DESIGNING A HEALING GARDEN FOR THREE PATIENT POPULATIONS

BASED ON

RESEARCH, THEORY, OBSERVATION AND INTERVIEWS

by

HAYES ROGERS FAIRCHILD

(Under the Direction of Brad Davis)

ABSTRACT

This thesis explores types of healing gardens suited for three patient populations: dementia, catastrophic, and psychiatric. It addresses the features that need to be included for each of these patient populations, and why different features need to be emphasized for each type of patient. It presents historical information on healing gardens, including prior research, theory, and design methods, as well as conclusions the researcher reached by observing patient behavior in gardens, and by conducting focused interviews with patients and unstructured interviews with garden directors. The researcher examines the results of these efforts through the prism of theoretical structures offered by environmental psychologists and landscape designers. The researcher then creates a prototype garden for each of the three patient populations.

INDEX WORDS: healing gardens, nature preference, stress reducing factors, evidence-based design, post occupancy evaluation, patient population, Roger Ulrich, Steven and Rachel Kaplan, clinical studies and physiological measurements with plants, supportive design theory, healing garden features

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DEDICATION

To the ones I love.

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CHAPTER ONE

INTRODUCTION

"I believe that there is a subtle magnetism in Nature, which, if we unconsciously yield it, will direct us aright" - Henry David Thoreau

This thesis explores the history, research, theory and design of healing gardens for three patient populations: dementia (patients whose cognitive abilities have been impaired, such as by Alzheimer's disease), catastrophic (patients whose physical abilities have been impaired, such as by injury to the spinal cord), and psychiatric (patients whose socialization abilities have been impaired, such as by chemical imbalances or traumatic experiences). It considers, for example, how healing gardens can reduce stress, patient need for medication, and patient recovery time. It also addresses differences among these patient populations that affect garden design. It specifically asks and answers the following questions:

1. Which healing garden features are the most therapeutic?
2. In what ways are these features therapeutic?
3. Which features best serve each of the three patient populations?

Chapter One introduces the thesis. Chapter Two reviews past work in the area of healing gardens. The review considers the origins of healing gardens, prior research, development of theory, and design principles derived from successful projects. Chapter Three discusses the researcher's methods: direct observation, focused interviews with patients, and unstructured interviews with garden directors. Chapter Four describes the context and gives background information on each of the study sites: Wesley Woods, Shepherd Center, and Skyland Trail.

Chapter Five provides the results of the studies of each garden and an analysis of the meaning of the results and how this information may be applied to the design of new healing gardens. Chapter Six incorporates the information from historical research and case studies resulting into three prototype designs representing each patient population. Finally, Chapter Seven presents general conclusions with suggestions for future research.

CHAPTER TWO

THEORY AND RESEARCH OF HEALING GARDENS

BRIEF HISTORY OF HEALING GARDENS

Healing gardens have existed for centuries. Clare Cooper Marcus and Marni Barnes explore the early history of healing gardens in their book, Healing Gardens: Therapeutic Benefits and Design Recommendations (1999). Cooper Marcus is currently Professor Emeritus in the department of Architecture and Landscape Architecture at the University of California, Berkeley. Barnes draws from over twenty five years experience as a practicing landscape architect, psychotherapist, and social worker. Barnes has worked in both the United States and Great Britain.

The notion that healing gardens are beneficial to human health dates back to the Middle Ages. The first healing gardens were cloisters, which were courtyard gardens in medieval monasteries (Figure 2.1). The layout of the monasteries centered around the cloisters where monks grew food and curative herbs. Cooper Marcus and Barnes note (2005), that, "hospitals and monasteries [in the Middle Ages] ministering to the sick, the insane, and the infirm often incorporated an arcaded courtyard where residents could find the degree of shelter, sun, or shade they desired in a human-scale, enclosed setting" (1999, p. 10). Courtyards were divided into four square areas, each quadrangle devoted to specific curative herbs to be used by the monks for medicinal purposes. The main aspect of a cloistered garden was that it was enclosed on all four sides (Figure 2.1).

Figure 2.1. St. Paul's Cloister Garden, 1208-1235 (Retrieved 3-11-11 from: http://www.gardenvisit.com/garden/st_pauls_outside_the_walls_cloisters)

Healing gardens returned to prominence in the 1700s, during the Age of Romanticism. Romanticism was a time of complex art and literature that placed importance on the natural environment, and its healing and therapeutic qualities. Disease was widespread. Hospital planning thus focused on air flow, ventilation, and sanitation. Planners began to place more emphasis on nature, recognizing qualities in outdoor spaces found nowhere else. German horticultural theorist Christian Cay Lorenz Hirschfield (1741-1792), for example, described a prescription for hospital siting and hospital garden design during this period:

> A hospital should lie open, not encased by high walls, not fenced in by looming trees. The garden should be directly connected to the hospital, or even better, surround it. Because a view from the window onto blooming and happy scenes will invigorate the patient, a nearby garden also invites patients to take a walk.
>
> The plantings, therefore, should wind along dry paths that offer benches and chairs. Clusters of trees are preferred to alleys of trees, which through the years will mature and meet at the top so that the air will not

> circulate. Sad conifers should not be used but trees with light and colored leaves and flowering and fragrant shrubs and flowers.
>
> A hospital garden should have everything to encourage the enjoyment of nature and to promote a healthy life. It should help forget weakness and worries and encourage a positive outlook; everything in it should be serene and happy. No scene of melancholy, no memorial of mortality should be permitted to intrude (Hirschfield, quoted in Warner, 1994; p.30) (cited in Cooper Marcus and Barnes, 1999, p. 12).

Hirschfield's prescription is an idealistic notion of how hospital healing gardens should be planned. It would be impossible to site every hospital as he suggested. Nonetheless, many of the attributes and features he discusses influence modern hospital landscape and garden design.

Healing gardens were first included in psychiatric hospitals in England in the 1800s, as Clare Hickman, a research fellow at The University of Bristol, observed in her paper: *Vis Medicatrix Naturae: The Design and Use of Landscapes in England for Therapeutic Purposes Since 1800* (Hickman, 2005). One of the earliest psychiatric hospitals was Brislington House, which Dr. Edward Long Fox opened in 1804. Brislington House was a private institution aimed at mostly upper and middle classes. Hickman wrote:

> Brislington House can be used as an illustration of the level of detail involved in the design of an asylum landscape. [At] this institution there were picturesque cottages (these could be used by the richest patients who were allowed to bring their horses and servants with them), a primitive stone viewing area, and a Cliff-Top Walk (2005, p. 2).

The Cliff-Top Walk was where Dr. Fox elevated the land inside the asylum so that the patients could view the distant landscape.

Brislington House also utilized "Moral Therapy," a new form of treatment introduced in the early 1800s that minimized physical restraints and emphasized human rights. Hickman (2005, pp. 1-8) wrote:

> This form of treatment was influenced by the ideas of philosophers such as John Locke, who had suggested in 1690 that insanity was caused by the misassociation of ideas. This concept was important because it moved away from the notion that madness was a physical disease that needed to be treated by physical methods, which was the general approach during the eighteenth century. Once madness was seen as an emotional disorder caused by errors in the patient's train of thought, it meant there was new hope of finding a cure. Moral therapy, therefore, espoused the removal of the patient from the environment and community that had caused these incorrect associations and their placement within a new environment and community, which could re-educate and, thereby, rectify errors within their thought processes (pp. 1-8).

"Moral Therapy" therefore contemplated that patients would be allowed to wander the landscape in a natural environment. Trees and shrubs continued to surround the grounds. More emphasis was placed on physical activity rather than physical restraint. As Hickman (2005) also observed:

the later Brislington House became the blue print for how the grounds were laid out around the great Victorian asylums (Figure 2.2). These features included `Airing Courts' (walled areas which adjoined the house and were divided into sections for patient use based on gender, level of illness and sometimes class), wider pleasure grounds, fields and an estate farm (pp. 1-8).

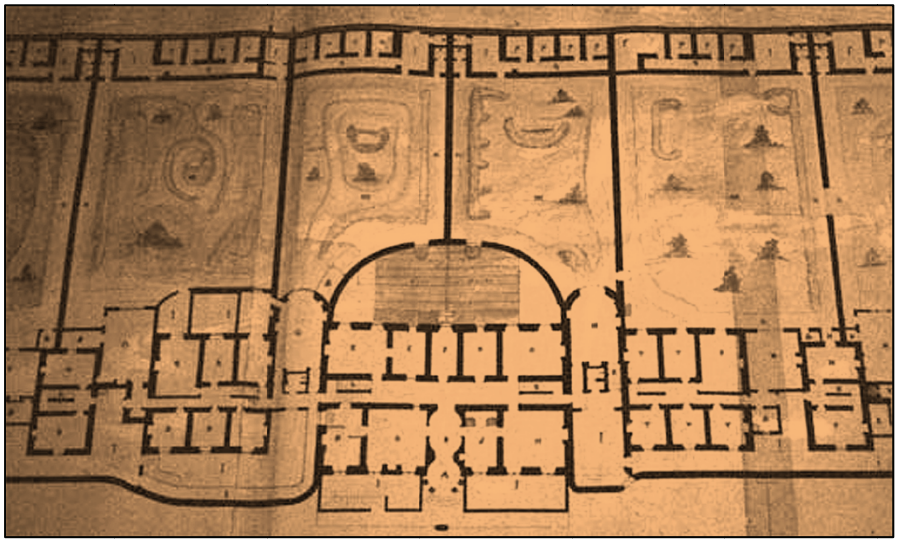


Figure 2.2. Plan of Brislington House Showing Airing Courts, 1804 (Retrieved 2-21-11 from http://www.parksandgardens.ac.uk/274/explore-31/feature-articles-151/therapeutic-landscapes-the-design-and-use-of-nineteenthcentury-lunatic-asylum-grounds-546.html?limit=l &limitstart=3)

The plan above, Figure 2.2, shows the importance that was placed on fresh air circulation because patients could not afford to catch others' illnesses. The plan shows the openness of it and how there are airing courts that will keep the air fresh. Hickman (2005) writes, "These features included 'Airing Courts' (walled areas which adjoined the house and were divided into sections for patient use based on gender, level of illness and sometimes class), wider pleasure grounds, sports grounds, fields and an estate farm" (p.3). These features and design ideas would

be continued into the future rise of the metropolis city and the advancement of landscape architecture.

Frederick Law Olmsted, the father of landscape architecture, employed sociological theory in designing for healthcare facilities. As Beveridge and Hoffman wrote, "During the years 1895-1912, John Charles and Frederick Law Olmsted, Jr. were employed as landscape architects for Butler Hospital, providing topographic and planting plans for both old and new portions of the hospital grounds" (Beveridge and Hoffman, 1987, p. 64, cited in Cooper Marcus and Barnes, 1999, p. 253). Figure 2.3 is the original 1912 site plan of buildings, topography, and roads at Butler Hospital, Providence, Rhode Island (Cooper Marcus and Barnes, 1999, p 252).

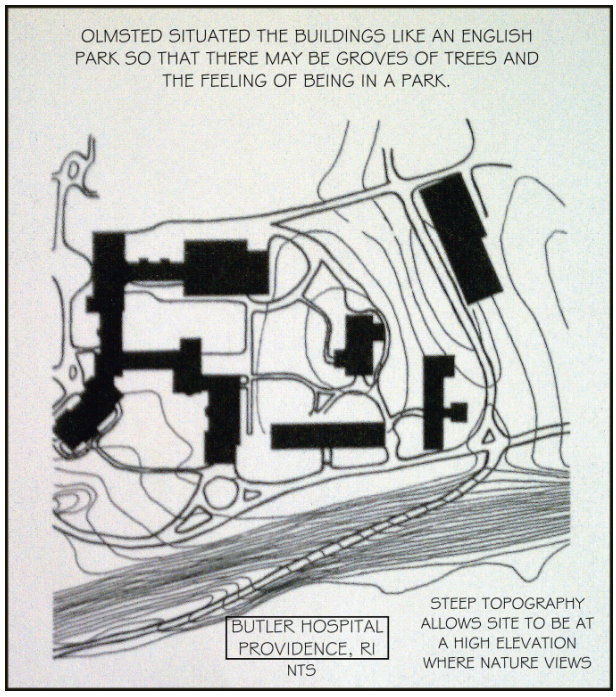


Figure 2.3. Original 1912 Olmsted Site Plan for Butler Hospital, Rhode Island (In Cooper Marcus and Barnes, 1999, p.252).

Butler Hospital, in existence since 1847, was the first hospital in the state of Rhode Island. It served acute care, as well as the mentally insane, and was the only hospital in Rhode

Island. In 1978, two buildings were connected to enable 130 patients to live on the grounds.. As Cooper Marcus and Barnes (1999), write, "Butler Hospital consists of four specific comprehensive programs, all of which take place within its campus: The Outpatient Specialty Program, Partial Hospital Program (similar to a day hospital), the Inpatient Specialty Program, and the alcohol and drug treatment services" (p. 252). Seven different units exist to take care of each of the acute care patients' specialized needs (p.252).

Figure 2.4. Buffalo State Hospital for the Insane, 1916 (Retrieved 2-23-11 from http://www.asylumprojects.org/index.php?title=File:Buffalo05.png)

Olmsted was also involved in the landscape design of other asylums in his later years of practice, such as the Buffalo State Hospital for the Insane. Patients and staff spent their time outside with nature. Figure 2.4 shows how the patients and staff made the decision to spend their days outside among the nature. The patients that did this on a daily basis experienced a faster recovery rate (Cooper Marcus and Barnes, 1999, p. 261). The design of the building enabled patients to spend time outside, on porches, taking advantage of nature views. Olmsted strongly believed in the restorative benefits of the landscape. He said, "...[Good garden design] employs the mind without fatigue, tranquilizes yet enlivens it and thus gives the effect of refreshing rest

and reinvigoration" (Retrieved on 4/13/10 from: http://blog.gaiam.com/quotes/authors/frederick-law-olmstead).

RESEARCH, THEORY AND DESIGN FOR THE MODERN HOSPITAL SETTING

With the advent of health care that is increasingly more technological and mechanized, hospitals have tended to define success by the result achieved for the patient, and have paid less attention to the quality of the journey to recovery. Hospital planners have not, until relatively recently, given detailed attention to designing either interiors or landscapes and gardens that help heal the patient and make the patient's stay more tolerable. Patients nonetheless seek restoration through nature, and look to nature to escape uncomfortable relationships. Pioneers in the healing garden movement have thus begun to focus on the stress-reducing qualities of gardens, the sense of calmness and relief from haste that gardens provide, and the other positive effects that gardens can have on health and attitude. Modern research and theory, and the transition to evidence-based design, mark the onset of a more scientific approach to designing for specific patient populations.

Research Methods and Studies of Modern Pioneers

The medical community has been somewhat resistant to the idea that gardens can have a meaningful impact on outcomes because there is not adequate scientific data to support the conclusion. As Gerlach-Spriggs, Kaufman, and Warner, wrote in their book, Restorative Gardens: The Healing Landscape (1998), "virtually no research would satisfy the medical scientists' need for double-blind control studies, nor are there crossover studies in which the data are reproduced and reaffirmed in a variety of experimental settings" (p. 35). Professor Paula Diana Relf, a Horticulture Therapy professor Emeritus at Virginia State University, pointed out that the employers and insurance companies that pay for healthcare do not want to pay for costs

that have not been shown by scientific study to add value (Relf, p. 235). Martha Tyson, a researcher and landscape architect, has described the kind of research that is needed:

> Good research is both valid and reliable. A study is considered valid if the research tools or procedures actually measure and accomplish what they were set up to (internal validity) and are able to be applied what they were set up to (internal validity) and are able to be applied to similar settings or situations (external validity) (Tyson, 1998, p. 17).

Cooper Marcus and Barnes (1999) noted, however, that "there is now enough quality research to justify the conclusion that there is suggestive evidence that aspects of the designed environment exert significant effects on clinical outcomes for patients" (p. 28). Gerlach-Spriggs, et al. (1998) agreed: "To ignore these data because they are soft would be akin to saying Mozart may not be exalting because we have no proof of it" (p. 35). Relf (1992) nonetheless observed that research in this area needs to take a more scientific direction (p. 235).

The more important research efforts of the modern era include: post occupancy evaluations generally; a key Roger Ulrich study; brain activity clinical studies; physiological measurement clinical studies; and the Kaplans' "Environmental Preference" study.

Post Occupancy Evaluations

Cooper Marcus and Barnes are two leaders in the healing garden movement. They have both been heavily involved with Post Occupancy Evaluations, or POEs, a research tool that is valuable in the study of healing gardens. The two define POEs as "studies conducted in a designed setting - in this case, a landscape - with the goal of assessing the advantages and limitations of that space for its users and non-users" (1999, p. 111-112).

As their book shows, a POE is a study of how patients actually use a designed space. Its purpose is to determine whether the design program and garden elements have proved to be successful. Cooper Marcus and Barnes (1999) describe multiple methods for post occupancy evaluations, including observation, interviews, time studies, seasonal studies, and behavior mapping. The authors also note that POEs also "may be expanded to incorporate the collection of additional information, such as emotional state and mood change" (Cooper Marcus and Barnes, 1999, p. 112).

In the book, Landscape Architectural Graphic Standards (2007), Clare Cooper Marcus (Ed.) laid out what a post occupancy evaluation entails. She recommended that a team consisting of both social scientists and designers perform a POE (p. 57). Table 2.1 is based on Marcus' three types of post occupancy evaluations.

Table 2.1. Types of Post-Occupancy Evaluations (Cooper Marcus, 2007)

TYPE OF POST OCCUPANCY EVALUATION	DESCRIPTION (paraphrased)
Indicative POE	Can be accomplished in a short time span. Interviews, walk through evaluation This type of POE can provide indications of major successes and failures and is most reliable.
Investigative POE	Often a response to questions that arose during the Indicative POE. Evaluation criteria often explicitly stated.
Diagnostic POE	Most comprehensive and in-depth. Essential to use multiple methods: Interviews, Questionnaires, behavior mapping, and observation. Results are often not only aimed at improving one facility, but improving several facilities of the same type.

There are limits on the utility of POEs, however. First, Cooper Marcus and Barnes caution that "While a post occupancy evaluation may lead to more informed design of future

gardens, this procedure of trial and error is not the most expedient" (p. 112). Second, as is obvious, a post occupancy evaluation cannot be performed until a project is completely installed.

The use of a POE allows the landscape architect to study how design affects health outcomes, and to share that information with other professionals involved in the project. As Cooper Marcus and Barnes (1999) noted, "The applicability to landscape architecture is twofold: it can be used as a self-checking mechanism to determine if design intentions were achieved; or it can serve as an assessment/evaluation of a space to formulate recommendations for change and guidelines for other similar spaces" (p. 112).

Roger Ulrich's "View Through a Window May Influence Recovery from Surgery" Study (1984)

Roger Ulrich authored a particularly influential paper on how nature (and specifically views of nature) affected hospitalized patients, entitled "View Through a Window May Influence Recovery from Surgery" (Ulrich, 1984). Ulrich is a professor in the Department of Architecture at Texas A&M University. He also serves as Director of the Center for Health Systems and Design, an interdisciplinary center sponsored by the colleges of both medicine and architecture.

In that study, Ulrich reviewed data with respect to gall bladder patients, some of whom had been placed in a hospital room with a view to a few trees, and others of whom had been placed in a hospital room with a view to a brick wall (Figure 2.5). Figure 2.6 is a plan of the hospital rooms and the views they had. The observations in the study covered from 1972 to 1981 (Ulrich, 1984). The study concluded that there were significant differences in the times that it took for each of the two patient groups to recover. The patients with a view of trees required less hospitalization time, took less pain medication, and experienced less stress along with overall better affect. The patients that had a view to a brick wall stayed in the hospital longer, required more analgesic doses, and had a lesser affect in general (Ulrich, 1984, p. 54).

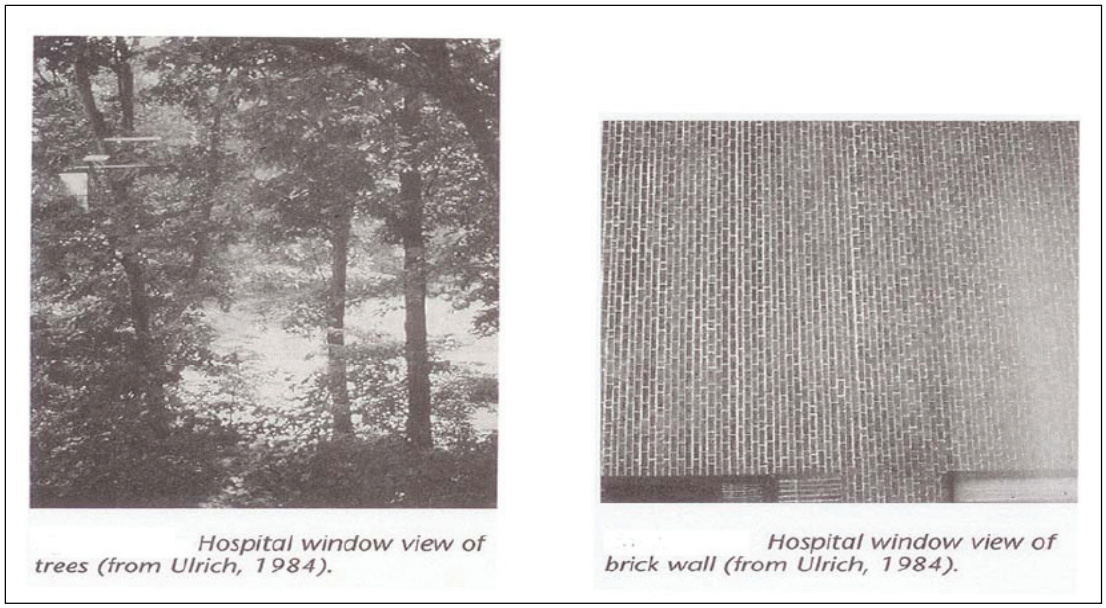


Figure 2.5. Hospital Room Views from Ulrich's Study (1984)

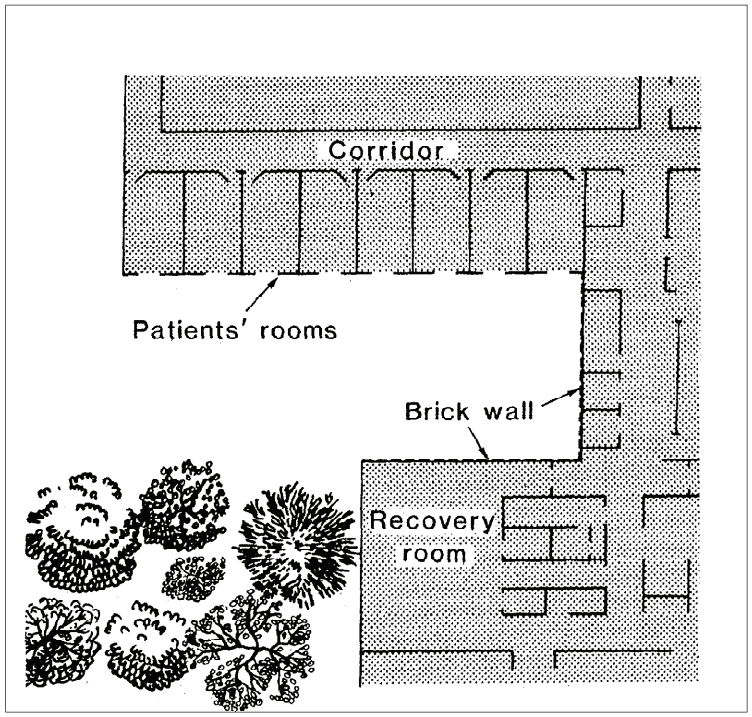


Figure 2.6. View from Patient Rooms in Ulrich's Study (Ulrich, 1984)

Table 2.2 shows the quantities of analgesics that patients in each of the two groups needed. The group of patients that had the view of trees generally required less pain medication, at least after the first day of hospitalization.

Table 2.2 Number of Doses of Analgesic Meds Given Two Patient Groups (Ulrich, 1984)

Analgesic strength	Number of doses					
	Days 0-1		Days 2-5		Days 6-7	
	Wall group	Tree group	Wall group	Tree group	Wall group	Tree group
Strong	2.56	2.40	2.48	0.96	0.22	0.17
Moderate	4.00	5.00	3.65	1.74	0.35	0.17
Weak	0.23	0.30	2.57	5.39	0.96	1.09

Cooper Marcus and Barnes (1999) wrote, "Ulrich's findings are consistent with the notion that visual settings with prominent nature tend to reduce stress and improve outcomes in patients groups that include those experiencing stress accompanied by feelings of anxiety (fear, tension)" (p. 60). Relf (1992), while expressing a preference for "properly designed" randomized control trials, notes, that, as in the case of Ulrich's 1984 study, "Exceptions to this research design have been used effectively in cases where randomized treatments occurred serendipitously, despite the fact that the variable being analyzed was never part of the original plan of the treatment" (p. 235).

The landscape architect can rely on research such as that in Ulrich's 1984 study to advocate incorporating elements of nature into design as a means of positively impacting patients physically as well as psychologically.

Brain Activity Clinical Studies

Nakamura and Fujii (1990, 1992, pp. 139-144; cited in Cooper Marcus and Barnes, 1999, pp. 54-55), landscape architects in Japan, conducted two studies in Japan. The first study measured the activity of brain waves of unstressed individuals viewing either plants or man-made objects. They had participants look at two types of potted plants, one with flowers

(Begonia) and one without flowers (Pelargonium). They recorded the participants' alpha rhythm activity, a measure of the rate at which the brain fires neurons. The results showed that the subjects were more wakefully relaxed when they were looking at plants with flowers, and less relaxed when they were observing plants with no flowers (Nakamura and Fujii, 1990, pp. 177-183; cited in Cooper Marcus and Barnes, 1999, pp. 54-55). Nakamura and Fujii's second study utilized electroencephalograms (EEGs) to compare the reactions of participants viewing a hedge with the reactions of participants looking at a concrete wall with small amounts of greenery. An EEG measures the currents that flow during synaptic excitations of the dendrites of many pyramidal neurons in the cerebral cortex (Cooper Marcus and Barnes, 1999, p.55). The concrete wall possessed dimensions very close to those of the hedge. The study showed that those who looked at the hedge experienced much less stress and much more relaxation, while those who looked at the concrete wall were negatively affected (Nakamura and Fujii, 1992, pp.177-183; cited in Cooper Marcus and Barnes, 1999, pp. 54-55).

These studies thus also provide reason for including appealing natural settings in healthcare facility design.

Physiological Measurement Clinical Studies

Ulrich also conducted a physiological study, looking at an array of responses given by 120 stressed participants (R. Ulrich, U. Dimberg, and B. Driver, 1991). Each participant viewed one of six different videotapes. The tapes showed either natural settings (water with vegetation) or built environments that did not incorporate aspects of nature (Ulrich et al., p. 78). The study recorded four physiological measurements for each participant: skin conductance, muscle tension, heart rate, and blood pressure. Individuals experienced restoration when they were exposed to the videos of nature. It usually took no more than three minutes for there to be

significant changes in all four physiological measures (Figure 2.7). Those participants who were exposed to video of the built environment, on the other hand, showed no reduction in stress. Ulrich concluded, "The pattern of physiological data further supported the interpretation that nature, compared to the built settings, more effectively lowered activity in the sympathetic nervous system" (p. 78). He also determined that people who were exposed to nature rather than the built environment had much lower levels of fear and anger, and reported much higher levels of positive feelings (p.79).

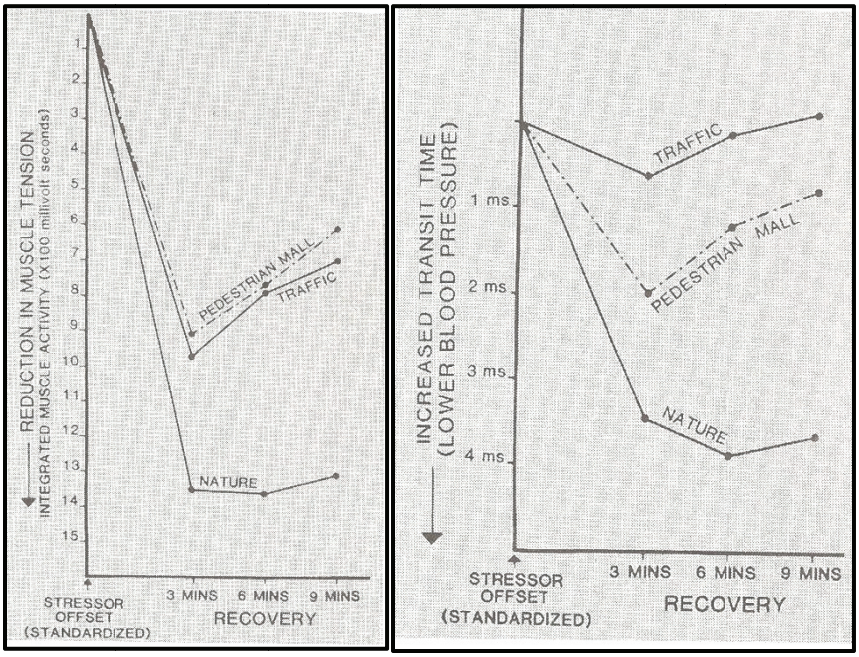


Figure 2.7. Results from Ulrich's Study Showing Decrease in Stress when Exposed to Nature (Cooper Marcus and Barnes, 1999, p.55)

Research conducted in Sweden confirmed Ulrich's findings (T. Hartig, M. Mang, & G. Evans, 1991). The study measured physiological responses such as blood pressure. The researchers' data showed that hospital patients preferred to have a view of trees and shrubs to a view of a built environment with no nature. They concluded that viewing plants could have significant positive effects, even when the individual viewed nature through a window rather than directly (pp. 3-36). They summarized results of the research in this area:

> All the research described above support the more general conclusion that visual exposure to plants and other nature lasting only a few minutes can foster considerable restoration or recovery from stress. Thus, it is overwhelmingly important that hospitals and healthcare facilities are built with all of these things in mind. Studies that have had extremely diverse patient groups strongly suggest that the presence of nature, indoor or outdoor gardens, plants, windows with nature views, increase both patient and family satisfaction" (Hartig, et al., 1991, p. 21).

The results of these physiological measurement studies demonstrate that nature can, and should be, used to impact patients of different types in healthcare settings.

Environmental Preference Studies

Steven and Rachel Kaplan, an environmental psychologist team from the University of Michigan, conducted several preference studies that involved asking participants to view pictures of natural and urban areas, and then to express their content or discontent with the material. The Kaplans administered brief questionnaires entitled the "Environmental Preference Questionnaire." They concluded:

> [Results] have shown essentially the same pattern of results. Consistently, the mean rating on the "nature" scale is the highest. The "nature" items include a range of everyday nature as well as some less accessible natural settings. A high score on the scale suggests that the person derives a great deal of satisfaction from the enjoyment of nature, and seeks natural settings whenever possible, including when harried or under pressure (Kaplan & Kaplan, 1982, p. 190).

These clinical studies involve the type of research and data that the medical community desires to see. If landscape architects and others can more scientifically show the effects of healing gardens in a laboratory setting, the medical community may attach more value to their recommendations.

Theory Advanced by Modern Pioneers

Healing garden researchers have spent much of their careers studying the effects of healing gardens in healthcare settings and how certain features help, or hurt, patients. Designers have made use of these findings, and have posed their own theories on why and how good garden design can benefit healthcare facility users.

Several modern theories can be and have been applied to healing gardens: the Kaplans' "Environmental Preference" theory; Kellert and Wilson's "Biophilia Hypothesis"; and Ulrich's "Supportive Design Theory."

Kaplans' Four Factors of Environmental Preference

Stephen and Rachel Kaplan's analysis of the interrelationships between the human and natural worlds has provided a platform that designers of healing gardens have found applicable. As described in The Experience of Nature: a Psychological Perspective (1989), the Kaplans developed what they call an "Environmental Preference Matrix." This matrix includes four factors: *coherence, legibility, mystery,* and *complexity.* The Kaplans' goal was to facilitate discussion of how these aspects of landscape design can make the landscape more attractive to the user.

According to the Kaplans, a landscape has *coherence* if it is composed with a modest number of distinctive regions. These regions must be relatively uniform within themselves and, at the same time, clearly different from each other (Kaplan & Kaplan, 1989, p. 55). The Kaplans

also wrote, “A coherent setting contributes to one’s ability to make sense of the environment” (p. 54). A landscape has *legibility* when it is open enough to allow visual access, and when it contains distinct and varied objects to serve as landmarks. “A legible space is one that is easy to understand and to remember” (p. 55). *Mystery* refers to “a promise of unveiling thus far obscured elements when entered” (p. 55). Mystery can be present in pictures or landscapes in many ways. The Kaplans wrote, “A suggested path that becomes obscure as it joins the woods, a stream that meanders out of sight, a scene that is hard to make out behind some foliage - these all have a quality of enticing one to want to know more; they compel one to change one’s vantage point and enter `deeper’ into the scene” (Kaplan and Kaplan, 1982, p. 190). Finally, *complexity* attracts individuals to landscapes. The Kaplans wrote, “Complexity is defined in term of the number of different visual elements in a scene; how intricate the scene is; its richness. It thus reflects how much is going on in a particular scene, how much there is to look at - issues that call upon the picture plane, as opposed to depth cues” (Kaplan and Kaplan, 1989, p. 53). The complexity of an environment gives users the feeling that they will have a diverse and stimulating experience.

The Kaplans then organize these four factors into a matrix that sorts the factors by what they call “informational needs” (“Understanding” or “Exploration”) and “how readily available the information is” (“Immediate” or “Inferred”/”Predicted”). The following Table 2.3 shows the Kaplans’ Matrix.

Table 2.3. Kaplan's Environmental Preference Matrix

	UNDERSTANDING	EXPLORATION
Immediate	**Coherence** Organization-Ease in which the environment can be read or understood.	**Complexity** Richness – Variety of objects (rather than the number of objects)
Inferred/Predicted	**Legibility** Way-finding - Ease of understanding orientation.	**Mystery** Sustained Interest – Potential for more information.

What the Kaplans' matrix tells the landscape architect is that landscape design in a health care setting should facilitate a patient's understanding of a landscape and make the patient want to explore the garden further. The designer should address both *coherence* and *legibility* to enhance understanding and *complexity* and *mystery* to encourage exploration.

Additionally, the characteristics of an environment that provide coherence and legibility are helpful for patient safety, and the characteristics that provide complexity and mystery are useful in appealing to patients' sense of aesthetics. "A design that incorporates all four factors not only offers security but also heightens the potential depth and intensity of human experience" (Kaplan & Kaplan, 1982, p. 153).

The Biophilia Hypothesis

Edward O. Wilson and Stephen Kellert, editors of The Biophilia Hypothesis (1993), use the term "biophilia" to refer to human "innate tendencies to focus on life and life-like processes" (Kellert and Wilson, 1993, p. 20). They submit that a diminished relationship with nature directly correlates with a less than satisfactory existence. Stephen Kellert (1993), Professor of Social Ecology and Co-Director of the Hixon Center for Urban Ecology in Yale University's School of Forestry and Environmental Studies, wrote, "The biophilia notion powerfully asserts that much

of the human search for a coherent and fulfilling existence is intimately dependent upon our relationship to nature" (Kellert and Wilson, 1993, p. 43). Like Kellert, Wilson (1975) observed that, "Humans choose `selected habitats' for their safety and their ability to provide food and water. These habitats were favorable to their well-being and survival" (p. 87). Their theory supports the notion that humans possess a primal need for nature as a source of safety, comfort, and restoration.

Kellert submits that man's affinity for nature arises from nine basic environmental values that shape the majority of man's life experience. Table 2.4 summarizes these values.

Table 2.4. Kellert's Typology of Values in Nature (Kellert, 2005, p. 34)

VALUE	**BRIEF DEFINITION (Kellert)**	**ELABORATIONS (paraphrased)**
Aesthetic	Physical appeal of and attraction to nature	Involves Recognition of symmetry, harmony, order, and balance. Provides feeling of safety and security.
Dominionistic	Mystery and control of nature	Creates a feeling of security, man's desire to conquer nature.
Humanistic	Emotional attachment to nature	Increased by animal's non-judgmental response, based on human self-esteem.
Moralistic	Moral and spiritual relation to nature	Deepens human connection to the cycle of life.
Naturalistic	Direct contact with and experience of nature	Release tension by resting attention demands and allowing for involuntary attention.
Negativistic	Fear of and aversion to nature	Sheer power of nature instills in us fear.
Scientific	Study and empirical observation of nature	Use processes or scanning to evaluate the natural environment.
Symbolic	Nature as a source of metaphorical and communicative thought	Aid in communication of complex thought and self-identity.
Utilitarian	Nature as a source of physical and material benefit	Offers craft and skill opportunities and thereby offers emotional benefits.

Kellert has a particular interest in the value and conservation of nature as well as ways to bring the natural and built environments together. Bringing both the natural and built entities together is of major importance in healthcare design. This is the main focus of Kellert's book entitled Building for People: Designing and Understanding the Human-Nature Connection (2005).

Kellert wrote, "People's environmental values were assessed based on conceptual framework developed by this author of nine basic ways people attach meaning to and derive benefit from nature" (Kellert, 2005, p. 34). Kellert believes that based on these nine values an individual's emotional and mental state can be gauged.

Kellert's "Values of Nature" offer an explanation as to the many benefits that healing gardens can provide. His guiding point is that the failure to take these values into account results in poorly designed landscapes, which in turn diminishes the individual's emotional and intellectual experience (p. 35).

Kellert's nine values particularly connect human well being with the need to experience and interact with the natural world. Kellert emphasized that man's sense or spirit of place reinforces his connection to the land and helps to uphold the satisfaction that derives from an accessible and secure setting. Benefits from nature come as a result of upholding the quality of nature, and the realization that the nature one experiences and its benefits are only as good as the encountered environment. Kellert wrote, "When examined closely, cherished places are not just cultural and social settings but also physical and ecological environments endowed with characteristics people associate with the place's distinctive identity" (p. 58). The more that people know their environment and the more affinity they have for that environment, the more people will benefit mentally, emotionally, and physically.

Healthy and familiar ecosystems permit humans to draw meaning and identity from the place as well as aid in the ability to sustain life and physical and mental well being. If these conclusions are generally true with respect to all humans and all encounters with nature, then they should carry even more weight in healthcare settings because of the frailty of the persons who use healthcare facilities.

Kellert's values remind landscape architects to give primacy to the connection between humans and nature, particularly in designing healing gardens.

Roger Ulrich's Supportive Design Theory

Roger Ulrich developed what he calls "supportive design theory." His fundamental premise is that people seek "support" through nature. He discusses that concept in a chapter entitled "Effects of Gardens on Health Outcomes: Theory and Research" (published in Cooper Marcus and Barnes, 1999, pp. 27-87). There, Ulrich uses the word "supportive" to refer to "environmental characteristics that support or facilitate coping and restoration with respect to the stress that accompanies illness and hospitalization" (cited in Cooper Marcus and Barnes, 1999, p. 9). Ulrich's research has typically focused on acute care settings, but his findings apply to healing gardens and other healthcare settings as well. Ulrich identified four stress-relieving resources important in the design of healthcare environments: *movement and exercise, social support, control,* and *natural distractions* (Cooper Marcus and Barnes, 1999, p. 36).

Movement and Exercise

Ulrich observes that there is substantial scientific evidence that movement and exercise reduce stress, including in patient populations (Cooper Marcus and Barnes, 1999, p. 46). He wrote, "The research provides a strong foundation for proposing that healthcare gardens that promote exercise should improve psychological well-being and foster gains in other health

outcomes" (p. 47). He reported several studies across the world where exercise actually lowered levels of depression. He wrote that "a controlled study of moderately depressed elderly found that simply taking a twenty-minute walk three times a week reduced depression symptoms" (p. 48). He therefore believed that it was imperative to promote movement and exercise in garden design.

Providing pathways, and assuring that way-finding is easy, accomplishes this objective. Movement is a characteristic of all living organisms. When designing healing gardens, the path and way-finding system must be a first priority. Enabling patients to enjoy paths, and making it easy for patients to follow paths, will aid in the healing process.

Social Support

Social support allows patients to interact with other persons, and particularly with other persons in their same situation. Healing gardens can provide an ideal setting for providing that kind of support to patients. In Cooper Marcus and Barnes book, Ulrich writes:

> Specific definitions of social support vary, but most encompass a range of different kinds of supportive social behaviors including, for example: expressing to a sick person that he is cared about, loved, or esteemed; encouraging the patient to express beliefs and feeling openly; giving the patient a sense of belonging to a social network or support group" (Ulrich, in Cooper Marcus and Barnes, 1999). p. 42).

The healing garden also provides a place where family, friends, and staff can interact with patients, and can do so in an environment that is more comfortable than the hospital itself. Ulrich found that "73 percent of all users engaged in talking at one time or another. Importantly, 36 percent of the persons they interviewed reported using the garden at least sometimes to visit with a patient" (p. 44).

Ulrich also reported that scientific evidence showed that social support is important to a robust healing process (Ulrich, 1992a, pp. 97-109). He cited a study by Berkman and Syme (1979), and wrote that, "An indication of the major importance of social support for health is finding that low social support may be as great a risk factor in mortality as is cigarette smoking" (Cooper Marcus and Barnes, 1999, p. 42). He pointed out that patient participation in horticultural activities and other garden projects can lead to a more rapid recovery (p. 45).

The physical features of a healing garden should maximize opportunities for social support. The garden should offer adequate benches, chairs and other place to sit (low walls, for example). Portable light weight chairs make it possible for additional persons to participate easily in socialization. As Ulrich observed, "Benches [can be] set in the park alcove at slight angles to provide opportunities for individuals or groups to sit together," and "[a] two foot high stone seating wall [can] serve as a resting place and an edge within the garden" (p. 45). When benches are built at a ninety degree angle then people can look at each other when they are talking and have a more meaningful conversation. What is important is that the landscape architect consciously design the seating so that it fosters and promotes social support.

Sense of Control

A healing garden can give patients a sense of control. Ulrich noted, "loss of control results from unsupportively designed environments that, for example, deny privacy, are noisy, have rooms arranged so patients cannot see out of windows, force bedridden patients to stare at glaring ceiling lights, or are confusing from the standpoint of way-finding" (Ulrich, 1992). In a study performed by Cooper Marcus and Barnes (1999), the two found a patient that said, "I was getting really teary in the hospital. You go from having control of your life to less control. Out here you're on your own; there's time to forget about it. You feel relieved from all the medical aspects

of your case" (p. 41). A healing garden can take the patient into a familiar and soothing place, nature, one that has great familiarity and that thus grants a sense of control.

Patients particularly experience a sense of control in working with plants in a healing garden. Patients grow plants and take care of them for months. Being able to care for something, such as plants, rather than being cared for, is uplifting.

Natural Distractions

Ulrich defined a natural distraction as "an environmental feature or situation that promotes an improved emotional state in the perceiver, that may block or reduce worrisome thoughts, and that fosters beneficial changes in physiological systems such as lowered blood pressure and stress hormones" (Ulrich, 1999, p.71). Ulrich notes that positive distractions may include things such as animals, music, comedy, and nature (Cooper Marcus and Barnes, 1999, p. 49). Ulrich focuses on the last of these, nature as a positive distraction.

Ulrich (1999) observed that, "There is mounting evidence that viewing certain types of nature scenes can significantly reduce stress. Accordingly, it seems very likely that one major way in which gardens in healthcare facilities can improve medical outcomes is by providing visual exposure to nature" (p. 50). Healing gardens thus can provide a welcome source of natural distraction.

Ulrich found in a study of four healthcare facilities that the most frequently mentioned positive garden qualities were visual nature elements, especially trees, greenery, flowers, and water (Cooper Marcus and Barnes, 1999, p. 5). Many respondents also named birds, sunshine, and fragrance. Ulrich wrote, "Findings surveyed earlier from studies of stressed non-patient groups suggested that even short-term visual contacts with nature - lasting only a few minutes - can produce significant restoration" (p. 58).

The Kaplans pointed out that positive distractions and diversity offered patients time to breathe and to focus their attention somewhere other than on their health and living situations (Kaplan & Kaplan, 1989, p. 161). Having something to care for, such as a plant or bird, also instills a sense of well-being in the patients. Again, having something to care for diverts their attention away from the fact that they are being cared for on such an intense level.

Ulrich also described how Hartig and his associates (from The Center for Health Design) observed how natural distractions reduced stress in patients:

> Hartig, et al. (1996) created stress in individuals with a demanding cognitive task, and then measured recovery effects of either (1) a forty minute walk in an urban fringe nature area, (2) a forty minute walk in an attractive urban area, or (3) reading magazines or listening to music for forty minutes (p. 53). Findings suggested that persons assigned to the walk in nature reported more positively toned emotional states than the individuals assigned to the other two activities (cited in Cooper Marcus and Barnes, 1999, p. 53).

Ulrich's "supportive design theory" thus reminds the designer to incorporate movement and exercise, social support, sense of control, and natural distractions into the planning process.

Evidence-Based Design

Hospital planners have often included landscape design only as an afterthought. Planners are increasingly using Evidence-Based Design (EBD), however, to create outdoor environments that promote tangible beneficial outcomes, and that support therapies, family involvement, staff performance, and restoration for workers under stress.

Therapeutic Landscapes Network (therapeuticlandscapes.org) defines EBD on its website as follows:

> Evidence-Based Design is using quantitative, and sometimes qualitative, research to design environments that facilitate health and improve outcomes. In some settings, design based on intuition or common sense is fine. But when it comes to creating spaces for specific people with specific needs (and where the space is designed for a specific outcome or result), design must be based on sound research (Retrieved 1/11 from http://www.healinglandscapes.org/resources-ebd.html).

As the authors of Evidence-Based Design for Multiple Building Types, Hamilton & Watkins (2009) phrase it, "Evidence-Based Design is the conscientious, explicit, and judicious use of current best evidence from research and practice in making critical decisions, together with an informed client, about the design of each individual and unique project" (p. 10).

Formulating design choices by studying results of the specific patient population is just this type of design process, one that is based on information available from past post occupancy evaluations and other research. Ulrich's 1984 study "View Through a Window" used quantitative data to show a relationship between humans and the natural world, and provides an example of the type of evidence that a planner can use to improve design.

Hamilton and Watkins (2009) submit that EBD should result in significant improvements in the facilities' clinical outcomes, economic performance, productivity, customer satisfaction, and cultural measures (p.14). They developed nine directives to advance making design-oriented improvements in a hospital's performance (p.15). Table 2.5 describes their Evidence-Based Design Process.

Table 2.5 Evidence-Based Design Process (Hamilton & Watkins, 2009)

	TASK	ACTIVITY
1	Identify Client's goals.	Note most important and facility-related global and project-based goals.
2	Identify the Firm's goals.	Understand the firm's strategic, project and evidence-based design objectives.
3	Identify the top one to three key design issues	Narrow the possible choices; work on high-impact decision.
4	Convert design issues to research questions.	Reframe statement of design issues to become research topics.
5	Gather information (*i. e.* , benchmark examples, literature sources, internal studies)	Infinite possibilities must be narrowed; limited perspectives must be expanded.
6	Critical interpretation of the evidence	No direct answers; requires open-minded creativity, balance and critical thinking.
7	Create evidence-based design concepts.	Based on creative interpretation of the implications of research findings.
8	Develop hypothesis	Predict the expected results of the implementation of your design.
9	Select measures.	Determine whether or not your hypothesis is supported.

The Center for Health Design developed a wheel to show the eight parts of the Evidence-Based Design process (Retrieved May, 2010 from: http://www.healthdesign.org/clinic-design/design-process).

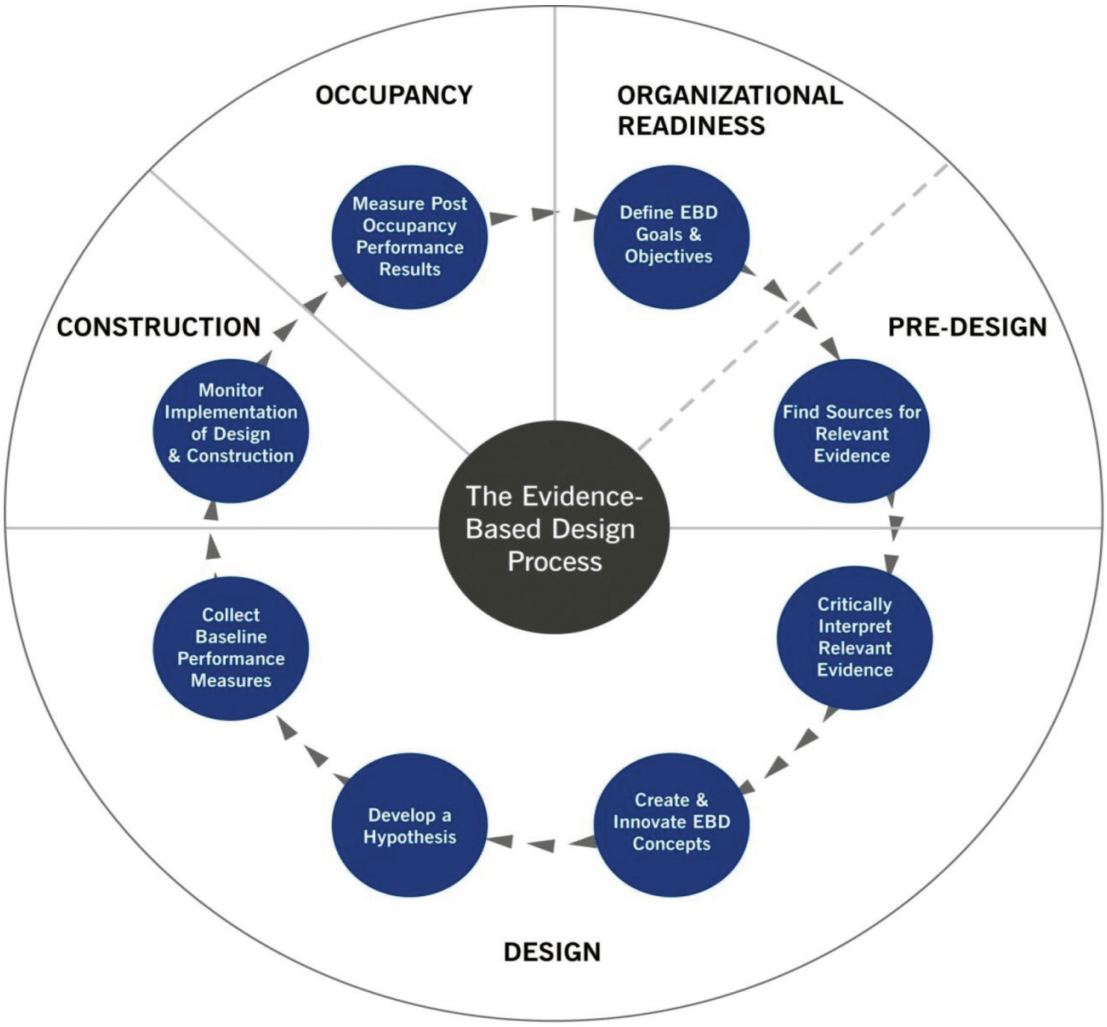


Figure 2.8. Evidence-Based Design Process (Retrieved 3-23-11 from http://www.healthdesign.org/clinic-design/design-process, January, 2011)

The Center for Healthcare Design wrote, "Evidence-Based Design (EBD) is a cyclical process that identifies available evidence, analyzes the evidence, develops design innovations, conducts research, and disseminates information for the next team to build upon. The eight key steps

in the EBD process are meant to run in conjunction with the traditional design process" (Retrieved 3-23-11 from http://www.healthdesign.org/clinic-design/design-process).

Theory and research work together in Evidence-Based Design to make the healing garden successful. Ulrich discussed the advantages and costs of Evidence-Based Supportive Design in his article "Effects of Healthcare Environmental Design on Medical Outcomes" (2000). Ulrich suggested that these advantages could be achieved by including supportive design criteria in the objectives of a new facility. They are summarized in the following table (paraphrased, using Ulrich's article, 2000).

Table 2.6 Advantages of Evidence-Based Supportive Design (Ulrich)

ADVANTAGE	**LIKELIHOOD OF ACHIEVING, GIVEN CURRENT RESEARCH**
Reduced stress/anxiety for patients and family	Very High
Reduced Pain	Moderately High for some Patient Categories
Improved Sleep Quality	High
Lower Infection Occurrence	Moderately High, especially for intensive or critical care.
Improved Patient Satisfaction	Very High
Benefits for Employees (reduced workplace stress, increased satisfaction, less turnover)	High that at least some will be attained.
Cost Savings (by improving medical outcomes)	Moderate to Moderately High, given extent hospital is well-designed throughout.

Use of Research and Theory in Researcher's Designs

Research has shown that a well-designed garden can have a positive impact on the healing process. The design theorists provide a very useful checklist of concepts for the designer to consider in planning a garden responsive to the needs of different patients types. The Kaplans' Environmental Preference Theory provides a structural format for thinking about how to incorporate elements that address coherence, legibility, mystery, and complexity (Table 2.3). Ulrich's Supportive Design Theory reminds the planner to utilize elements that address movement and exercise, social support, sense of control, and natural distractions. Kellert and Wilson's nine-value "Biophilia Hypothesis" provides more abstract reminders about how to connect the human and natural worlds (Table 2.4).

CHAPTER THREE

METHODOLOGY

The investigator's ultimate objective was to develop prototypical healing gardens for each of three types of patients – dementia, catastrophic and psychiatric – and to do so within the footprint of a model garden, based on a dementia facility in Athens, Georgia. The investigator desired to use the theories and structures analyzed in the preceding chapter to guide the project. The investigator particularly wanted to obtain information useful in answering the three questions posed at the outset of this thesis: which healing gardens features are the most therapeutic; in what ways are they therapeutic; and which features best serve each of the three patient populations.

The investigator chose to design healing gardens for these three patient types because three health care facilities in the Atlanta, Georgia, area, each with a well-known healing garden and a well-respected garden director, were accessible. The facilities were: Wesley Woods, primarily a geriatric services facility; Shepherd Center, a catastrophic services hospital; and Skyland Trail, psychiatric treatment center. Each is described in detail in Chapter Four. The fact that much prior research has focused on these three patient populations also influenced the selection of the types of gardens to design.

The investigator selected three well known research techniques: direct observation, focused interviews with patients, and unstructured interviews with the garden's program directors for each of the facilities. This Chapter describes these techniques in greater detail.

Chapter Five describes the results of the research conducted with these techniques, and the conclusions the investigator drew from those results.

The researcher obtained approval for the research project through The University of Georgia's Institutional Review Board (IRB). As required, the researcher completed online training and obtained specific Board approval, including a blank consent form to be signed by patients (Appendix A) and an 18-item questionnaire used to interview patients at the three facilities (Appendix B). The researcher also submitted to the IRB letters of consent forms each for the three facilities, authorizing the researcher to conduct on-site interviews and observation. Appendix C shows the consent letter from Skyland Trail. The researcher does not provide consent letters for Shepherd Center and Wesley Woods because the IRB approved the project on the basis of the Skyland Trail consent letter alone.

The research methods the investigator chose also were selected in part because of budget constraints and the time allotted for the project. Budget and time restraints often limit research. (Retrieved 4/28/11 from http://www.fws.gov/windenergy/docs/Research_Considerations.pdf.) The researcher's methods are, however, among frequently utilized methods for collecting data relating to gardens, and are used in conducting post occupancy evaluations of gardens (Cooper Marcus and Barnes, 1999).

DIRECT OBSERVATION

Observation is a method employed across a broad spectrum of disciplines. There are many types of observation that may take place during a project. As John Zeisel (1981) writes, "Observing behavior in physical settings generates data about people's activities and the relationships needed to sustain them; about the regularities of behavior; about expected uses, new uses, and misuses of a place; and about behavioral opportunities and constraints that

environments provide" (p. 111). Something that Zeisel points out that is an advantage of observation is that the investigator does not have to be an expert to undertake observation and thereby gather reliable and valid data.

Direct observation is a specific type of observation. In a paper presented online, (Retrieved from http://www.scribd.com/doc/54056537/5/Living-Environments-Next-Steps), Schwarz and Vernon (2011) write, "Through direct observation, researchers can determine how residents use the spaces they live in and the extent to which their environment enables them to engage with the community around them. Interview questions can address public spaces, private units, and services" (p. 33). The scientific community accepts direct observation as a sound method for collecting data. Zeisel says that direct observations are particularly important and useful to environment-behavior researchers, including landscape architects (1981, p. 137). Direct observation becomes an important technique where, as here, the researcher has limited time or finances (information retrieved from http://www.staff.city.ac.uk/j.s.labonte/pdf/fieldandobservationresearch.pdf on 2/11). One advantage of direct observation is that it can be performed quickly.

The utility of direct observation is sometimes limited by what is known as "Hawthorne Effect," a distortion in the information-gathering process caused by the fact that the persons being observed know that they are being observed (Zeisel, 1981, p. 117). Zeisel (1981) says that, "You can try to minimize the Hawthorne effect by spending enough time at your research site that people there get used to you and take you more for granted. Observers can develop tasks for themselves to do while observing so that people begin to see them as other people with something to do" (p. 117).

For this thesis, the researcher used direct observation as the first step in collecting information. The observer tried to be as discreet as possible to decrease bias. The researcher sat alone while engaging in direct observation. At Wesley Woods, the investigator observed the dementia garden through windows overlooking the garden, a vantage point from which he could not be seen, for half an hour. In the second courtyard garden, a psychiatric garden retrofitted for dementia patients, the researcher sat with the garden director in wheelchairs at a planting trough for ten minutes. Then, the two sat on the ledge of a goldfish pond for fifteen minutes and in two chairs next to the raised planting bed for fifteen minutes. In the exterior garden, the researcher sat on each of three benches for a total of an hour and a half.

At Shepherd Center, the researcher toured the garden twice, each time for an hour with the garden director during a class visit. At Skyland Trail, the researcher spent two full days sitting alone on each of the several benches in the garden (except on a few occasions in which he was joined by the garden director Libba Shortridge).

Direct observation proved to be a highly useful and sometimes indispensable tool here. At Wesley Woods, for example, the garden director warned that patient interview processes might not be successful. He indicated that many patients at that facility were not capable of engaging in long conversations, and might not be willing to engage in conversation at all (personal communication, K. Hines, May, 2009). He therefore took the time to walk the investigator through the hospital gardens, and to take him to observation points at windows overlooking the gardens. The researcher thus was able to observe real patients, in real healing gardens, and to pick up on non-verbal cues and other things that would have been impossible to detect without physically being there. Direct observation also allowed the researcher to see patients' actions and interpret the information without having to rely on others' data.

FOCUSED INTERVIEWS

In John Zeisel's book *Inquiry by Design* (1981), he dedicates a chapter to focused interviews. In focused interviews, the researcher asks a participant open-ended questions in order to elicit a truthful and insightful response. Zeisel says, "Such questions are fringe forms of a research tool of potentially much more penetrating power. You can use a focused interview with individuals or groups to find out in depth how people define a concrete situation, what they consider important about it, what effects they intended to have in the situation, and how they feel about it" (p. 137). The researcher designed a questionnaire (described below), used the questionnaire to ask questions of the garden users, simultaneously engaged them in conversation about the garden, and wrote answers to the specific questions, as well as other information that they provided.

When a researcher makes out a questionnaire for focused interviews, he or she thinks about the questions so that they may bring forth as much information as possible. Thus, in a focused interview, the researcher probes and tries to discover if the participant's responses are different from the hypothesized ones. If the researcher can do this, then he or she can redefine and readjust the guide, or questionnaire (p. 138). It should be noted that the act of creating a questionnaire is not as easy as it appears. In John Zeisel's book, the entire chapter ten is dedicated to the process of writing a good questionnaire, one that will increase reliability and validity (p. 157).

During the process of a focused interview, the interviewer used items known as "probes". Zeisel (1981), writes, "Probes are primarily questions that interviewers interpose to get a respondent to clarify a point, to explain further what she meant, to continue talking, or to shift the topic (p.140). There are many different types of probes which John Zeisel discusses in his

book *Inquiry by Design* (1981). Zeisel adds, "To avoid misunderstandings, one should know that for surveys in which questions are posed with prescribed rigidity, a 'good interviewer' is one who adheres to the text and never develops initiative of his own. In a focused interview, the opposite is true" (p. 138). The fact that the researcher/observer has the freedom to speak freely with the patients is an advantage. Being able to openly talk to the patient allows the researcher to pull more data and information that will be valuable to the results and discussion chapter. The researcher used focused interviews here to research garden design.

Such interviews offered more opportunity, by normal conversation, to obtain complete information than did simple "yes/no" questionnaires. The investigator requested that facility directors advise patients that someone would be in the garden asking questions about the therapeutic aspects of the garden, and that they were free to participate or not as they saw fit, and had each facility director explain to staff and patients, during a lunch hour announcement, that the researcher would be there for the day to ask simple questions about people's likes and dislikes about the garden. About half of the patients signed up in advance for interviews at specific times; the other interviews occurred as patients were encountered.

The questionnaire the investigator designed (Appendix B) consisted of eighteen questions, twelve of which directly related to one of Roger Ulrich's four stress relieving measures: movement and exercise, social support, sense of control, and natural distractions. There were three questions for each of Roger Ulrich's stress coping mechanisms, plus a fourth that essentially repeated one of the other questions. The final two questions record the patient's age and gender, data which the researcher ultimately did not use.

The researcher had each patient sign a consent form (Appendix A), which the researcher also signed, before the interview process began. The researcher asked the questions from

Appendix B, and took the time to record the patients' answers, thus giving the patients more time to think and talk about their answers. In retrospect, it would have been useful to have used a voice recorder, so that the researcher would have had a more complete record, and the ability to have his hands, eyes, and ears available to communicate with the patient. The interviewer engaged the patients in open-ended conversation after they answered the questions in the questionnaire.

UNSTRUCTURED INTERVIEWS WITH PROGRAM DIRECTORS

Discussions with the garden directors at Wesley Woods and Skyland Trail, each of whom had been at their facilities for over a decade, yielded much valuable information. At Wesley Woods, the investigator and Kirk Hines spent two hours in discussion in his office. The investigator used the questionnaire (Appendix B) to elicit his views on how patients used the Wesley Woods gardens, and focused specifically on how the patients (and staff) used the gardens, and what they found to be the most popular features. The investigator also discussed the features of the gardens that made them easier to use and that provided necessary shade, safety and security – things on which the patients would not necessarily focus. The interview with Libba Shortridge at Skyland Trail lasted an hour. The investigator also used the questionnaire (Appendix B) to guide the discussion with her, and covered essentially the same ground as he had with Hines at Wesley Woods. Personal issues prevented Debi Cziok, the garden director at Shepherd Center, from giving the investigator individual access to the Shepherd Center garden. The investigator twice had toured the Shepherd Center garden, however, with Debi Cziok during Professor Marguerite Koepke's Fall Healing Gardens classes. The investigator also had a follow-up phone conversation with Debi Cziok which lasted about 45 minutes.

CHAPTER FOUR

CASE STUDY SITES

This chapter describes the facilities at which the investigator conducted his research. It identifies the kinds of services provided at each facility, and sets forth the general layout of the garden spaces at each case study site.

The researcher gathered information at each of three nationally renowned healthcare facilities on how different patient populations used the gardens at each facility. All three facilities were located in Atlanta, Georgia. They each have in-house therapists, who are in charge of the garden at his or her facility, and have responsibility for the horticulture program at the facility. Cooper Marcus and Barnes (1999, p. 14) explain how relatively few healing gardens in healthcare facilities there are that are geared toward patients. The two wrote, "Sadly...[patient-oriented healing gardens] are the exceptions in the healthcare field. Pressure from insurance companies to minimize hospital stays have largely worked against the provision of actual useable gardens in new or refurbished medical complexes" (p. 14).

The following table summarizes the three facilities the researcher chose, and the types of patient population each housed:

Table 4.1. Three Case Study Sites and their Patient Population's Disease

FACILITY	**DISEASE**
Wesley Woods	Dementia (*e.g.,* Alzheimer's disease)
Shepherd Center	Catastrophic (*e.g.,* Spinal Cord Injury)
Skyland Trail	Psychiatric (*e.g.,* Depression/Bipolarism)

CASE STUDY ONE: DEMENTIA HEALING GARDENS AT WESLEY WOODS

Wesley Woods Center of Emory University, affiliated with Emory University's Robert W. Woodruff Health Sciences Center, is a free-standing geriatric hospital. In addition to housing patients, it conducts research into geriatric issues, and participates in interdisciplinary training programs. The facility has several different components, each specializing in the care of elderly patients facing different kinds of age-related health care issues: a geriatric care hospital, an independent living facility for seniors, an outpatient center, and a long-term nursing care facility (Retrieved 3/09 from: www.wesleywoodsinc.org; www.emoryhealthcare.org).

"The 64-acre campus at Wesley Woods sits on wooded land, with lakes and a river" (Retrieved 3/09 from: www.wesleywoodsinc.org). Figure 4.1 is a picture of Wesley Woods taken from Google Earth. The facility's major garden areas are labeled.

Figure 4.1. Satellite Image of Wesley Woods Dementia Facility (Retrieved 3-25-11 from www.googleearth.com)

There are two courtyard gardens that are entirely surrounded by walls of buildings that house patients. One is a courtyard garden originally designed for use by dementia patients, and

recently redesigned by Angela Pappas (2006). The second courtyard garden originally was designed for use by psychiatric patients and has been retrofitted to suit dementia patients as well. There is also an exterior garden with a greenhouse.

The first courtyard serves a patient population with a diagnosis mainly of dementia with agitation. The National Institute of Neurological Disorders and Stroke defines dementia as:

> ... a word for a group of symptoms caused by disorders that affect the brain. It is not a specific disease. People with dementia may not be able to think well enough to do normal activities, such as getting dressed or eating. They may lose their ability to solve problems or control their emotions. Their personalities may change. They may become agitated or see things that are not there (Retrieved on 3/10 from: www.ninds.nih.gov).

When a person has dementia it means that they are exhibiting clinical symptoms associated with memory loss.

The dementia garden courtyard recently has been reconstructed. Angela Pappas designed the new courtyard garden as part of her Master of Landscape Architecture thesis, entitled *Exploring Therapeutic Restoration Theories of Nature and Their Application of Design Recommendations for an Alzheimer's Garden at Wesley Woods Hospita*l (2006).

This first courtyard garden occupies a 50’ by 50’ area, as shown in Pappas’ design (Figure 4.2).

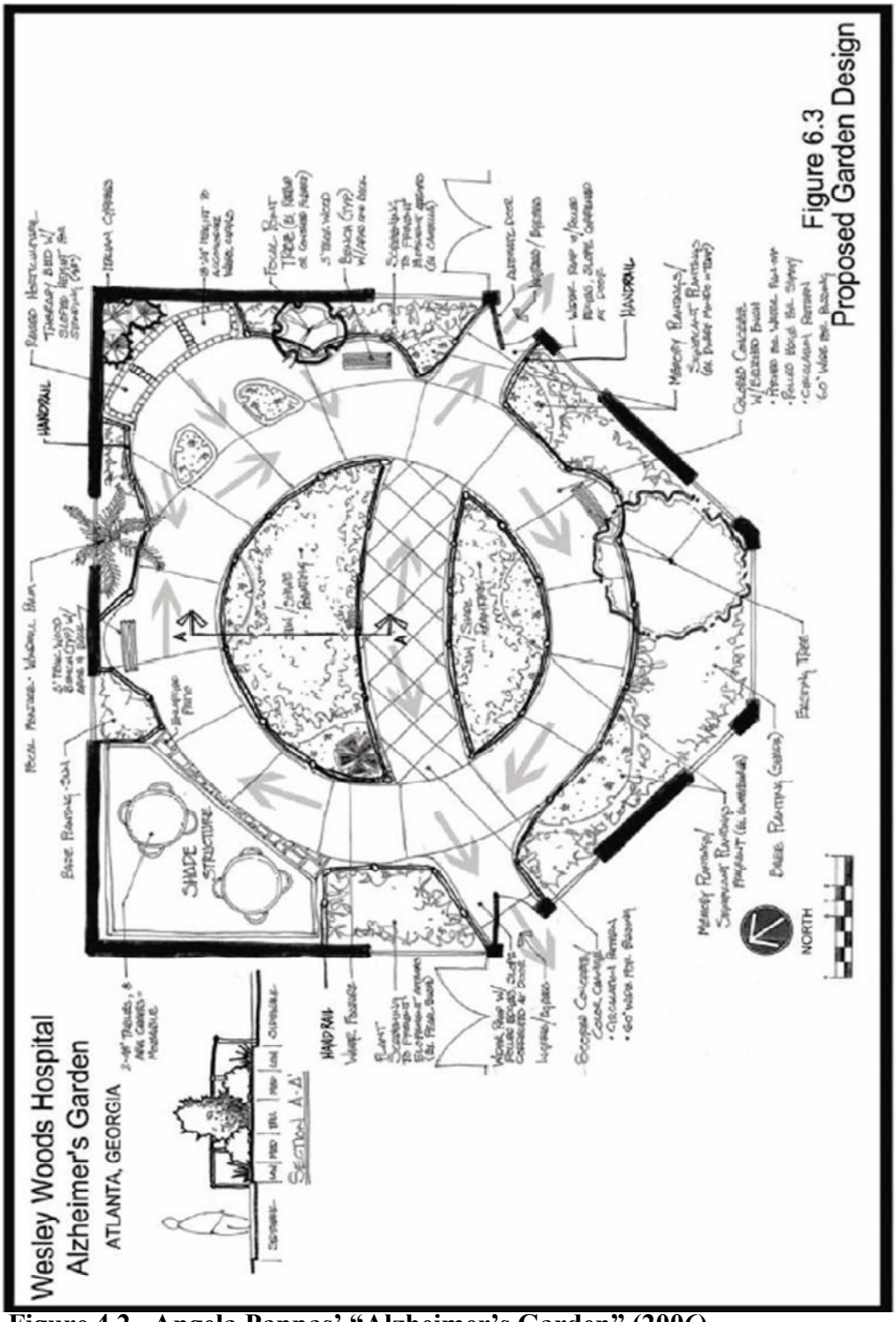


Figure 4.2. Angela Pappas’ “Alzheimer’s Garden” (2006)

A pathway runs through the central planting, with railings that afford patients a safe means for maintaining their balance. There is a single large maple in the center of the courtyard. A pergola with an evergreen vine covering it provides excellent shade and shelter in one corner of the garden. A second pergola shades a space with a bench and a space for patients to park their wheelchairs.

The psychiatric courtyard also contains a water feature located in a raised stone pond along one side of the garden (Figure 4.3). It contains a small bald cypress, several goldfish, and a bubbling fountain feature. Rocks surrounding the feature for drainage and aesthetics are securely attached to the ground.

Figure 4.3. Wesley Woods Psychiatric Garden Water Feature (Photo by author)

The second courtyard garden serves psychiatric patients who have been diagnosed mainly with severe depression, but, as noted, has been retrofitted to serve dementia patients as well. The psychiatric unit has a door that opens into the garden, and the patients are allowed access to the

garden only when accompanied by family, doctors, or other staff. Most of these patients require accompaniment by staff at all times.

The garden is a square space, with an L-shaped planter in the middle containing four large crepe myrtle trees that survive well in a raised planter (Figure 4.4). Their trunks are not suitable for climbing.

Figure 4.4. Crepe Myrtles, Wesley Woods Psychiatric Garden (Photo by author)

The garden also has raised planters where patients plant their favorite types of flowers or vegetables (Figure 4.5). One raised bed allows patients to access it by rolling their wheelchairs under it, and to use the planter as they would a table (Figure 4.6).

Figure 4.5. Psychiatric Garden Raised Vegetable Planter (Photo by author)

Figure 4.6. Wheelchair Accessible Planter (Photo by author)

There is a large drain in the middle of the garden to accommodate the water runoff, with three large planters placed on or at the edges of the grate (Figure 4.7).

Figure 4.7. Planters covering grate (Photo by author)

As patients exit the inner courtyard gardens, they enter a large outdoor garden area, with several niches. There is also a greenhouse (Figure 4.8) in which patients can work with plants in an indoor setting, regardless of outdoor weather conditions. In the greenhouse, a small entrance room houses a bird cage. Patients enjoy feeding the birds, as well as watching and chatting with them.

Figure 4.8. Wesley Woods Outdoor Garden (Photo by author)

A path winds through the woods, and is bounded by the greenhouse to one side and a railing and shrubbery to another (Figure 4.9). In the outdoor garden area there are several niches that provide patients with places to spend time either reflecting, or sitting with family and friends. The gardens soften the glare of the bright white paint of the surrounding buildings. The plantings in the garden attract birds, bees, and butterflies.

Figure 4.9. Path with Boundaries: A Greenhouse, Railing, and Shrubs (Photo by Author)

The three spaces at Welsey Woods can also be multi-functional. Dementia patients use all three garden spaces (though the most severely challenged mainly use the Alzheimer's courtyard that Pappas (2006) designed). The psychiatric garden was retrofitted to be suitable for not only psychiatric patients, but also patients with dementia.

The gardens at Welsey Woods demonstrate design for the lowest functioning patient. The gardens tend to be simple rather than complex, promoting a sense of place. They show the importance to elderly patients of water features (tranquil sound and scenery, opportunity for tactile contact, attenuation of extraneous noise, and the opportunity for viewing goldfish). They also reveal the importance of making gardens safe for the particular patient demographic that uses the garden (secured rocks, railings, extra height for garden structures, reduced risks associated with water features, non-poisonous plants, smooth paving surfaces, secure enclosure, and limbs pruned high to prevent climbing). Aesthetics also play an important role (variety of visual stimulation, reduction of extraneous glare, landmarks, and natural distractions). Features that provide opportunity for social support are key (seating niches and alcoves, benches beneath trees, and places to work with plants).

CASE STUDY TWO: CATASTROPHIC HEALING GARDEN AT SHEPHERD CENTER

The Shepherd Center is a catastrophic care facility located in the midtown area of Atlanta, Georgia. Shepherd Center is one of the top rehabilitation hospitals in the nation, specializing in treatment, research, and rehabilitation for patients with spinal cord injury and brain injuries. These types of injuries make it difficult for patients to move around and get exercise.

The garden is located in front of the hospital along Peachtree Road, a major thoroughfare. A Google Earth image of Shepherd Center, (Figure 4.10) shows the tree canopy and the siting of the garden and the hospital relative to Peachtree Road.

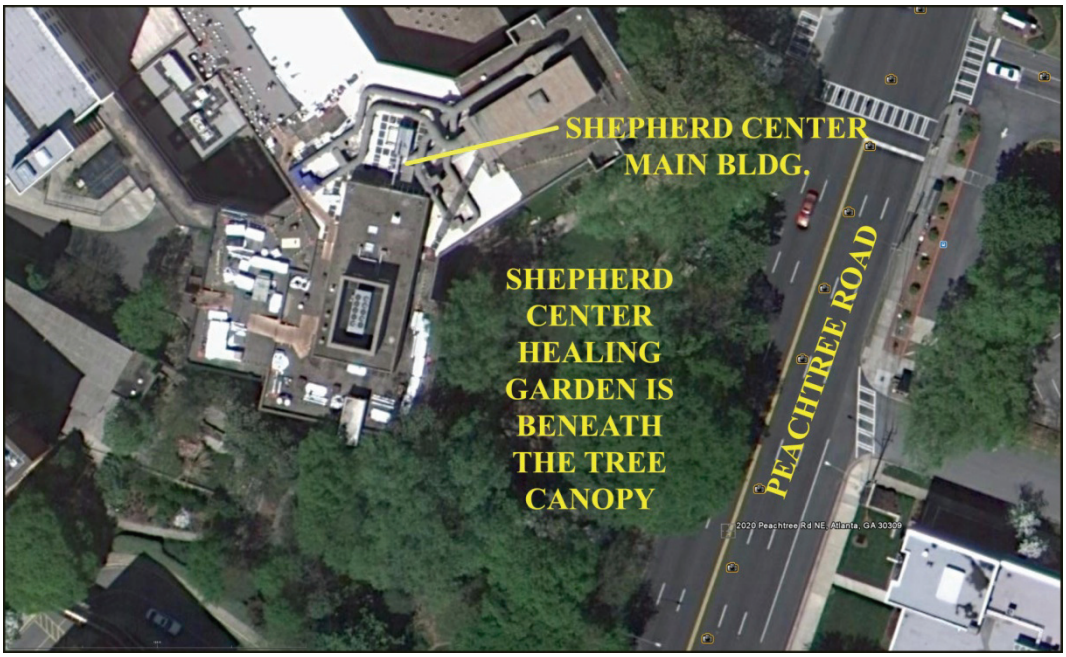


Figure 4.10. The Shepherd Center, Atlanta, GA (Retrieved 3-25-11 from googleearth.com)

A canopy of very old oak trees shades the garden. An attenuation screen of azalea and native trees separates the garden area from the road. A circular track offering ample space for wheelchair movement surrounds a large lawn area. There are several niches along the path. A large fountain sits in a niche on the southwest side of the garden. Another corner of the garden includes raised planting beds that make it easier for patients to access plantings. The plants in the garden attract birds, bees, and butterflies. Vertical vegetation in the form of trellises and hanging baskets make it easier for patients to reach and work with plants.

The garden at Shepherd Center shows the particular importance of accessibility and opportunity for movement and exercise. It demonstrates how to make a space functional for wheelchair bound patients (smooth paving, lower sightlines, large turning radii, wide pathways, raised beds and roll under planters). It reveals how the garden can offer opportunity for exercise (circular track). It also shows how a garden should be designed to distract patients from their physical problems (fountains offering sound and sight, plants attracting birds, bees, and

butterflies, and vertical vegetation). The garden also reveals how best to offer opportunity for socialization (ample seating at the height of wheelchairs, and opportunity to work with others in planting areas).

CASE STUDY THREE: PSYCHIATRIC HEALING GARDEN AT SKYLAND TRAIL

Skyland Trail was founded to provide a long-term care facility for people with many different psychological and socialization issues. One of its facilities includes a healing garden to which patients that Skyland Trail houses elsewhere travel by bus. Skyland Trail has off campus housing for its patients. The facility with the garden is located just north of downtown Atlanta, Georgia. It is a special place, manned by gifted and sincere staff.

Patients at Skyland Trail transition from more intensive to less intensive levels of care as they progress in their recovery. According to Skyland Trail's admission information, "Skyland Trail's philosophy of care focuses on client-centered recovery and wellness. Ultimate treatment goals include: improved overall functioning, acquisition of new skills, enhanced socialization, capabilities, and community reintegration" (Skyland Trail: Offering Hope, Changing Lives, 2011, p.3). The length of stay at Skyland Trail varies with each patient and program. The staff conducts client reviews on a regular basis to determine the appropriate level of care for each patient.

Patients complete a schedule each day that consists of such things as art therapy, adjunctive therapy, life skills training, nature therapy and expressive therapy. Clients have the option of working in the garden or the greenhouse. The greenhouse offers a site for classes that the facility holds. The activities include: working with plants both in pots and in the ground; working on several different types of craft projects; and building garden features such as ponds.

Skyland Trail's brochures discuss how its client-centric clinical approach begins by identifying personal recovery goals (Skyland Trail: Offering Hope, Changing Lives, 2011, p.7). Employees work closely with each individual patient to develop an individualized recovery plan that includes medication, therapy, personal health, nutrition, socialization, readiness for employment, spirituality, leisure activities, and cultivation of healthy relationship with family and friends (Retrieved on 6/09 from: www.skylandtrail.org). The Skyland Trail model views recovery as a continuum and anticipates that episodes of regression may occur. The staff works closely with patients throughout their recovery, teaching different levels of coping with challenges.

Skyland Trail has about a .7 acre piece of land that is connected to the built facility. This land, or garden, consists of trails that wind through trees and planted flower beds that attract birds, bees, and butterflies. The garden includes a tall, two-tiered fountain surrounded by flowers. Patients participate in many different projects in the greenhouse, and there are several sculptures that were created by the clients. The facility also has a courtyard space where the patients may eat, visit, read, or socialize. A bog garden with rare and interesting plants restricts access to and from a nearby busy road.

The garden at Skyland Trail includes features that make way-finding easy, such as landmarks, uncomplicated paths, open layout, and clearly marked destinations. The greenhouse, the craft-making, and gardening opportunities discussed above encourage socialization. The water features, the plants that attract birds, bees, and butterflies, the bog garden, and the sculptures all provide distractions for the patients.

CHAPTER FIVE

RESULTS AND DISCUSSION

This chapter describes the results of the direct observations, the unfocused interviews with patients and the unstructured interviews with the garden directors for each of the case study sites. It also includes summary tables showing the key features and functions of the gardens at each of the three case study sites, and how the key features reflect the factors that Ulrich used to address the characteristics of healing gardens and that the Kaplans used more generally to address the appeal of landscapes, as described in Chapter Two.

WESLEY WOODS

Direct Observation

All three gardens – the dementia garden and psychiatric courtyard gardens, and the exterior garden with the greenhouse -- provided convenient places for patients (and family and staff) simply to relax. Spaces were available in which patients could socialize, but there were also niches in which patients could be alone with their thoughts. The gardens softened the glare from the bright white walls of the surrounding buildings, making the setting seem less hospital-like. The Japanese maple in the dementia garden provided changing seasonal interest. The pleasant scents of plant materials added to the sense of relaxation in all three gardens.

The water feature on the side of the psychiatric garden had a Bald Cypress tree growing in the middle of it, had water hyacinths and contained goldfish. The bubbling water fountain in the dementia garden served to mask extraneous noises, and helped provide a soothing environment.

About three-fourths of the patients went immediately to the water features upon entering either courtyard garden and almost all stopped there at some point during their visit.

All three gardens had superior shade features, mostly provided by shade trees. The Japanese maple in the dementia garden provided shade under and around it. The pergola there with a vine covering it offered protection in one corner of the garden, and a second pergola, also there, sheltered a bench and a space convenient for wheelchair patients. Three Crepe Myrtles in a raised planter offered shade for the entire psychiatric garden. A Wisteria covered pergola provided shade in the exterior garden.

The paths of all three gardens were paved. Most of the paving was dyed concrete in order to provide a smooth surface and dim the brightness of white concrete. Along the edges of the gardens were bands where different materials were used, such as a line of bricks in a pattern. The main issue with paving was that it provided a safe surface for the patient population. The amount of money that the projects were given were also reflected in the paving.

Safety features were apparent: Stones were fixed so that patients could not use them in a dangerous way. Railings in the dementia garden were placed so as to give patients a means of maintaining their balance. Pergolas were constructed to heights that prevented patients from reaching the top of the structure. The limbs of trees were pruned so that they were out of reach. None of the plant material in the garden was poisonous or otherwise capable of causing physical harm. Three large pots were placed over a drainage grate in the psychiatric garden, so that patients would not trip or get their wheelchairs caught in the grate.

The bubbling water feature in the dementia garden offered pleasing and calming auditory stimulation. Patients in the psychiatric garden particularly enjoyed watching the goldfish in the water feature. The patients also liked to place their hands in the water.

The plantings in all three gardens attracted birds, bees, and butterflies, and offered year round seasonal interest. The wildlife appeared to provide patients with a positive distraction from the routine that they experience within the hospital.

The opportunity that patients had to work with plants in the psychiatric garden and in the greenhouse appeared to provide a satisfying distraction, and an opportunity to have a degree of control over their environment. The greenhouse also housed a birdcage in a small entrance room. Patients enjoy feeding the birds, as well as watching and chatting with them.

The courtyard gardens were enclosed spaces, with secure entry and exit points. Walls and hedges, railings and the side of the greenhouse bounded the exterior garden, preventing outsiders from intruding and patients from wandering away.

Focused Interviews

The responses that patients in the dementia garden provided do not necessarily demonstrate what garden features are, in fact, most appropriate because, by definition, their dementia limits their ability to assess their own needs and desires, and to communicate that information accurately. Nonetheless, what they have to say about features that appeal to them is instructive.

The patients at Wesley Woods responded to the questionnaires as follows:

Table 5.1. Patient Answers to Questionnaire at Wesley Woods

QUESTION	WESLEY WOODS (7) (dementia)
MOVEMENT AND EXERCISE	
1. How does the garden allow you to socialize?	By being with other patients (3) By being with staff (1) Visiting with family (3)
2. Where is the best place to visit in the garden?	Benches (6) Greenhouse (1)
3. Do you prefer to go to the garden alone or with friends?	Alone (0) With friends (7)

SOCIAL SUPPORT	
4. How does the garden allow you to socialize?	By being with other patients (3) By being with staff (1) Visiting with family (3)
5. Where is the best place to visit in the garden?	Benches (6) Greenhouse (1)
6. Do you prefer to go to the garden alone or with friends?	Alone (0) With friends (7)
SENSE OF CONTROL	
7. Do you like working with plants?	Yes (7) No (0)
8. Do you prefer plants in pots or in the ground?	Ground (4) Pots (3)
9. Do you like to take plants home or back to your room?	Yes (3) No (4)
NATURAL DISTRACTION	
10. What in the garden takes your mind off things?	Water (5) Birds and butterflies (2)
11. Do you prefer man-made or natural features?	Natural (5) Man-made (2)
12. What is your main purpose of going to the garden?	Visit (5) Get out of the hospital (2)

The responses to the questionnaire thus show what was and was not important to patients with the challenges that Wesley Woods users faced, at least in the view of those patients. These are the responses given by the Wesley Wood's patients with the least important at the top and the most important at the bottom:

- The opportunity for exercise was relatively unimportant;
- Natural elements were more appealing than man-made elements;
- Spending time with others was very important;
- The opportunity to work with plants was very important;
- The soothing distraction provided by water features was extremely important.

The researcher's informal conversations with patients at Wesley Woods confirmed most of what their formal questionnaire answers revealed. Wesley Woods' patients noted informally that their favorite things about the gardens included (Least important is at the top and the most important is at the bottom):

- Looking at plants in the gardens;
- Touching plant material with their hands;
- Putting their hands in the water features;
- Being able to sit and talk with others;
- Enjoying the scents of the gardens;
- Experiencing the sense of accomplishment that came when a plant grew or became healthier as a result of their care.

Unstructured Interview with Program Director

Kirk Hines, one of the first Horticultural Therapists in the nation, is the garden director at Wesley Woods, a position he has held for well over a decade. He offered the following observations with respect to the features and characteristics of the gardens he oversaw (K. Hines, personal communication, May, 2009).

The three spaces at Wesley Woods are multi-functional. Dementia patients use all three garden spaces (though the most severely challenged mainly use Alzheimer's courtyard that Pappas designed). The psychiatric garden was retrofitted to reach not only psychiatric patients, but also patients with dementia. One thing that Hines emphasized with respect to all garden areas was that each had to be designed for the lowest functioning user of the space.

Psychiatric patients receive some of the best therapy in the garden by simply sitting quietly alone. Therefore, it is important to provide niches and alcoves for patients to have access to

privacy. He also noted that staff members also take advantage of these niches, seeking respite from the stress and pressure of their own jobs. Moveable seats can make use of the gardens more flexible. Hines cautions, however, that chairs and other seating may need to be fastened to the ground for safety reasons, particularly in dementia and psychiatric gardens, where users may lash out by throwing furniture. Additionally, wheelchair patients may require special accommodation, giving them opportunity to participate in conversations with others.

Horticultural therapy, provided in the healing garden, can also offer an opportunity for social support. Patients become acquainted and develop mutually supportive relationships in planting and growing things together.

The water features in the gardens not only provide soothing and masking sound, but also give patients an opportunity to do two other things they enjoy: watching fish, and placing their hands into the water.

Pleasant scents help convey a sense of relaxation and comfort to patients, who may be confined inside of hospital walls when not in the garden. Plants such as lavender and lemon verbena are an effective source of aromatherapy. Hines intends to turn a Cypress tree into a bonsai form, something that will provide enjoyment and teach patience.

Providing adequate shade is particularly important because dementia patients are usually at an age where the sun can easily burn them. According to garden director, Kirk Hines, the psychotropic drugs that Wesley Woods patients take also make their skin more sensitive (personal communication with Kirk Hines, July 2009).

Safety is critically important. Steps should be taken to minimize the risk of falls or other accidents: the garden should have sufficient handrails for support; metal grates should be covered; stones in planting beds should be fastened securely so that patients cannot move or throw them.

Hines was considering adding metal grates just below the surface of water features to prevent patients from immersing themselves in the water. Secure physical boundaries should be established to prevent patients from wandering outside protected areas.

SHEPHERD CENTER

Direct Observation

Personal issues prevented Debi Cziok from allowing the researcher to observe the garden with her. The researcher had the opportunity, however, to visit the garden on two prior occasions, as part of class field trips led by Professor Marguerite Koepke in Fall of 2008 and 2009.

The circular path around the garden afforded patients an adequate (and continuous) opportunity to obtain exercise in their wheelchairs or with walkers. The smooth paving of the path facilitated use by physically disabled patients. The main and access paths included at least a five-foot turn radius, so that patients could comfortably maneuver their wheelchairs to access as many features of the garden as possible. Paving patterns provided visual clues for way-finding, and ran along raised beds so that patients could have access to plants. The ratio of hardscape to planting in the Shepherd Center garden was higher than in other types of gardens, to take into account for the need for wheelchair accessibility. There were no spaces in the garden specifically structured to provide patients with the opportunity to be alone. Nevertheless, patients could find private spaces if there were not many users in the gardens.

When they chose to stop, patients were drawn to both active and passive areas of the garden. The active area of the garden gave patients the chance to work with plants, in places where they could easily roll up next to (or stand over) raised planting beds (Figure 5.1).

Figure 5.1. Patient in Wheelchair by Raised Bed (Photo by Marguerite Koepke)

As shown in Figure 5.2, patients used adaptive tools that Cziok had designed. Small hand shovels, trowels and garden pruners could be attached to patients' wrists, for example, so that patients were less likely to drop or lose them. She also designed the tools so as to require less force to operate.

Figure 5.2. Debi Cziok shows how to use adaptive garden tools (Photo by Marguerite Koepke)

The passive areas of the garden included a three-tiered stone fountain with water spilling from each of the upper levels. The water feature lent a sense of privacy to the garden, and also helped mask the sounds from nearby Peachtree Road. During a class field trip to Shepherd Center, the researcher noted that the fountain attracted not only the patients, but the students themselves. The passive areas also included niches in which seating was designed to facilitate communication among patients, visitors and staff.

The seating near the water feature and in the other areas where patients could stop to talk with visitors and staff was arranged to make it easy for patients to maneuver around, or to transfer from wheelchairs to, the seating. The extensive tree canopy and arbors provided more than ample shade.

Focused Interviews

The researcher was able to obtain questionnaire responses only from two users who were in the garden at the time of his visit. The very small sample size means that their responses do not necessarily represent what the responses from a larger sample would have been. The responses to the questionnaire at least provide insight into how the garden appealed to at least the two users. Their responses to the questionnaire were as follows:

Table 5.2. Patient Answers to Questionnaire at Shepherd Center

QUESTION	Shepherd Center (2) (Catastrophic)
MOVEMENT AND EXERCISE	
1. Do you use the garden for exercise? How?	Yes, "wheeling around" (1) Yes, gardening (1)
2. What is the best exercise in the garden?	"Wheeling around" (2)

QUESTION	Shepherd Center (2) (Catastrophic)
MOVEMENT AND EXERCISE	
3. Do you like to exercise alone or with others?	Alone (1) With other (1)
SOCIAL SUPPORT	
4. How does the garden allow you to socialize?	By working in the raised beds with other patients (2)
5. Where is the best place to visit in the garden?	Fountain Area (2)
6. Do you prefer to go to the garden alone or with friends?	Alone (0) With other (2)
SENSE OF CONTROL	
7. Do you like working with plants?	Yes (2) No (0)
8. Do you prefer plants in pots or in the ground?	Ground (1) Pots (1)
9. Do you like to take plants home or back to your room?	Yes (0) No (2)
NATURAL DISTRACTION	
10. What in the garden takes your mind off things?	Plants (2)
11. Do you prefer man-made or natural features?	Natural (0) Man made (2)
12. Main purpose of going to the garden?	Work with plants (2)

The responses to the questionnaire thus show that the features most important to the design of a garden for physically challenged patients, at least in the view of these two patients are:

- The opportunity to get exercise, either by wheeling around or working in the garden;
- The chance to be with others, including friends;
- The ability to have a peaceful and relaxing place to rest (at the fountain); and

- The ability to work with plants.

The researcher's informal conversations with patients at Shepherd Center also showed that they liked being in the garden space because:

- The garden space made them feel as if they are away from the hospital;
- They looked forward to being outside and rolling around;
- They felt like they were not in a hospital while outside.

Unstructured Interview with Program Director

Debi Cziok is the garden director at Shepherd Center. She is a Horticultural Therapist and Registered Nurse. She offered the following observations in the limited time she had available for discussion (D. Cziok, personal communication, May 2009):

Movement and exercise are critical to the recovery and rehabilitation of shepherd Center patients, so that the garden was planned so as to offer patients the space and configuration they needed to exercise.

The garden was designed to make sure that no part of using or working in the garden was too intense or stressful for patients. This is where Ms. Cziok got the idea of using the adaptive tools because it made gardening so much easier for the patients.

SKYLAND TRAIL

Direct Observation

The researcher visited Skyland Trail in early Summer, on two consecutive days from 9 a.m. to 2:00 p.m. each day. The researcher had also visited Skyland Trail twice with Professor Marguerite Koepke's Healing Garden class (LAND 4080/6080).

Patients stopped often at raised beds and wall planters, where they could work with plants. They also frequented the pergola where they could watch birds and insects from a shady spot.

The greenhouse was a popular destination as well. Skyland Trail holds classes there, and patients work on projects that they may take home with them or leave in the garden for others to enjoy. Patients often went to the greenhouse first. It was a place that could be enjoyed, rain or shine, and also appeared to be a good place for patients to visit with staff and friends (Figure 5.3).

Figure 5.3. Skyland Trail Greenhouse (Photo by author)

The garden included a tall, but small diameter stone fountain surrounded by plants that attract all types of flora and fauna. There is only one bench looking onto this space. It is a swinging bench hanging from a pergola covered by an evergreen vine. The fountain area was designed to offer solace, and a chance to observe the butterflies, birds and bees attracted by the flowering plants. Counselors and patients used the space for private therapy sessions.

The garden offered other private spaces, mainly in niches that included private seating.

Statues and artwork by clients provide positive distractions (Figure 5.4 and 5.5). Figure 5.4 is a sculpture designed and built by a patient. Figure 5.5 is a scarecrow that was created by the

patients which they decided to name "Dolly Parton." Director Libba Shortridge says that anything providing a smile is a positive distraction (Personal communication, 5-11).

Figure 5.4. Skyland Trail Sculpture Built by Patients (Photo by author)

Figure 5.5. "Dolly Parton" scarecrow Made by Patients (Photo by author)

Seating areas were shaded, with pergolas, arbors, and shade trees. Benches in shaded areas provide patients with a cool place to sit and relax.

A bog garden between the main part of the garden and a major thoroughfare was constantly wet, and impeded or prevented traffic through it. It was also filled with interesting wetland plants, such as Pitcher Plants.

Focused Interviews

The mental disabilities of the patients in the psychiatric garden limit somewhat the utility of the information they conveyed because they were not necessarily capable of identifying features that were most appropriate for their treatment. The responses, for example, to questions 3 and 6, indicating that they largely prefer exercising alone, contradict the redevelopment of social skills that a psychiatric garden is intended to facilitate. As with dementia patients, their responses are nonetheless useful.

The Skyland Trail patients answered the questionnaires as follows:

Table 5.3. Patient Answers to Questionnaire at Skyland Trail

QUESTION	Skyland Trail (16) (Psychiatric)
MOVEMENT AND EXERCISE	
1. Do you use the garden for exercise? How?	● No (9) ● Yes, walking (4) ● Yes, gardening (2) ● Yes, "creating crafts" (1)
2. What is the best exercise in the garden?	● Walking (13) ● Planting flowers and vegetables (2) ● Cleaning the greenhouse (1)
3. Do you like to exercise alone or with others?	● Alone (12) ● With others (4)

SOCIAL SUPPORT	
4. Do you use the garden for exercise? How?	• No (9) • Yes, walking (4) • Yes, gardening (2) • Yes, "creating crafts" (1)
5. What is the best exercise in the garden?	• Walking (13) • Planting flowers and vegetables (2) • Cleaning the greenhouse (1)
6. Do you like to exercise alone or with others?	• Alone (12) • With others (4)
SENSE OF CONTROL	
7. Do you like working with plants?	• Yes (12) • No (4)
8. Do you prefer plants in pots or in the ground?	• Ground (11) • Pots (5)
9. Do you like to take plants home or back to your room?	• Yes (4) • No (12)
NATURAL DISTRACTION	
10. What in the garden takes your mind off things?	• Birds and creatures (9) • Sound of water fountains (2) • Watching people (3) • Listening to music (1) • Projects (1)
11. Do you prefer man-made or natural features?	• Natural (15) • Man-made (1)
12. What is your main purpose of going to the garden?	• Class (3) • Watch birds and butterflies (7) • Grow veggies (3) • Meet with counselors (3)

The responses to the questionnaire thus show that the features most important to the design of a garden for psychiatric patients (at least from the perspective of these patients) are:

- the provision of ample space to permit and encourage walking;
- the utilization of planting beds and pots, to offer both an opportunity for these; patients to work with their hands, and a location at which they can socialize;
- the selection of plant materials that will attract birds and butterflies;

- the use of relatively more natural than man-made material; and
- the inclusion of areas where patients can be alone if they choose.

The researcher's informal conversations with patients at Skyland Trail confirmed most of what their formal questionnaire answers revealed. Skyland Trail patients noted informally that among their favorite things in the garden were, in order from least to most favorite:

- experiencing the butterflies and bees the foliage and fauna attracted;
- the cool calming experience of placing their hands in water;
- looking at and touching plant material;
- enjoying scents the plants gave off, and
- experiencing the sense of accomplishment that came from seeing a plant for which they were caring grow or become healthier as a result of their care.

Unstructured Interview with Program Director

Libba Shortridge is the director for the Skyland Trail garden. She is a Horticultural Therapist with credits from The Horticultural Therapy Institute in Colorado, and holds a Master of Landscape Architecture degree from The University of Georgia. She offered the following observations in response to the researcher's inquiries about the features of the Skyland Trail garden (L. Shortridge, personal communication, May 4, 2009).

Generally more than half of the patients that Skyland Trail serves prefer to spend their time outside in the garden, either as an observer or as an active participant. The garden therefore requires both active and passive spaces. Skyland Trail patients look forward to the part of their day they can spend in the garden.

Shade is important not only for comfort of Skyland Trail's patients, but also for protection from sun exposure. Many psychiatric patients take psychotropic drugs, which make them more vulnerable to sun exposure.

Safety and security are important at Skyland Trail. Well-established physical boundaries help keep patients in the garden and discourage unwanted visitors, and also provide a sense of security to the patients themselves. The garden utilizes trees without low limbs to prevent psychiatric patients from climbing. Stones in planting beds or along streams are fastened securely to the ground so that patients, who sometimes try to lash out against each other or authority, cannot move or throw them.

Seating is arranged to afford patients a greater opportunity for social support. They allow patients and sometimes staff to sit and chat with family, friends, and each other. At the same time, psychiatric patients receive some of the best therapy in the garden by simply sitting quietly alone. The Skyland Trail garden includes common area seating, niches, and alcoves that offer privacy to patients.

A garden should also include objects that reach an individual on several sensory levels. A bubbling water feature, for example, is pleasant to look at and at the same time offers pleasing and calming auditory stimulation.

Positive distractions are key to stress relief. Listening to the water from the fountain might take him or her on a journey to a good time that they had at a beach. Statues and artwork by clients provide positive distractions (Figure 4.14 and 4.15). Anything that creates a laugh or smile is a good feature for a healing garden. Activities such as working with plants, or on different types of craft projects, serve further to distract.

SUMMARY

The following Table 5.4 summarizes the key features and differences between the garden spaces in the three facilities:

Table 5.4 Garden Features and their Affects in each Garden

	DEMENTIA	**CATASTROPHIC**	**PSYCHIATRIC**
PLANT MATERIALS	Appeal to all senses. Use non-poisonous and "safe" plants. Use plants that provide shade and present nice vignettes through windows. Seasonal interest.	Use safe plants. Raised beds make plants more accessible. Use plants that produce flowers or vegetables. Seasonal interest. Vertical Vegetation.	Use safe plants. Attract birds, bees, and butterflies. Use plants that produce flowers or vegetables. Seasonal interest
Primary Differences	Focus on scent to provoke memory.	Emphasis is on "working" in the garden for physical rehab.	Major emphasis on safety.
SHADE	Drugs make skin sensitive (interview with K. Hines). Provides respite. Decreases the heat.	With the energy exerted to use a wheelchair it is important patients have a cool place to relax.	Important because of patient's medications (Interview with Hines). Provides a cooler spot for reflection and visitation in warm weather.
Primary Differences	Focus on keeping patients in shade at all times.	Sun is o.k., although patients in wheelchairs become tired.	Many Psych. Patients take drugs that do not allow them in the sun, others have no problem.
SECURITY/ BOUNDARIES	Patients must be unable to leave garden area. Outsiders must be kept out.	Must be suitable for wheelchair-bound patients. Do not want wheelchairs near automobile traffic. Maintain privacy.	Must have walls because of security risks. Prevent outsiders from entering. Keep anxiety and stress at a minimum.

	DEMENTIA	CATASTROPHIC	PSYCHIATRIC
Primary Differences	Enclosed courtyard garden. Doors can lock. Paving alerts to change in space.	Thick shrub hedge protects from busy road. Large, open area. Boundary marked by large circular path.	Gardens are sprawling, yet encompassed by buildings. Part of garden is a path that runs through a small wooded area. Patients really enjoy the birds and squirrels in the woods.
SEATING	Allows a place for social interaction and/or individual reflection. A place to rest and view garden objects.	Important so visitors can sit with patients who cannot stand. Provide walls/seats that patients may sit on by use of a sliding board.	Important as a point of meditation and reflection away from the hospital. Place for social support from staff and family.
Primary Differences	All three gardens provide seating that is meant for 3 or 4 people. Shade is used extensively. Safety is of main importance. Hines says the designs are for the lowest functioning patients. Small courtyards provide intimacy.	Fountain and stone circular bench provide social space. Patients work together when gardening. They use a slide board to move from the wheelchair to the wall.	Seats are plentiful. Seating places emphasis on facing focal points and other positive distraction.
SCENT	May trigger memories or "schemas." Patients become more interested in plants.	Raised beds make scent very apparent to patients. Makes working with plants much more enjoyable.	Plants with scent are used as a means of aromatherapy. Good smells instill calming emotions. Plants with smell benefits are more exciting to work with.

	DEMENTIA	CATASTROPHIC	PSYCHIATRIC
Primary Differences	Scent is very intriguing to dementia patients. Outside is an herb garden where patients may touch with their hand and smell. Patients may grow their own herbs in greenhouse,	Scent is appealing to patients. Cziok usually works with herbs and other flowers that produce a pleasant smell so that the patients can benefit. Patients maintain a vegetable garden.	Scent is important for this population. Patients work with herbs such as Lavender and Lemon Verbena, plants Hines says have been proven to have calming effects.
POSITIVE DISTRACTIONS	Statues, pictures, or plants may trigger schemas, or memories from the past. Water features provide a focal point.	Numerous raised planters where they work with their hands. Water features block unwanted noise and provide pleasant sites, space to visit.	Water drowns out unwanted noises from the hospital. Butterflies and birds provide distractions. Any type of garden art is beneficial.
Primary Differences	Pond with Goldfish and birds positively distract patients. Gardening is available to patients to fit their health level. Shade and comfort are a main focus, most benches face a focal point that positively distracts.	A lot of people in garden for "people watching". Planting beds can be accessed by patients at all times. The garden is outside and has many birds, bees, and butterflies.	Patients always have a choice of many projects to participate in. Skyland Trail places much focus on artistic therapy.

	DEMENTIA	CATASTROPHIC	PSYCHIATRIC
PAVING	Changes in paving patterns alert patients that they are approaching entry and exit points. It is important that rocks and small stones are affixed so as not to present a safety hazard.	Important that the surface is one that is smooth so that wheelchairs do not become stuck. Paving is a secondary design concern for these patients because they are looking more at what is ahead of them than what is under them.	All elements on the ground, such as pebbles and rocks, must be securely fastened so they cannot be thrown or used as any other safety hazard. Use easily readable pattern.
Primary Differences	Planters are placed over grates for safety. Patients cannot access rocks and stones, as they are affixed.	Rocks should be kept clear of paths so as not to cause a wheelchair accident. Patients may use rocks if they wish, it is a good form of physical rehabilitation.	Paving is both smooth and wooded. Paths run throughout and patients are encouraged to explore the paths.

Ulrich's four factor classification scheme provides a useful tool for sorting the features of the three case study gardens (Table 5.5):

Table 5.5. Roger Ulrich's Four Factor Model Related to Three Case Studies

	Movement And Exercise	***Social Support***	***Sense of Control***	***Natural Distraction***
Wesley Woods	Walking through gardens, Working with plants, and Lifting things such as gardening tools.	Benches provide places to visit, Staff can work with patients, and Patients help each other with projects.	Walls provide security, allowed to enter and exit freely, and control over working with plants.	Birds and other nature sounds, Sculptures and statues, Plants offer distractions, Activities of other patients, and Change in scenery. Water features provide a focal point.

Shepherd Center	Patients have a long circular path to stroll. Working with plants.	Benches provide spaces to visit. Patients and staff spend quality time. Family and friends can work along with patient.	Can work with plants, have control over plants, and free to roam garden area.	Outside nature sounds, Passing cars on Peachtree Road, and other patients working with plants. Water feature distracts from street noise.
Skyland Trail	A lot of space to walk paths and Working with plants in pots and the ground.	Spend time with family, friends, and staff, Gain confidence through work with plants, and Encouraged and rewarded by staff.	Free to roam, Completely responsible for projects, and Choice in Activities.	Sounds of nature, Many different types of flora to observe, Patients have projects scattered through the garden, and Other patients working is a distraction. Water features sooth and calm.

The following table addresses the gardens in terms of the Kaplans' four factors in their preference theory: coherence, complexity, legibility, and mystery.

Table 5.6. Kaplan's Four Factors of Preference Theory Related to Case Study Sites

	Coherence	***Complexity***	***Legibility***	***Mystery***
Wesley Woods	Courtyard gardens are small and organized. Different areas are easily seen and accessed within each garden.	Although courtyard gardens are small they still contain complexity. Trees, water features, and nature sounds create interest without compromising the ease of movement. Paths wind through the garden and around the greenhouse, although landmarks are available throughout.	The two courtyard gardens are very legible. Small spaces allow patients to build a mental map and not become lost. In the outside garden area, paths make it very legible in that the paths all lead to particular patient spaces.	There is not much mystery in the courtyard gardens, as the entire garden can be seen from any spot within the garden. The outside/greenhouse garden has paths that meander and create mystery. The patients continue to walk in order to discover what cannot be directly seen.

	Coherence	***Complexity***	***Legibility***	***Mystery***
Shepherd Center	Garden is open. Patients can see the entire garden from one viewpoint.	Low complexity. Garden area is very open and different spaces are well defined.	Very legible. The low complexity allows patients to easily find their way through the garden. Even though there is low complexity, there are landmarks, such as the raised beds, that patients can use for way-finding.	The garden is quite large but very open. Therefore, patients can see the garden from one point. The size of the garden creates mystery because without viewing each of the features closely they still remain unclear as to what they are. For example, raised beds and a walled fountain area.
Skyland Trail	Paths are clear and readable. Different areas in the garden, such as the greenhouse and meditation area are clearly separate.	High complexity. The garden has many different planting beds and buildings for patients. There are many things for the patients to contemplate.	Landmarks and regions help make this garden legible. There are a lot of different spaces in this garden, however, the regions allow patients to know the environment and function effectively within it.	This garden has a lot of mystery. Most of the mystery is created through the many paths that run through the garden. The paths often have turns where the patient cannot see what is around the corner, offering promise of further exploration.

CHAPTER SIX

IMPLICATIONS FOR DESIGN

PREFACE TO PROTOTYPE DESIGNS

This chapter combines the research and theory discussed in the first chapter with what the researcher learned through observations and interviews, to create prototype gardens. The researcher utilized the footprint of an existing garden space, described below, and designed three prototype gardens to fit that footprint: one for dementia patients, one for catastrophic patients, and one for psychiatric patients. In each case, a garden design is displayed first, followed by a narrative description of the key features of the garden and then by a table that addresses the garden's design in terms of the Kaplans' environmental preference matrix, Ulrich's "supportive design theory" and other factors which were revealed through observations and interviews. Each design takes into account how each of these patient types move through, use, view, and benefit from the gardens. Appendix D shows opportunities for varying the treatment of the edges of each garden depending on the variations of each patient type.

The courtyard garden footprint that was chosen by the researcher was Highland Hills Dementia Hospital in Athens, Georgia. The researcher chose the courtyard garden space because he had previously been exposed to it as a design project in Professor Marguerite Koepke's Fall 2008 class, "Healing Gardens" (design studio, LAND4080/6080), at The University of Georgia. Although the footprint was taken from a dementia garden, the author intended to show that a space of fixed dimensions could be designed to accommodate different types of patient populations. The following figure is a base map of the prototype site that shows its dimensions and courtyard

location between two buildings. This project would have been very different had the researcher chosen three separate sites to design.

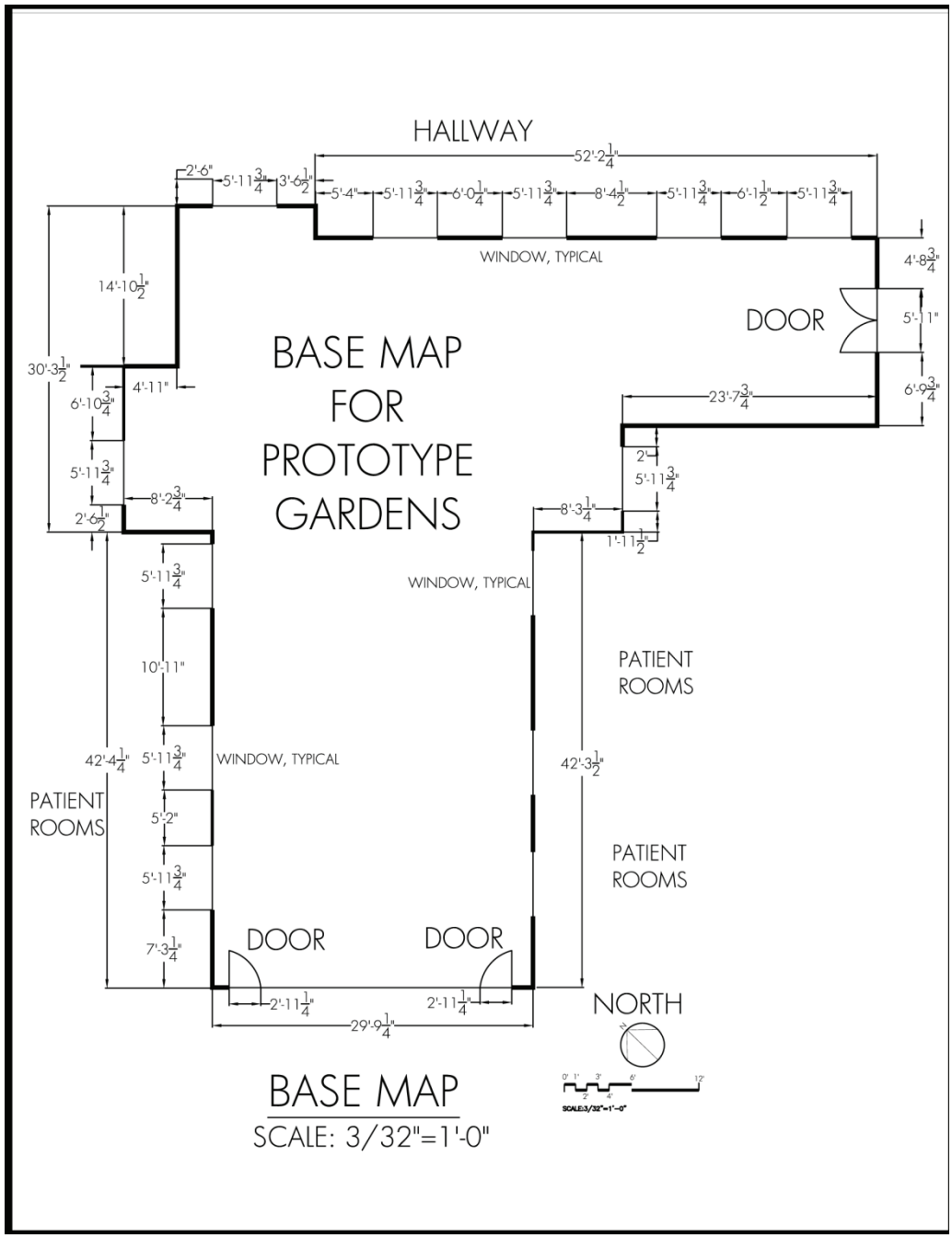


Figure 6.1. Base Map for Prototype Site

PROTOTYPE THERAPEUTIC GARDEN ONE: DEMENTIA HEALING GARDEN

Dementia usually comes late in one's life and has devastating effects on both the patient and the patient's family. The disease slowly destroys an individual's memory over time. Everyday tasks become monumental. The dementia garden in Figure 6.2 considers these issues.

As one enters the garden from the south side, there is a patio area for patients to sit and enjoy the garden with family, staff, and friends. It provides ample seating where patients can rest and communicate with others. The center of the south section of the garden has a large bubbling water feature. The fountain creates white noise that blocks out the sounds of other patients and the hospital. The fountain also encourages meditation. There are often alcoves where the patients may sit and relax, much like the one proposed in the following drawing by the author:

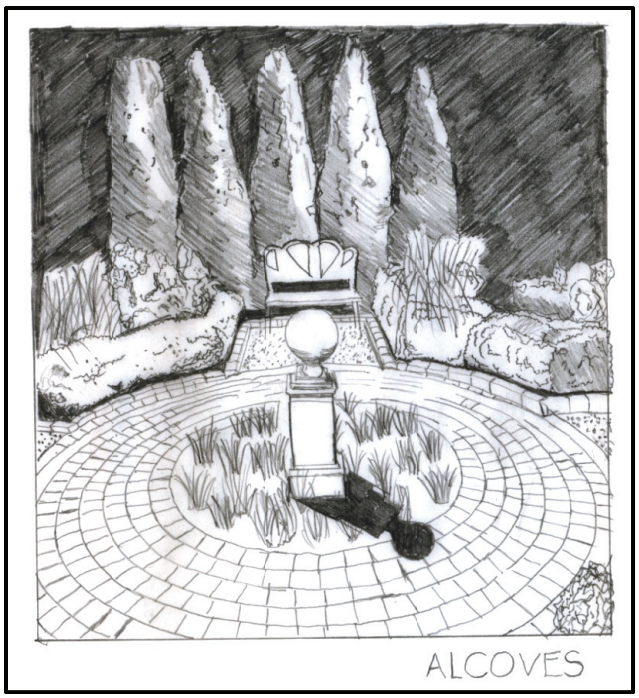


Figure 6.2 . Sketch of proposed alcove in which patients may enjoy solitude and privacy. (Drawing by Author)

The benches along the side of the garden are positioned in front of plants that provide a measure of privacy to those on the benches and those inside. The same plantings provide vignettes

for those looking out of the windows, so that the garden has therapeutic qualities for those both actively and passively experiencing the garden.

Raised planting beds in the middle of the garden and along the edges allow patients to work with their hands and to grow plants of their choice. This provides opportunity for movement and exercise and helps confer a sense of control.

There are two sculptural pieces in the northeast corner of the garden. One is an old bicycle leaning up against a wall that might create positive schemas, or memories, for the patient. Another is a statue of a person, or alternatively, a religious figure that might appeal to patients who find solace in religion.

Figure 6.3. Bike Leaning Against a Wall may Resurface Positive Memories (Drawing by Author)

A large "C" shaped seat wall that is the most prominent feature of the garden enables patients to sit, relax, and visit with others. The shape of the wall seat allows several people to carry

on a conversation at the same time. A shade tree surrounded by the wall seat and a nearby pergola offer shade to patients that cannot tolerate heat. The tree and pergola provide sufficient shade, but not so much as to prevent plants from growing. The pergola is extra high, at least eight feet, so as not to create safety hazards.

On the upper east side of the garden, a wooden bridge crosses a large water feature. The water feature provides a place for meditation, as well as pleasant sound to drown out extraneous noise. Fish or turtles can be introduced into the pond as a source of additional interest. It is important, however, to keep the water shallow, about one inch with a black bottom. Benches around the water feature offer additional opportunities for relaxation and conversation.

The paving is smooth, utilizing one type of material except where the designer wishes to signal an exit. The paving is monochromatic, intended to make the garden less confusing by helping dementia patients see everything as a whole. There are changes in paving pattern at entry and exit points to alert patients that they are at the garden area boundary.

The sides of the buildings and a wall enclose the garden space. There are secure entry and exit points. Vertical vegetation on the walls between patient room windows and on the pergola provides visual intrigue.

Railings around the water feature, around and also behind the "C" shaped wall seat, and along both sides of the bridge are placed to assist patients who have difficulty walking.

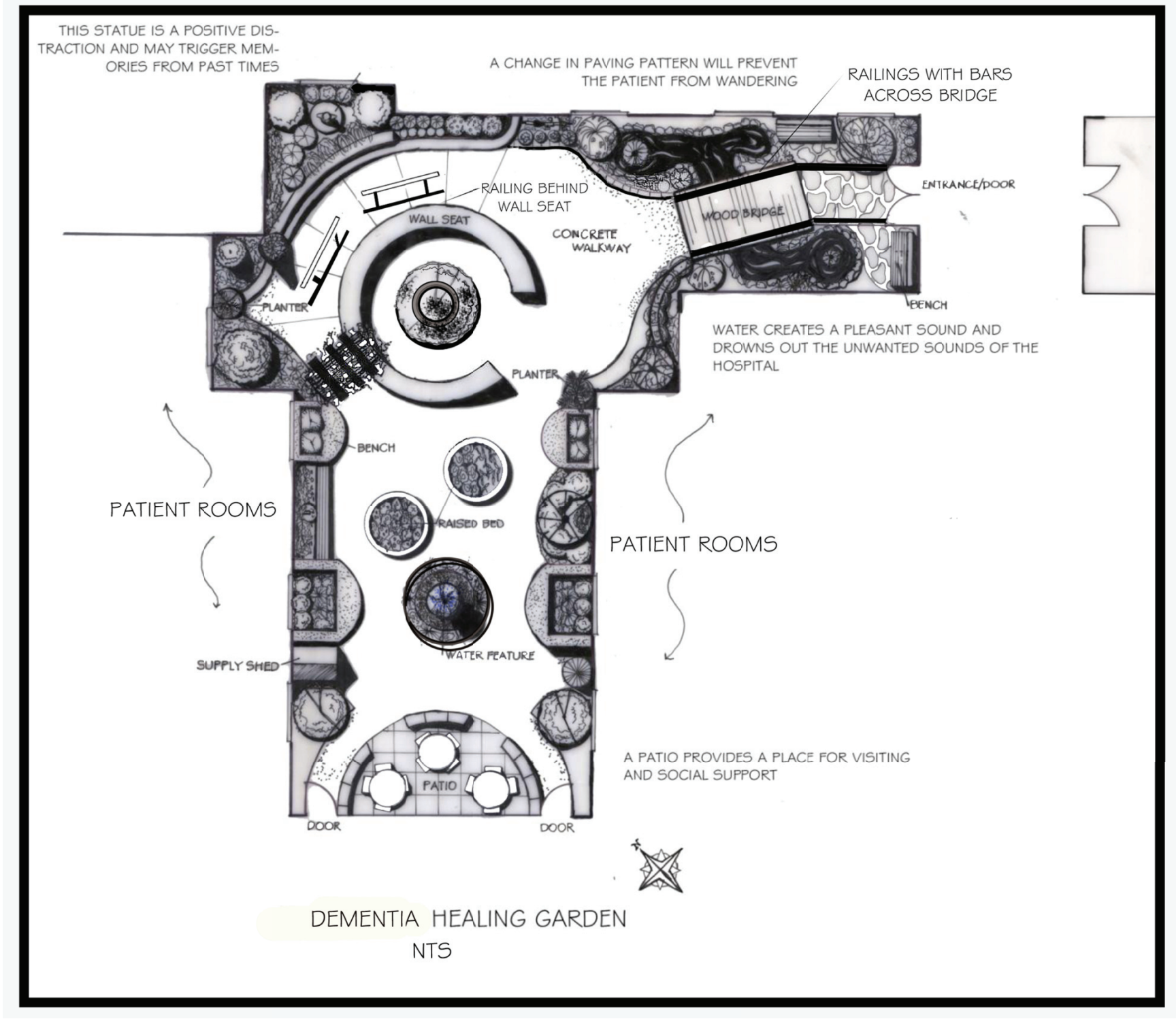


Figure 6.4. Prototype Dementia Healing Garden

Table 6.1 Kaplan's, Ulrich's, and Others Factors in Dementia Healing Garden

KAPLAN FACTORS	
Coherence	The garden has four distinct regions. The regions are similar in size, but each has different features. Patients can easily see what activities the garden has to offer.
Legibility	The plan is open enough that patients can see most of the garden from one place. Landmarks, such as the statue, raised planters, or the bridge, help orient the patient.
Mystery	As the patient walks across the bridge, it is unclear what they will encounter around the next turn. This entices the patients to learn more. The tree in the middle of the circular seating obstructs views and makes the patient want to know what is behind it.
Complexity	The garden offers a variety of visual and physical cues. The garden is easily readable, but still provides stimulation. There are several different seating styles, a pergola that adds a vertical element, and a bubbling fountain.
ULRICH FACTORS	
Movement + Exercise	Patients can walk through the garden and can work with plants in raised beds for exercise.
Social Support	Benches along the sides of the garden offer places for social support and visitation. There are tables and chairs on the patio offer a different arrangement encouraging conversation. The "C" shaped bench allows patients to face each other as they talk.
Sense of Control	Patients have a few spaces where they can go for privacy. Patients can go to any part of the garden they wish. The raised beds and planters are designed so that patients can easily use them.
Natural Distractions	Fountain drowns out unwanted noise. Plants and trees provide visual appeal and also attract other wildlife. The statue and bicycle are intended to provide positive memories.
OTHER FACTORS	
Risk of Injury	Paving material all on grade and flat. Planters are circular rather than square with sharp corners.
Security	The garden is surrounded by walls on all sides. Points of entry and exit may be locked.
Accessibility	Paths are level and smooth and seating is plentiful.

PROTOTYPE THERAPEUTIC GARDEN TWO: CATASTROPHIC HEALING GARDEN

Patients in catastrophic care facilities usually have experienced a tragic accident, leaving them paralyzed or with severe motor disabilities. Their injuries affect both their physical and mental health. The catastrophic healing garden is designed to accommodate and help patients with these issues.

The garden has a relatively high proportion of paved space to accommodate patients' wheelchair movement, and to allow for at least a five-foot turning radius at any point in the garden. The paving remains smooth throughout the garden for easy mobility.

The garden includes two fountains, which interviews indicated were particularly important as distractions for catastrophic patients. The small stones that surround the base of the fountains are permanently affixed to minimize risk of injury.

The garden also includes three raised planting beds, a potting table, and large planters against the walls that patients in wheelchairs can easily access. Adaptive tools are available for use in the planting beds. The garden includes a wall with semicircular hanging baskets that wheelchair patients can utilize for planting.

Benches are placed in multiple locations to offer patients an opportunity to move from their wheelchairs to the benches and to visit with staff, family, or friends. Shade trees are placed over most seating areas to protect patients and visitors from over exposure to the sun.

Plants placed along the walls and in front of windows provide a sense of privacy and elements of visual appeal. Sight lines are relatively unobstructed so that patients can view the garden from one spot.

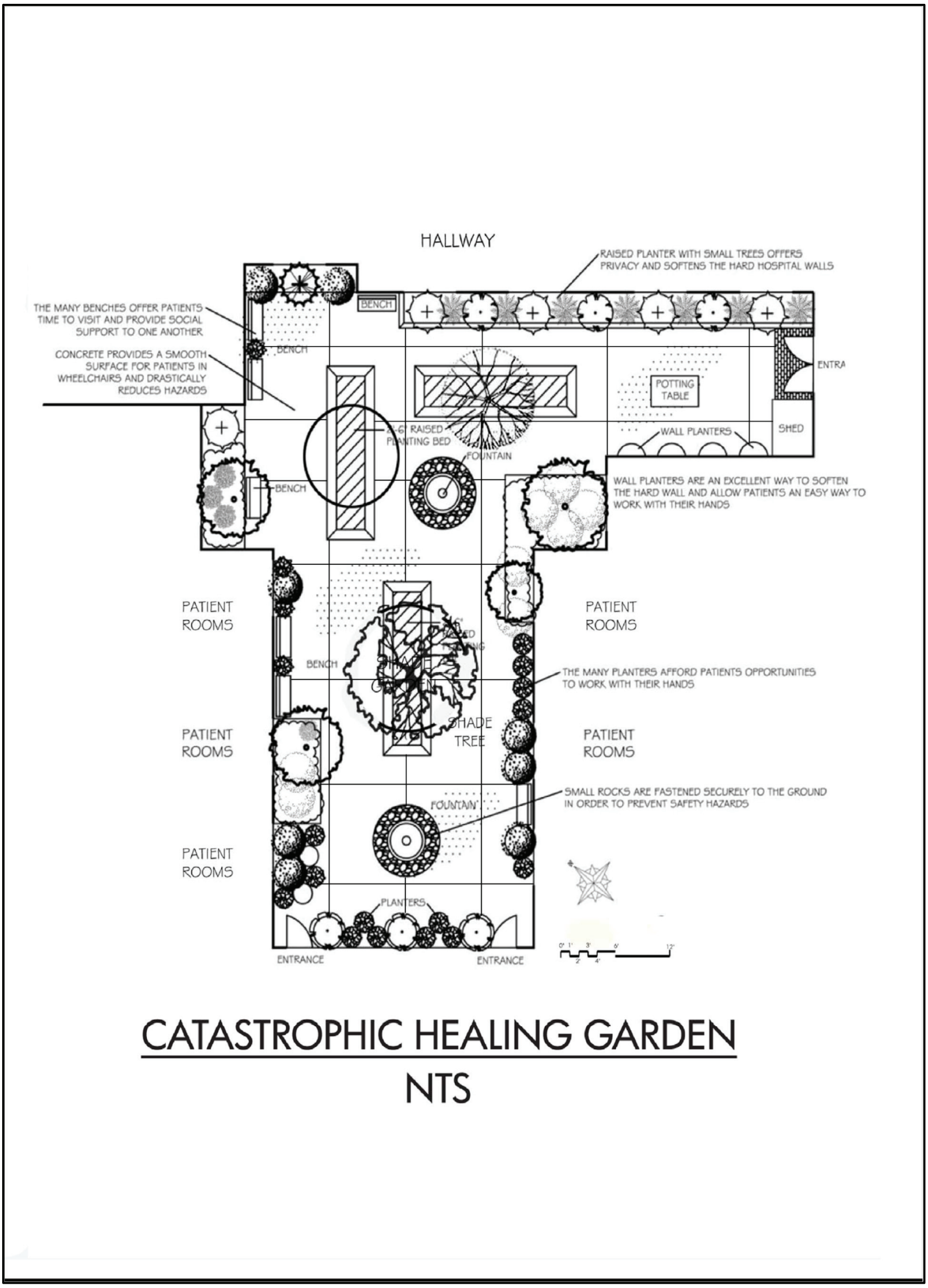


Figure 6.5. Prototype Catastrophic Healing Garden

Table 6.2 Kaplan's, Ulrich's, and Others Factors in Catastrophic Healing Garden

KAPLAN FACTORS	
Coherence	The garden has several distinct regions. The same elements are present in each of these regions: raised planting beds, benches, and fountains.
Legibility	The garden remains open enough to allow visual access even to those confined to wheelchairs. The garden is easy to remember as the different beds and fountains, provide landmarks.
Mystery	The garden takes into account the lower sightlines wheelchair users have. What may be apparent to a standing person (what is located on the other side of a planter, for example), may still provide an element of mystery for the wheelchair user.
Complexity	The fountains, benches, raised planters, and plant material offer complexity.
ULRICH FACTORS	
Movement + Exercise	There is plenty of room for the patients to roll around in their wheelchairs. They also get exercise by using the potting table and the raised planting beds.
Social Support	Benches provide places for social support. The patient can talk to someone sitting on a bench or use a sliding board to sit on the bench as well. The ability to work with others in the dirt with plants offers further opportunity for communication and moral support.
Sense of Control	Working with, growing, and caring for plants offers patients a sense of control. Being able to wheel, or be wheeled, outside of the hospital walls offers sense of control.
Natural Distractions	The fountain features distract from the routine of hospitalization. The plants in the garden attract birds, bees, and butterflies for the patients to view.
OTHER FACTORS	
Risk of Injury	Smooth pavement and ample room to maneuver reduce risk.
Security	Not an important issue, except to the extent walls discourage unwanted visitors.
Accessibility	The spaces are designed to make wheelchair use easy.

PROTOTYPE THERAPEUTIC GARDEN THREE: PSYCHIATRIC HEALING GARDEN

The psychiatric garden is geared towards relieving stress and improving the patient's affect. It incorporates features that give patients the opportunity to be alone (*e.g*., benches in niches), as well as features that encourage the patients to socialize (*e.g*., herb garden, seat wall along reflection pool).

The garden includes a seating area where patients may visit with staff or family. The seating area has a seat wall surrounding it. There are also several benches located throughout the garden. Many of the benches are located in front of or beside patients' room windows. The designer should pay attention to both the privacy of the garden user and the patient indoors. It remains important that the patients inside of their room are able to see out into the garden without feeling as if people are looking at them. A solution to this is to place vine covered trellises in front of the windows, perhaps 3-dimensional trellises that provide privacy for the patients but also allow them a screened or veiled view into the garden while also providing an added measure of privacy for garden users. The garden users then have the added advantage of being able to garden vertically.

A number of large trees and the vertical height of the walls that surround the garden offer ample shade. The trees, however, are deciduous so that sunlight can warm the garden during the cold months of winter. The design avoids the use of trees with low limbs that patients may climb. A tree such as Ulmus Parviflora (Lacebark Elm) would work here, especially if limbs were pruned.

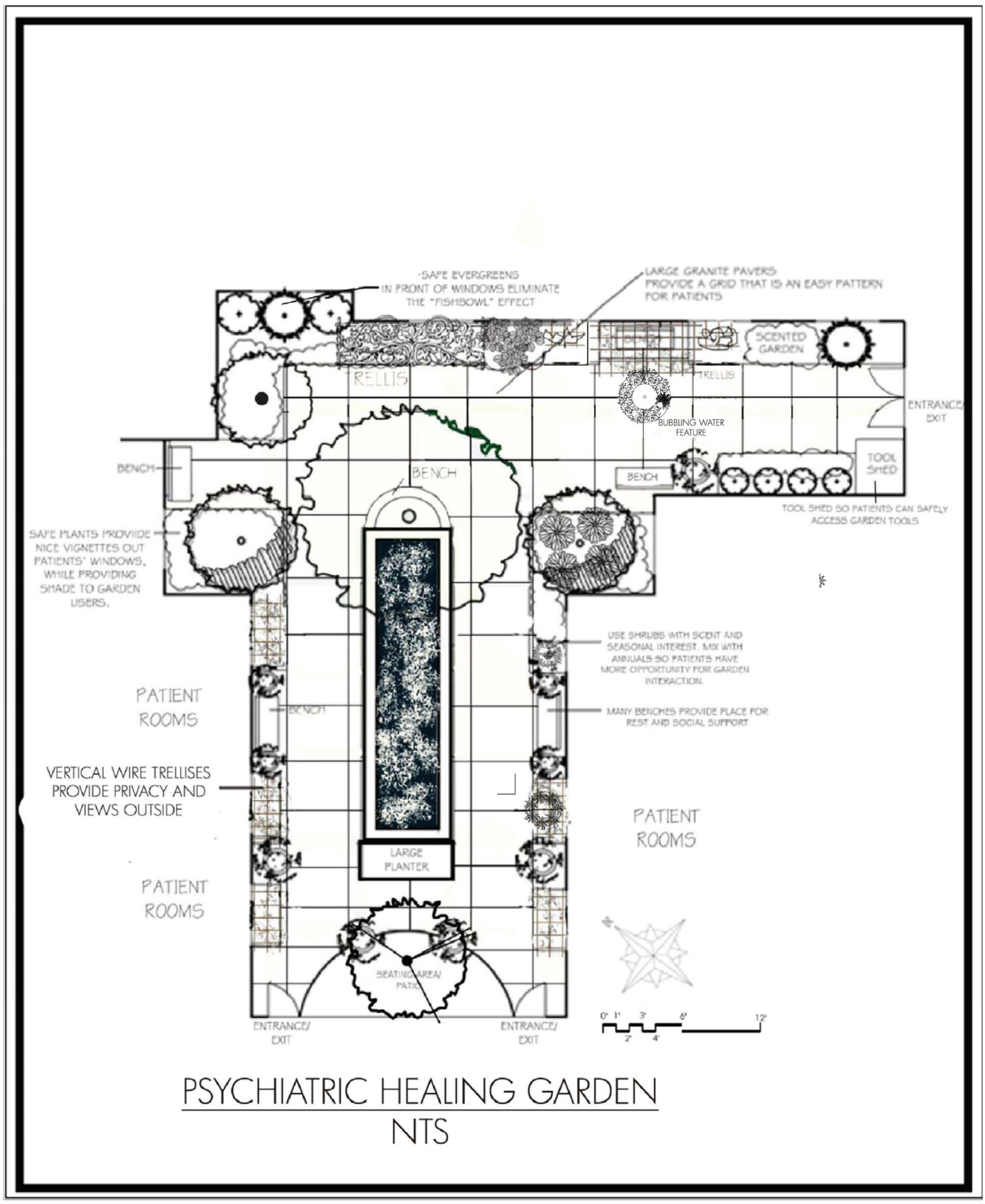
The garden includes a large reflection pool and bubbling fountain, both of which are natural distractions intended to sooth the patient and encourage contemplation. The reflection pool has a depth of only one inch so as to minimize risk to patients. The pool should have a black bottom. With a black bottom, depth should not be an issue. The pool is surrounded by a seating

wall that provides an extra measure of security. Further, there is a railing on the back of the seating wall for additional security.

The garden offers a wide variety of plant types to maximize appeal to the senses. There is an area devoted to a scented garden, with plants such as Lemon Verbena and Lavender. The scented garden and other plantings are those that will attract the most birds, bees, and butterflies. The plan includes several beds where patients can work and do their own gardening. It includes a shed that houses tools for the patients to use.

The layout of the garden is straightforward and more or less symmetrical so that patients do not become confused. The square grid on the pavement helps give patients a sense of place and direction.

The garden is entirely enclosed with secure entry and exit points, for security purposes. As a measure of privacy, large evergreens are planted in front of patient rooms for privacy.



PSYCHIATRIC HEALING GARDEN
NTS

Figure 6.6. Prototype Psychiatric Healing Garden

Table 6.3. Kaplan and Ulrich's Factors as they Relate to Psychiatric Healing Garden

KAPLAN FACTORS	
Coherence	The plan is fairly symmetrical with a grid paving pattern. The bubbling fountain feature and the reflection pool offer two distinct regions.
Legibility	The paving grid is one that can be easily followed throughout the garden.
Mystery	The reflection suggests an infinite horizon. The different scents present in the Scented Garden offer mystery to patients who do not know plants.
Complexity	Complexity is more limited. Benches and planters are purposefully symmetrical. The reflection pool, plant materials and garden scents nonetheless provide a varied experience for the patient.
ULRICH FACTORS	
Movement + Exercise	The garden is a very open space where patients may walk freely.
Social Support	Benches provide sites for conversation. Patients and staff may also sit on the side of the reflection pool. Patients can work in the planting beds along the edges of the space. With this population, it is just as important to provide semi-private niches where patients may go and reflect alone.
Sense of Control	Patients can choose where they want to sit or be in the garden. Working with plants in the different beds offers control.
Natural Distractions	Birds, bees, and butterflies are attracted to the flowers and shrubbery in the garden. The reflection pool and bubbling fountain are water features that are positive distractions. The different plants keep patients distracted.
OTHER FACTORS	
Risk of Injury	The reflection pool is an important part of the garden, but presents the greatest safety hazard. A wire mesh or piece of plexi-glass can be placed just beneath the surface of the water to prevent patients from entering.
Security	The garden is entirely enclosed, with controllable points of entry and exit.
Accessibility	Not particularly an issue.

CHAPTER SEVEN

CONCLUSIONS

When we try to pick out anything by itself, we find it hitched to everything else in the Universe….The whole wilderness in unity and interrelation is alive and familiar…the very stones seem talkative, sympathetic, brotherly…

Everybody needs beauty as well as bread, places to play in and pray in, where Nature may heal and cheer and give strength to body and soul alike.

–John Muir (cited in Duncan, 2009, p.1).

This thesis has explored how hospital healing gardens have been and can be designed for three different patient populations: dementia, catastrophic, psychiatric. It has considered how the designer needs to address differences among these patient populations when designing a garden for each.

As the research in Chapter Two shows, healing gardens can in fact promote better patient outcomes. As that research also demonstrates, making gardens aesthetically pleasing can diminish stress, reduce the need for medication, hasten the healing process, and make the journey to recovery easier. At the outset of this thesis, the investigator wished to answer and discover information about healing gardens and how they could benefit specific patients: dementia, catastrophic, and psychiatric populations. The questions brought forth by the investigator were:

1. Which healing garden features are the most therapeutic?

2. In what ways are these features therapeutic?

3. Which features best serve each of the three patient populations?

The research conducted has shown that particular features must be treated in specific ways for different patient populations. The following paragraphs summarize the major findings of this thesis and offer answers to the three major research questions.

The thesis shows how the features of each of the three gardens are responsive to the Kaplans' four environmental preference factors (coherence, legibility, mystery, and complexity); to Ulrich's four stress reduction factors (movement and exercise, social support, sense of control, and natural distractions); and to other factors that the three case study garden directors identified as important (safety, security, and accessibility).

As summarized in Chapter Five, sense of place, safety, aesthetics, socialization, and security, are particularly important for the dementia garden; accessibility, opportunity for exercise and movement, and positive distractions are particularly important for the catastrophic garden; and ease of way-finding, encouragement of socialization, and natural distractions are particularly important for the psychiatric garden.

Each of the three gardens the researcher designed incorporated the learning from his own and prior research; the theoretical structures that academics provided; and the major takeaway points from each of the case study sites.

The three plans differ among themselves in that each places relatively greater emphasis on particular features. All three gardens, for example, have pathways: in the dementia garden the material in the pathway change at entry and exit points to alert the user to change (*i.e.*, an indication of moving from outdoors to indoors); in the catastrophic garden they are broad and

circular; and in the psychiatric garden they follow a grid pattern. Each garden also includes a water feature: in the dementia garden it serves to soothe; in the catastrophic garden it serves primarily to distract; and in the psychiatric garden it serves primarily to offer an opportunity for meditation.

Benches are placed throughout. Although they serve common purposes in all three gardens, their most important functions differ by garden: in the dementia garden they offer a place to rest; in the catastrophic garden they offer a place for visitation; in the psychiatric garden they offer a place for reflection. Shade is of equal importance in all three gardens, although for slightly different reasons: in the dementia garden, the sensitivity of elderly patients' skin; in the catastrophic garden, the vulnerability of patients to heat; and in the psychiatric garden, the sensitivity of patients on psychotropic drugs to sun exposure. Security is more important for the dementia and psychiatric gardens than for the catastrophic garden. Each garden addresses safety in different ways: the dementia garden, for example, includes railings throughout; the catastrophic garden provides a smooth surface to accommodate wheelchair movement; and the psychiatric garden has properly pruned trees so that they may not be climbed.

All three gardens offer social support, but in somewhat different ways: the dementia garden emphasizes wall seats and benches; the catastrophic garden emphasizes gardening opportunities; the psychiatric garden emphasizes intimate seating, while still allowing separate niches for private meditation. Finally, and critically, all three gardens emphasize sensory appeal (visual, auditory, tactile, and olfactory) as a means of achieving stress reduction, distraction, and enjoyment.

Future research in the healing garden area should focus on the effect of different types of positive distractions: providing music, games to play, or artistic projects involving the garden. Such research could also look at how catastrophic patients could have spaces where they are eye-level with standing or walking users of the same space. It should consider additional means for

effectively bringing nature into the hospital, or at least making it more readily accessible. Future research should endeavor to more fully integrate nature with health care facilities of all types with increasing emphasis on specialized spaces for specific patient populations.

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APPENDIX A

PATIENT CONSENT FORM

HEALING GARDEN PROJECT CONSENT FORM

I, _____ agree to participate in a research study titled "DESIGNING A HEALING GARDEN FOR THREE DIFFERENT PATIENT POPULATIONS" conducted by Hayes Fairchild from the College of Environment and Design at the University of Georgia (404-313-1717) under the direction of Mr. Brad Davis, College of Environment and Design, University of Georgia (542-5194). I understand that my participation is voluntary. I can refuse to participate or stop taking part at anytime without giving any reason, and without penalty or loss of benefits to which I am otherwise entitled. I can ask to have all of the information about me returned to me, removed from the research records, or destroyed.

The reason for this study is to identify aspects and features of healing gardens that are appealing to patients in specific patient populations. If I volunteer to take part in this study, I will be asked to do the following things:

1.) Sign a Consent Form
2.) Discuss aspects of the healing garden that you like or dislike.
3.) Allow the researcher to observe behavior within the garden.
4.) Complete an 18-question questionnaire with the researcher for approximately 15-20 minutes.

The benefits for me are that I may gain a better sense and understanding of the healing aspects of the garden. Research in this area will further benefit alike patients. The researcher also hopes to learn more about the effectiveness of healing gardens as they relate to a patient's hospital satisfaction.

No risk is expected and in the event that you may feel uncomfortable and wish to withdrawal from the study you may do so at any time.

There will be no financial or other type of incentives given for participation in the study.

No individually-identifiable information about me, or provided by me during the research, will be shared with others without my written permission. I will be assigned an identifying number and this number will be used on all of the questionnaires I fill out.

The investigator will answer any further questions about the research, now or during the course of the project.

I understand that I am agreeing by my signature on this form to take part in this research project and understand that will receive a signed copy of this consent form for my records.

_____	_____	_____
Name of Researcher	Signature	Date

Telephone:_____

APPENDIX B

PATIENT QUESTIONNAIRE

STUDY: DESIGNING A HEALING GARDEN FOR THREE DIFFERENT PATIENT POPULATIONS

1. How does the garden allow you to socialize?
2. Where is the best place to visit in the garden?
3. Do you prefer to go to the garden alone or with friends?
4. Do you use the garden for exercise? How?
5. What is the best exercise in the garden?
6. Do you like to exercise alone or with others?
7. What in the garden takes your mind off of things?
8. Do you prefer man-made or natural features?
9. What is your main purpose of going to the garden?
10. Do you like working with plants? Why?
11. Do you prefer plants in pots or plants in the ground? Why?
12. Do you like to take plants back to your room or home with you?
13. Do you prefer to work with others or alone in the garden?
14. What is most pleasing about the garden? Least?
15. How do you decide when to use the garden?
16. Do you prefer to visit with family and friends indoors or outdoors?
17. What is your age?
18. What is your gender?

APPENDIX C

LETTER OF PERMISSION TO CONDUCT RESEARCH AT SKYLAND TRAIL

SKYLAND TRAIL
Offering hope, changing lives

Libba Shortridge, MLA
1961 North Druid Hills Road
Atlanta, GA 30329
June 1, 2010

Human Subjects Office
612 Boyd GSRC
The University of Georgia
Athens, Georgia 30602

To whom it may concern,

I am eager to begin the assessment titled, "Designing a Healing Garden for Three Patient Populations," outlined by the principal investigator, Brad Davis, and Co-Principal Investigator, Hayes Fairchild, in their IRB approval request dated May 14, 2010. This project has been vetted through Skyland Trail's Medical Director and VP of Clinical Services who endorses the investigation and commits to supporting the project through encouraging participation and promoting the endeavor. We hope to provide a good learning environment and the patients necessary for this study.

Sincerely,

Libba Shortridge, MLA
Horticultural Therapist

1961 North Druid Hills Road | Atlanta, Georgia 30329 | tel 404.315.8333 | fax 404.315.9838 | www.skylandtrail.org

APPENDIX D

Opportunities for Edge Treatment Variations for the Three Gardens

The following Figure D1 labels the edges of the garden to facilitate the discussion of the edge treatments that follows:

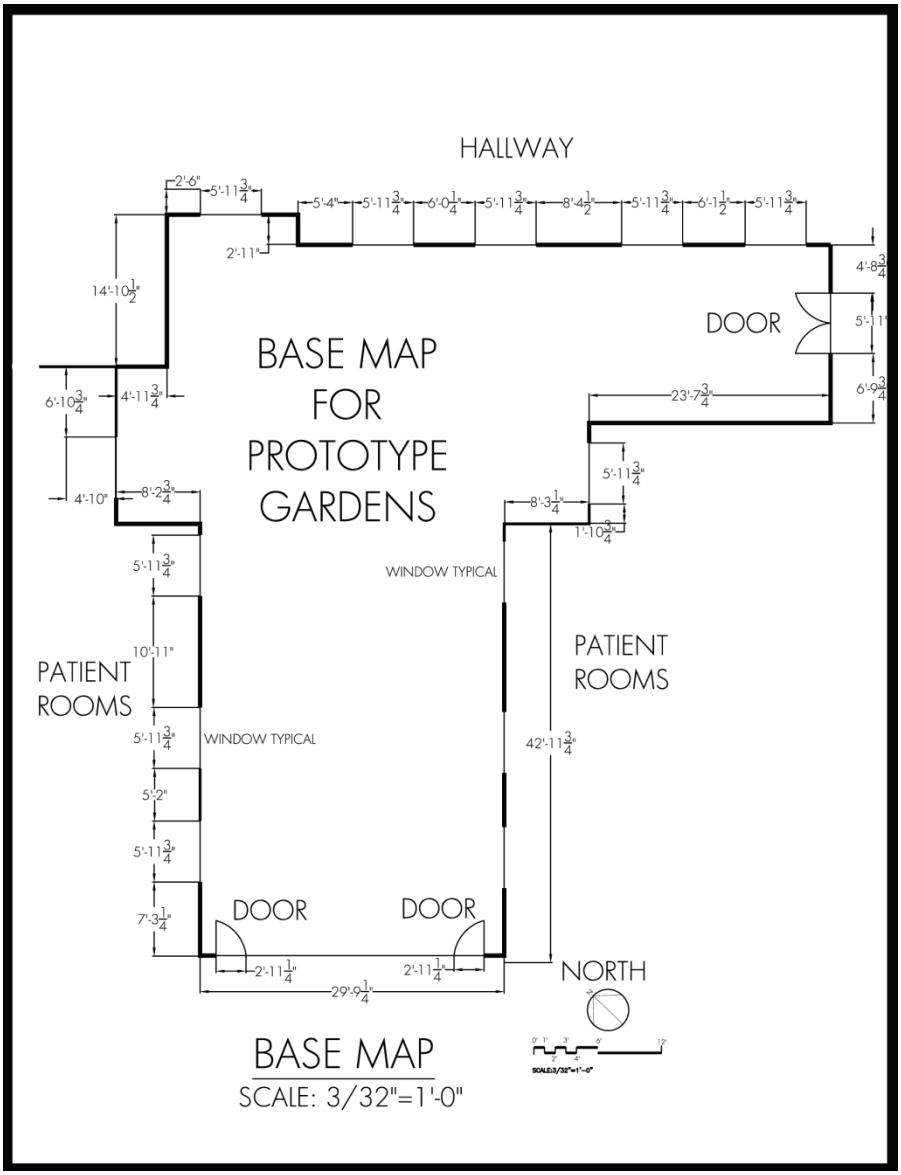

Figure D1. Base Map for Three Prototype Gardens

Dementia Garden

In the facility from which this layout was adapted, the garden is totally surrounded by building walls. If the building walls included only A, B, C, and D, those walls could have windows at a minimum height of six feet, high enough to admit light into the building yet protect privacy. The walls prevent garden users from looking inside the building and room occupants from looking directly out of the building. B could be a glass wall with entry and exit points on either side, opening into a building common area. E and F, and J and K, could be opposing bamboo fencing of a height of a minimum of seven feet, to provide textural variety, foliage, and a place for vertical vegetation. G, H, and I could be a minimum seven foot high brick wall, with a secured entry and exit point centered in wall H.

Catastrophic Garden

Assuming flexibility with respect to building walls, A, C, and D could be typical windowed walls. Wall B could include a garage door, as an option to the entry and exit points shown on the design that would open up the building and integrate the interior and exterior spaces. Wall E could include an additional wide and unsecured entry and exit point. Regardless of whether wall E includes that feature, E and F, and J and K, could be higher (six feet) walls made of brick, stucco, or bamboo that step down to a lower (three feet) wall at G, H, and I, made of one of the materials suggested for, but not already used, for E and F, and J and K. H would have a wide and unsecured entry and exit point.

Psychiatric Garden

Assuming flexibility with respect to building walls, A, B, C, and D should be windowless walls, to avoid patient apprehension that they were being watched. Wall B secured entry and exit points as shown in the design. Alternatively, wall B could be made of a one-way glass that is

opaque from the outside, but that offered a view from the inside. The material would have to be shatter-resistant for safety purposes. The corners at E and F and at J and K present good opportunities for locating schema. The background wall of seven feet in height should be simple enough to offer contrast for the schema. The walls that have the schemas need to be inconspicuous so that the schemas are the main focus. G, H, and J would be walls of a minimum of seven feet in height suitable for covering with vegetation. Wall H would include a secured entry and exit point.