows for a higher degree of natural sunlight for all patient (and staff/visitor rooms) as well as an increase in legibility. Many current architects, critical of the dinosaur nature of modern hospitals are returning to this 18th-19th century style of construction (Pearson, 1995). In this proposal, however, rather than looking out over a private hospital courtyard, views are directed to open space, shared with the local community.

7.5.1 General Recommendations for Siting of Programs and Building Layout.

Many of the decisions made were drawn from both the earlier discussions on specific user needs and on the results of the site analysis. For example, patients suffering from high stress illness (cardiac care, intensive care, psychiatry, etc.) were given priority for views to positive distraction. Patients entering the hospital for short stay, diagnostics, and tests that create a high index of fear were given priority access to outdoor plaza, cafeteria, and accessible walkways. A strong effort was made to group patients together rather than segregate. It is with purpose that the hospital has one main cafeteria rather than several small satellites. Placement of the primary open space was also made in consideration of

senior neighbours as well as recreationalists. Certain populations, by virtue of their illness were located more towards the inner shady core that surrounds the retained Douglas fir Knoll (for example, cancer treatment). All patients, however, have access to both sunny and shady areas within the hospital environs. A strong effort was made to retain and enhance site resources whenever possible and to use disadvantages as benefits.

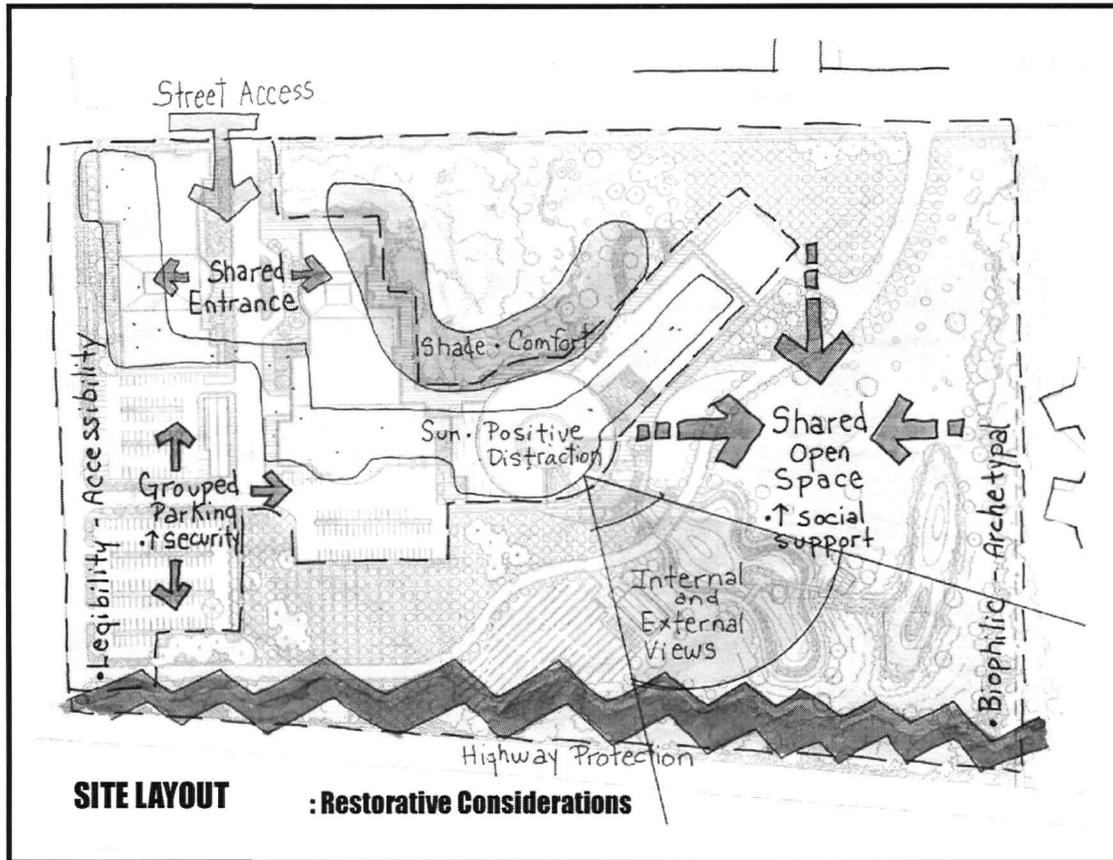


Figure 7-8: Site Layout Considerations (simplified for graphic purposes).

- The bulk of inpatient rooms are oriented to southwest or southeast open space with some rooms facing the more intimate inner forest core: patients will be afforded a choice of views.
- Siting and layout of built structures responds to open space programs with creation of large and small enclosures.
- Sharing of open space, of entrances, and of parking will work to integrate rather than segregate.
- The southeastern low point (behind constructed berm necessary for noise protection) creates a perfect potential for shared open space. The new design of the open space creates a form of 'cloister' situated between highway, new hospital, and neighboring senior's facilities.
- Walkways through the hospital are direct, leading from elevator to elevator, with the cafeteria as midpoint. Walkways will be lined with windows on both sides to enable outdoor views. The initial entry will feature views direct to nature beyond.

- Staggered heights of buildings facilitate views and enhance human scale. By concentrating the height of buildings towards the centre of the complex, the hospital will also blend in more appropriately with the surrounding small-scale houses/complexes.
- Strong indoor-outdoor relationships are created to improve views to nature and promote fascination. These include: atria with greenery, skylights, roof gardens, water fountains, indoor aquariums.
- Building orientation takes advantage of views to Mount Baker, views to open space, views to nature, and views south to agricultural fields.
- Roof gardens are accessible when possible.
- Configuration of buildings in this manner allows for the retention of a large portion of the central knoll of Douglas Fir. Several other important or potentially important identified habitat areas are also protected-refer to Biodiversity Mapping, *Figure 7-5*).
- Choices for sun or shade are made possible via building orientation.
- Windows will be set no higher than .75 metre off floor to facilitate views from beds.
- Use of the hospital tower promotes opportunities for walking indoors.
- Primary street access is from Marshall at Gladwin, the current site of a transit stop. Gladwin Road becomes a side access for parking as well as a main entrance for emergency vehicles.
- An evident street face is defined, and shared open space is defined. Parking has been clustered to enhance safety and security for staff as well as to improve wayfinding by visitors/patients. Lighting of significant pathways will be vital for this 24-hour environment.

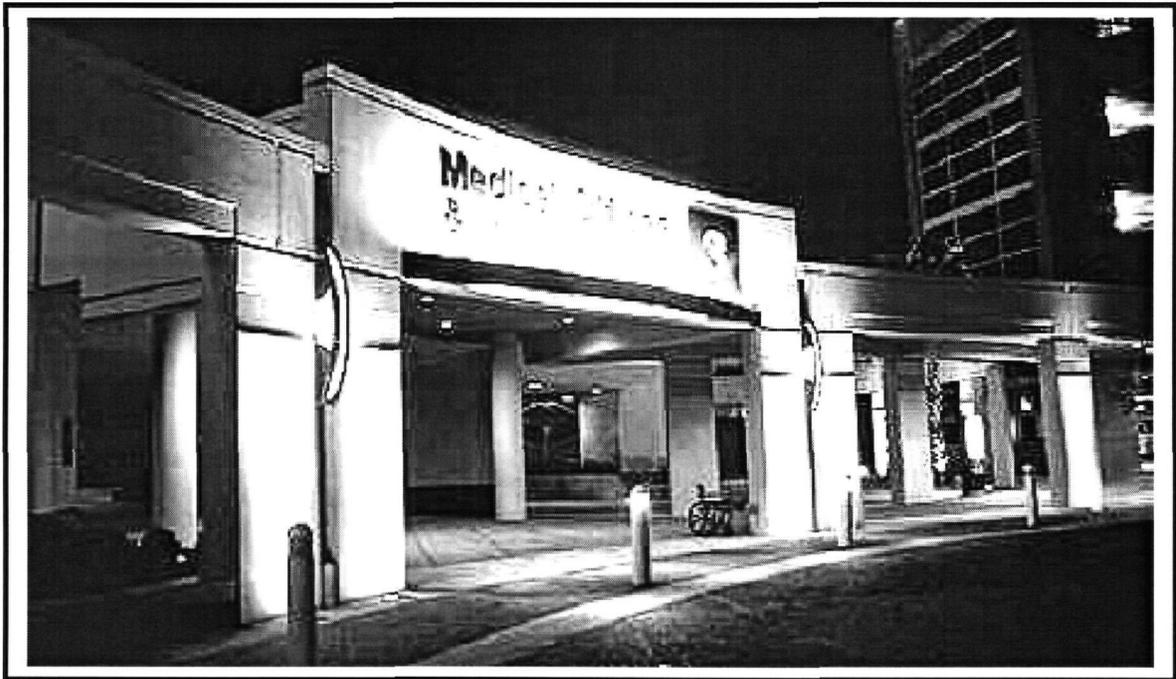


Figure 7-9: Example of Lighting: Image of Kaiser Permanente Medical Complex in Fontana, Ca. Nighttime building illumination from top down scatters light towards and onto walkways, giving a sense of connection and security. Lighting would continue in this manner along paths by illumination of lane trees. Day and evening lighting effects can also be achieved through appropriate placement of trees in relation to sun angles.

Marshall Road

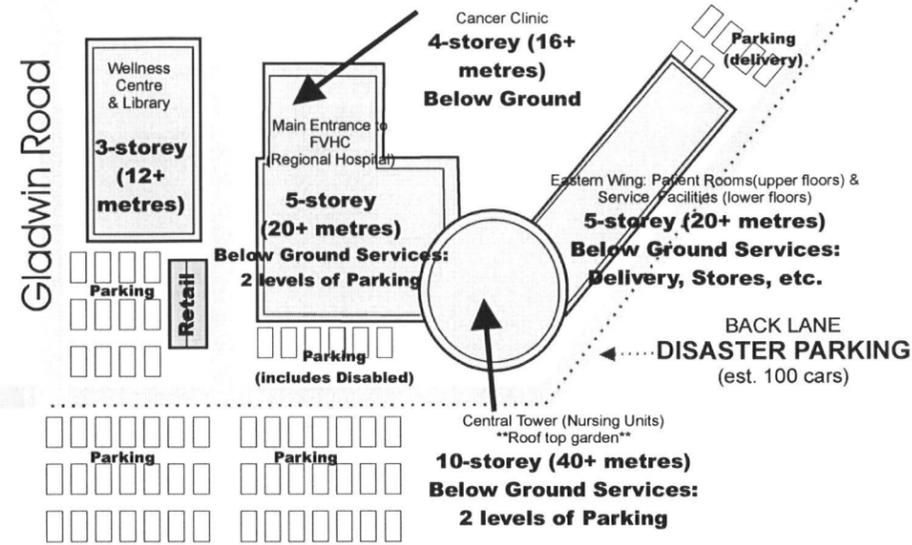


Figure 7-10: Built Program Basics.

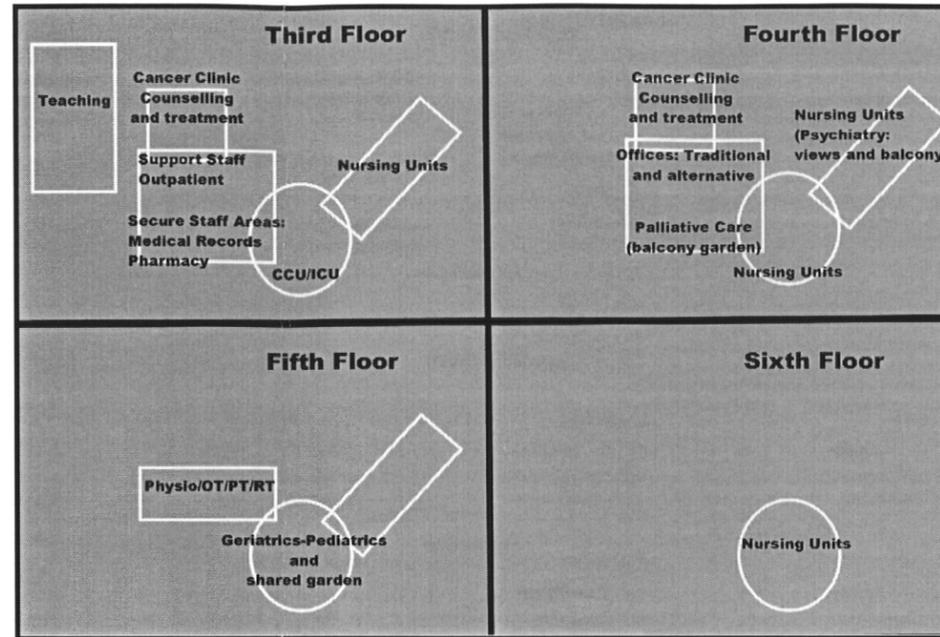


Figure 7-12: Program Proposals, Floors 3 to 6.

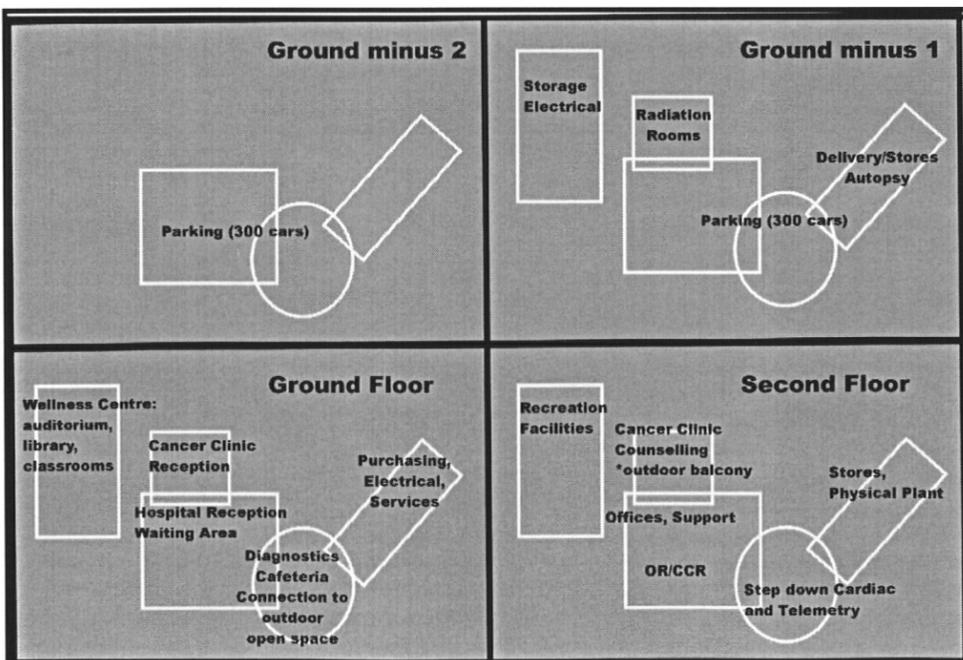


Figure 7-11: Program Proposals, Floors G-2 to 2.

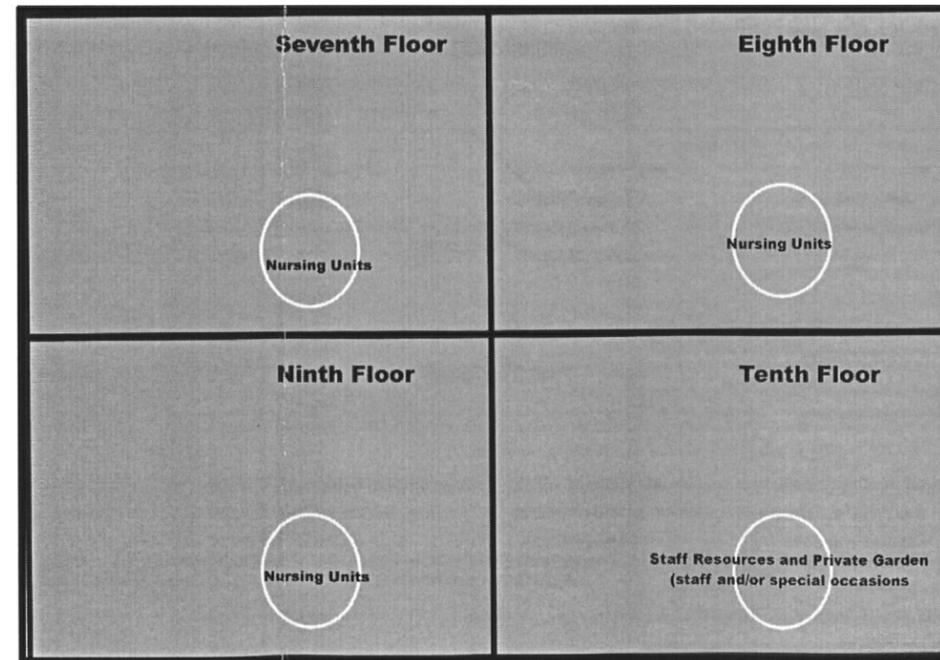


Figure 7-13: Program Proposals, Floors 7 to 10.

7.5.2 Proposed Hospital Programs.

An exploration into program placement that "fits" with the design is shown in these diagrams. Programs were situated according to an assessment of needs for sun or shade, views to nature versus views to activity, proximity to outdoors, as well as potentials to group users together for social support and/or efficiency in shared open space.

1. Efforts are made to minimize mass of building. The building is staggered, with a central tower "hidden" amongst the Douglas Fir woodlot.
2. Parking (both under and above ground) is offered in this still largely rural area. Until transit catches up, patients, visitors and staff will be highly dependent on the automobile. Parking is clustered for safety purposes with 600 below ground stalls, 200 above ground stalls, and flexible above ground temporary parking (main entrance street and back lane*).

In the case of a Disaster Response, however, this lane could be opened up to handle 100+ extra cars.

3. Patient wings are located primarily to the south and south east of the building in order to facilitate views to landmarks as well as the open space program. Offices, generally located in the central entrance core of the hospital do not have the same views of open space but they are privy to sunlight and views of the shared entrance area.

4. Placement/programs of specific patient populations follows the discussion in Chapter IV. For example, diagnostic patients have easy access to outdoor gardens, walking routes, and the Café.

5. Clustering of buildings and programs maximizes open space and allows for retention of existing resources, views, and vegetation.

7.6 Key Views.

Given the strong evidence of the restorative benefits that result from visual access to nature, consideration of key views was considered of high importance. Key Views are identified as those subject to one or more of the following elements:

1. **High Frequency.** For example, views outside the windows of ICU/CCU patient rooms are very important as these patients may be confined to bedrest for days, weeks or longer. Attention not only to the scenic beauty and the restorative quality of the view is important, but also consideration of seasonal and temporal changes to spark fascination in the viewers. The most pastoral of views will become a source of sensory deprivation without some signs of life, evolution and change.
2. **High Number of Viewers.** For example, if the cafeteria is to become a welcoming place for staff, visitors, patients and community members alike, then this view will require enough interest to appeal to a wide range of users. Hallways, entrances, and waiting areas may be used by very large numbers of persons and yet are often overlooked as viewing opportunities.
3. **High Expectations.** A rooftop garden that offers views to Mount Baker and southern agricultural fields should be oriented in such a way as to enable a full and complete vista. Vegetation growing along the enhanced berm (southeastern corner) may need to be pruned and maintained to preserve the integrity of this view.

Criteria for evaluation of key views has been adapted from the Procedures and Standards for Visual Landscape Inventory used by the British Columbia Ministry of Forests (B.C. Ministry of Forests, 1997).

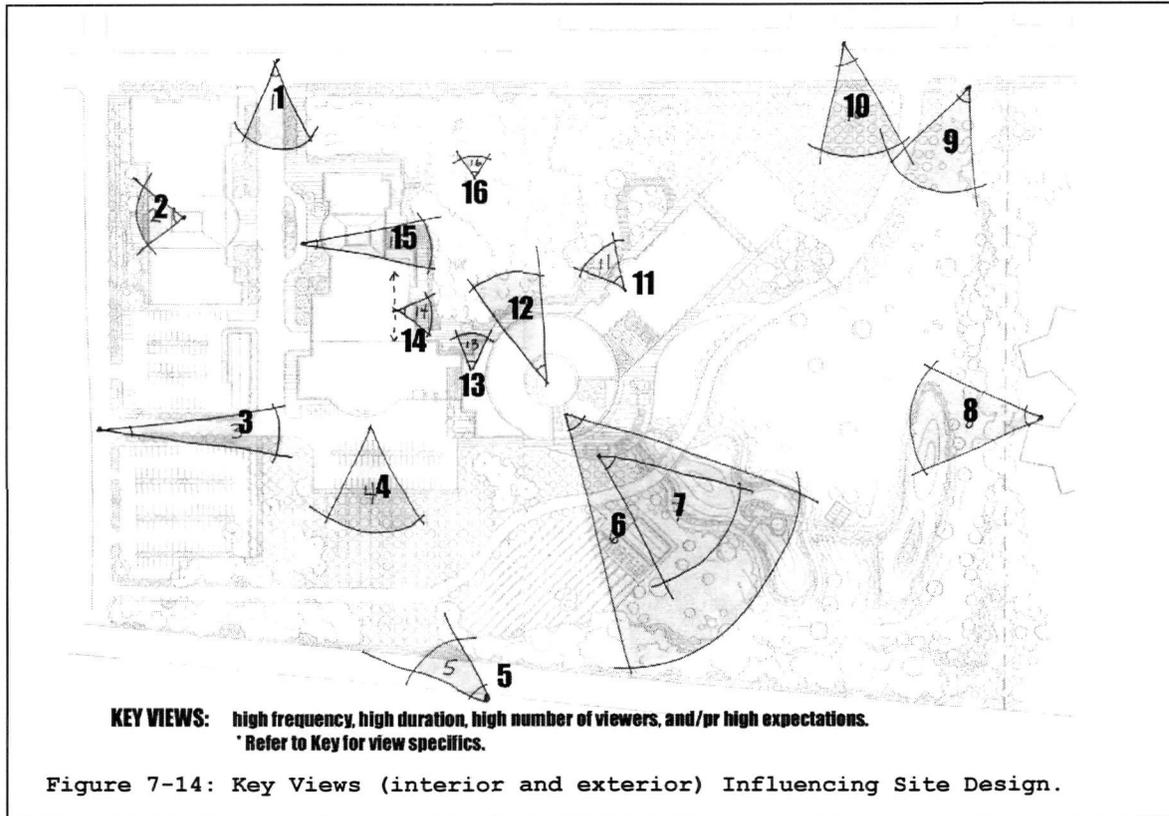
There are some areas (e.g. primary entrance, cafeteria with view to open space) that will be affected by all three parameters and are therefore vital for maintenance and attention.

As discussed in the previous chapter on site analysis, exterior views are vital to this region (views to mountains and agricultural fields). These views are enhanced through the construction of the central tower as well as a proposal for several rooftop gardens that allow individuals to ascend to key viewing points. Interior site views will also be important in both the enclosed marshland and the Douglas Fir woodlot.

Views into the site have also been considered. For example, small areas of orchard trees will be visible from both Marshall road and the Trans-Canada Highway, giving motorists a visible cue to the site. The site should present a welcoming presence in order to encourage community use. This may range from the functional placement of a popular coffee shop near the entrance to an unobstructed view along a winding bicycle/walking path.

It is also noted on the Key View Map that visual access through the built form has been highlighted in some areas. Most importantly, the entrance offers a view not only into the reception lobby but directly through to the woodlot behind, enhancing the sense of access, comfort and enclosure without blocking the entrance of sunlight. Glass atria and glass-covered walkways are envisioned throughout the site providing easy visual access to nature: trees, water, open space, and habitat.

The primary key view facilitated/promoted by this design are as follows:



View	Description
1.	Welcoming street face with hints of landscape beyond: visible orchard, sunny entrances.
2.	Sky roof over community auditorium leading to health library and outdoor reading room.
3.	Legible view to emergency. Clear visual access for ambulances.
4.	View from ER to orchard filled berm: sense of protective enclosure, view of living landscape.
5.	View from highway to hospital orchard: visual cue.
6.	From upper tower and roof garden, view to landmark Mt. Baker.
7.	From Café and patient rooms (N.B. CCU/ICU), view to interior landscape: design for biophilia.
8.	View from Mayfair Home to open space and Café: welcoming.
9.	Welcoming views from Marshall Road (to open space and Café).
10.	View from Marshall Road (and Menno Home) to front yard orchard: visual cue, invitation.
11.	View from Psychiatry (N.B. lounge, locked rooms) to woodlot and old orchard.
12.	View from Tower (all floors) to interior woodlot.
13.	View from Diagnostics Indoor waiting area to outdoor waiting area and woodlot trail access.
14.	View along hospital corridor to interior woodlot and waiting areas.
15.	View from main entrance/reception (hospital and cancer clinic) to woodlot garden area.
16.	Interior views of native coniferous "forest": 60-70 year-old Douglas Fir trees, some Alder/Cottonwood/Maple.

7.7 Site Circulation.

7.7.1 Requirements.

Main Street: A legible main street entrance with easy physical and visual access to main entrances and parking. Entrances to the 3 main programs will be shared to avoid stigmatizing one group. On-street parking will be available as well as a drop-off and turn-around.

Emergency Street: An easy access route will be available for ambulances. This should be a secondary access point only for public and staff. Street parking will be disallowed to decrease potential conflict between cars and emergency vehicles.

Fire and Emergency Lanes: Emergency access is planned throughout the site open space and around all built forms. A 3-metre perimeter around the building is graded and paved, with grass-crete installed where necessary to provide access for fire vehicles.

Experiential Roads and Paths: The delights of a back country road are provided for in the open space program with a curvilinear path that features a water crossing. Vehicular access is limited and road parking is available only for community volunteers. Walking, jogging, cycling, roller blading, and equestrian passage will be encouraged along this pathway. A variety of pathways, some simple, circular and direct and others more circuitous give users a variety of options and a sense of control.

Secondary Recreation Connections: As discussed briefly in chapter VI (Site Analysis), it is considered vital to include in the site circulation connections to off-site amenities. A "Wellness Walkway" route along Primrose Avenue would require little more than simple street restoration to enhance this flat access to the Mill Lake viewpoint. This route then connects to a more challenging path that traverses Mill Lake and returns to the site via the steeper Gladwin Road. This presents a recreational opportunity for staff as well as community members. The aforementioned "Trans-Canada Green" (running along highway edge) should also be considered during berm construction.

7.7.2 Vehicular Circulation.

Legibility is high on the list of priorities for circulation in the hospital environment. From emergency vehicles to anxious patients and families, to staff members late for work, the priority is to get to the hospital as quickly as possible. Primary access for all users is simple and direct, although there is provision for a more pastoral back lane drive. The two major entrances are clearly evident (Main and Emergency) as are entrances to parking (above and below ground). Provisions have also been made for visitors to park briefly on the main Entrance Street while waiting for relatives or friends.



Main Street
Access (view
south into
site off
Marshall
Road): urban
typology,
shared
entrance.

Emergency
Vehicle
Primary Access
(view east
into site off
Gladwin Road):
limited
access.

Back Lane
Access: rural
typology,
restricted for
recreational
and open space
stewardship
programs.

Figure 7-15: Typical Street and Lane Profiles for Restorative Facility.

Primary access to the VHC is from Marshall Road (runs east to west). All new arrivals to the hospital are dropped off or arrive at the Main Entrance off Marshall. Connections to all three major programs (Regional Hospital, Cancer clinic, Wellness Centre) can be made from this central location, thus promoting a sense of legibility and community. Aboveground parking is grouped on the western edge of site, within a short walking

distance of the hospital. This area will have special attention to lighting and security present at change of shift for staff security.

Secondary access is via Gladwin Road (no exit road running north to south along western site edge). This secondary route will be used primarily for ambulance arrivals and for staff (close to parking). Parking is not permitted on this street and street trees are kept to a minimum to enable clear visual access in emergencies. As discussed, emergency vehicles have access to all building fronts and to open space. Grasscrete is used in potentially soft ground areas to create a more natural appearance to these functional areas.

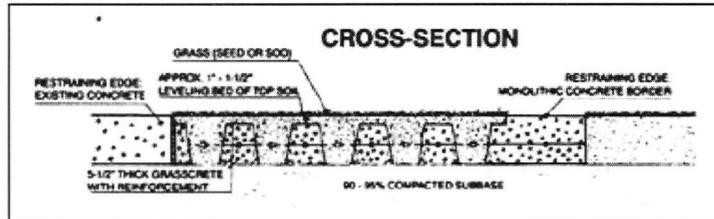


Figure 7-16: Grass Crete Section.
Source: www.progressiveconcrete.com

Delivery trucks have access via the "back lane" road. This is a 6-metre wide asphalt road with a gravel edge. This back road and "back door" delivery area will be visible to users on site. This is considered within character of this mixed urban/rural region.

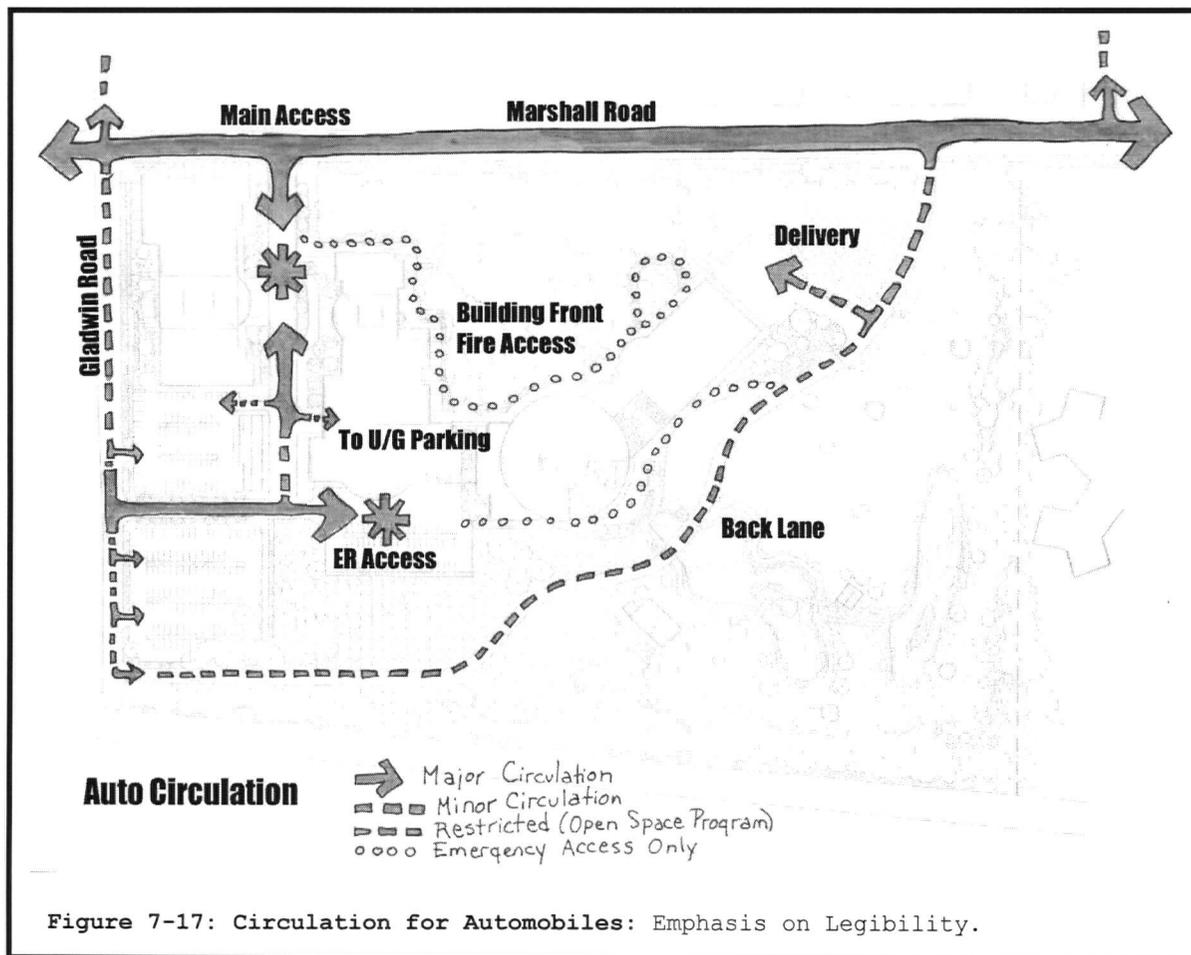


Figure 7-17: Circulation for Automobiles: Emphasis on Legibility.

7.7.3 Self-powered (universal design).

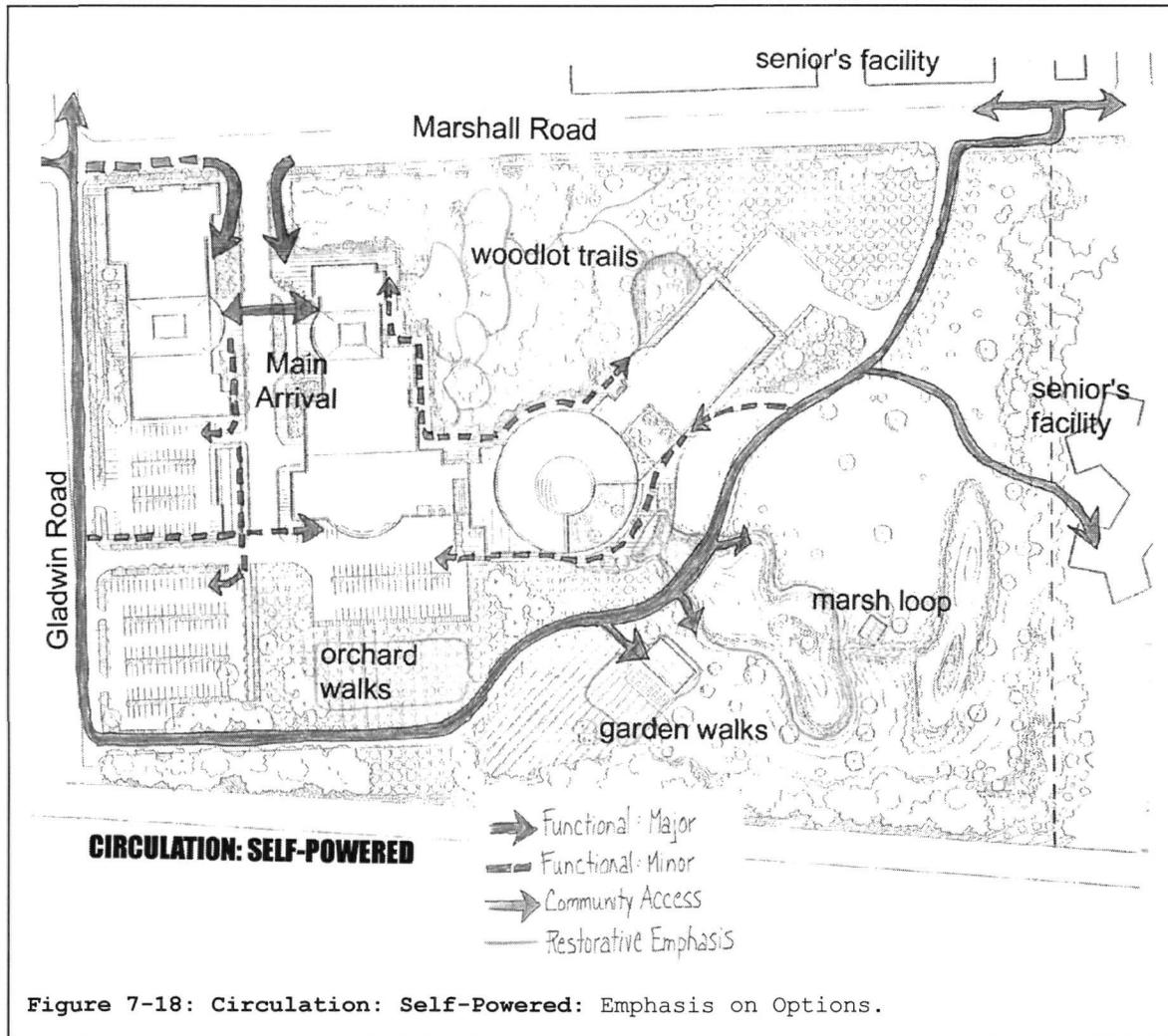


Figure 7-18: Circulation: Self-Powered: Emphasis on Options.

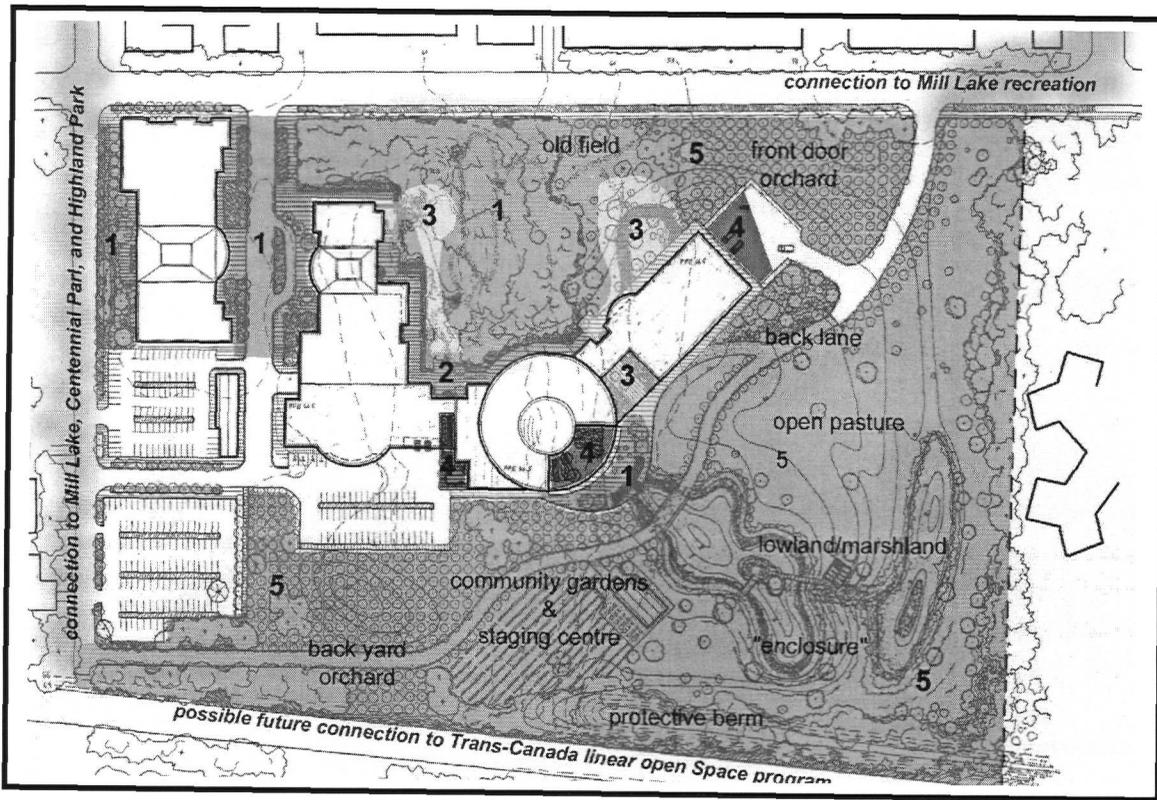
Cyclists, pedestrians and wheelchairs access the hospital via the new Entrance Street or back lane depending on their destination. Arrivals to the hospital, Wellness Centre, or Cancer Clinic all share the main entrance node. The back lane leads to the "Community Café" (cafeteria, coffee shop, limited retail) as well as to open space programs (marsh, pasture, gardening, orchards). Several accessible walking paths are available on the VHC (Valley Health Centre) property, passing through the woodlot, the orchards, the gardens, and around the pond/marsh. All these paths/roads are graded at less than 8% slope with frequent rest stops. Distance between rest stops is dependent on anticipated use. In high use areas, rest stops occur every 200 metres, and in low use areas are 500 metres apart. The majority of paths are designed for year-round use (asphalt, grasscrete or crushed gravel).

7.7.4 Equestrian.

Local residents passing through on horseback can use the back lane and pasture and would exit on Gladwin. The previously discussed 'Trans-Canada-Green' corridor link along the highway will be a future resource for equestrian interests (refer to Section 6.3.2, Figure 6-25).

7.8 Open Space Organization

This analysis attempts to bring together restorative design on the land with the realities of practical management. The hospital design was examined and evaluated according to which areas necessarily fall under the jurisdiction of hospital management (primarily for maintenance and security) and which areas could become part of a "Co-Management Process" or collaborative effort with local community groups.



Open Space Organization.

Hospital Managed:

- 1 all users
- 2 visitor emphasis
- 3 patient emphasis
- 4 staff emphasis

Co-Managed (public-private):

- 5

Figure 7-19: Open Space Organization and Management
(explanation on following page).

The community emphasis of the open space program is made evident by the large area mapped as falling under "Co-Managed" jurisdiction. Also identified within the hospital jurisdiction were areas with particular potential for meeting the needs of specific user groups. As noted on the diagram above, certain areas were chosen to highlight specific interventions for patients, visitors, staff or the community at large.

It should be stated that although certain areas are being highlighted as special or unique for one population of users, it is expected that all users of the spaces will receive therapeutic benefit. For example, a highly restful and peaceful garden with flowing water and sounds of birds may provide great satisfaction to patients recovering from acute coronary incidents. This same garden, however, would also provide great benefit to that patient's family members and caregivers.

7.8.1 Explanation of Open Space Organization.

Management/ Stewardship	Primary Users	Implications
1. Hospital Managed	All Users	Security and maintenance done by hospital staff, with costs and workload kept to a minimum. Private fundraising may be required for construction of special gardens or spaces.
2. Hospital Managed	Patients	Garden and landscape programs may become components of medical therapy (physiotherapy, occupational therapy, pet therapy, follow-up programs post cardiovascular and/or cerebrovascular accidents, spinal cord or brain injury, psychiatric in/outpatient programs). The majority of these programs would require supervision by qualified medical staff.
3. Hospital Managed	Visitors	
4. Hospital Managed	Staff	
5. Co-Managed (Public- Private)	All Users, including community members	The larger open landscape is presented as an opportunity for co-management with a community group. This would involve a combined effort between management from the regional group and from the hospital, with decisions mutually agreed upon in regards to planting and programs. Although the open space should remain open and available to all users, it does not preclude the possibility of contracting out local farmers to harvest crops, berries or raise limited livestock on the property. All of these activities would enhance the restorative benefit of the open space.

1. **Open Space for All Users-Hospital Managed:** These include the more "urban" areas of the site (entrances, library garden, outdoor plaza/café) and those areas in such proximity to the hospital as to require special concern for security (e.g. the Douglas fir woodlot). Maintenance will be the responsibility of the hospital.
2. **Open Space with Emphasis on Patient Needs-Hospital Managed:** Although all patient groups have been considered in the design of this landscape, it was only possible to select a very few for illustration of specific interventions. Highlighted for further exploration were two diverse groups with varying needs. A garden was designed to meet the needs of patients and families faced with cancer treatment. The psychiatric population was explored in terms of open space needs. As well, some general interventions to benefit all patients were proposed, for instance increasing the accessibility of outdoors to hospital patients. These interventions are illustrated and discussed in the following chapter.
3. **Open Space with Emphasis on the Needs of Visitors/Outpatients-Hospital Managed:** Highlighted for further exploration is the internal strip of "potential" visitor space that is visually accessible from the entrance and corridors.

4. **Open Space with Emphasis on Staff Needs-Hospital Managed:** It is anticipated that a variety of spaces will be required for staff: for meals, quick retreats and social/educational/recreational gatherings. Considered vital are issues of security, brief retreats/refuge away from patients and areas to congregate. Examples of consideration of staff needs are highlighted in the design in the following prototypical responses:

- Clustering of parking and well-lit primary passage from parking to hospital (CPTED principles),
- Cafeteria space/coffee shared with community,
- Mount Baker Roof Garden atop patient care tower intended for staff retreat (informal and formal gatherings),
- Private garden refuge outside emergency for ER staff, support staff and EHS attendants,
- Easy and safe access to Wellness Centre for recreation/education.

Chosen for further exploration in this project are the two private staff refuges.

5. **Open Space with Emphasis on Community Needs:** The primary user groups will be those members of the community concerned with stewardship of the land and those interested in recreation. Ideally, a program that combines both objectives will develop over time.

- **Public Recreation Opportunities on site include:**

Dogwalking, jogging, strolling, picnicking, bird and animal watching, pick up sporting games, passive activities-reading, sunning, and people watching. The primary use area will be the open pasture and marshland with connection to the Community Café. Washrooms will be shared with landscape volunteer facilities. Educational opportunities will also be available at the Outpatient/Wellness Centre, situated in the core of the main Shared Entrance.

- **Public Landscape Stewardship Opportunities:**

Responsibilities and requirements are outlined below.

7.9 Proposal for Community Landscape Stewardship.

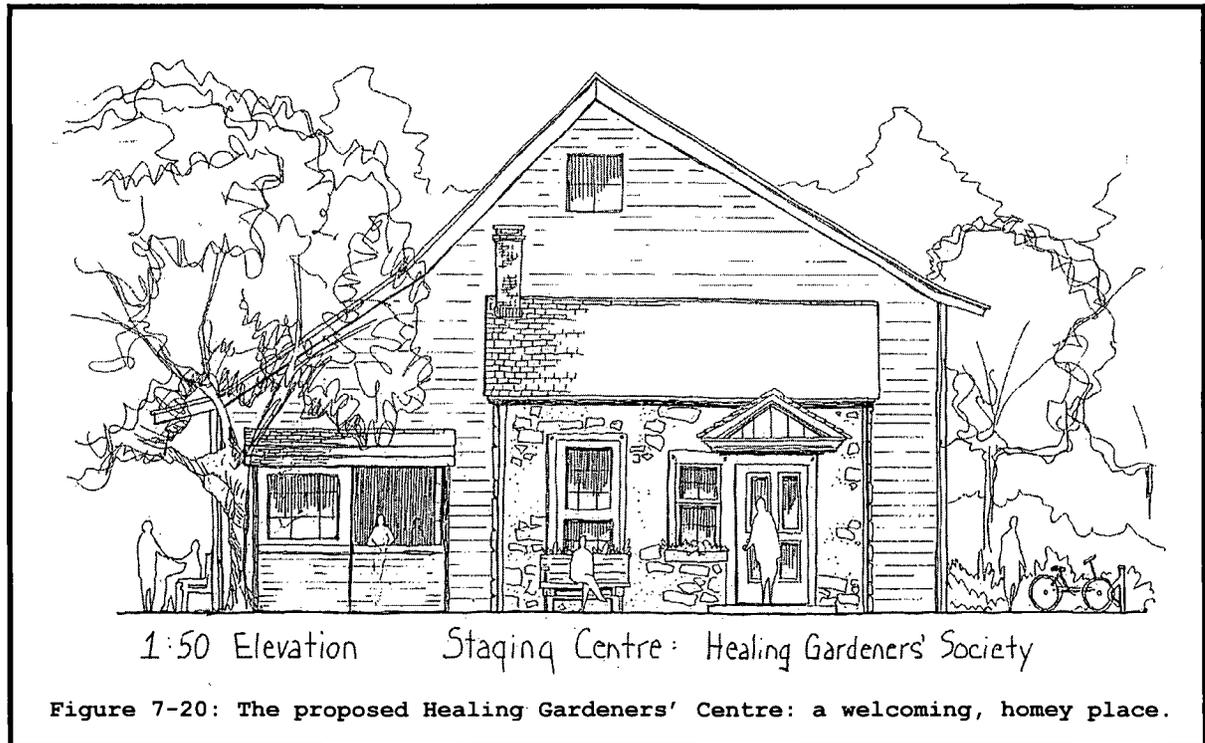
The southeastern "skirt" of the design exists as an edible, living landscape that will require stewardship and management. In the public health care system, such expenditures are difficult to justify without significant community involvement. A proposal has been made to develop a co-management system of stewardship of this hospital open space.

A volunteer community group-the "VHC Healing Gardeners Society" is proposed to take on the shared management of this landscape unit with the hospital. The optimal condition would be to develop this society along with the public process set up to formulate goals and objectives for hospital design. Local interest groups that may be approached to form the Healing Gardeners include:

- Central Fraser Valley Naturalist Society and other groups concerned with habitat,
- Local 4-H programs/farming clubs,
- Local berry farmers (able to offer equipment on loan and expertise),

- Local school groups (Trinity Western University, highschoools, elementary schools),
- Local horticultural/plant appreciation societies and community gardening groups,
- Local professionals/technicians (foresters, landscape architects, engineers, carpenters, etc.)
- Senior's Peer Counseling of B.C., Friends of Schizophrenia and other community based programs of support.

7.9.1 Infrastructure Required:



The community will require a staging centre situated amidst the healing landscape agriculture. This centre should include:

- Tool shed/Tractor Shed/Garden Shed,
- Booth for seasonal produce marketing,
- Accessible Road for Tractor (share hospital delivery lane),
- Place for coffee-food-snacks,
- Place for visiting/learning/sharing,
- Washrooms and access to clean water,
- Barn/shed/shelter for visiting pasture animals,
- Area for public interaction with visiting animals,
- Potential for gardens/orchards to be used for rehabilitation purposes (e.g. accessible surfaces).

7.9.2 Responsibilities of Volunteer Group:

The Healing Stewardship Society will take on an active role in managing, maintaining and preserving the restorative open space and will meet, as

required, with hospital management, security, horticultural therapists, health care providers and patients and families. The involvement and visible presence of the group will in itself provide benefits as preference for rural farmscapes has been shown to increase with the evidence of active stewardship (Sheppard, 2001). Specific responsibilities are discussed below.

Sub-Area	Responsibilities
Urban Woodlot	Monitoring of trail paths and trail rest stops will be required to ensure freedom from graffiti, and hazards (fallen branches, etc.). It will be important to monitor the continuing health of trees and watch for potential blow-down. This is not expected to be a great concern as the retained trees are sheltered from significant wind by large buildings. Shade loving bulbs and native herbaceous plants are visioned along forest edges of paths and volunteers will be responsible for the maintenance of this woodland edge.
Habitat Orchards /Berries /Gardens	Trees in the orchards will be chosen with public input (examples may be hazelnut, heritage apple or crabapple). Organic production, avoiding the use of pesticides will be recommended. At harvest times, the Healing Garden Group may market produce from a booth situated near garden shed (accessible to hospital patients and staff). Extra produce may be sold to local markets to raise funds.
Open Pasture	Ensuring good maintenance and safety will be important. Local farms will be solicited to bring in farm animals on a temporal basis to "mow" the open space. Community members with attachment to rural property/4-H clubs, etc. will be encouraged to organize these domesticated grazing animal outings. Locally available are horses, ponies, sheep, goats, llamas and dairy cattle. Minimal fencing combined with hedgerows will contain the animals. Monitoring and maintenance of the hedgerows will be required.
Lowland/ Wetland	The intention for this area is to allow it to flourish in a naturalistic manner. Responsibilities will therefore include monitoring the balance between functionality and mystery. Plantings may require pruning in order to enable safe views and safe passage. The volunteers may take on monitoring of habitat (counting/identification).
All open space	The monitoring and elimination of exotic invasive plants will be the society's responsibility for all open space areas. A particular focus will be on the highly disruptive <i>Rubus discolor</i> (Himalayan Blackberry). This invasive shrub, although it does have some value as bird/small mammal habitat, is particularly aggressive in the Fraser Valley conditions. Site analysis revealed a significant amount present in the lower reaches of the Douglas Fir woodlot.

7.9.3 The Community Viewshed

Views within the site are strongly addressed in this design. Perhaps equally as vital are the views into the site as experienced by passersby. Drawing in the community involves more than programming and designing a welcoming inner sanctum. The community must first be drawn onto and into the site.

- First Order of Community Access= Visual Access
- Second Order of Community Access= Physical Access

Drawing in the community requires a welcoming street face that hints to landscape experiences beyond. The main entrance and the back lane entrance have both been designed to accomplish this goal. The main entrance speaks strongly of function, legibility and access to programs. This approach is uncomplicated, with visible parking (underground and aboveground) and a shared, accessible entrance. In times of high stress, patients and visitors need this simplicity: all answers, no questions.

The back lane, in contrast, appeals strongly to biophilic needs for nature and features a stronger sense of mystery. The lane winds and slopes past the "back door" (delivery), passes along an open field and across a body of water. Passage through an orchard greets the user at either end of this rural lane. For highway users, a glimpse into the southern "back yard" orchard provides a sense of place. Those approaching west along Marshall are greeted by an open door that pulls them into the shared main entrance.

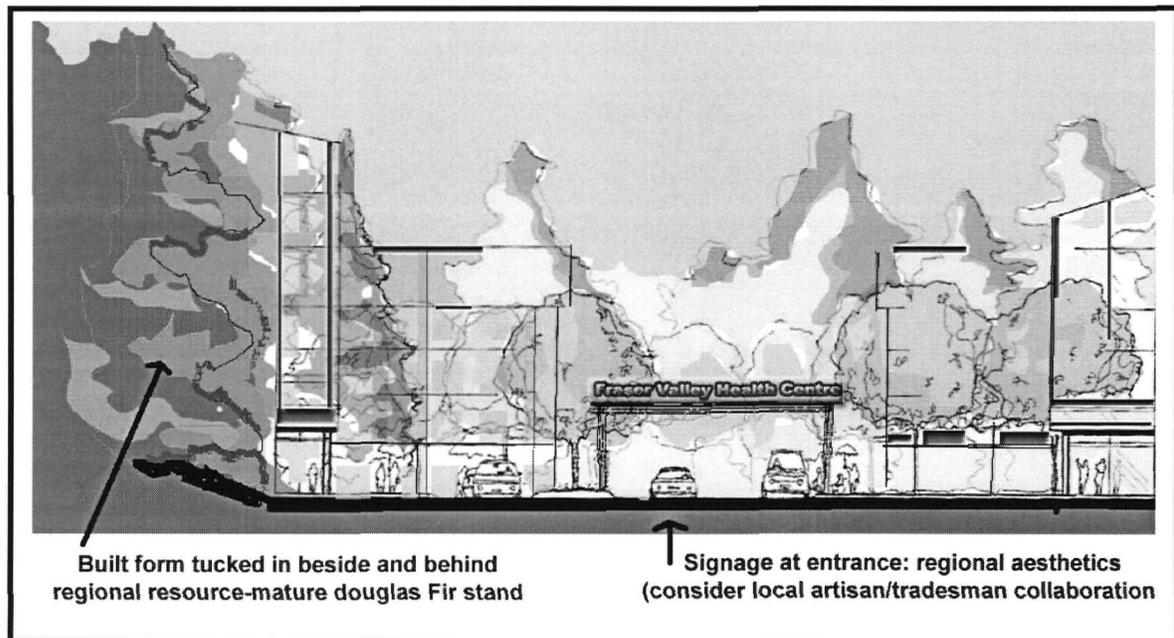


Figure 7-21: Primary community arrival to all hospital programs (view south from Marshall road). Easy wayfinding yet references of natural resources beyond.

The following section highlights two specific and important interventions made on the site: grading (Figure 7-22) and vegetation retention (Figure 7-23). These actions are illustrated using the master plan.

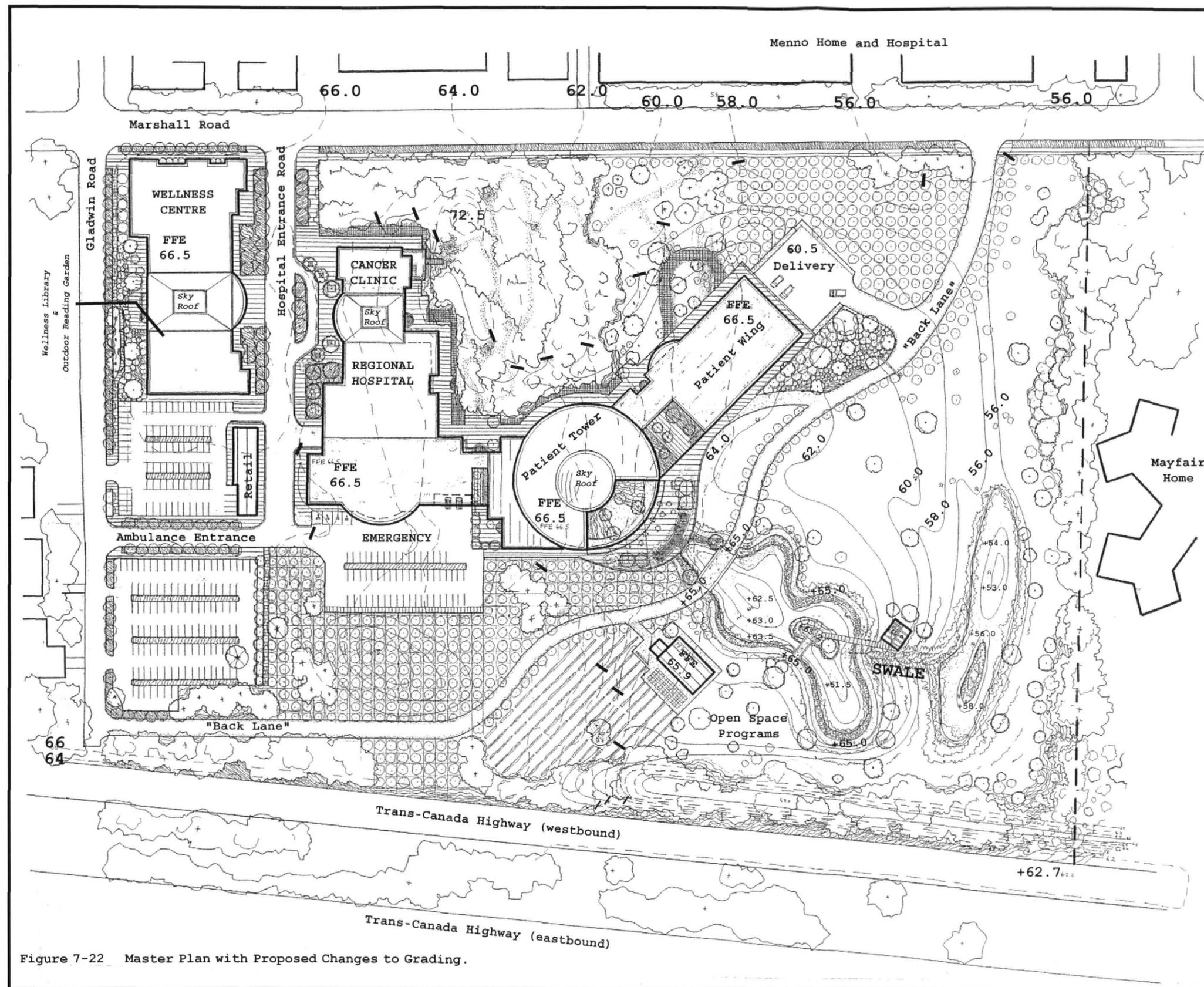


Figure 7-22 Master Plan with Proposed Changes to Grading.

7.10 Master Plan: Specifics.

7.10.1 Site Grading.

KEY:

 Solid line refers to proposed grade changes.

 Dashed line refers to existing grade changes.

***Altered grades all meet up with existing grades at edge of property line, with the exception of the enhanced berm. It is assumed that sound protection would also be built for Mayfair Home & Hospital.*

A decision was made following site analysis to let current topographical conditions guide the design for the new hospital and landscape. The low point was identified and chosen as an appropriate locale for water location. The elevated knoll, considered a regional landmark, was chosen for retention and enhancement. Ensuring the survival of this mature, second-growth stand of Douglas fir trees presented a particular challenge for siting and grading.

The final design features two significant open spaces: the central treed area ("hugged" by built form) and the large southern open area. Bordered on all sides by hospital facilities and/or constructed berm, this open space becomes a large cloistered and sheltered "garden".

As becomes more evident in cross-sections (in next chapter), there is a major drop from the hospital floor elevation to the southeastern portion of the site. This drop enabled the creation of a restorative waterfall and water body at the base of the Café (cafeteria). Despite this drop of nearly 15 metres from the knoll apex to the low point, it was possible to grade paths <8% and achieve universal accessibility.

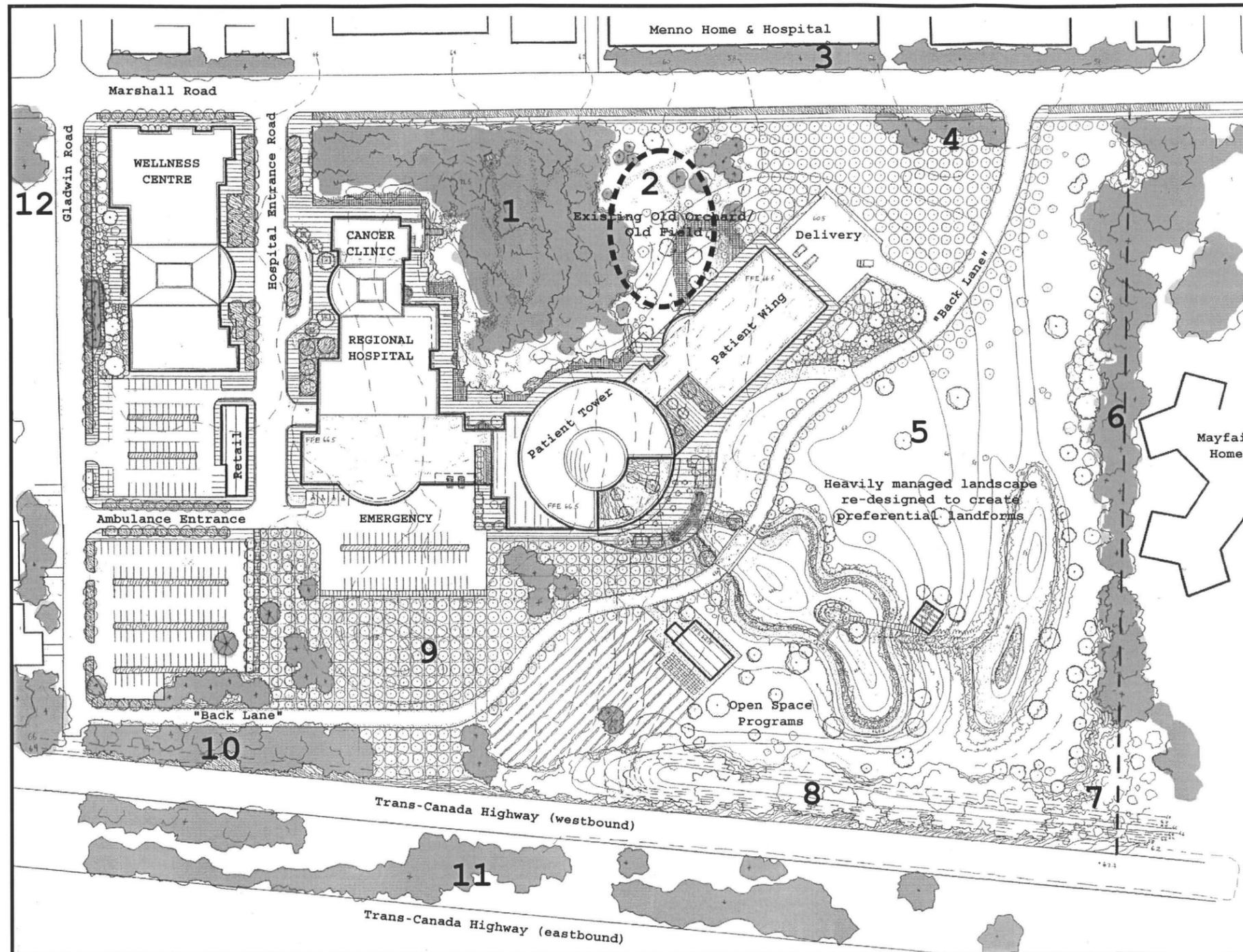
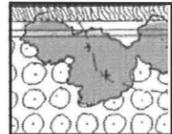


Figure 7-23
Master Plan
with Details
of Retained
Vegetation.

7.10 Master Plan: Specifics.

7.10.2 Vegetation Retention.

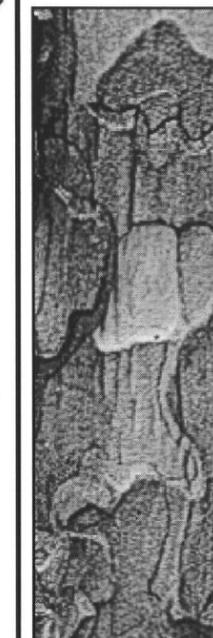
KEY:



Areas/trees marked with an X and colored green (medium grey in B&W copies) indicate retention of existing vegetation.

A site-specific approach was used and efforts were made to begin with available resources, enhance where possible and protect where required.

Efforts were made to bring new design together with existing features in a harmonious manner that would promote restoration.



A prime objective that followed site analysis was the retention of as many mature trees on site as possible. This is for several reasons, such as:

- * Respect for history and evolution of site,
- * Economic benefits (dollars saved by reducing need to buy mature trees, reduced cost of tree removal),
- * Immediate restorative benefits derived from having mature trees already on-site in view of hospital users.

NOTES.

1. The majority of healthy trees in the central knoll are retained. This space becomes a vital restorative resource for users.
2. Remnants of an old hazelnut orchard are retained amidst an old field that has both important habitat and restorative value.
3. Mature Douglas Fir trees currently line the northern side of Marshall Road and are retained. These trees help to reduce the height and mass of proposed buildings.
4. A stand of Douglas Fir at proposed new "Back Door" entrance creates a landmark and enhances wayfinding.
5. Currently a sparsely vegetated area, this open space becomes prime location for open pasture, as well as stormwater retention (water flows to southeastern corner of site).
6. Existing tall stand of Douglas Fir frames view of Mayfair residents into open space.

7. In order to maintain views to meeting Baker, this corner will require maintenance to keep vegetation at suitable height.
8. Berm enhancement will require removal of current vegetation. As much as possible, these trees will be replaced after raising the berm.
9. Little 'pockets' of existing native trees within the orchard plantings may develop into private, special landmarks.
10. The southwest portion of the berm does not need to be raised, but vegetation should be enhanced (noise protection/sense of enclosure).
11. The highway berm currently has a good balance of open and closed areas and should be monitored to ensure views to southern farms are not blocked.
12. Adjacent homes and parks feature several mature native and exotic trees that should be protected to maintain a respectful transition between the large hospital and its humble surroundings.

Summary.

The task of satisfying both restorative and functional requirements, while attempting to adhere to a strong landscape ethic that respects the humble origins of a place and tries to build upon rather than build over is a challenging procedure.

From a functional point of view, this design, as it progressed, was constantly cross-checked with needs of emergency vehicles, stressed emergency arrivals, and harried staff members. Legible circulation and a simple building configuration were required for all main entrances and major nodes of activity. Sustainable practices were employed where possible, and, in fact, the desire to enhance biodiversity played a significant role in determining what open space was most valuable for retention. Site analysis and consideration of varied user needs played

strongly in determination of open space and built layout, configuration, and programming. Programs inside and outside the hospital rely strongly on one another. For example, if it were not possible to place the Intensive/Cardiac Care Units on the southern tower with views to the open space, then a new viewshed will be required.

The configuration of the buildings and the open space, in this broad plan, while satisfying several other stated objectives, allows for the retention of a large portion of the central Douglas Fir knoll. Several other important or potentially important habitat areas are also protected (old fields, large open pasture, healthy hedgerow of mature Douglas fir on the eastern border). Neighbors (both single-family homes and senior's facilities) have been considered as evidenced by the graded height of the hospital and the facilitated access points.

By proposing a management plan that seeks to involve the community in the construction and maintenance of the open space programs, (and, ideally, with fundraising for smaller gardens) should enhance the feasibility of many of these proposed programs. Designed with, in essence, a large public park and an accessible outdoor/indoor cafeteria, the "complex is a place for both the sick and the healthy. It can be an integral part of everyday life, not just an emergency destination" (Pearson, 1995).

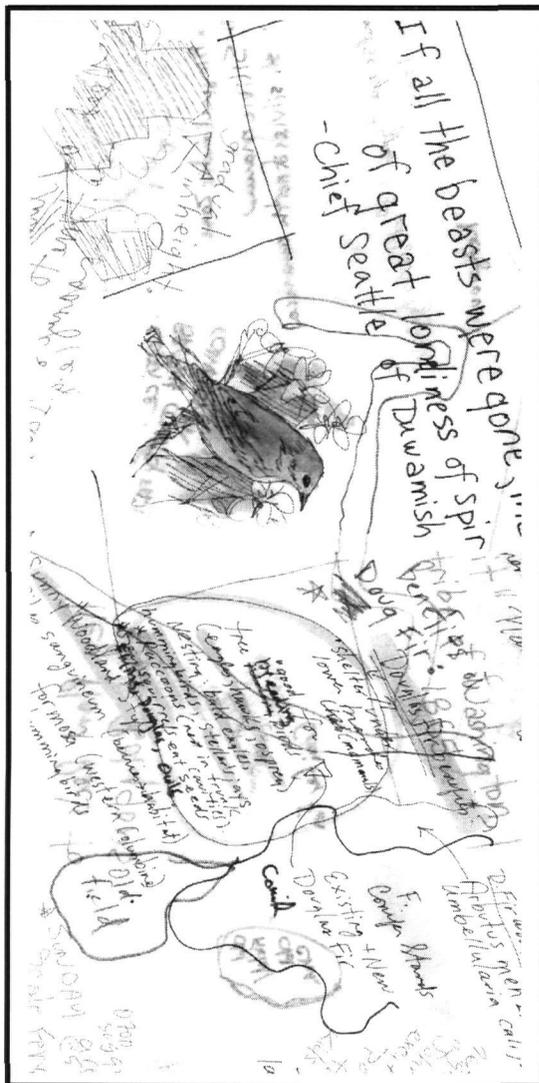


Figure 7-24: Rough worksheets used on-site and in studio helped form the design process.

8.1 Urban Entrance: Shared Hospital Open Space.

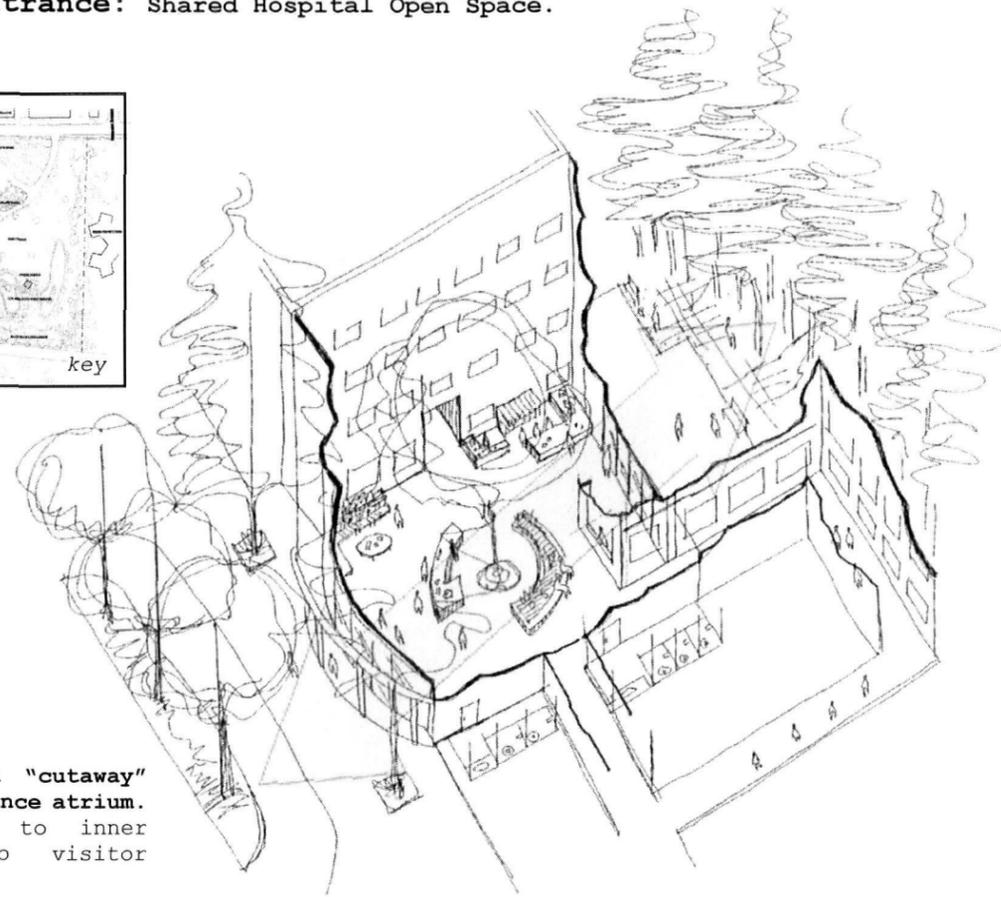
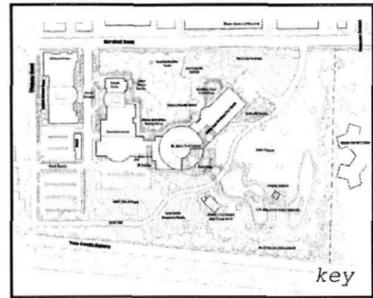


Figure 8-1: Axon "cutaway" view of main entrance atrium. Immediate views to inner woodlot and to visitor seating areas.

1:250 Axonometric : Built Form Facilitates Views to Nature
 (Main Entrance → Hospital Forest)

Description.

A welcoming urban street face at Gladwin and Marshall is proposed. An entrance street (2 lanes for passage, 1 for parking) becomes a defined volume of space that also acts as a waiting area, staff break area, and public visit area. All three hospital programs are accessed from this area. The orientation of buildings will enable sunny experiences. Glass atriums at building fronts allow visual access to gardens and landscapes beyond.

Restorative Benefits.

Stress for new arrivals is reduced by the easy wayfinding provided with a single, shared entrance for all users. Stress is also reduced by providing easy physical and visual access into the hospital and through to the woodlot open space behind. A wide band of planting in front of the Wellness Centre will feature a bermed grassy seating area with canopy trees. In summer, users may choose to lay under the trees. In winter, they will use the covered benches set 200 metres apart in this high use area. The entire area is graded for accessibility without the use of ramps or stairs. As this space sits adjacent to the Wellness Centre, evening and weekend use will be expected (courses, lectures, workshops, indoor recreation). A sense of security is provided through good upkeep, good lighting and wayfinding, and clear visual paths (refer to CPTED Appendix II).

Users.

This is the primary entrance for all new arrivals to all hospital programs (patients, staff, and the public).

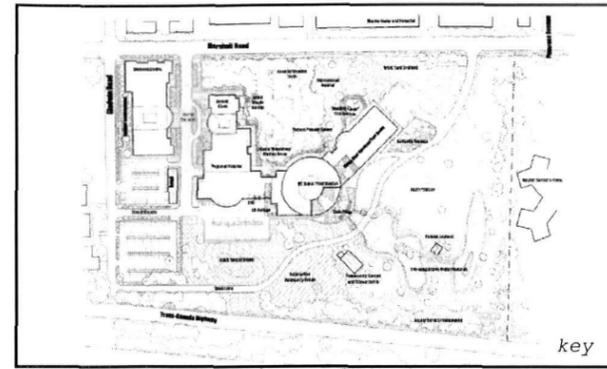


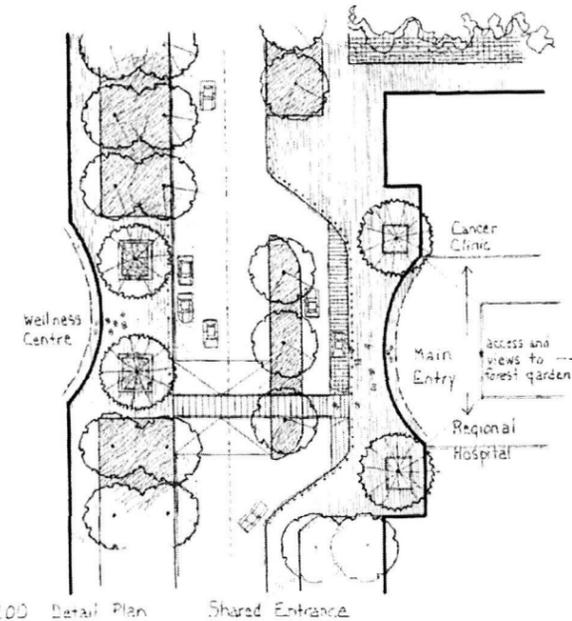
Figure 8-2: Location of shared entrance.

Maintenance.

The design includes pavers, planters, benches, lighting, and simple planting schemes. The goal will be to achieve low maintenance requirements through simplicity in design and patterns and site fixtures.

Special Features.

Entrance to the main hospital features arrival at an indoor "living landscape". Inner offices and clinics will face onto this indoor cloister garden. Easy visual and physical connections are made to pavilion-style hallways and to central woodlot area.



1:200 Detail Plan Shared Entrance

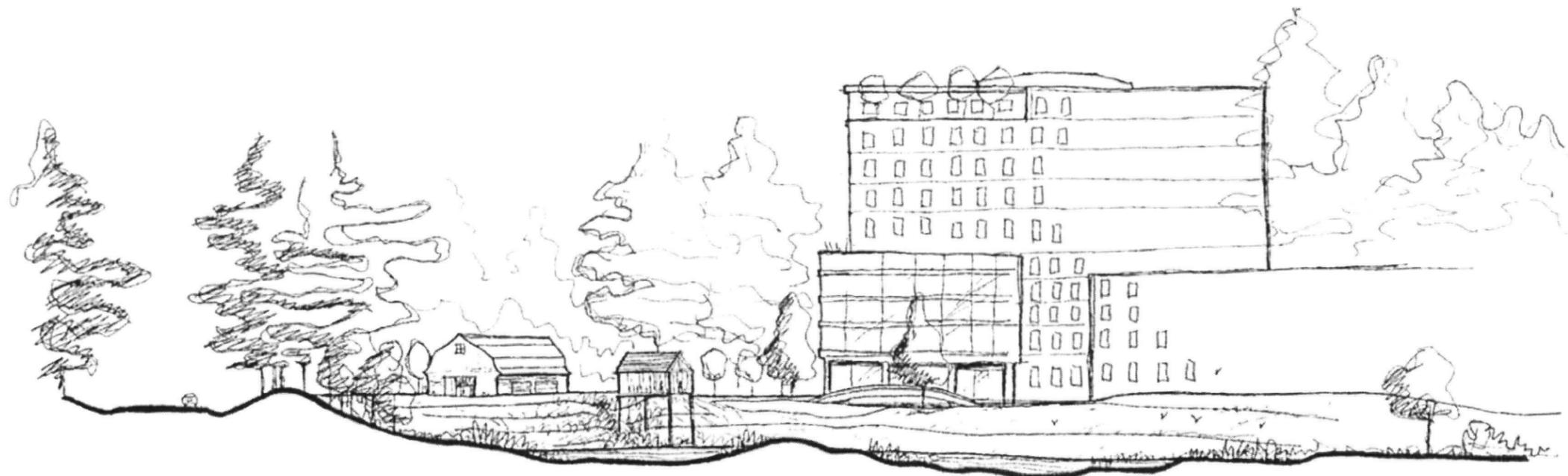
Figure 8-3: Detail of shared entrance street plan. On-street parking and easy access to underground parking as well as turnaround will reduce stress of arrivals.

CHAPTER VIII The Restorative Vision: Details and Specialized Spaces

Design and program discussion to this point has focused primarily on large-scale interventions and the choices behind them. The overall site layout has been described (through text and visuals) as one that is holistically restorative to the widest range of users. The Valley Health Centre, as proposed, is welcoming to the community and offers a variety of spaces, large and small, for staff, patients, and visitors to seek stress reducing activities. This chapter will deal primarily with the close-up look at several of those spaces, with descriptions and original drawings that aim to illustrate how the application of restorative design principles can create a landscape that promotes wellness and reduces stress.

Individual spaces for users with unique needs will be explored in more detail. It is expected, however, that many more of these unique spaces would be required. The spaces provided here are designed to act as precedents for future spaces, and as motivators for the imagination. The absence of strong research into the design needs and requirements of special populations requires the designer to simply learn as much about that group as possible, envision oneself in his/her place and imagine what you would require...or what you would wish for.

The spaces are outlined as they were presented in the preceding section, according to intended users and intended management of the space. Each space is described briefly, followed by a summary of restorative benefits, the intended users, and special maintenance needs, if any.



1:500 Section-Elevation : view west of enhanced berm and constructed marsh.

Figure 8-4: View (west) towards Community Café and open space program. Stewardship society staging Centre and Marsh Lookout are visible. Café hidden behind simple concrete bridge traversing water body.



Restorative Benefits.

Social support is stressed in this design and program. Also facilitated are: physical and visual access to nature (including proximity to moving water), accessibility to wide number of people, and enclosure in the living landscape.

Users.

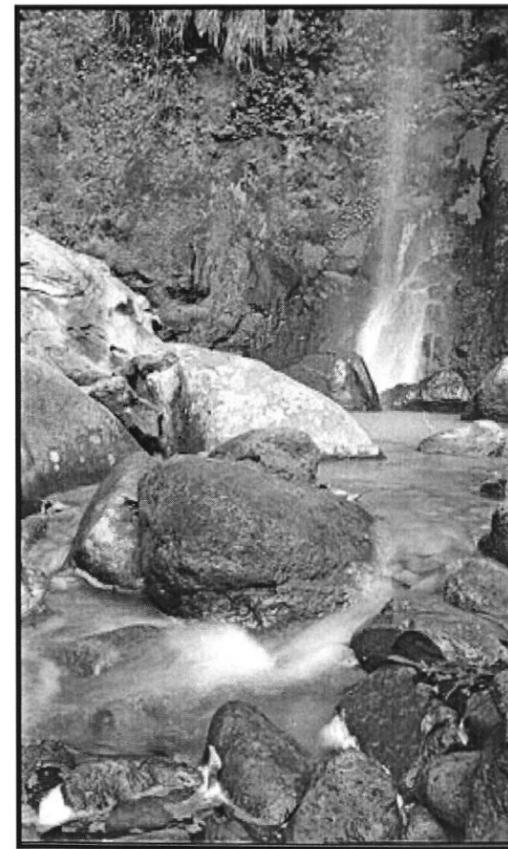
All Users: Patients, Staff, and Public. Pet Therapy will be encouraged in outdoor plaza.

Maintenance.

Maintenance should be minimal and will be the responsibility of hospital staff. The design is kept simple to orient views outward. Movable seating will require maintenance (left out rain and shine), as will the water feature and simple planters. The area is purposely designed open and flexible. This will enable the space to be configured for use by various groups for parties, rehabilitation or teaching sessions, or just simply for sitting and visiting.

Special Features.

The café is designed to draw in members of the community and is therefore easily accessed by hospital users as well as by the public (via the back lane). Views to the enclosed open space will be a primary feature.



**8.2 Community Café:
Shared Hospital Open Space**

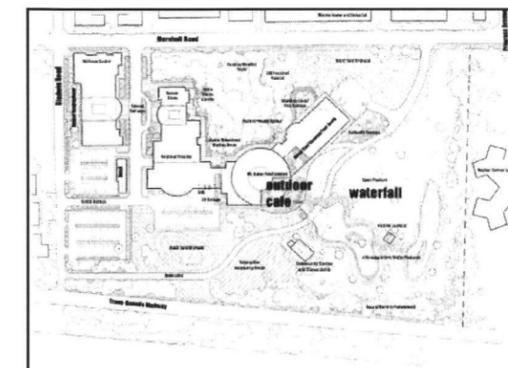


Figure 8-5: Location Café.

Description.

This is a sunny, accessible open plaza at the southern base of the patient tower. It connects to a ground floor cafeteria, as well as a modified "food court". Private enterprise will be encouraged (snack shop, coffee shop, etc.) The Café will be an open plaza that encourages eating, meeting, talking, and people/habitat/animal watching. The plaza itself features a large water feature at a height of 1 metre, suitable for resting beside and touching the water. At the foot of the café is a 2-metre waterfall that drops into the constructed pond and then gradually moves down into the more natural marshland in the southeastern corner. Paths on either side of the waterfall are graded at <8% to allow wheelchair access. Handrails will also be required. The plaza has views to the marshland (and footbridge that passes over water to lookout shelter) and to the hospital volunteer garden shed. Paths lead out from the plaza to the marsh, orchards and raspberry fields. Although there are open views to the water and pasture, the area will have a protective sense of enclosure created by the tower, berm, and trees.

Urban Woodlot: Description.

A significant amount of the mature, second growth Douglas Fir at the centre of the site has been retained and is hugged by the built form. The main hospital buildings wrap around the woodlot edge, thereby maximizing views to the trees for all users of the hospital. Trails are graded within the woodlot to allow universal use with frequent small nodes supplied with seating and water features (fountains for dogs, humans and birds).

Restorative Benefits.

The forest has multiple benefits: promotion of biodiversity, experiential, and recreational. This area will provide lookout habitat for raptors overlooking the adjacent pasture as well as nesting and forage for a variety of species. The trees give a strong sense of regional identity. At the heart of this "urban woodlot" is a small clearing and rustic shelter that serves as an "away" place (meditation, refuge, grieving, small ceremonies). This forest clearing is intended for no more than 12 people in order to retain the strong sense of shelter and enclosure.

Users.

All users will benefit from views to the forest and edge experiences. Public, outpatient programs, visitors, and certain patients (e.g. psychiatric) will make use of internal trails. Staff may use internal trails as a means of arrival/exit from site. Nurses leaving after day shift (catching bus on Marshall) may choose to leave in groups via the forest as a way to discard the day's stress (security issues).

Maintenance.

Maintenance and monitoring of trails will be the responsibility of the proposed volunteer group. Simple forest trails will be made accessible year round using packed gravel. Edge plantings of shrubs may require pruning to keep open ground plane views into the forest.

Security measures will include:

- emergency call boxes be placed along trails,
- lighting of one major path,
- security personnel present during shift change/peak use.

Space within a Space: The Forest Cloister.

Description.

The inner edge between the building and the woodlot will be a shady site with significant exposure to nature. A 3 metre wide strip serves functionally as fire access and has the added benefit of providing spaces for visitors (and others) to wait. The main hospital entrance and corridor link provides visual cues to the presence of these gardens. Access to woodlot trails is apparent at each node.

Restorative Benefits.

The experience provided in these spaces will be complete immersion in nature. The built form protectively at one's back, views and thoughts are oriented into the woodlot. Edge planting will be primarily native (no exotic invasives) with punctuations of color and fragrance: Choisya, Philadelphus, Rhododendron. Forest edge bulb plantings will mark changes in season. A woodland garden planting strategy for the forest edge (a variety of canopy heights) and a liberal use of *Acer circinatum* will help provide bird habitat, thereby introducing restorative sights and sounds.



Figure 8-6 (above):
Multi-faith congregation centre in centre of woodlot. Accessed by following one of several looped trails, this rustic space with little more than benches and a minimal overhead will be available to all persons or groups of persons in need of respite. Programs may be promoted/developed in association with Pastoral Care.



Figure 8-7 (left & right):
Collages of native plants. A native palette will be encouraged in the forest and on the forest edge to enhance biodiversity and promote education about local, native plantings. Occasional fragrant or unique exotics may be introduced for special places/occasions. Invasive exotics will be kept in check.

8.3 Urban Woodlot: Shared Hospital Open Space

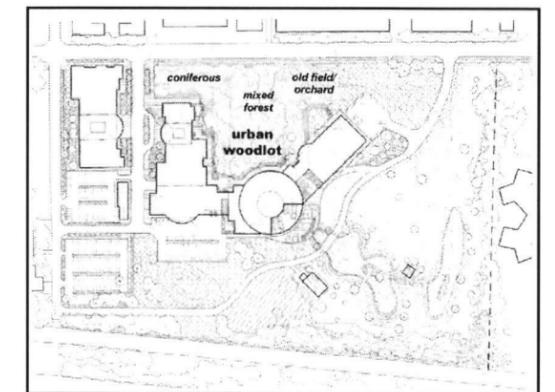


Figure 8-8: Location Woodlot.

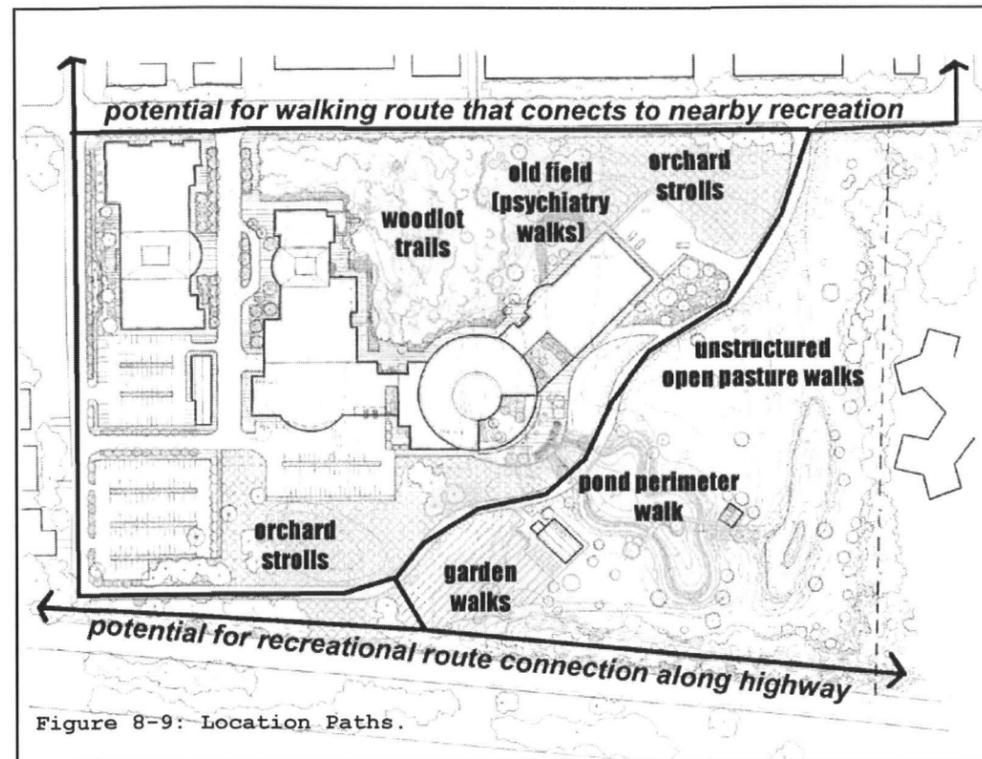


Figure 8-9: Location Paths.

An effort was made to maximize access to all parts of the site, leaving only the lower reaches of the marsh off-limits for birds to flourish unimpeded.

The paths are made of a variety of textures to give interest yet accessibility: recycled asphalt or crushed gravel or grasscrete. Areas of grasscrete are planted with appropriate groundcovers (sweet woodruff in shady forest areas, turf in sunny areas). All paths lead out from the hospital core. The diversity of materials/surfaces can also be utilized in hospital programs aimed at rehabilitation. For example, patients recovering from strokes (with impaired mobility and possible dependence on wheelchairs or devices) must learn to handle a variety of surfaces.

Restorative Benefits.

All paths offer strong connections to nature. Balance of understanding to mystery alters from trail to trail, allowing patients to choose level of security or complexity. All paths can be left behind if patients prefer to wander in the orchard, pasture or forest.

It should be noted that an emphasis was placed on paths that are linear and formal, yet natural. Orchards, rows of raspberries, community garden plots, and other such paths offer a sense of order within the chaos experienced by patients and visitors of hospitals. Choices are present yet uncomplicated. Wayfinding is facilitated. A variety of rest stops should be built every 200-400 m and made of natural, familiar content and material. Simple wood benches are planned.

Users.

Public, staff, and all patients can use these loops. Psychiatric patients in particular were in mind with this design. Along these trails, public art may be featured but should only be of a natural content, keeping stress and misinterpretation to a minimum (Ulrich, 1992).

Looping and redundancy of trails is featured not only for safety measures but to allow staff members to mark off certain loops as appropriate distances to walk/run during break times.

Maintenance.

Path upkeep should be enough to maintain accessibility yet allow natural weathering. Raking gravel, replenishing gravel or groundcovers, clearing snow, and raking leaves will be among the tasks taken on by the volunteer group. Any major upkeep requirements (e.g. repairing broken pavers or clearing hazardous trees) will fall to the hospital. In selected areas, path side plantings will need pruning to maintain clear visual access for safety purposes. All paths will feature automatic dusk lighting on 2-hour timers. Engineering will have the potential to turn on lighting at any hour, however, in case of emergency. Emergency call boxes will be placed at locations along the paths. Gates may be required to close off paths after nightfall. Maintenance by hospital staff of these features will be required.

Focus: Designing for Function Creates Restorative Opportunities.

Several areas that required vehicular access utilized materials that would also provide more natural settings for walking. For example, a special opportunity for a pathway arose in the design for fire access to the north building face. This grasscrete turnaround also serves as a walking loop for psychiatric patients.

The need to provide 3-metre access around the buildings for fire access also provided opportunities to enable outdoor access by all patients (wheelchairs, bed-patients) as well as frequent visitor and staff nodes. These areas will be highlighted later in this chapter.

8.4 Accessible Walking

Loops: Co-Managed Open Space (also Staff/Visitor/Patient Open Space).

Description.

These (and many more) pathways have been designed for maximum accessibility, control, options and experiences. Users are given 3 distinct road types on the site. These are primarily the functional routes. These varied paths act as the restorative routes for walking, jogging, cycling, or simply viewing. By utilizing the regional aesthetic and propensity for growing fruit, some interesting walks through rows of trees and canes were created. A looping system was created within the woodlot to increase defensibility.

The formal lines of orchards and gardens are very comforting to trek through during times of stress. Straight lines are less stressful and give a sense of order to the chaos that often accompanies hospitalization.

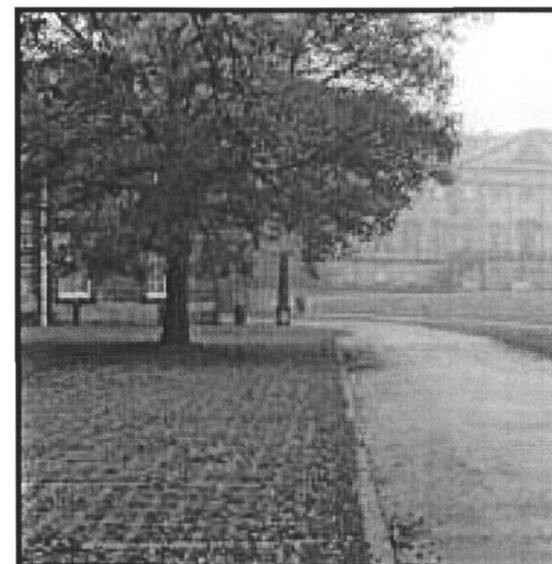


Figure 8-10: Grass crete. Functional with a more natural appearance.

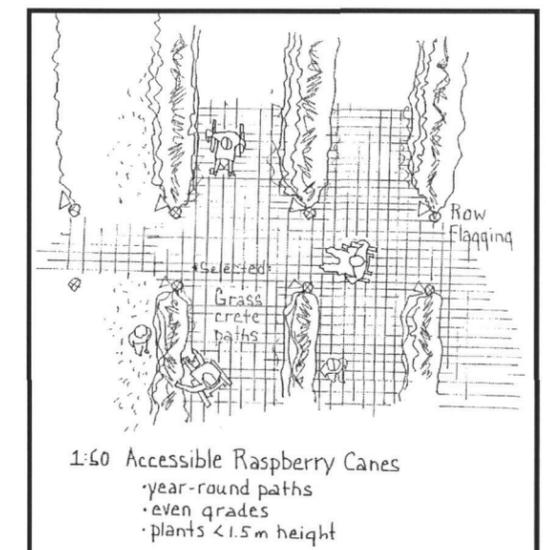


Figure 8-11: Accessible Raspberry Walks: Unconventional, 'regional' pathways.

Examples of Designed Accessible Walking Loops .



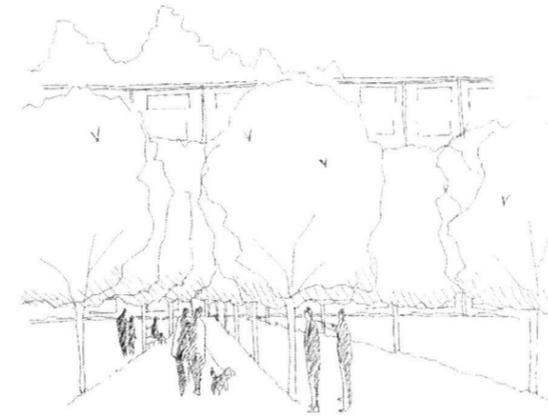
Conceptual Sketch : Marsh Walk

Figure 8-12: Conceptual Walkway past Marsh.



Conceptual Sketch : Raspberry Cane Walk

Figure 8-13: Conceptual Walkway, rows of Raspberry Canes & Community Gardens.



Conceptual Sketch : Orchard Walk

Figure 8-14: Conceptual Walkway down Orchard Rows.

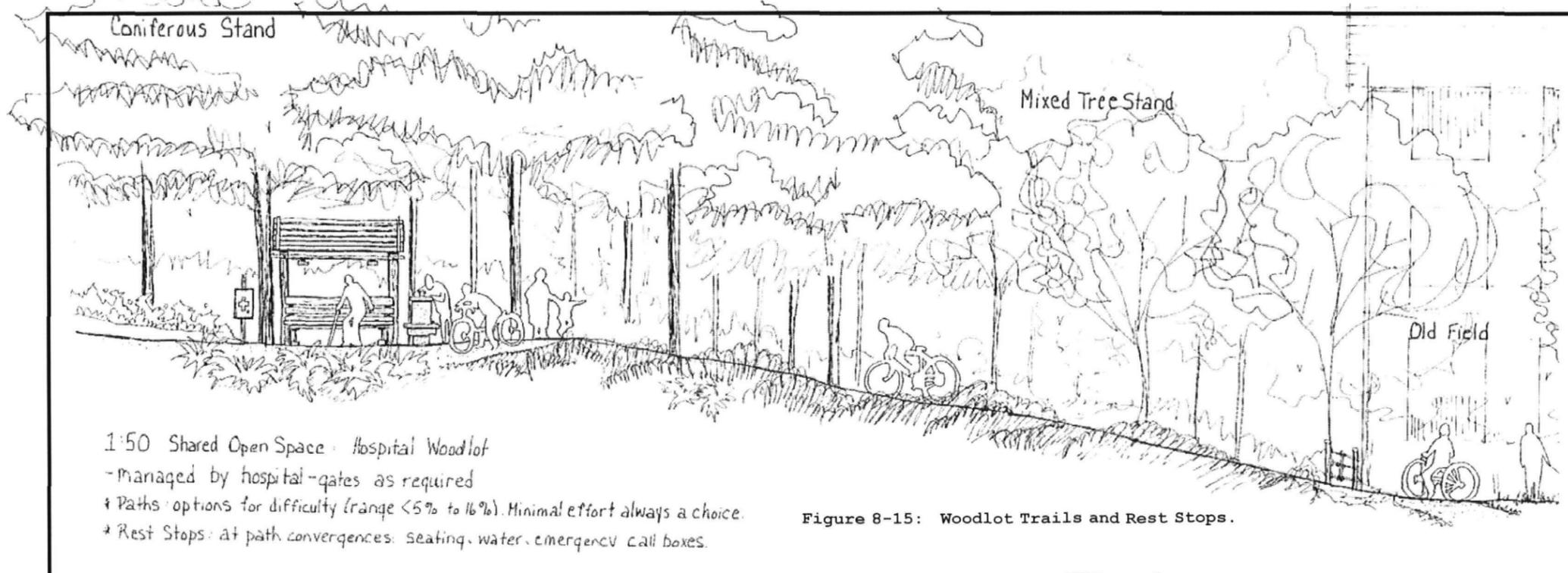


Figure 8-15: Woodlot Trails and Rest Stops.

8.4.1. Research Findings Supporting Walking Programs for Mental and Physical Health:

An Overview:

1. Women and Cognitive Function.
 In this 2001 study, 5,925 women (age 65 and older) were tested for cognitive function at 8 year intervals. Researchers found that for every mile walked per week there was a 13 percent less chance of cognitive decline (Yaffe, 2001).

"Women who walk regularly are less likely to experience the memory loss and other declines in mental function that can come with aging. This is an important intervention that all of us can do and it could have huge implications in preventing cognitive decline" (Yaffee, 2001).

2. Prevention of Diabetes.
 This 1997 trial showed an impressive reduction in the development of diabetes following regular physical activity. Moderate-intensity physical activity (walking to jogging) was found to be associated with a one-third to two-thirds lower incidence of NIDDM (non-insulin dependent diabetes) over 4 to 14 years in persons at high risk for the disease (e.g. family history). It was concluded that public health programs aimed at increasing opportunities for physical activity before illness would be a beneficial investment for communities (Clark, 1997).

3. Treatment of Depressive Mental Illness.
 An NIH (National Institute of Health) supported study at Duke University in 1999 made headlines when it was discovered that patients who took brisk 30-minute

walks or jogs three times a week recovered from major depression almost as well as those on anti-depressant medication (60% vs. 64%). Perhaps even more significant, when the original patients were tested again 6 months later, only 8% of the exercise group (who continued their exercise) had a return of symptoms. The drug group had a relapse rate of 38% (Blumenthal, 1999).

4. Exercise as a Singular Treatment for Mental Illness.

The National Institute of Mental Health recognizes exercise as a valid treatment for anxiety and depression. Early clinical trial evidence also suggests that regular exercise may be useful as a singular treatment for some anxiety disorders, for individuals suffering from body image disturbance, and for the reduction of problem behavior of developmentally disabled persons, as well as an adjunct in the treatment programs for schizophrenia, conversion disorder, and alcohol dependence (Wattles, 2001).

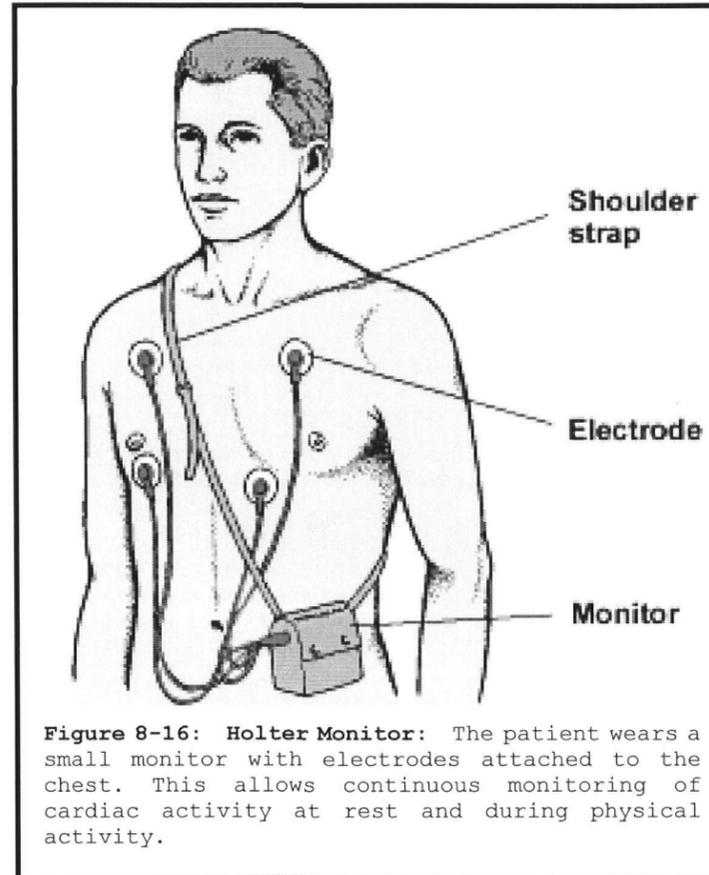


Figure 8-16: Holter Monitor: The patient wears a small monitor with electrodes attached to the chest. This allows continuous monitoring of cardiac activity at rest and during physical activity.

5. Walking Programs for Heart Health.

The Healthy Heart Program at St. Paul's Hospital in Vancouver, British Columbia is renowned for its work in both the prevention and treatment of all manners of heart disease. A significant aspect of their patient program is the initiation of an exercise program suitable for each individual, beginning with simple treadmill walks and progressing from there. Since physical inactivity is the most prevalent modifiable risk factor for heart disease, increasing physical activity or "active living" is a major goal for participants in the Healthy Heart Program (Healthy Heart Program, 2002).

"Physical inactivity Lack of physical activity is a risk factor for coronary heart disease. Regular aerobic exercise plays a significant role in preventing heart and blood vessel disease. Even modest levels of low-intensity physical activity are beneficial if done regularly and long term. Exercise can help control blood cholesterol, diabetes and obesity as well as help to lower blood pressure "(Healthy Heart Program, 2002).

6. Reduce Risk of Cancer Development.

Women who are active reduce their risk of cancer by 30% vs. sedentary counterparts. This is similar to the Lean women who exercise reduced their risk of breast cancer incidence by 43% compared to sedentary counterparts. This study supports the work done by University of southern California and University of Norway that states that physical activity can reduce breast cancer incidence from 25-60% in the groups of women studied.

"Participation in recreational physical activity in any period of life, rather than during a specific period, appears to be relevant, implying that women who start with recreational physical activity at later ages may still benefit from their efforts (Verloop et al, 2000).

7. Relieve Symptoms of Arthritis.

The recommended and often standard treatment for forms of rheumatoid arthritis include such harsh medications as Methotrexate, an antimetabolite often used in the treatment of cancer (e.g. chemotherapy). It has been shown to be successful, but not without harsh side effects.

As a personal and entirely anecdotal endorsement of walking/jogging/running, my own battle with a rare form of hereditary arthritis began before I had my 30th birthday. The rheumatologist gave me several options, including the above drug therapy. Frightened by the prospect of receiving "chemotherapy", I chose one of his other "alternative" options: vigorous exercise. By taking up running (marathon running) and attempting to decrease stress in my life, I have managed to ward off the worst of the illness. I occasionally have opportunity to speak with others with similar genetic conditions: men and women, many younger than I, often disabled and unable to work/study/play or enjoy life. I am a strong advocate of regular and vigorous exercise (the actual amount dictated by the body's pain response). Perhaps the most significant barrier, according to patients, is the lack of facilities where they can begin a program (walking, swimming, etc.) and feel comfortable about the pace at which they must begin.

A strong recommendation by the Mayo clinic for all forms of arthritis, but in particular inflammatory and rheumatoid forms is to "...exercise to strengthen muscles around joints, increase your range of motion and increase your overall fitness" (Mayo Clinic, 2002).

8. Exercise as a Cost-Efficient Treatment.

Perhaps most significant in a public health care system, the treatment of mental health with exercise and activity has been shown to be far more cost-effective than the standard drug therapy treatment (Greist, 1979).

Facilitating Walking/Exercise Programs: Summary Remarks.



The Valley Health Centre has great potential to create activity options for all members of the community. Beginning (and maintaining) physical exercise to prevent and control illness is not as simple as just 'going out for a walk'. Guidance by rheumatologists, cardiologists, physiotherapists and other health care professionals (dependent on illness being treated) is needed.

Taking steps to prevent the development and/or progression of illnesses will not only prove cost efficient in the long term but will go far in improving the general health, well-being, and happiness of the community at large.





Figure 8-17 (above): Photoshop Visualization.
 Moving along accessible raspberry cane paths (grass crete surface in selected pathways; height restriction on raspberry canes).

Figure 8-18 (below): Photoshop Visualization.
 Moving along pathways through 'Old Fields'/'Old Orchards' (some present on site, others to be designed). Surfaces will be year-round: range of materials, (e.g. asphalt, coarse gravel, concrete in areas near buildings).

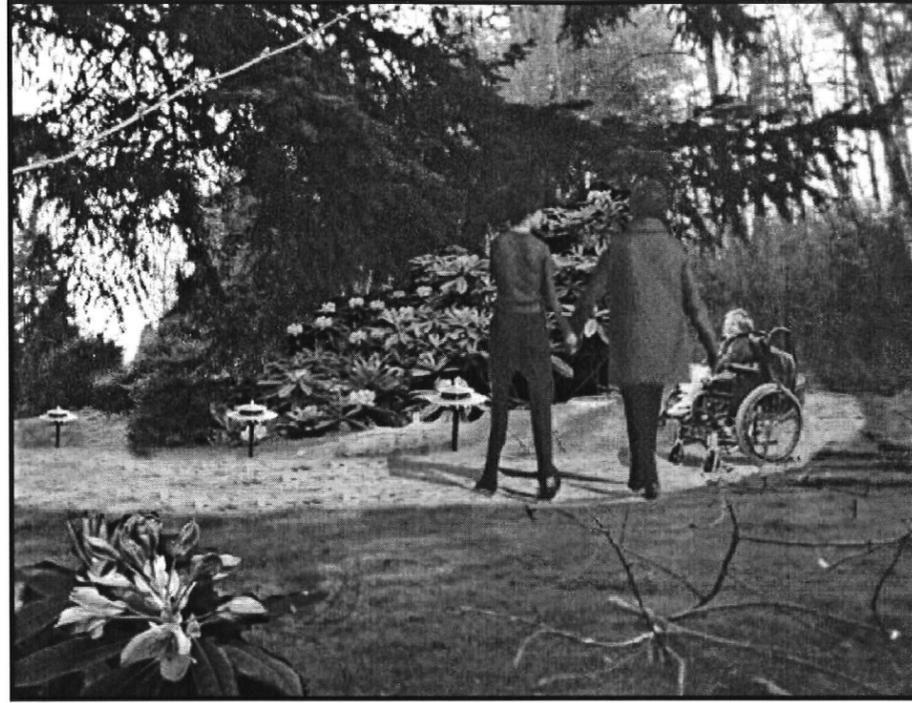


Figure 8-19: Photoshop Visualization: Example of pathway leading through/into open space programs (graded for wheelchair accessibility). Examples of path lighting and native shrubbery shown (Pacific Rhododendron).



Photoshop Visualizations of Pathways.

Figure 8-20 (pictured below): Photoshop Visualization. Hand-rendered image of Community Stewardship Centre (shown as simple rendering in figure 7-19).

In this image, life has been brought into the Centre through the addition of site-specific photography, animals, signage, people, and possible programs. For instance, depending on the choice of trees to be planted in the orchards, heritage apples or other fruits may be marketed to hospital staff, visitors, and patients and the community at large. The Centre is designed to have a welcoming, accessible feel that caters to all persons, regardless of ability or health stages.

Free-roaming rescue animals may become a part of the open space program (important restorative and altruism benefits).

Figure 8-21: Location Primary Psychiatry Programs/Designs.

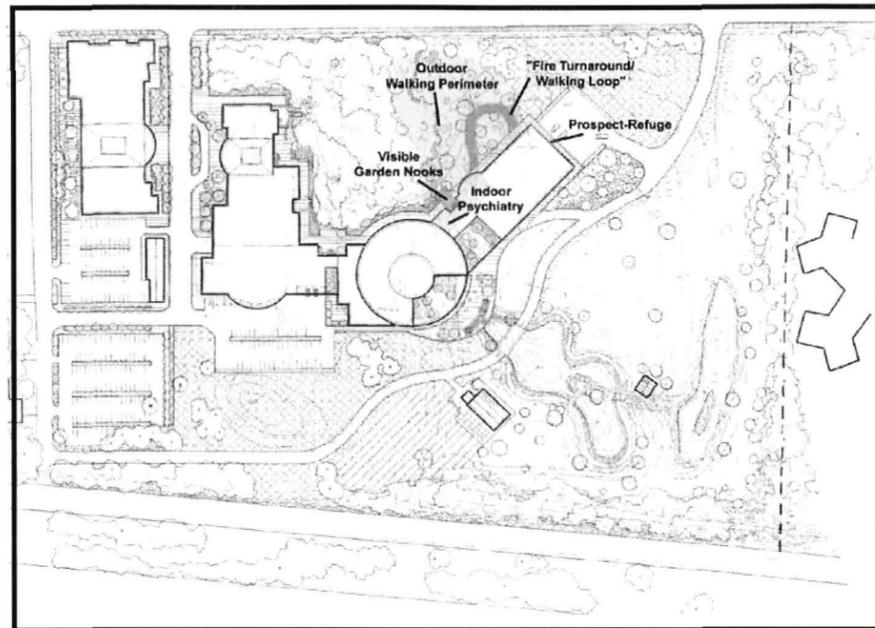
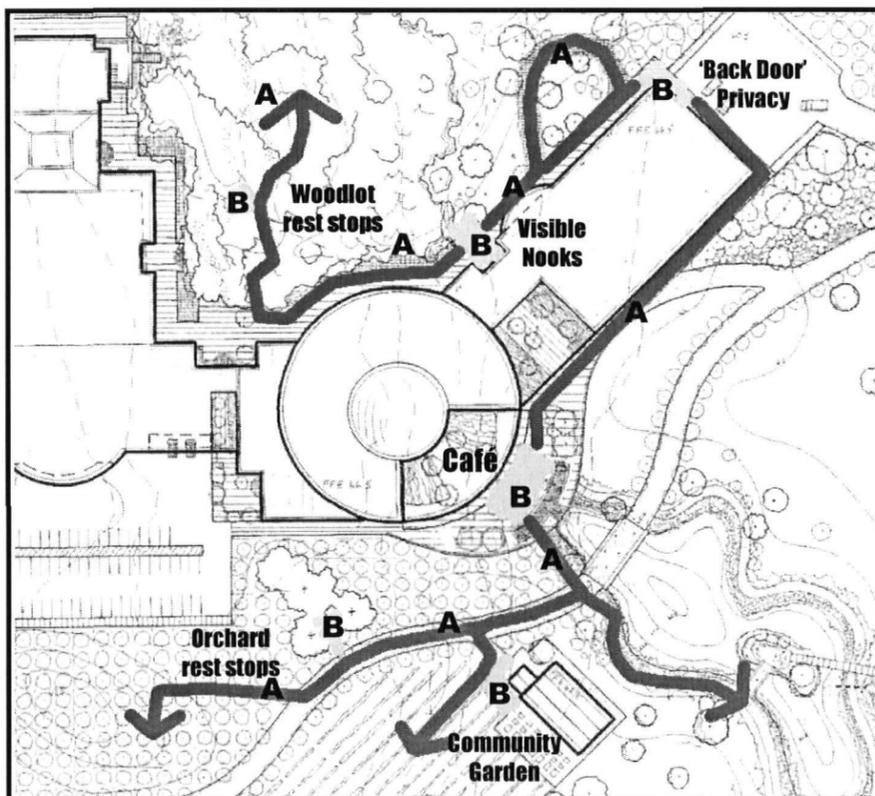


Figure 8-22: Outdoor Psychiatry Connections - paths (A) and nodes (B). Arrows to Open Space Programs/Potential Programs.



Design/Program Objectives (for Inpatient-Psychiatry Unit):

1. **Access to open space programs and walking programs** is facilitated and controlled by staff according to patient restrictions. In particular, access to the nearby woodlot, Old Field and new orchard will become a component of patient treatment. As patients are given higher levels of independence, access to these areas should increase. Although the unit is on the fourth floor, elevator access will provide easy wayfinding to exits and entrances with necessary signage to direct patients to programs. It is expected that patients will likely be introduced to the various programs as a component of their treatment plan. It should also be noted that attention to security should be high, with target hardening where applicable.

2. **Access to the café** (a place to take coffee, smoke, people-watch, or socialize) is also facilitated by elevator routes. A controlled elevator from the fourth to the first floor will offer a direct route to the café. This will be an important place for social support.

3. **A walking circle/area** is designed within visual access of caregivers. The Fire Access 'turnaround' doubles as a walking circle, and a grasscrete surface permits use year round while maintaining a natural feel. As well, a portion of the nearby 'Old Field' bordering the Woodlot will be fenced off (preferably with hedgerows) to give a safe "inner sanctum" for patients to wander in nature. The size and extent of this area would require further analysis.

4. **Exterior views to nature are promoted**, in particular from:

a. *The shared "day room" (lounge), and*

b. *Locked rooms*, where patients admitted against their will under the Provincial Mental Health Act are kept for a limited time if deemed necessary for staff or patient safety. Patients in these situations are often suicidal and/or homicidal and strong efforts to reduce stress are needed. Routinely, this extends only to painting walls in muted colors. This plan proposes opening up views (through safe, unbreakable glass) to the forest and pasture beyond.

5. **A visible smoking nook** is built (visible to caregivers and patients on ward) into the design. A high percentage of psychiatric patients are smokers and stress may be reduced if they can visualize a place where this activity is permitted. These nooks are designed in a very similar manner to those illustrated later on as 'Visitor Open Space'.

6. **Access to prospect-refuge** is facilitated by proximity to the Woodlot and to private areas in the Old Field. The topography of this portion of the hospital allows patients to sit on a hillside and view activity on Marshall Road below. Access into the Woodlot will be determined according to patient restrictions.

A unique, and likely popular location will be the area overlooking the hospital delivery bay. The inner Fire lane provides quick and easy access to the upper balcony overlooking this 'Back Door'. Despite the seemingly unaesthetic appeal of "Delivery Areas", these are traditionally well used by both hospital staff and patients as refuges for escape.

8.5 Psychiatric Population: Challenge for Programming and Design

This new hospital serving the Fraser Valley of British Columbia is expected to care for a large number of patients suffering from a variety of mental illnesses. Special attention is required in both design and programming. This project attempts to point out the urgency of including this often forgotten group in early stages of design.

Drawing from conversations with other health care professionals, as well as the designer's own personal experience with this patient population, these main objectives for design have been delineated:

1. **Access to open space programs,**
2. **Access to the café,**
3. **A walking circle/area,**
4. **Exterior views to nature,**
5. **A visible smoking nook,**
6. **Access to prospect-refuge.**

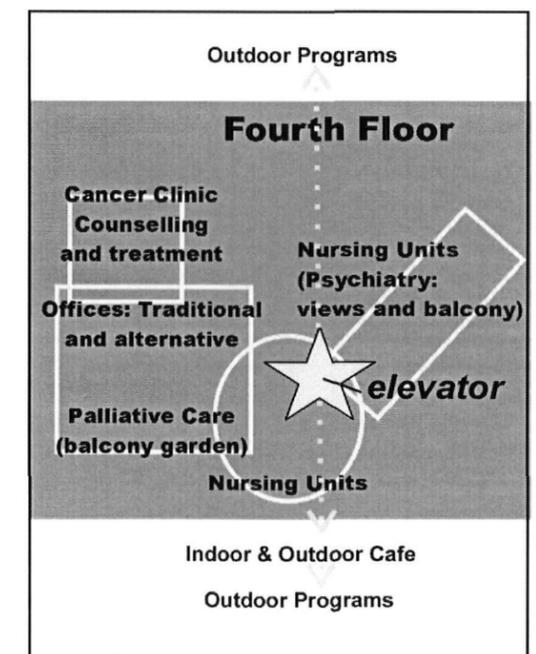


Figure 8-23: Focus on Psychiatry Placement in Built Program (elevator access to programs).

Anecdote (a call for a defined walking route)...

Working on a secured psychiatric facility in an urban core, I was assigned the task of accompanying a large man (300 lbs of muscle developed through fits of rage) on a supervised walk pass. Patients who had shown improvement were given these passes. I knew little of his history...we all knew little. He had been very closed mouthed since admission. As we set off down a back alley, I tried in vain to find a route that would be interesting, yet defensible for me. This became more of a concern as his 'life story' began to unfold with multiple arrests for violent crimes. As we walked down alleys lined with 6-foot high fences I could see him becoming much more relaxed and more free with his "tales". My own stress levels were, however, soaring. We returned without incident. The psychiatrist was thrilled with this new discovery of "Walk & Talk". The first thing I did? I got in the car and mapped out a safe, secure walking route that would reduce his stress yet keep mine under control. That "secure" walking route became the standard for all walk passes.

The Need for Flexibility.

Although there is a defined "Psychiatric Unit", patients suffering from mental illness are found throughout the hospital. Women with post-partum depression are found in the obstetrics units. Anorexics are treated on medical floors for gastric tube-feeding and in CCU/ICU for life-threatening electrolyte imbalances. Persons with mental illness are often victims of assault and require surgical treatment. Non-compliance with medications, poverty, poor nutrition, and a high prevalence of substance abuse leaves many open to a host of medical complications. Like the caregiver, the designer must be prepared for every eventuality. Designs and programs throughout the hospital must be flexible and accommodating.

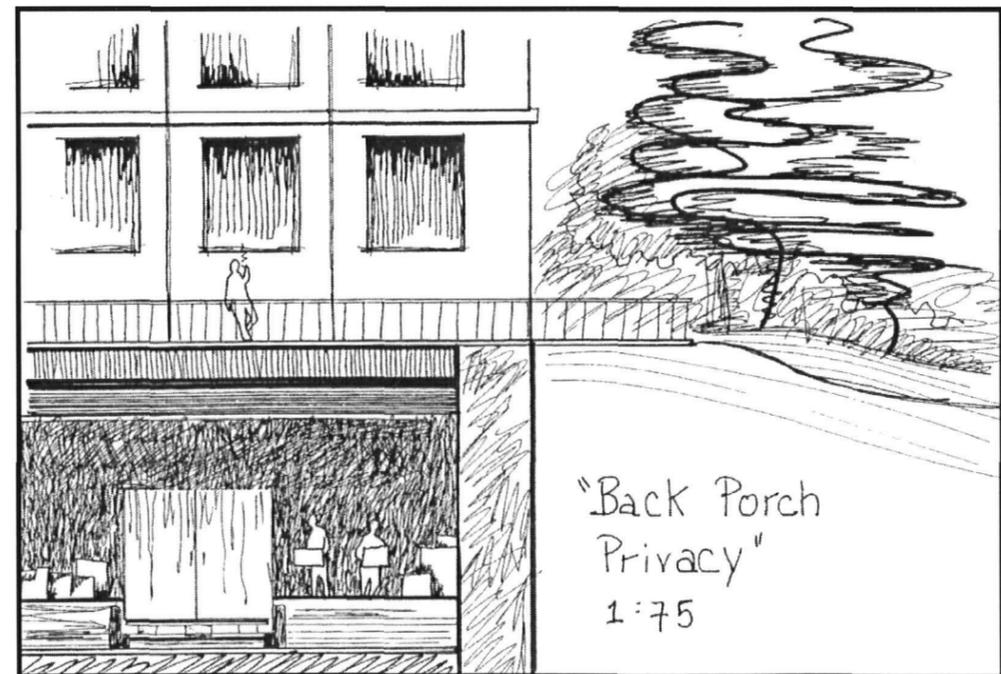


Figure 8-25: "Back Door Privacy". An option to retreat to area above loading dock for solace and some degree of Prospect-Refuge.

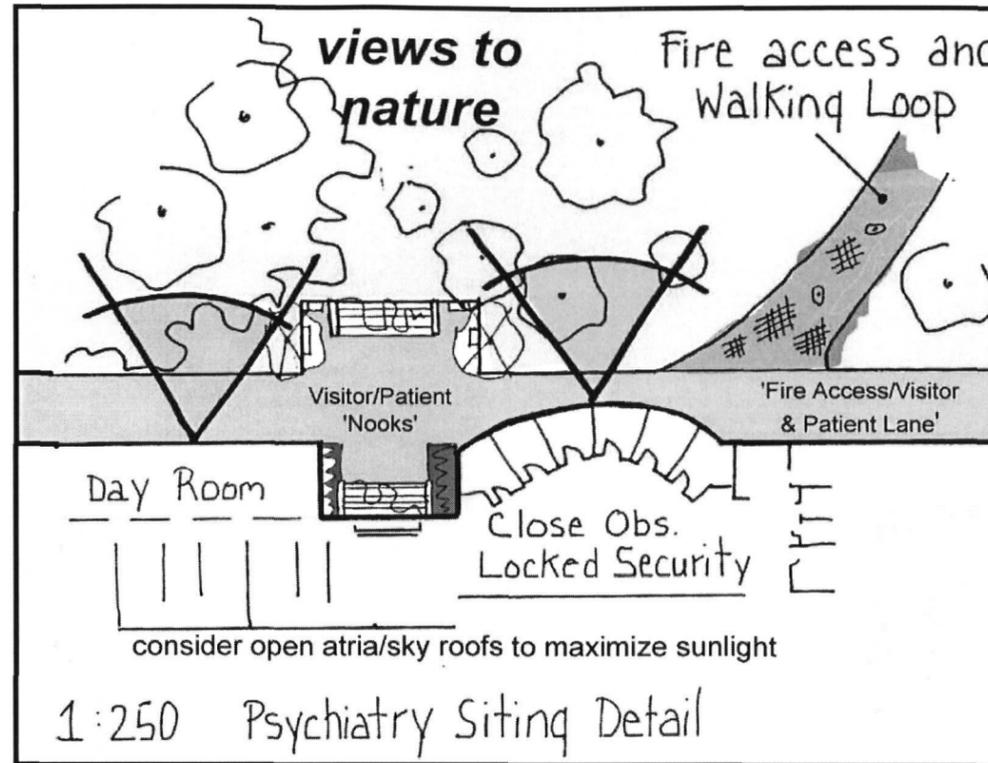


Figure 8-26: Detail Plan of Psychiatric Siting (indoor-outdoor relationship evident).

Research Highlight: Schizophrenia & Smoking Behaviour.

Patients with schizophrenia have an extremely high prevalence of smoking; a 1986 US study found 88% of these patients were smokers compared with only 33% in the general population (Hughes, et al, 1986). The increase in dopamine release induced by smoking has been hypothesized as being helpful in alleviating some of the positive schizophrenic symptoms (delusions, hallucinations, paranoia, etc.). Therefore, schizophrenics may smoke in an attempt to self-medicate (Hughes, et al, 1986).

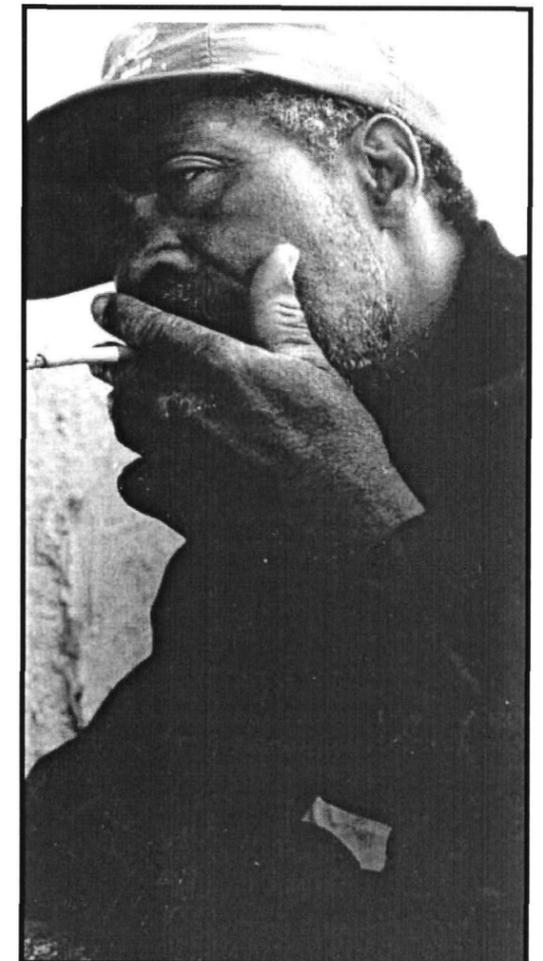
Smoking also interacts with neuroleptic treatment (common drug treatment for schizophrenics, includes the drugs Haloperidol and Chlorpromazine). Neuroleptic plasma levels are reduced causing higher doses to be prescribed and, subsequently, leading to higher incidence of side effects (Goff, et al, 1992).

One study actually showed that patients smoke more when treated with the neuroleptic Haloperidol than during a medication-free state (McEvoy, et al, 1995).

The argument could be made that until medical science discovers a more effective treatment for the disease, smoking may be an unfortunate but inevitable side effect. For some this may seem contrary to design a health care facility that enables smoking. For this designer, it is merely an attempt to design for all user needs.

The Dilemma of Designing for Smoking.

This project may receive criticism for actively designing spaces for people, and in particular patients, to smoke cigarettes. Medical science has not yet adequately developed a fool-proof cure for this addictive habit, and it is the objective of this project to provide for, and design for the needs of the clients. Patients suffering from mental illness are at particular risk for this form of substance abuse. While provincial rules dictate no smoking indoors, the design does feature several areas suitable for smoking. A very brief overview of medical research that supports this design move is offered here.



8.6: Cancer Clinic Woodlot Garden: Patient Open Space

Description.

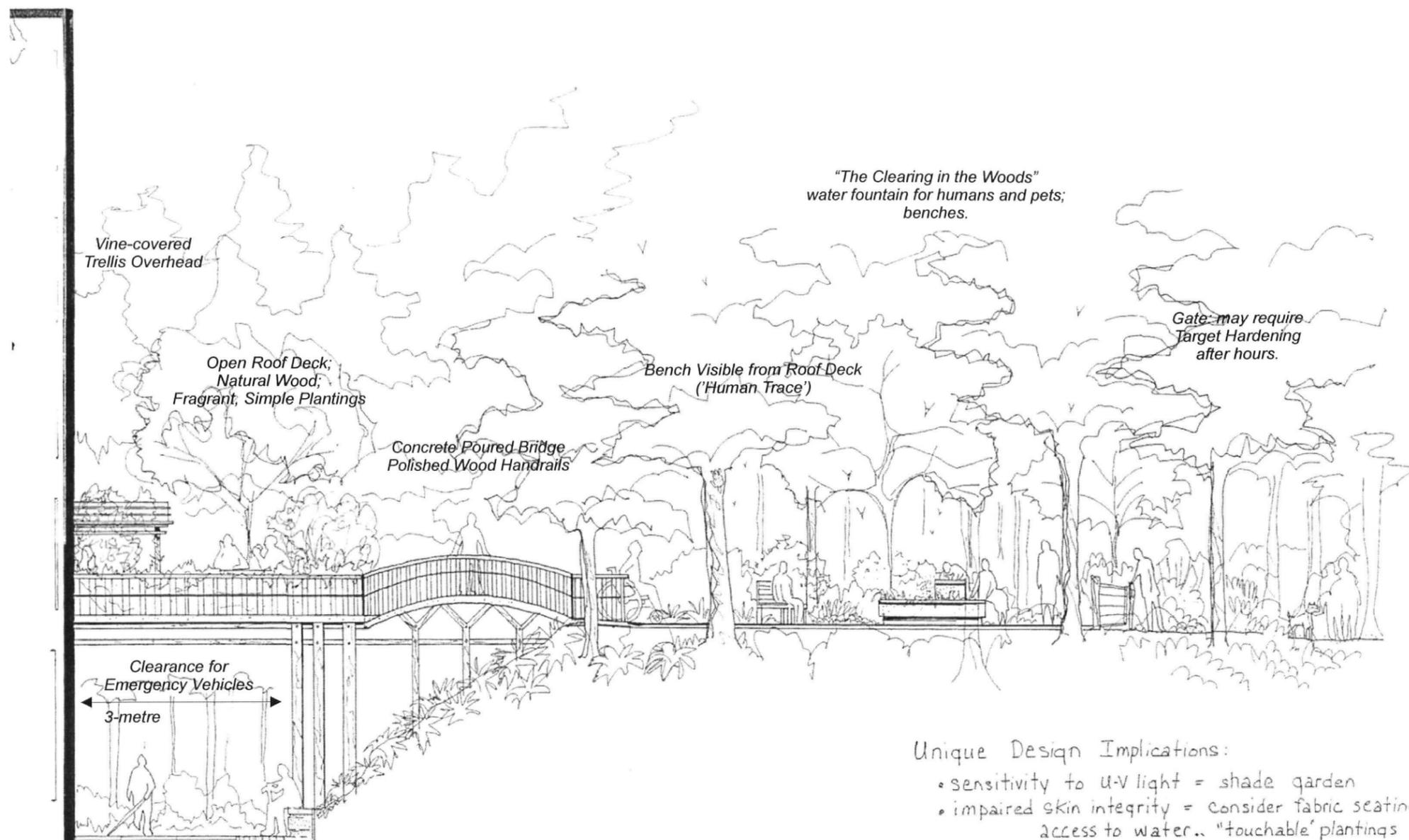
This garden utilizes the power of the shady treed landscape. It is built primarily for the patient (and loved ones). A roof deck emerges from the second floor of the building and offers an accessible route to an elevated position on the centre knoll. The garden area is in fact a small clearing in the woods that offers a water feature and simple site furniture.

Restorative Benefits.

Users of this private garden space have the potential for:

- sensitivity to ultraviolet rays,
- impaired skin integrity,
- heightened feelings of helplessness/hopelessness, and a
- strong sense of loss of control.

Offering these patients (and the staff who care for them) a space enclosed by the healing power of nature is vital. This is a shady garden protected from wind. Rain protection is given with an overhead structure on which vines are trained. Waterproof, fabric chairs will be comfortable to sensitive skin.. Situated on the edge of the Urban Woodlot, this



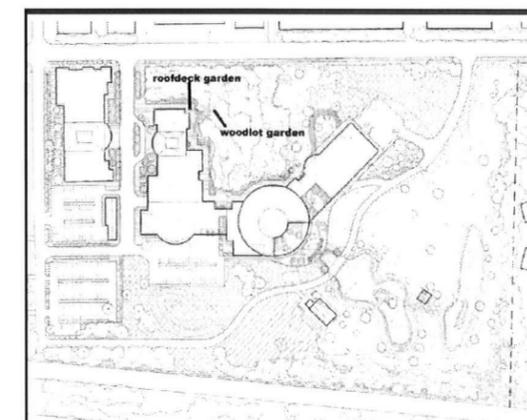
Unique Design Implications:

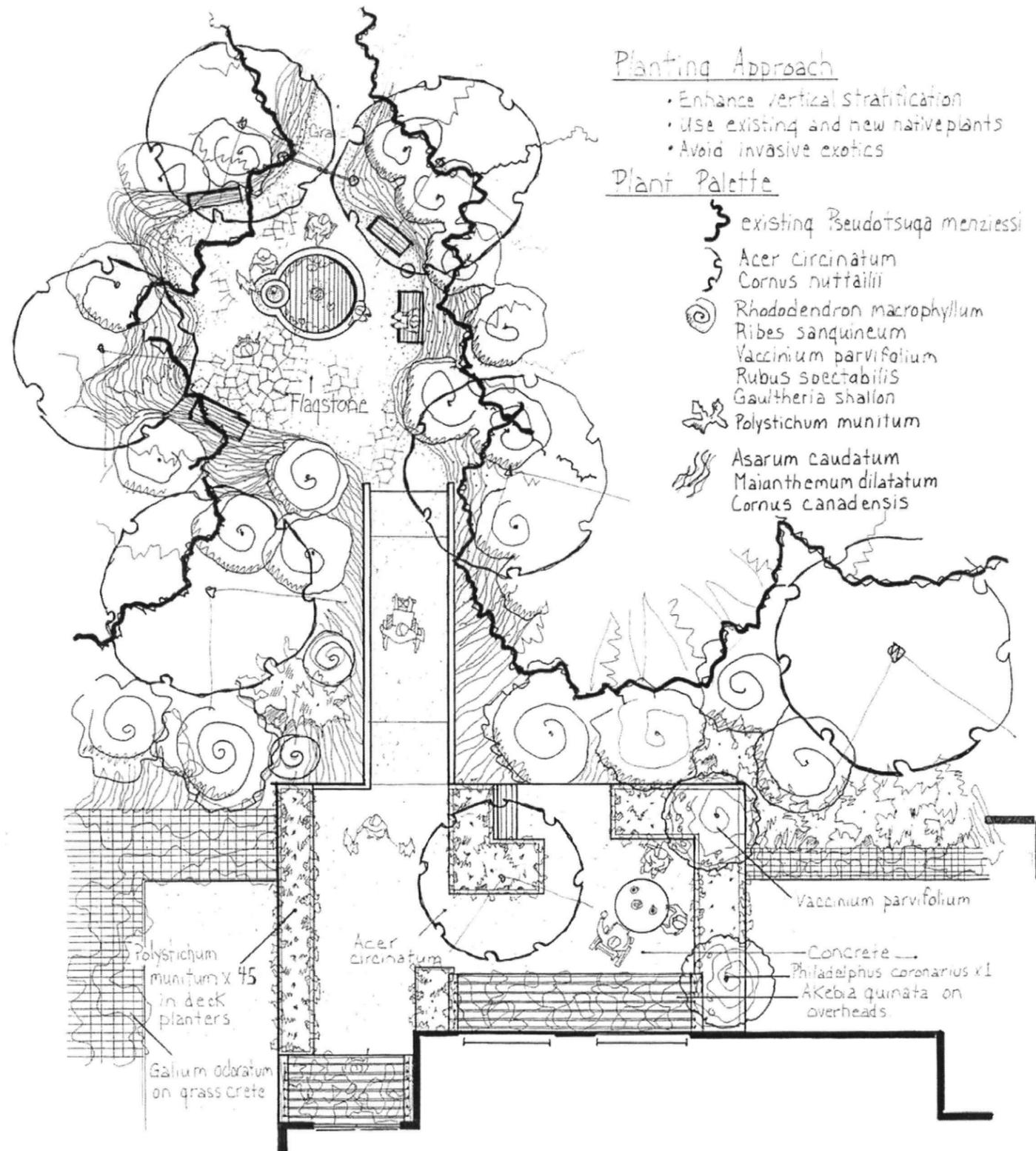
- sensitivity to u-v light = shade garden
- impaired skin integrity = consider fabric seating
- access to water.. "touchable" plantings
- helplessness/hopelessness = facilitate need to

Figure 8-27: Section-Elevation of Cancer Clinic Woodlot Garden (view north). It should be noted that the design of a shady woodland garden for the Cancer Clinic does not imply that only sedate and sorrowful programs will occur here. Celebrations and gatherings can take place in the forest clearing. During the day, hikers or cyclists may pass through the rest area and visit. Pet therapy should be strongly encouraged, to the point of having a resident pet.



Figure 8-28: Location of Cancer Clinic Garden Design.





N ↑ 1:50 Patient Open Space: Cancer Clinic "Woodlot Garden"



garden will also offers the choice of "escaping", thereby regaining some control.

Additionally:

- Plants with pleasing fragrances and textures will be used;
- Emphasis on green/blue/white in color palette (soothing and peaceful colors);
- A woodland garden approach will be used to enhance bird/habitat attraction;
- Peaceful sounds will be incorporated through a small water fountain.

Users.

Unique: Cancer Clinic patients, visitors and staff. Encouragement of pet therapy will require special features for visiting pets (e.g. drinking fountains).

Maintenance.

This space will require a higher level of maintenance by hospital gardeners due to the small size and need for finer attention to detail. Deck and bridge maintenance will be required, particularly in winter seasons. The deck and bridge will be of concrete construction with wood and cast iron details.



Figure 8-29: Detail-General Planting Scheme for Cancer Woodlot Garden. Immediate views are available to inner woodlot and to visitor seating areas.

elevator bank, it will be available for long or short breaks. The design will be minimal so as not to distract from the surroundings. A permanent podium may be constructed to allow the space to be used for awards and ceremonies (private or public).

Restorative Benefits

Stress reduction is offered through contact with nature and escape (from work and from patients). Significantly these gardens are places where staff are not accountable to the public and can momentarily let down their defenses. A sense of control is imparted to users. More so in the rooftop garden, a strong sense of away is made available to the user.

Users

E.R. Refuge: Emergency staff, night shift staff and ambulance/police/security personnel will be the primary users. Patients are not given visual or physical access to this space.

Mt. Baker Retreat: This area is restricted to staff except for special occasions. A wide array of staff will be expected to use this garden.

Maintenance

Hospital gardener maintenance will be required although staff may take on these relatively small gardens as their own project (as long as the space and budget for plants and materials is provided).

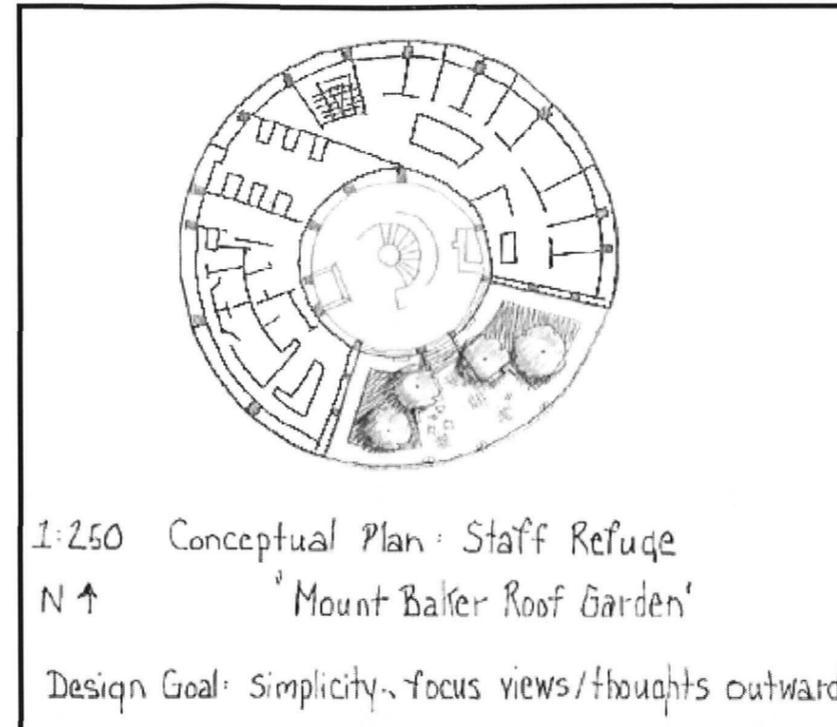
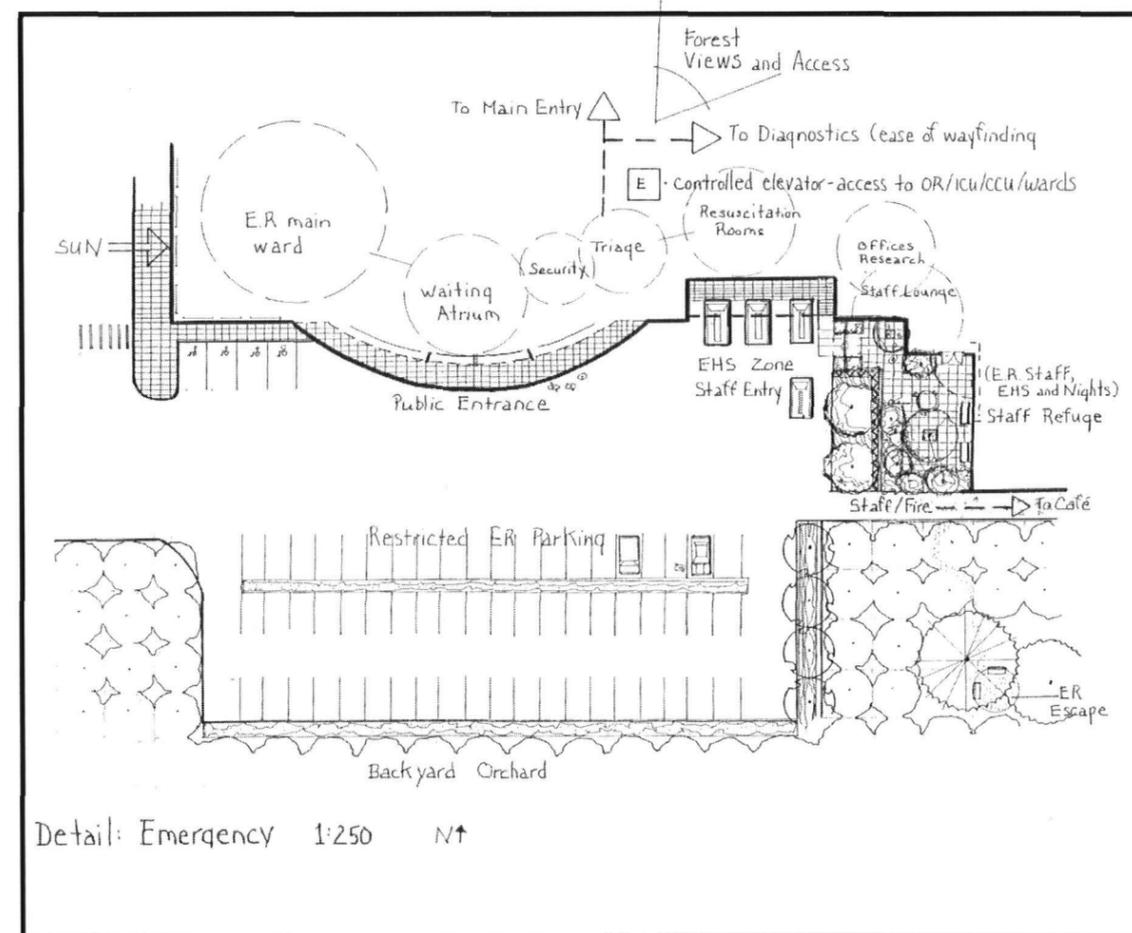
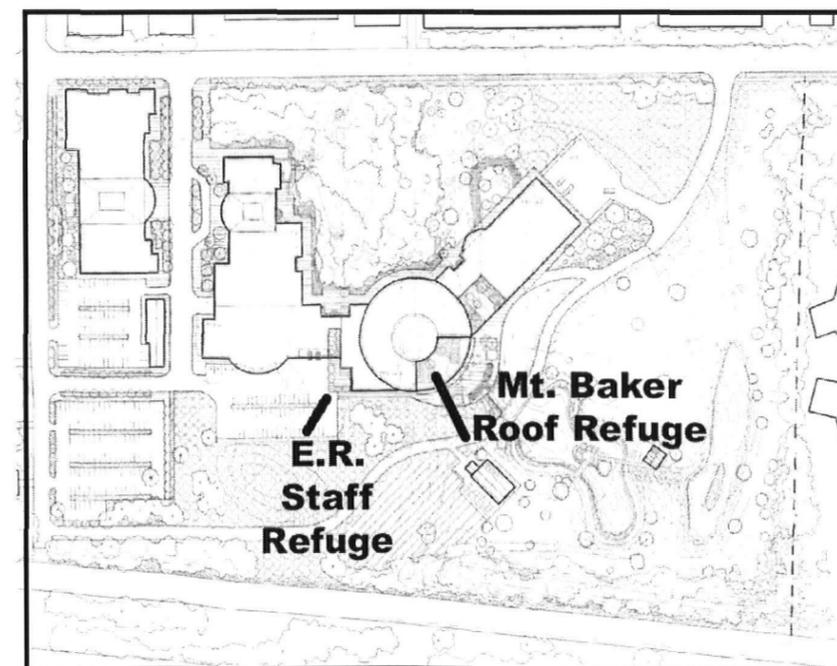


Figure 8-30 (above) : Detail Plan of Mt Baker Staff Retreat.

Figure 8-31 (left) : Plan of Emergency Entrance (with interior connections).

Figure 8-32 (below) : Location of Proposed Staff Refuges.



8.7 Staff Refuges: Staff Open Space

Two gardens are featured here. It is expected, however, that several more would be included in the final plan.

Description

a. Emergency Room Staff Refuge

This a small but vital garden space created within a nook of the built form outside Emergency. Enclosed by plantings, it will be a means of quick and brief immersion in nature for stress reduction and retreat and refuge. The proximity of the garden to the E.R. allows this space to be used frequently for brief periods of time throughout the shift. The garden provides a view of Emergency Health Service (e.g. paramedics) arrivals. This visual access will be particularly important on night shifts.

This garden space will likely be shared by a range of professionals, as the ER is often the gathering point for several public professions. A card-controlled access from the outside keeps the place safe from non-intended users. The inner entrance leads directly into the staff lounge.

b. Mount Baker Visual Retreat

Situated atop the 10-storey tower, and facing south, this space focuses on the views outwards. Views to regional landmarks are maximized from this point (Mt. Baker and southern rural lands). As well, a significant view of the open space program is facilitated, and the height is low enough to prevent complete removal from the sense of enclosure. Perhaps in reaction to the lack of attention staff have been given in modern design of hospitals, this group of users have been afforded this choice garden spot for refuge. Easily accessed by a central



Section-Elevation: ER Staff Refuge 1:50

- Objectives: "Quick + Easy Refuge"
- proximity to ER
 - visual + physical access to ER's bay
 - visual access to ER entrance
 - Views + exposure to biodiversity
 - Safety + refuge from clients

Figure 8-33: Elevation View towards Emergency and ER Staff Refuge Garden. The garden is in close proximity to ambulance bays, allowing users to monitor incoming patients.

Human Scale Interventions.

The illustration at left highlights more than just the design and location of the E.R. Staff Refuge. It is recommended that the built form should feature fenestration and indentations as detailed here. Dropping down the occasional portion of roof top not only creates an instant roof garden (physical and/or visual access) but also helps to decrease the apparent mass of building size.

Multiple large windows, set low to facilitate views from beds also help break up the size and scale of the structure.

Creating a more human-scale and friendly appearance to the built structure will benefit all users, from immediate hospital personnel to community members passing by. For the staff member taking a brief retreat outdoors, the building will act as their backdrop from which they observe nature. A sympathetic built form will enhance the degree of stress reduction. For members of the public, viewing the hospital as an impressive, yet humanistic structure will increase chances of them coming on to the property to use the café or participate in volunteer or social support programs.

This attempt to humanize the buildings will be especially important on this site, given the existence of single family homes and low-rise senior's facilities nearby.



8.8 Accessible Building Perimeter: Visitor Open Space & Patient Open Space

Description

As has been described previously, the built form is surrounded by a minimum 3-metre wide pathway, accessible to emergency vehicles as well as individuals on foot, in wheelchair, or in hospital beds. Small indentations are placed along this pathway to demarcate special areas for rest by users. In most cases, these indentations correspond with entrances, sliding glass doors or large windows. As the visitor arrives at the front atrium, he or she is instantly cued as to the presence of a waiting area (s) within the hospital, nestled below the mature Douglas Fir. The designs for these spaces are all meant to be simple, with subdued planting, water features where possible and simple yet comfortable benches. A bench is always strategically placed opposite the entrance to the "waiting nook" to give evidence of human sign and increase comfort level.

Restorative Benefits.

Legibility, proximity to nature, accessibility, and the presence of an enclosed, hugging 'archetypal' space are all present in this design element.

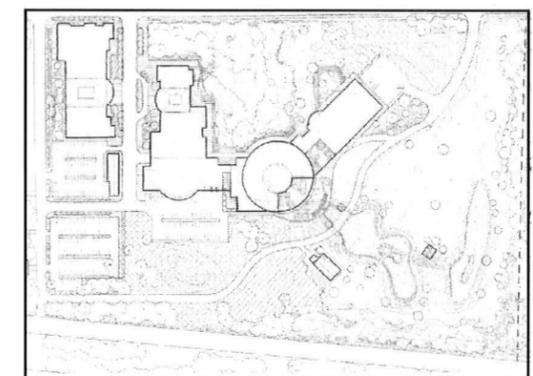


Figure 8-35: Key to Inner Core "Visitor Nooks"

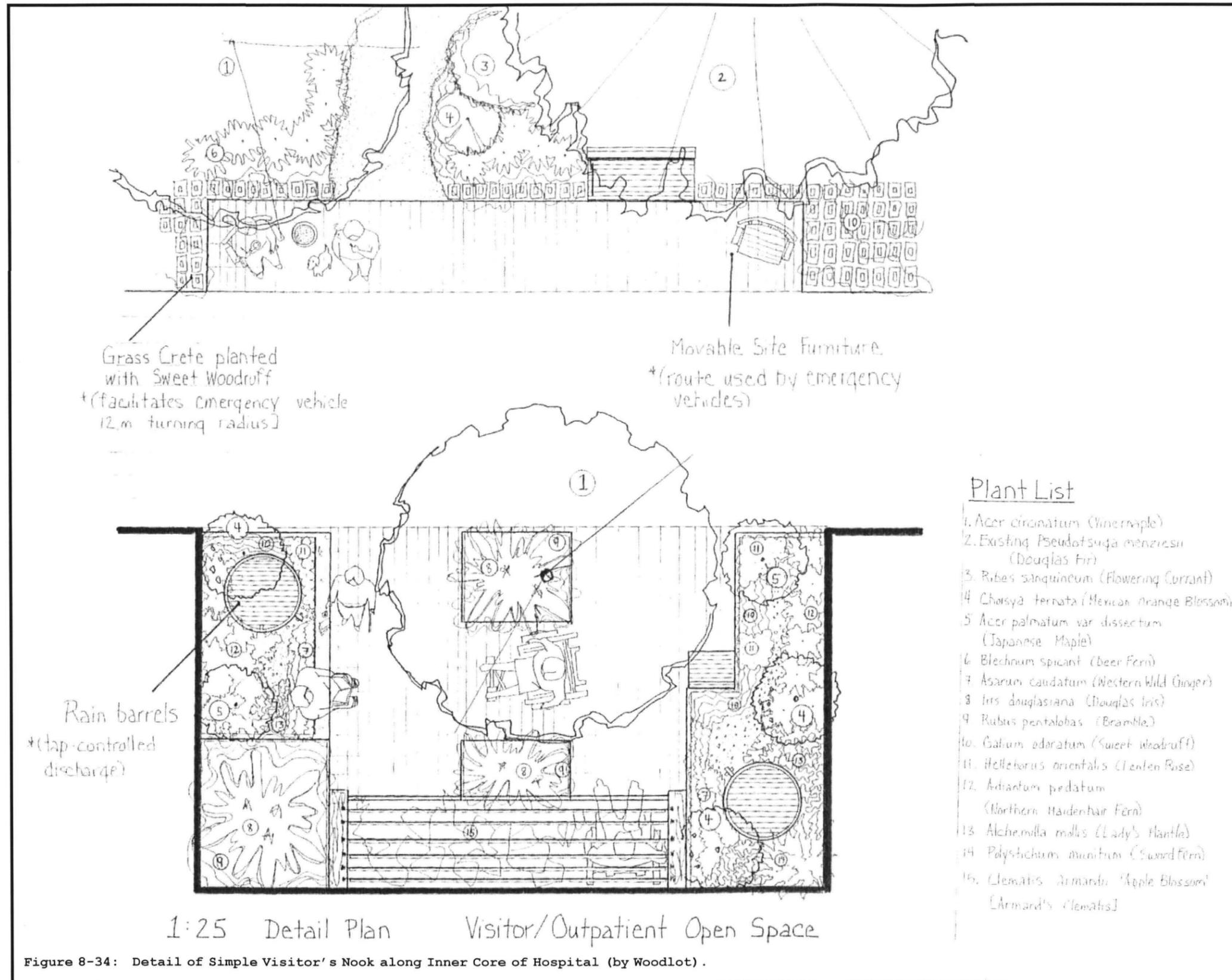


Figure 8-34: Detail of Simple Visitor's Nook along Inner Core of Hospital (by Woodlot).

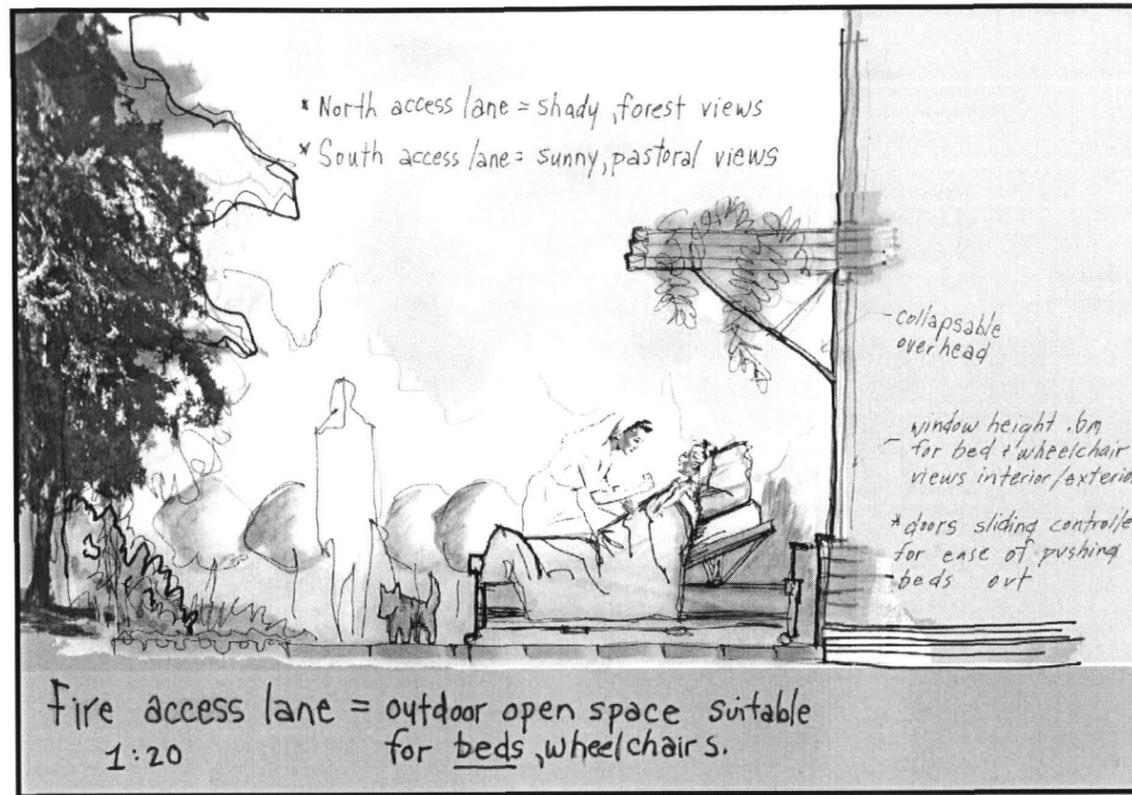


Figure 8-36: Outdoors Accessibility Achieved for All Users.

Anecdotal support of design.

'As the night progressed, it was not the fact that his wife of fifty years had suffered a massive stroke that frustrated and angered him. It was not even the fact that she would clearly die that night that upset him. Reconciled with the imminent passing of his beloved wife, it was the frustration that she would most assuredly die in this emergency room, in this windowless corner, in this artificial and sterile environment, that he could not suffer any longer. She had lived all her life "outside": wife of a farmer, avid gardener, caretaker of numerous rescued animals. How could she pass away without one last breath of fresh air, one last passing bird song, or one last feel of the breeze through the native maple trees?

Despite the fact that we were in a small emergency in a rural area, pushing that bed outside, over the curb, and next to the non-descript staff 'garden' was a challenge that required the full participation of several nurses and security guards. Nevertheless, that 40 minutes of manpower was the best nursing care plan we could have devised for the man who was about to lose his wife. She did pass away, in a corner of the emergency, later that afternoon, but for him to have spent just 30 minutes at dawn watching the sunrise as she slept beside him in her hospital bed was enough to calm him and leave him with good memories of her final moments.

Why should it be so difficult to take patients outside, everyone in the department wondered?'

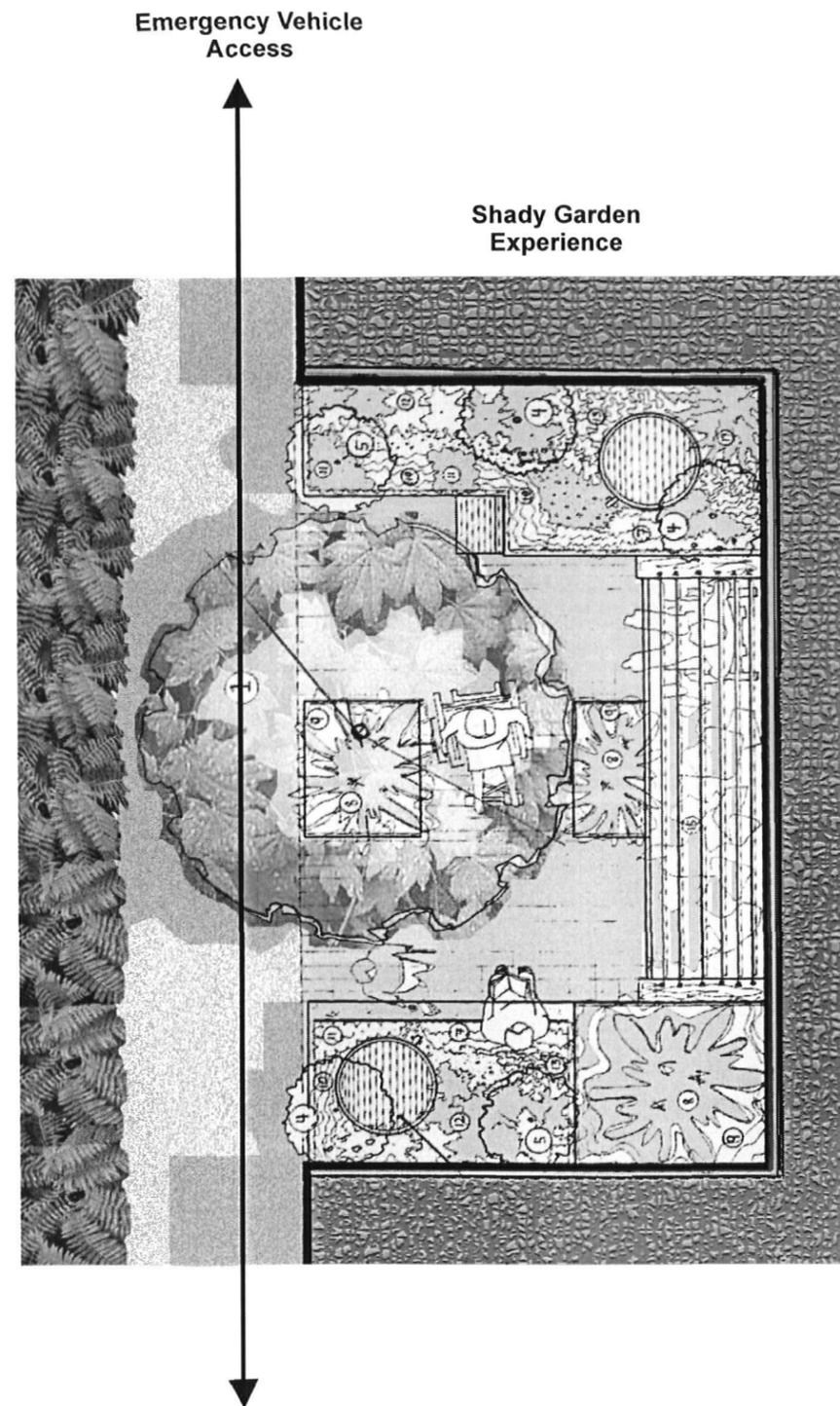


Figure 8-37: Sample Visitor Nook-Adobe Photoshop Visualization.

Users.
All users will find these spaces beneficial. The highest use, however, will be by visitors, patients awaiting diagnostic tests (laboratory and ultrasound departments are also located on ground floor) and patients. In particular, this provides an easy means by which caregivers can push beds outdoors for restorative purposes as well as for emergency evacuation purposes.

Maintenance.
Upkeep will be done by hospital employees with assistance from volunteers if desired. Upkeep should be low-cost as the primary goal is to keep planting schemes and design features simple, native, and low in labor. Plants that grow well in shady environments will need to be employed. Surfaces will need to be kept clear of debris in order to ensure easy movement of hospital beds, wheelchairs, and emergency vehicles.



Site Furniture.
Benches, artwork, water features, and other site furniture and amenities will all be of a simple and easy to maintain nature. Abstract art will be avoided to reduce stress (Ulrich, 1992). These small nooks on the inner core of the hospital may be a potential site for local artisans to be involved in creating regionally-themed benches (refer to Figure 4-3: Abbotsford Bench Art Program).

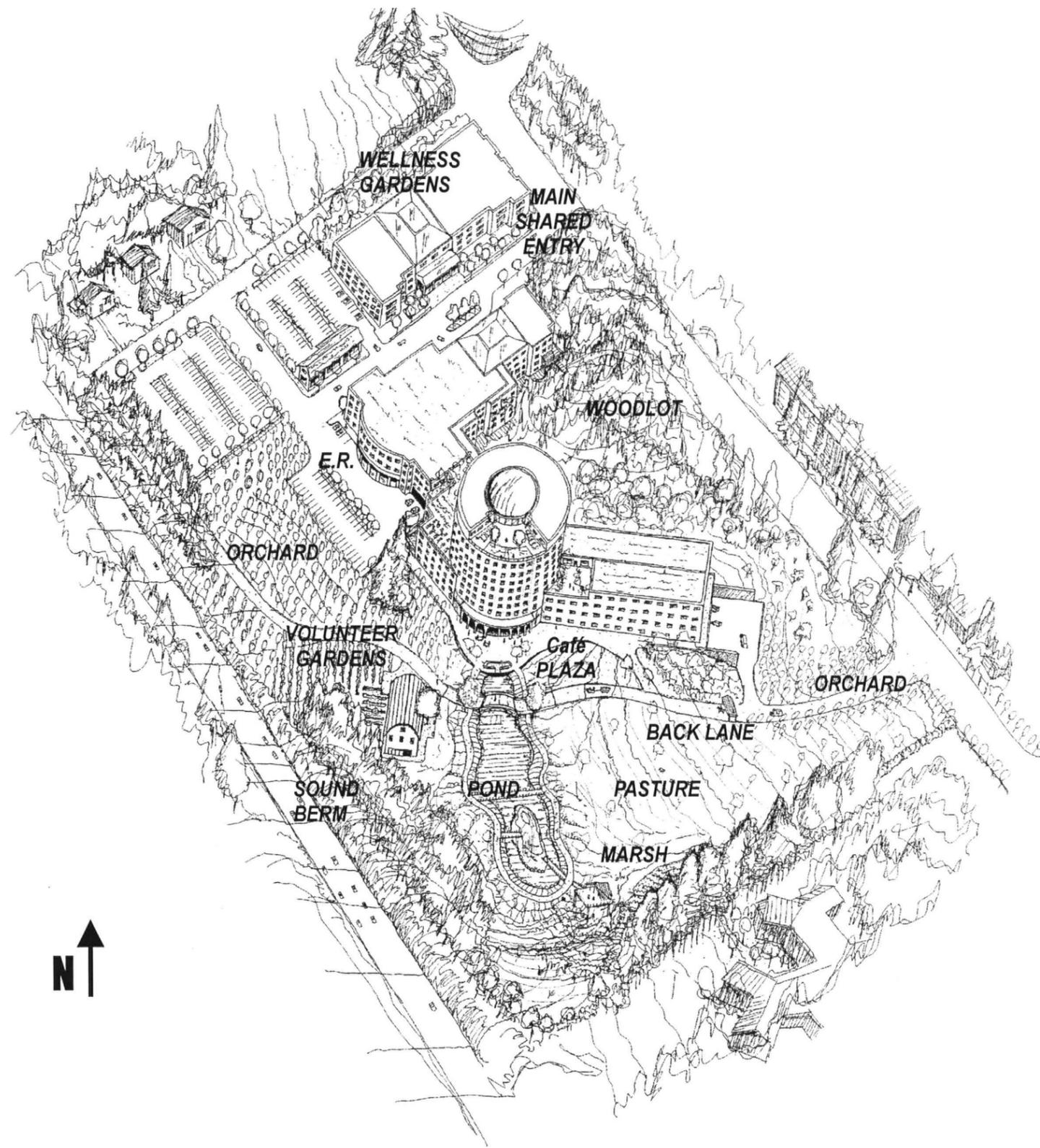


Figure 8-38: Axonometric of entire site showing depth of enclosure and open space.

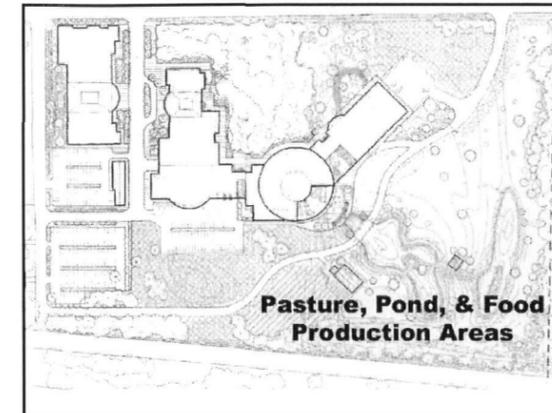


Figure 8-39: Location Open Space Programs.

facilitate this. The siting of design of significant, memorable features that create landmarks, small or large will enhance this understanding. A significant tree, a bridge, a garden shelter are easily identified and recalled. At the opposite end of the spectrum, seasonal bulb plantings in the meadow beyond, or a unique display of natural stone art at water's edge may only be noticed after successive visits, yet give an equally strong sense of understanding (Kaplan, Kaplan and Ryan, 1998).

Users

All users: Patients, Staff, and Public.

Maintenance

Maintenance will be the focus of the previously discussed Healing Gardeners' Society.



8.9 The Open Space- "Pasture, Pond and Production": Co-Managed Open Space

Description.

At the core of this open space is the pond or marsh (dependent on season and rainfall). Designed with an accessible path it provides benefit to human, aquatic, aerial and terrestrial habitat. Pasture land and edible landscapes buffer the water from its built environment. The open space landscape, while skirting the hospital's southeastern edge, in fact creates a very positive, volumetric space between Mayfair Hospital, the new hospital, and the Highway Berm (Condon, 1988). The tall Douglas Fir trees edging the property contribute to the human scale of the space, by furthering the sense of enclosure. Small pockets of space along the meadow edge become even more human scale when the open space recesses under tree canopies.

Restorative Benefits.

Visual and physical access to a living landscape will appeal to the biophilic nature in all users. Creating an actual working landscape that requires human stewardship for functioning appeals to the universal need to nurture. Providing opportunities for nurturing is identified as an important means of battling the helplessness and hopelessness experienced by hospital patients (Beck & Katcher, 1984).

Movement into and through the open space should be filled with choices and options for varying degrees of interaction with nature. Opportunities for movement that features high understanding and legibility will facilitate a strong sense of personal security (Kaplan, Kaplan and Ryan, 1998). The accessible paths will facilitate this. The siting of

CHAPTER IX

Final Recommendations for Future Inquiry or Design

9.1 Recommendations for Proposal

- *Public presentation at University of British Columbia: April 30, 2002*
- *Presentation to City of Abbotsford Staff: 31 May, 2002*

Some of the following recommendations or follow-up ideas developed late in the design process and time simply did not permit further research/drawing or exploration. Other issues were raised during the public presentation at the University of British Columbia or at an informal presentation given to City of Abbotsford staff.

1. **Traffic Calming measures** along Main Street Entrance into hospital may be required/explored.
2. **Development of street guidelines** specific to Marshall Road would require further inquiry into rurally appropriate street treatment. This front Marshall Road may also be considered for inclusion in hospital programming, as it becomes part of a "loop" around and through the hospital. Issues to consider would include:
 - The profile of Marshall and Gladwin, which may require widening of the sidewalks to allow for passage of two wheelchairs;
 - The appropriateness of Marshall for wheelchairs/disabled due to its steep grade;
 - Whether the Marshall road street treatment would include retention and enhancement of current Douglas Fir on both sides. Keep mystery to a minimum by eliminating mid-size shrubs except at apex of knoll. Appropriate understory may be planted under these large "street trees";
 - The possibility of creating a running loop for staff that uses back lane and travels along Marshall (one large loop).
3. Consider the use of **hazelnut trees in orchards**. These trees grow very well in this climate and the hardness of the outer shell virtually eliminates the chance of a child allergic to nuts cracking open and ingesting one. The outer shells are not allergens.
4. Consider the use of **Heritage apple trees in orchards**. There are local growers in the Abbotsford area working with highly disease resistant, heritage trees and may be interested in 'donating' trees for the hospital orchards. Maintenance, research, and follow-up care would likely involve these interest



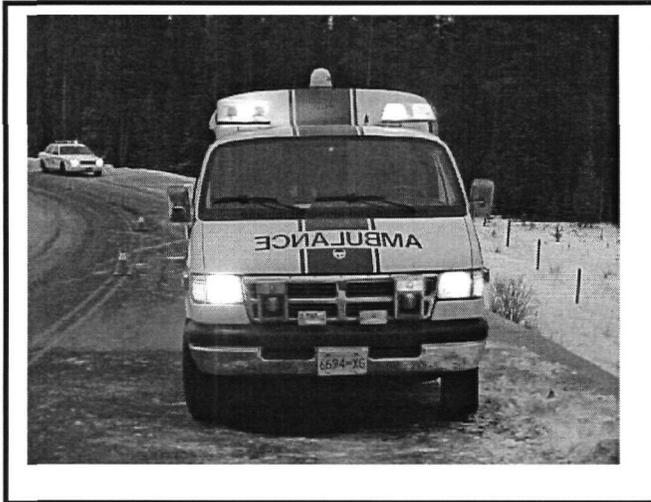
groups. Also, non-fruiting but flowering trees may be considered for orchards (if known to attract large numbers of birds).

5. **Guidelines for communities** may be explored and developed, that ask or answer the following question: To what extent does a local community have influence on a large regional, provincially funded hospital?
6. The University of British Columbia or other **local schools** may have large scale agricultural programs that require land that would be interested in joining the co-management of the open space, and donating product and time.
7. **A defined running track** with 24 hour lighting that runs through and around the site would be useful not only for community members but also for staff. Many larger regional hospitals now feature 24-hour gyms with treadmills where nightshift workers will spend their 45-minute 'breaks'. While it is expected the Wellness Centre will include access to treadmills, an outdoor track with an appropriate surface would be a particular treat in this mild climate. The possibility then exists to create a yearly fundraising "Run for the Hospital" that would cross through the hospital and around Mill Lake. The distances of these running routes have not been explored.
8. A proposal has been made for a rooftop garden that is shared by both geriatric/rehabilitation and paediatric populations. Another unique feature would be **a defined and designed play area for children** (patients, visitors, and community) within the open space area. The long flat lawn south of the hospital and just east of the cafeteria would be an appropriate place for this design.



9. In the proposed plan, **grassy treed swales** are in all parking lots. These plantings may require enhancement in the shared parking lots to the southwest, in consideration of views from the western side of the hospital and tower.
10. In this proposal, the community has been considered strongly as a component of the design and the program. More specific design plans, however, would require a much more involved effort to **identify very specific community groups and their needs**. For example, identification of preferred types of recreation (rollerblading, equestrian, cycling, etc.). Given that this region is home to a very high and growing number of horse breeders and owners, the desire to place a small riding ring on the site may be expressed by the community as a means of increasing involvement as well as a restorative vision for hospital patients. Full determination of open space programs would need community input and decision-making.

Figure 9-1: A designed, supervised play area for children; in plain view of hospital.

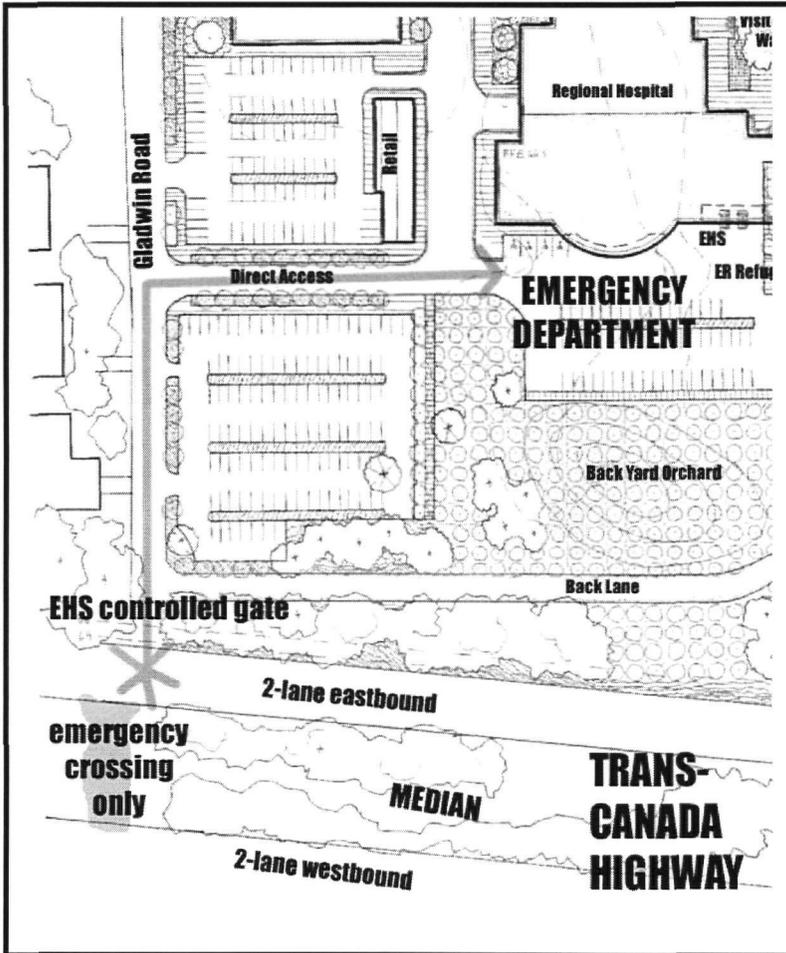


11. **Recycling and discard of waste** is an issue to be explored within the hospital site: for compostables, paper, plastic, and biohazards. Hospitals are well known to be highly wasteful. This can be blamed on the high risk of biohazard but it is also well known amongst hospital workers that little effort/budget is put into efforts at recycling.

12. **Alternate energy** use may be explored on site: solar, wind, water. Windmills were not explored

based on cursory data that these are harmful to bird populations. This would require further investigation.

13. **Emergency Health Services (EHS) access from Trans-Canada Highway**



onto Gladwin and into the hospital would be effective in decreasing ambulance transit times for major traumas. Such an access point would make this hospital a primary provider of highway accident care. Measures would need to be taken to ensure this does not become a "short-cut" for highway access by the general public. One possible solution may be a controlled electronic gate accessible only by ambulances.

14. **Security issues** related to welcoming the community onto the landscape have been mentioned briefly here. A more thorough delineation of security measures would be required. For example, while

Figure 9-2: EHS access onto Gladwin from Trans-Canada Highway. This close proximity would have a significant impact on morbidity/mortality of highway trauma victims.

several walkways have been designed for use by all individuals, certain areas may require fencing or (preferably) hedgerowing. An example would be a boundary created in the north Old Field space for use by psychiatric patients. Water features, although designed to be shallow would require safety measures (regional fencing, etc.) in high use areas.

15. The open space area becomes in all essence a significant public park. **Programming for special celebrations** (cultural, regional, etc.) should be done during the design phase, beginning with the planning of a significant ribbon-cutting ceremony. Special events could be celebrated here: e.g. annual Strawberry/Raspberry/Blueberry festivals. The open space could be leased out to groups for one-day events (e.g. club picnics, obedience dog trials, etc.).
16. A final image/map/overlay that would be created (given more time) would be a "**Community Integration Overlay**". This overlay would detail several possible community activities. These might include:
 - Drivers passing by,
 - Pedestrians walking by,
 - Recreationalists cycling or jogging through,
 - Visitors stopping at café for a cold drink or a latte,
 - Children playing in defined open space near café,
 - Seniors walking in open space,
 - Celebrations going on in open space,
 - Staff members taking lunch under an orchard tree,
 - Community members gardening or pruning orchard trees,
 - Community members arriving at Wellness Centre for talks on health promotion, disease prevention,
 - Schoolchildren taking inventory of bird habitat in marshland.
17. A very few examples of roof gardens, private gardens, and water features have been chosen to illustrate in this project. As a major emphasis was on creating an entire restorative landscape for the site, time did not permit the design or even the locating of all unique spaces. It is assumed that the landscape should become filled (incrementally) over time with **a variety of unique spaces that feature comfortable seating, access to water, views to nature, and the potential for interaction with other humans or with habitat.** For example, pathways in the Douglas Fir Woodlot feature a variety of rest stops that could become the focus of a local design competition to create benches and water features.
18. In terms of the very important **water feature**, the plan has laid out a main waterfall at the base of the southern café, a lined pool and two marshlands (one only accessible by humans, the other for habitat and maintenance stewards only). Several smaller, accessible water features should become a standard part of all small places. This is detailed in some of the unique features (e.g. Cancer Clinic Garden) detailed.
19. The plan of the built form also features several "indentations" that create visitor/patient spaces. While it is not detailed, the entire perimeter of the ground floor should be fitted with movable **overhead shelters** to enable patients to easily make their way out side in chairs, by foot, or even if pushed in bed.



Figure 9-3 (this page): Examples of varied water features. Preferred for greater restorative benefits are any features with moving, splashing, spraying water due to the effect of negative ions (Parsons, 2000).



9.2 Follow-up Research Encouraged.

As has been mentioned, several assumptions were made during this project. Given the author's experience in the field of health care, these assumptions were possible. For the designer not equipped with twenty years experience beside health care providers, dealing with death and illness, and facing on a regular basis the stress from all users of a hospital environment, these assumptions would be impossible. Unfortunately, the research done for this project revealed very little in the way of evidence-based testing of preferences (in particular, of staff and visitors). Research was rare in terms of specific needs for all groups in terms of needs or wants in the way of amenities, activities, programs, garden styles.

The natural, woodland garden style was utilized in several of the interventions done for this project. This was done as a result of regional and local site analysis, site conditions, and known local preferences. It was also done as a means of attracting habitat in order to enhance the 'living' aspect of the landscape. This planting style, however, was entirely possible because of the location of the proposed site. Would this style of garden be as restorative in a region known for its arid conditions and sparse growing conditions? Would the cost of irrigation be worth the benefits, or in this case would regional preferences win out? Research across cultures and across regions would be helpful.



Figure 9-4: Image of 'Mountain Stream' BEDSCAPES™. Developed with the assistance of Dr. Roger Ulrich, these "scenic curtains" are designed to envelop the patient in a stress-reducing atmosphere within the confines of the hospital.

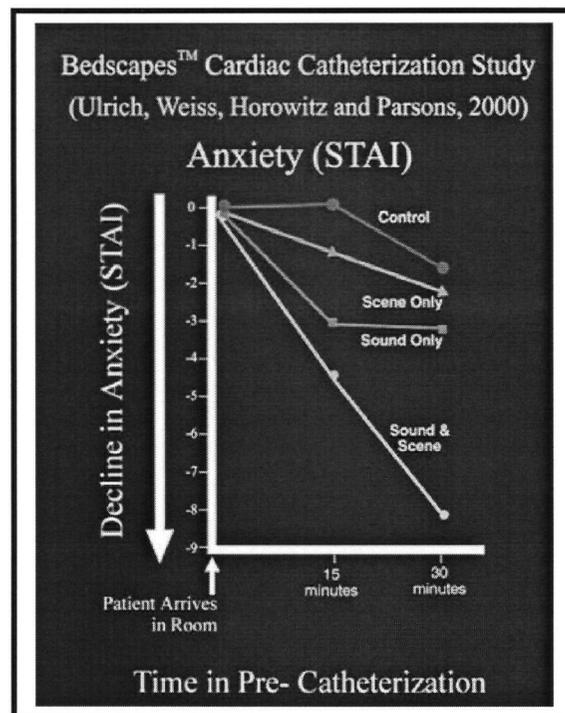
Specific testing of needs of staff members in the hospital setting would also be extremely helpful. As a Certified Emergency Nurse, the author has enough access to those staff members to be able to do impromptu questioning of preferences and needs but no document was found in the research to quantify any of these anecdotal findings.

In terms of patients, specific populations are rarely referred to in the literature. Patients are generally spoken of as a single entity experiencing a single form of stress. Researchers of stress and its detrimental effects, however, would surely differentiate between the short bursts of anxiety experienced pre-diagnositics versus the long-term weight of dealing with a terminal diagnosis. The needs for unique spaces, for views, for facilities, for choices, and for comfort will differ greatly across the wellness-illness continuum. Specific research for designers in this area would be helpful.

Figure 9-5: Beth Israel Cardiac Catheterization Study, 1999.

Patients awaiting cardiac catheter procedures (angioplasties, angiograms, stent implantations, etc.) are routinely brought into the diagnostic room several minutes prior to the actual test for preparations, last minute screening, research trials, etc. Strong sedatives/analgesics are generally used to keep the patient awake but calm (Diazepam, Fentanyl, Versed). This randomized trial showed a dramatic reduction in stress with exposure to the "natural scenes" combined with "natural sounds".

One has to query the results of a study, however, when the first investigator listed is also associated with the product. This would be an intriguing study to conduct at random cardiac units across North America.



Questions arise as to "How much nature is enough?" Roger Ulrich has shown benefits in patients who are exposed simply to curtains imprinted with natural imagery. A Cardiac Catheterization study done in 1999 at Beth Israel, NYC, showed dramatic stress reduction in patients exposed to natural scenes with natural sounds while awaiting catheterization (Horowitz and Ulrich, 1999).

However, Ulrich does agree with Lewis (1996) that, as participation increases so too do the benefits. Is a small, green roof top garden sufficient to give the restorative benefits required? And, if so, for what segment of the patient, visitor, staff population is this enough?

Or is it necessary or even desirable to provide all users with access to large open spaces in which to wander or wheel or gaze?

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Appendix I: Principles of Universal Design

In order to achieve accessibility of built forms and open spaces, the following guidelines should be applied to design and programming.

1. Aim for Equitable Use:

- Design is useful and marketable to people with diverse abilities.
- Provide the same means of use for all users: identical whenever possible/equivalent when not.
- Avoid segregating or stigmatizing any users.
- Provisions for privacy, security, and safety should be equally available to all users.
- Make the design appealing to all users.

2. Aim for Flexibility in Use:

- Design accommodates a wide range of individual preferences and abilities.
- Provide choice and options for use.
- Facilitate the user's accuracy and precision.
- Provide adaptability to the user's pace.

3. Aim for Legibility of Essential Information:

- Use of the design is easy to understand, regardless of user's experience, knowledge, cultural background, language skills, or concentration level but not condescending.
- Eliminate unnecessary complexity.
- Simple signage and wayfinding.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance (hierarchy of information).

4. Aim for Awareness of diverse interpretations:

- Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- Provide adequate contrast between essential information and its surroundings.
- Provide compatibility with a variety of techniques or devices used by people with sensory limitations (eg. Signage for sight-impaired).

5. Aim for Tolerance for Error:

- Design should minimize hazards and the adverse consequences of accidental or unintended actions.
- Arrange elements to minimize hazards and errors: Frequently used elements easily accessible and visible.
- Provide choices and options to prevent users entering into situations beyond their abilities.
- Provide warnings of hazards and errors.

6. Aim for Low Physical Effort Always an Option:

- Design can be used efficiently and comfortably and with a minimum of fatigue, yet opportunities for challenge are available.
- Allow user to maintain a neutral body position.
- Use reasonable operating forces.
- Minimize repetitive actions.
- Minimize sustained physical effort.

7. Size and Space for Approach and Use:

- Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.
- Provide a clear line of sight to important elements for any seated /standing user.
- Make reach to all components comfortable for any seated/standing user.
- Accommodate variations in hand and grip size.
- Provide adequate space for the use of assistance devices or personal assistance.

Modified from:

Center for Universal Design. 1997, *The Principles of Universal Design*, developed for North Carolina State University (Online), Available: [http://www.design.ncsu.edu:8120/cud/univ design/princ overview.htm](http://www.design.ncsu.edu:8120/cud/univ_design/princ_overview.htm) (2001, November).

Appendix II: Principles of CPTED

(Crime Prevention through Environmental Design)

CPTED ((Crime Prevention through Environmental Design) contends that by designing the physical environment in a manner that positively influences human behaviour, it is possible to create a climate of safety in a community. Perhaps as significant as the reduction in crime, is the heightened feeling of security sensed by the legitimate users of the space. As a 24-hour facility, the hospital requires a design strategy that, without abandoning aesthetics, allows for safe passage by staff and visitors to and from cars/buses/buildings/programs at every hour of the night. The principles of CPTED contend that, while there are occasions in which locked gates and fences become necessary, much can be done to heighten safety and security through manipulation of the external environment and its components.

CPTED was developed in the 1960's for use by architects, city planners, landscape architects, interior designers, and law enforcement personnel.

The principles of CPTED hinge on the following five key strategies: Territoriality, Natural Surveillance, Activity Support, Access Control/Target Hardening, and Image/Maintenance.

1. Territoriality.

People protect territory that they feel is their own and have a certain respect for the territory of others.

Ownership is expressed through good upkeep, and care and attention to environment: fences, artwork, paving, signage, planting, and gateways. Applying a hierarchy of space identifies ownership by delineating private space from public space through real or symbolic boundaries.

2. Natural Surveillance.

Criminals don't want to be seen.

Visual access around buildings, along pathways and in outdoor spaces is maximized to discourage intruders. Elements to be considered:

- Building orientation (to face open space),
- Windows (placement, height),
- Entrances & exits (indoor-outdoor relationships),
- Parking lots (isolation versus clustering),
- Walkways (lighting, designated, redundancy of loops),
- Landscape planting (open versus closed, pruning of shrubs to maintain visibility),
- Fences and walls (permeability, escape routes),
- Signage (to discourage and/or encourage use as required).

Landscaping in sensitive areas adheres to the "groundcover-canopy" strategy. In the hospital environment, eye level must be considered from a wheelchair position.

The addition of programs, activities, or persons in plain view further discourages unwanted behaviour (for example, parking lot attendants and reception clerks). Lighting of sensitive areas will further enhance natural surveillance.

3. Activity support.

Encouraging positive activity in public spaces helps discourage crime. This has the added benefit of providing restorative benefits if patients are in visual access of these activities (Ulrich 1992).

Programs designed to bring community members together for legitimate activities increases natural surveillance as well as feelings of ownership, thus preventing crime. Providing amenities that support community events furthers this strategy.

4. Natural Access control/Target Hardening.

Interventions may be required to enforce restrictions on use/access.

Natural Access control is aimed at preventing users from entering into unsafe situations through the use of sidewalks, paving, lighting, signage and/or landscaping to clearly guide the public to and from entrances and exits. The use of fences, signage and/or or landscaping to prevent and/or discourage public access to or from dark and/or unmonitored areas may also be required. Target hardening, necessary in higher risk areas, uses physical barriers, security devices and tamper-resistant materials to restrict entrance. It is expected that areas of a health care facility will require this more definite form of crime prevention in addition to the more general environmental manipulations. In particular, placement of emergency call boxes and security personnel posted at parking lots/walkways for shift changes.

5. Image/Maintenance Considerations.

A maintained place is a watched place.

Ensuring that a building or open space is clean, well maintained, and graffiti-free facilitates the CPTED principles of natural surveillance, natural access control and territorial reinforcement.

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