

DEMENTIA GARDEN DESIGN:
A FRAMEWORK TO FACILITATE KAPLANS'
ATTENTION RESTORATION THEORY (A.R.T.)
IN ENVIRONMENTS OF CARE

by

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Abstract

This thesis documents an exploratory design process that examines the efficacy of a framework for designing dementia gardens based on: **theory**, Stephen and Rachel Kaplan's Attention Restoration Theory (A.R.T.), (Kaplan and Kaplan, 1989) and Roger Ulrich's Theory of Supportive Gardens (Ulrich, 1999); John Zeisel's (2007) **process** for designing dementia gardens; and **design details**, Claire Cooper Marcus' Garden Audit Tool (2007) and Moore's analysis of exemplary dementia gardens (2007). It documents the integration of theory that is not specific to dementia gardens (Kaplan's A.R.T. and Ulrich's Theory of Supportive Gardens) with process (Zeisel) and programming elements that are specific to dementia gardens (Cooper Marcus' Garden Audit Tool Kit and Moore's exemplary dementia gardens). The framework was developed during an illustrative courtyard design project for a retirement center whose clientele included patients with varying need levels. Throughout the illustrative design project, knowledge of the four A.R.T. characteristics (**Being Away**, **Fascination**; **Compatibility** and **Extent**) guided design decision-making in an effort to create an engaging environment, where improved health outcomes and restorative person-environment interactions could occur.

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Dedication

For my parents...

*Who first introduced me to the Zen of gardening and who learned to
accept their very adult daughter's desire to have a new computer
for graduate school instead of a new couch;*

For Maria & Aiden and Kate & Trivet for keeping the nest and our hearts full

For Lauren, Tyler, Jonathan, Melissa and Charlotte...

Whose shared journeys continue to provide love and inspiration

and

For John...

"Rarest soul I ever knew"

Preface

Landscape aesthetics is a lonely subject that demands time, patience and energy on the part of the researcher and substantial support from time to time (Wu, 1995, p. xxiii).

These graduate studies in landscape architecture have been a personal quest to understand how landscape architecture impacts our quality-of-life, and from this study of landscape architecture grew my interest in landscape aesthetics. As a baby boomer, I had the opportunity to experience the transformation of the United States following WWII. Born in Washington, D.C., some of my earliest memories are of its slums, standing in stark contrast to my post-war, single-family neighborhood carved into the thick Maryland forest where we played.

I spent the remainder of my childhood in a suburb of Omaha, Nebraska, literally in the Cold War shadow of the Strategic Air Command's Headquarters at Offutt Air Force Base where my father worked. Within one block of my home lived nine classmates, all sons and daughters of well-educated professionals attracted to the excellent, independent school system and small town atmosphere. We walked everywhere—to school, to piano lessons, to each other's houses, to the ballpark, to the drug store, to church. We also had a special place on a hill overlooking the lights of Omaha where we could experience and discuss a burgeoning sense of our place in the world. As Robert Pyle states in *Biophilic Design*, "Our blocks were populated by families who did not find it strange to accord their children the freedom of the day: once homework or yard chores were finished, it was 'Bye, Mom, see you at dinner' for most of the kids" (Kellert, 2008, p. 215).

After becoming the mother of five active children, my life morphed into the now ubiquitous chauffeur in a mini-van. I joined the ranks of parents across the nation whose stress levels are proportionate to the amount of time spent navigating their progeny through congested streets. I wondered why my children wouldn't experience what I had experienced as a child. What happened, and how did we get here? Landscape architects seemed to

possess much relevant knowledge that might lead us out of our current entrapment or keep us from becoming further entrapped. But, it almost seemed as if they were keeping that knowledge secret. Why didn't they utilize it and provide solutions? Did landscape architects know how to preserve the special places where we could talk, the woods to play in, the empty lots for baseball, and the close neighborhoods where we could walk to school? Could they advocate for special places that spiritually nourish us? Could they educate policy-makers about the need for large public areas where we could share in the "natural" world, or for smaller areas within cities? Could they help us avoid the repetitive suburban landscaping mistakes that collectively undermine the ecosystems where we live?

And so the journey began. At the end of my first semester in graduate school, Professor Tim Keane treated his natural systems class to one additional lecture, and I was able to question him about what I had just spent a semester studying in another class. Why were formal design elements such as rhythm, symmetry, balance, etc. important in designing environments that people would enjoy? What was the connection between abstract design principles and the experience of being in that space? Understanding the vague topic of landscape aesthetics now became an additional part of my personal attempt to understand how landscape architecture impacts our quality-of-life.

I believed that landscape architecture would be a good profession with which to grow old. I didn't realize that I would grow old in the pursuit of the profession. Neither did I realize that I would benefit from Roger Ulrich's research while a patient in Intensive Care at St. Luke's Mid America Heart Institute, in Kansas City, Missouri. Intensive care patients are treated to a restorative view of a beautiful park. Other patients get a view of the parking garage, and I experienced both on different occasions. The unforeseen benefit of growing old while learning the profession was that it allowed me the luxury to explore other quandaries that were important to me and which are included in the background portion of this thesis.

According to Wu, landscape aesthetics can be a lonely subject. It wasn't for me. I have received substantial support, not from time to time, but rather constantly, from many people—fellow students, friends, faculty, my family, particularly my husband, John, and Assistant Professor Katie Kingery-Page and Professor Timothy Keane. For all of them, I am very grateful.

Kellert, S.R., Heerwagen, J.H., and Mador, M.L. (2008). *Biophilic design: the theory, science and practice of bringing buildings to life*. Hoboken, New Jersey: John Wiley & Sons.

Wu, Jiahua, (1995). *A comparative study of landscape aesthetics: landscape morphology*. Lewiston, New York: The Edwin Mellen Press.

Chapter 1: Introduction

This thesis documents an exploratory design process that examines the efficacy of a framework for designing dementia gardens based on:

- **theory**, Stephen and Rachel Kaplan's Attention Restoration Theory (A.R.T.), (R. Kaplan and S. Kaplan, 1989) and Roger Ulrich's Theory of Supportive Gardens (Ulrich, 1999);
- John Zeisel's (2007) **process** for designing dementia gardens;
- and **design details**, Claire Cooper Marcus' *Garden Audit Tool Kit* (2007) and Moore's analysis of exemplary dementia gardens (2007). The diagram below illustrates the process used during the design of the Schowalter 'My Garden' Courtyard, which also resulted in the creation of a framework for the design of dementia gardens.

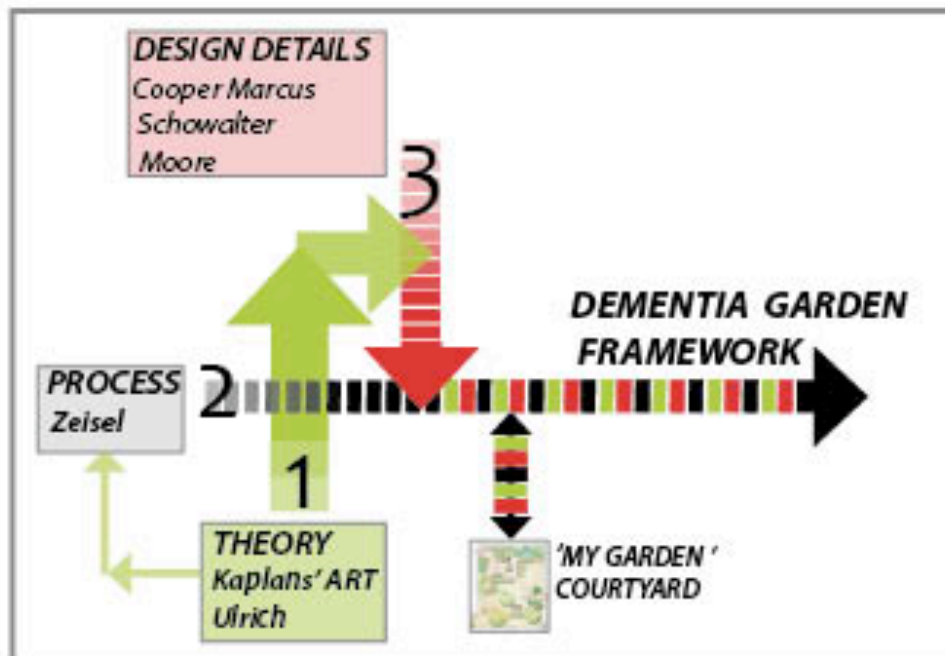


Figure 1.1 Dementia Garden Framework Diagram.

The diagram illustrates how Theory impacted Process and Program during the process of designing Schowalter Villa's 'My Garden' courtyard. The process also resulted in development of the Dementia Garden Framework.

The thesis documents the integration of theory that is not specific to dementia gardens (Kaplan's A.R.T. and Ulrich's Theory of Supportive Gardens) with process (Zeisel) and design details that are specific to dementia gardens (Cooper-Marcus' Garden Audit Tool) and Moore (2007). The integration of these components results in a framework, which I call a Dementia Garden Framework.

This framework was developed during a semester-long independent study that produced illustrative design drawings for a courtyard at a retirement center at Schowalter Villa, Hesston Kansas. Residents had varying levels of physical and cognitive needs, and the Schowalter staff wanted to ensure that everyone would be safe when using the courtyard. The framework is what I wish someone had handed me as the semester started. A guide incorporating theory, process and program details would have been invaluable to me, but no such framework existed. Consequently, I had to build one on my own. It was an independent study, after all.

The development of this framework and the semester-long project that created the need for the framework came about through an unplanned but timely series of events that involved multiple participants. I was enrolled in a post-baccalaureate graduate program in landscape architecture at Kansas State University and had an on-going thesis project in aesthetics research under Professor Tim Keane. Schowalter Villa, a Mennonite retirement community in Hesston, Kansas, was seeking design services for an amenity that would enrich their community. They wanted to build a "dementia-proof" garden, and the staff and residents of Schowalter Villa were already very knowledgeable and invested in the project. They approached Katie Kingery-Page, Assistant Professor in Landscape Architecture, hoping to involve students in the project. I worked with Assistant Professor Kingery-Page, completing illustrative drawings of a courtyard during a one-semester, one-credit class.

In the process of developing this framework, I was able to align two formerly conflicting theories of restoration, Attention Restoration Theory (A.R.T.) and Ulrich's Theory of Supportive Gardens. This was accomplished by showing in the framework how the theories could be considered supportive of each other as well as supportive of the clientele for whom the courtyard was being designed. This framework was useful for me, and I hope that it will be useful for other novice designers of dementia gardens.

Incorporating two conflicting theories into the design process was not part of the original programming for the Schowalter Courtyard. I began exploration of the contributions that Attention Restoration Theory (A.R.T.) might make to this project after reading Moore's article (2007) documenting the presence of A.R.T. components in "successful" dementia gardens. Individual staff members at Schowalter were already familiar with A.R.T., which also encouraged me to see how Attention Restoration Theory might contribute. However, after my continuing education in therapeutic garden design, I realized that Ulrich's Theory of Supportive Garden Design was well respected and frequently cited as a base of theory for the design of dementia gardens. Subsequently, I began exploring its potential to help achieve a successful therapeutic garden.

I had not spent much time reading about healthcare garden design before becoming aware of the controversy between Ulrich's approach and the Kaplans' approach to restorative environments. The similarities and points of departure for A.R.T. and the Theory of Supportive Garden Design are explored in depth later in this document, but I felt that a courtyard that was designed to facilitate A.R.T. and included Cooper-Marcus' design details, would also meet Ulrich's goals for supportive gardens and stress reduction.

In addition to theory from the Kaplans and Ulrich, the framework also includes process from John Zeisel. This process successfully integrates psycho-neurological knowledge and design experience, specifically design for Alzheimer's patients. Zeisel's design background and his involvement in the design and administration of retirement centers has provided a unique

opportunity for combining the design process with informed neurological knowledge of the dynamics of dementia patients.

Clare Cooper Marcus' contribution to the Framework is providing suggestions for specific design details and procedures for on-going maintenance, all recommended by experienced garden designers. Her Alzheimer's Garden Audit Tool provides specific suggestions for design, maintenance and programming. Keith Diaz Moore's article (2007) provided support for the idea of incorporating A.R.T. into dementia gardens as well as providing additional, specific design details for dementia gardens that support Attention Restoration Theory.

Attention Restoration Theory as the Primary Theoretical Basis

Despite the inclusion of Ulrich's theory, Zeisel's process, Cooper-Marcus' and Moore's program elements, A.R.T. remains the primary theoretical basis for the design of the Restorative courtyard at Schowalter Villa. I felt that A.R.T. could make significant contributions to the project and keep the garden from suffering from the malaise Zeisel identifies when therapeutic gardens become "trite and simplistic" (Zeisel, 2007, p. 20). The three contributions listed below help achieve this goal.

- A.R.T.'s first contribution is providing *a road map through the numerous existing paradigms* for which dementia garden designers advocated. Some of these paradigms involved process, some involved program elements. However, few involved rigorous theory. Most of these paradigms were based on experience as successful designers of dementia gardens and an understanding of the benefits of horticultural therapy. Missing was knowledge of theory and research exploring how specific design details actually improved the users' quality of life or their ability to function within the specialized setting of dementia gardens. With the exception of a few designers, knowledge of neuropsychology and cognitive information processing seemed to be absent from these paradigms.

- The second contribution A.R.T. made to the project was its potential to *improve health outcomes* for residents. Even for the elderly not suffering from dementia, cognitive functioning, particularly executive functioning, can be a challenge. *An environment possessing the four A.R.T. characteristics and capable of restoring Directed Attention capabilities might permit residents to function more fully.*
- Third, I felt that A.R.T. might provide a possible framework for *understanding the resident's desires to be outdoors*. Many studies in environmental aesthetics have documented that people prefer natural environments to manmade environments. Additionally, continuing studies have clarified these preferences and explained them in terms of neuropsychological mechanisms and cognitive functioning.

The Kaplans' work (1989, 1995) and the work of other researchers (Ulrich, 1983, 1984, Hartig, 1993,) assert that there is a natural tendency to prefer environments that are restorative. In the Kaplans' own words, "Aesthetic reaction is an indication of an environment where effective human functioning is more likely to occur" (R. Kaplan and S. Kaplan 1989, p. 10). *A.R.T. might help explain why the residents of Schowalter were seeking outdoor environments.*

From the residents of Schowalter Villa themselves came evidence of their preference for outdoor environments. The following compelling testimonials illustrate their desire to recreate experiences in environments that were now missing from their lives.

"I am a person that needs sunshine and fresh air, and I miss the outdoors. I miss sitting outside with my wife and enjoying an afternoon. I would love to sit and eat outside. If I could, I would put a fence around this whole place."

"We ended up sitting and visiting together for two hours. It was lovely and we all enjoyed our time outdoors." ...

" I remember being protected from spring rains as we enjoyed the sounds of thunderstorms and the smell of a wet garden"....

“Here at the Villa I like to watch the men mow the lawn, the birds and squirrels at the feeders, and the children running and playing outside.”... “

I would like to have the opportunity to get outside a little bit everyday”... “

If there was a fence I could go all around and no one would have to watch me.”

Writings from Schowalter Residents

Therapeutic Gardens and Dementia

Many Schowalter residents come from farming backgrounds, and their desire to be outside is understandable. However, outdoor environments have been utilized in many environments of care in order to improve health outcomes for all residents, not just those with a farming background. As a subset of healthcare gardens, dementia gardens are being promoted and studied by practitioners and researchers in order to improve health outcomes in dementia patients.

In their introduction to the *Journal of Housing for the Elderly* (2007, Vol. 21), an issue dedicated to outdoor environments for people with dementia, Benjamin Schwarz and Susan Rodiek state, “we consider the outdoors to be an essential component in the intervention efforts in dementia care” (Schwarz, B., and Rodiek, S., 2007, p. 6). However, even though dementia patients share many of the same challenges as others who suffer from chronic illnesses, “relatively little is known about how persons with dementia respond to specific environmental features, and how planned activities and environmental conditions can encourage usage and/or benefit residents” (Schwarz, B., and Rodiek, S., 2007, p. 6)

Currently in the United States, there are 5.4 million individuals diagnosed with Alzheimer’s disease, the leading form of dementia, and 172 billion dollars are spent annually in their treatment and care. Alzheimer’s disease is the seventh leading cause of death. Unlike other diseases, (prostate cancer, breast cancer, heart disease, HIV and stroke) which collectively showed a 57percent decrease in death rate, the death rate from Alzheimer’s disease increased 46 percent from 2000-2006. In 2010, there were 5.6 million Americans 85 and older. By 2050, that number will reach 19

million, (Alzheimer's Association). On a daily basis, 14.9 million Americans are caring for people with Alzheimer's.

Dementia is characterized by the loss of or decline in memory and other cognitive functions. Central to treatment of Alzheimer's disease and other dementias is the preservation of abilities that are still intact. Preserving and supporting cognitive functioning becomes an important component of dementia treatment. Early diagnosis is also crucial.

Can outdoor environments created to support directed attention functioning become an "essential component of the intervention efforts in dementia care" (Schwarz, B., and Rodiek, S., 2007, p.6)? Can this Framework help support those intervention efforts? Retirement communities struggle to keep their facilities affordable for their residents. If outdoor environments become an essential component in intervention efforts in dementia care, they need to be designed correctly to facilitate these interventions efforts. They also need to be constructed in a cost-effective manner. A framework that incorporates proven design details with process that helps guarantee safety could be useful in keeping costs down and improving health outcomes.

Moore even suggests that environments possessing the restorative characteristics of A.R.T. might be used to help diagnose dementia in the preclinical stages. "Recent neuropsychological research suggests that attention function has significant predictive value in diagnosing dementia in the preclinical phase," (Moore, 2007, p. 73). Can the Kaplans' Attention Restoration Theory (A.R.T.), Ulrich's Theory of Supportive Gardens, Zeisel's process and Cooper-Marcus' and Moore's design details be successfully incorporated into a framework to facilitate the development of outdoor environments used in diagnosing dementia in the preclinical phase?

Currently, pharmaceutical therapies offer limited hope for treating dementia, but three drug companies currently have new dementia medications in the late clinical trial stage. These companies hope to have these drugs on the market in 2013. Early diagnosis and treatment will be

critical to the new drugs' efficacy in slowing the progression of dementia (Bary, 2012, p. 23).

As hope for new pharmacological treatments and early diagnosis of dementia increases, attention is turning to designing therapeutic gardens that support functioning for people with not only dementia, but other health outcomes as well. Dementia gardens are a subset of the much larger area of therapeutic gardens. Diverse professions and research activities support the design of these therapeutic gardens. Cognitive psychologists, horticultural therapists, physical therapists, occupational therapists, gerontologists, neurologists, nurses, doctors, psychiatrists, architects, environmental psychologists, and landscape architects have all contributed to our current understanding of therapeutic gardens.

This growing understanding of therapeutic gardens also benefits from the literature of landscape aesthetics which over the last 400 years has evolved from an exclusive, primarily visual "art of taste" (Downing, 1841, p. 28) practiced on large estates into an active research area that explores the role landscape plays in our societal and personal well being. Chapter Two of this document traces some of this history, which I felt helped to explain this evolution.

The Background section of this document covers many subjects. The length of the Background section results from two factors--the knowledge required of successful dementia garden designers is extensive, and my personal interest in the history of landscape aesthetics and research was also extensive.

In the Background, I first briefly trace the historical, cultural and environmental factors influencing the development of landscape aesthetics in the United States. These factors are: Judeo-Christian beliefs; fourteenth century Italy; eighteenth and nineteenth century England; and nineteenth century United States. These historical, cultural and environmental influences set the stage for the government's requirements for visual analysis in the 1960's and resulted in three landscape assessment paradigms: Professional; Behavioral and Humanistic. From the Behavioral category comes the

research that produced Attention Restoration Theory, the Theory of Supportive Gardens, and other on-going research in therapeutic garden design.

Also included within the Background Chapter is a large section devoted to the Kaplans. This portion is lengthy for numerous reasons. First is my interest in their work and its progression over the last forty years. Their research began in the 1970's and was well grounded in the rigors and scientific theory of operant psychology research. Secondly, because the Kaplans have successfully applied their theoretical research into the design process, (*With People in Mind*, 1998,) the scientific basis is often overlooked or trivialized by people unfamiliar with this research. It is easy to incorporate their design suggestions without understanding the theory behind it. And, while that might have been the Kaplans' intent, I feel that it would be inappropriate to shortchange this theory in a scholarly endeavor. Additionally, a thorough understanding of their theories is necessary in order to understand the similarities and differences between Ulrich's research centering on the concept of reducing stress, and the Kaplans' that emphasizes cognitive restoration. Ulrich's research shares many similarities with the Kaplans' research, but there are significant if not subtle distinctions between them.

After the section on the Kaplans and Ulrich, I include a section on the at-times confusing terminology of therapeutic gardens, followed by a section on the history of therapeutic gardens. Next is an overview of one subset of therapeutic gardens, (dementia gardens), and the illness that creates the need for these gardens.

Chapter 3: Process: IMAGE, PRESENT, TEST, documents the design process. Throughout Chapter 3, headings from Zeisel's process (IMAGE, PRESENT AND TEST) are used for the different stages of the task of designing the Schowalter Courtyard, for example, concept development; presentation of design alternatives; refinement of design; final illustrative design. Within this section I show how the developing framework was utilized to achieve the stated program goals at Schowalter Villa.

Schowalter Villa is a residential living community in Hesston, Kansas that is run by the Mennonite Board of Mission and Charities of Kansas. Anticipating new growth, the Villa has undertaken renovation of existing facilities and expansion through new facilities. 'My Garden, My Home' was the name given to the project of updating of an assisted living facility and the renovation of an existing courtyard. In keeping with their Mennonite tradition, many of Schowalter's residents come from rural backgrounds with daily outdoor work. Unfortunately, some of these residents are no longer able to go outside without assistance or escort. The Schowalter community responded to their residents' desires to have access to the outdoors by engaging in a project to provide a safe outdoor living space with independent access.

Toward a Base of Knowledge for Landscape Architecture

As a graduate project in landscape architecture, this thesis belongs in the category of landscape aesthetics, specifically the subset of cognitive aesthetics. While aesthetics is not new to landscape architecture, cognitive aesthetics, which deals with human preference and human information processing in the natural environment, is relatively new. Today, landscape aesthetics research covers an extraordinarily wide range of topics. For example, Hagerhall, et al, have attempted to attribute individual landscape preference to the landscape's inherent qualities of fractal geometry (Hagerhall, Purcell, & Taylor, (2004). Kuo and Taylor's research links attention deficit disorder to a lack of access to outdoor environments (Kuo, and Taylor, A.F. 2004). A natural setting's ability to aid in recovery from mental fatigue is the subject of other lines of research (Han, 2003; Kaplan, R., and Kaplan, S., 1989; Hartig, Kaiser, and Bowler, 1997). All this diverse research seeks to build a new understanding of the role that natural or nature-like settings play in improving the built environment and the quality of the lives of the people who inhabit these environments.

The work presented here follows this young tradition of landscape architecture research in human landscape preference and builds upon prior

research. Many questions about design guidelines require extensive further research and post-occupancy evaluations beyond the scope of this project. And, while larger research issues remain, it is felt that A.R.T., Ulrich's Theory of Supportive Gardens, Zeisel's process recommendations and Cooper-Marcus' design details and Moore's analysis inform and enrich the design of restorative gardens for dementia patients.

This endeavor has been a broad, academic learning experience that was largely motivated by personal questions and shaped by a series of fortunate circumstances. The result is a fairly in-depth understanding of therapeutic design—theoretical and practical-- because of the experience of working directly with residents, staff and administrators. It has been a useful academic exercise, one that could serve as a springboard for specialized design projects that help both people and places by contributing to our understanding of therapeutic gardens.

In addition to contributing to therapeutic garden design and research, it is hoped that this thesis will contribute toward landscape architecture's own base of knowledge, as envisioned by Ervin Zube, who "saw the profession evolve from one aimed largely at synthesizing and applying knowledge generated from outside landscape architecture to one that is now active in creating its own base of knowledge" (Gobster, Palmer, Crystal, 2003, p.175)

Chapter 1 Citations

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Chapter 2: Background--From a Visual 'Art of Taste ' to Environmental Psychology

Why does a virtuous man take delight in landscapes? It is for these reasons: that in a rustic retreat he may nourish his nature; that amid the carefree play of streams and rocks, he may take delight (Hsi, 1935, p. 30).

Developing an understanding of human landscape values requires an understanding of the cultural history of the country where landscape values are being studied.

When we see a landscape, we do not simply perceive it. As we sense nature, we invariably and instinctively interpret it. We sense the world through cultural contact lenses, as it were, lenses that determine the way we see things but which are in themselves transparent because they are so deeply entrenched in our way of viewing the world that to us, they blend with what we see (Gunnarsson, 2006, p. 223).

This section focuses on the cultural contact lenses by which landscape is viewed in the United States. By briefly highlighting historical factors that have influenced the development of landscape values, one gains a better understanding of landscape aesthetics research in the United States. The significant historical factors covered in this chapter include:

- Judeo-Christian Beliefs
- Fourteenth Century Italy
- England in the 1600's
- Eighteenth and Nineteenth Century England
- Nineteenth Century United States (Zube, in Smardon, 1986, p. 18)
- The Landscape Disposal Period: 1785-1877
- The Landscape Preservation: 1864
- Recreation Landscapes: 1920-1968
- Ameliorate Scenic Ills: 1965
- Environmental Planning: 1969 (Smardon, 1983, p. 9).

This historical review begins with an examination of how landscape values were affected by: Judeo-Christian beliefs; fourteenth century Italy;

England in the 1600's, (which is important because it sets the stage for eighteenth and nineteenth century England); and nineteenth century United States. In the introduction to *Man and the Natural World*, Keith Thomas (1983) states:

But to understand these present-day sensibilities we must go back to the early modern period...It was these centuries which generated both an intense interest in the natural world and those doubts and anxieties about man's relationship to it which we have inherited in magnified form. (Thomas, 1983, p. 15)

Judeo-Christian Beliefs

Central among the historical factors listed on the preceding page are the Judeo-Christian beliefs and traditions which European colonists and immigrants brought to the United States during settlement (Nash, 1967, p.13). Even though they came seeking religious freedom, they arrived on the shores of America with their Bibles in-hand and their Judeo-Christian beliefs in their hearts. In his now legendary essay, "The Historical Roots of Our Ecological Crisis", historian Lynn White states, "Especially in its Western form, Christianity is the most anthropocentric religion the world has seen" (White, 1967, p. 5).

The following passage from Genesis is often cited as evidence that Jews and Christians believe that the Earth and "all the fullness thereof" were created for man and this belief fueled the anthropocentric view. "God blessed them and said to them, 'Be fruitful and increase in number; fill the earth and subdue it. Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground'" (Genesis 1:28). While White's essay has been thoroughly debated and criticized for being overly simplistic, it is cited as one cornerstone of the environmental ethics movement. (*Environmental ethics for the novice*, npd, p.1) Christianity shares this anthropocentric worldview with the other Abrahamic religions (Judaism & Islam), where Man transcends Nature, and Nature is thought to be secondary (Tucker, 1997, n.p.).

According to White, this anthropocentric worldview derived from the conquest of pagan animism by Christianity.

The spirits of natural objects, which formerly had protected nature from man, evaporated” (White, 1967, p.6). The contemporary theology that resulted from the conquest of paganism “provided the moral underpinnings for that ascendancy of man over nature which had by the early modern period become the accepted goal of human endeavor (Thomas, 1983, p.22).

Cicero’s (106-43 B.C.) *De Officiis* refers to this as “man’s great opportunity.”

It is no mean manifestation of Nature and Reason that man is the only animal that has a feeling for order, for propriety, for moderation in word and deed and so no other animal has a sense of beauty, loveliness, harmony in the visible world (Abrams, 1968, p. 402).

By 1630 when Des Cartes denied that animals had souls and the Cartesian view “generated a vast learned literature” (Thomas, 1983, p.34), the anthropocentric worldview was entrenched, and the Elizabethan worldview became one of cosmic order. Man could move up the chain of being toward God, or down toward beasts, which was more common (Abrams, 1968, p.401).

In Tudor and Stuart England the long-established view was that the world had been created for man’s sake and that other species were meant to be subordinate to his wishes and needs....Nature made nothing in vain, said Aristotle, and everything had a purpose. Plants were created for the sake of animals and animals for the sake of men. Domestic animals were there to labour, wild ones to be hunted. The stoics had taught the same: nature existed solely to serve man’s interests (Thomas, 1968, p. 17).

Even though the natural world had been created for man’s sake, realistic fears of the “frequently dangerous and always beyond control” (Nash, 1967, p.9) natural world kept man from enjoying it. *Beowulf*, the “oldest of the great long poems written in English” (Abrams, 1968, p. 30), probably written around 700 A.D., is a vivid description of the horrors of the dangerous, uncontrollable natural world in Grendel’s Mere:

They hold to the secret land, the wolf-slopes, the windy headlands, the dangerous fen-paths where the mountain stream goes down under the darkness of the hills, the flood under the

earth. It is not far from here, measured in miles, that the mere stands; over it hang frost-covered woods, trees fast of root close over the water. There each night may be seen fire on the flood, a fearful wonder. Of the sons of men there lives none, old of wisdom, who knows the bottom (Abrams, 1968, p. 59).

In addition to the rational fears of the natural world, the philosophical fear of sliding down the chain of being away from God and toward animals also kept man from enjoying the natural world. To move closer to animals meant becoming more animal-like, with no souls and no sense of order.

St. Anslem, writing at the beginning of the 12th century, maintained that things were harmful in proportion to the number of senses which they delighted. Therefore he maintained it was dangerous to sit in a garden where “there are roses to satisfy the sense of sight and smell, and songs and stories to please the ears” (Clark, 1961, p. 3).

Good Christians were to “maintain an aloofness from the pleasures of the world” (Nash, 1967, p.19) which also kept them aloof from the pleasures of nature and its inherent dangers. However, a century later when Dante (1265-1321) wrote his *Divine Comedy*, “the supreme and the centrally representative expression of medieval man in imaginative literature” (Mack, 1962, p. 490), the emergence of a different attitude toward nature can be detected. Written during the end of the medieval period, Clark credits the poem with a “change from the menacing world of the early Middle Ages, to the gentler world of the microtheos, when God might be manifest in nature” (Clark, 1961, p.8).

The moment was the morning’s earliest prime,
And the sun mounted up, accompanied
By those stars that with him began to climb
When divine love first made through heaven to glide
Those things of beauty. (Mack, 1962, p. 593)

Fourteenth Century Italy

Dante’s writings were followed by those of Francesco Petrarch, born in Italy around 1300. (Petrarch, np. website). Petrarch has been credited (or blamed) for the start of humanism and the end of the “dark ages” when few people could read or write. Clark (1961), Nash (1967), and Pregill & Volkman

(1993), all cite Petrarch's letter, "The Ascent of Mount Ventoux," as an important document clearly illustrating Petrarch's personal struggle with the sinful lure of the natural world. This struggle appears to be a continuation of the attitudinal change noted in Dante's *Divine Comedy*. In the following passage, Petrarch has written a letter to his father describing his trip to the top of Mount Ventoux. While at the top of the mountain, Petrarch has opened his copy of St. Augustine's *Confessions*, which "I always have about me," and he quotes St. Augustine:

'And men go about to wonder at the heights of the mountains, and the mighty waves of the sea, and the wide sweep of rivers, and the circuit of the ocean, and the revolution of the stars, but themselves they consider not.' I was abashed, and asking my brother (who was anxious to hear more), not to annoy me, I closed the book, angry with myself that I should still be admiring earthly things who might long ago have learned from even the pagan philosophers that nothing is wonderful but the soul, which, when great itself, finds nothing great outside itself" (Clark, 1961, p. 10).

Clark also asserts that Petrarch was, "probably the first man to express the emotion on which landscape painting so largely depends: the desire to escape from the turmoil of cities into the peace of the countryside" (Clark, 1961, p. 10).

Was Ervin Zube referring to Petrarch and the beginnings of humanism when he asserted that American landscape values were born in fourteenth century Italy (Smardon, 1986, p.18). Zube does credit Italy with "the emergence of this modern concept of landscape as a source of pleasure and satisfaction" which "was enhanced by subsequent developments in landscape painting and garden design" (Smardon, 1986, p. 5).

Or, might Zube have been referring to other cultural events resulting in changed landscape values in Italy? According to Pregill & Volkman (1993), during the fourteenth century in Italy the concept of land as a market commodity was born. During the fourteenth century, Italy led the world in the change from feudalism to a "new landscape order based on urbanization & free market economies" (Pregill & Volkman, 1993, p.207). Viewing land as a liquid asset certainly would have changed man's relationship with the land.

Notably in northern Italy, where feudal forces had been less pervasive than in other parts of Western Europe, the landscape gradually evolved into a multi-functional entity, engendering both agricultural & leisure activity. In northern Italy, both of the functions accrued from rapid development of market systems, enabling resourceful individuals to invest in land for monetary gain and sensual pleasure...soon entire regions bore the mark of Renaissance humanism, fueled by market capitalism and the habit of prosperous individuals of viewing land as a commodity in the market system (Pregill & Volkman, 1993, p. 207).

18th and 19th Century England

The emergence of the Romantic tradition has been referred to as the “great leap in eighteenth century Britain” (Pregill & Volkman, 1993, p. 247), and is the second factor that Zube (Smardon, 1983) cites as having shaped American landscape values. The origins of romanticism and its implications for landscape aesthetics are explored here.

Although the concept of land as a commodity in the market system originated in Italy, the country’s preoccupation with ancient authority kept it from embracing scientific inquiry as readily as northern Europe. “With the application of practical science to technology” (Pregill & Volkman, 1993, p.238) northern Europe soon gained technological superiority (White, 1967, p.3). And, before the end of the 18th century, “England had become, with the exception of the Netherlands, easily the most urbanized country in Europe” (Thomas, 1983, p. 243).

Science wedded to technology had provided a more powerful tool with which man could exert his dominion over creation. In the words of Sir Francis Bacon (1561-1626), “the purpose of science was to restore to man that dominion over the creation which he had partly lost at the Fall” (Thomas, 1983, p.27). In England, science wedded with technology yielded advances in industrialization, agriculture and the growth of polluted, crowded cities.

Choking under clouds of sulfur-laden smoke and encouraged by country estates of the wealthy, city residents began to idealize the countryside where “landowners would walk into the sweet meadows and green woods, there to rejoice their spirits with the beauty and savor of the

sweet flowers, and with the harmony of the birds” (Thomas, 1983, p. 249). The advancement of agriculture from 1760-1820 and the existence of “rigorous and symmetrical cultivation” (Thomas, 1983, p. 263) also contributed to an environment where natural landscapes began to be preferred.

Luxurious man, to bring his vice in use,
Did after him the world seduce,
And from the fields the flowers and plants allure,
Where Nature was most plain and pure.
He first enclosed within the gardens square
A dead and standing pool of air,
And a more luscious earth for them did knead,
Which stupefied them while it fed....
'Tis all enforced, the fountain and the grot,
While the sweet fields do lie forgot,
Where willing Nature does to all dispense
A wild and fragrant innocence;
And fauns and fairies do the meadows till
More by their presence than their skill,
Their statues polished by some ancient hand,
May to adorn the gardens stand;
But, howsoe'er the figures do excel,
The gods themselves with us do dwell.

The Mower, Against Gardens, Andrew Marvell, 1681 (Abrams, 1968, p. 982).

Pregill & Volkman, in partial agreement with Thomas, believes that two events fueled the development of the Romantic tradition in England: “the worship of nature and the ownership of property” (Pregill & Volkman, 1993, p. 247). Worship of nature was facilitated by circumstances where nature was not identical with difficult, physical labor. On the grand estates of England preserved for future generations by primogenitor, nature could be viewed, manipulated and enjoyed, rather than being a source of constant, unpredictable physical work.

Just as the idealized notions about nature would soon become part of the American culture, these ideas were influential in other European countries. Writing in his travel book, *The Labyrinth, 1792-93*, the Danish poet, Jense Baggesen advocates for placing benches across the countryside so that peasants can realize the beauty of the surrounding landscape, and

become a more “human human being; he would suddenly cultivate a taste for this beautiful scenery, for glorious Nature, and would certainly no longer be remiss in turning to the source that yields up such sweet blessings.” Author Gunnarsson interprets these writings to mean that,

...nature is not an unavoidable fact of life, not synonymous with hard physical labour carried out in order to obtain the basic necessities of life. Nature is a delimited space that man can independently decide to retreat from in order to enjoy the spectacle from a distance. Nature has become an aesthetic matter. Nature has become landscape (Gunnarsson, T., et al, 2006, p. 223).

In 1700, seventy-five percent of British citizens lived in rural areas, and only thirteen percent lived in towns with a population over 15,000. In 1800, the number of British citizens living in towns had increased to twenty-five percent. By 1851, more British citizens lived in towns than in the country. At the beginning of the 18th century, two million acres were in common fields in Britain. From 1760-1820, 2.5 million acres ceased being in common fields by being enclosed in a new, neat landscape, (Thomas, 1983, p. 243). These are the “gardens square” in Marvell’s poem *The Mower, Against Gardens*. In one hundred and fifty years, England had been transformed from a predominantly rural country to a predominantly urban country.

The beginning of the Romantic period was a reaction against polluted, crowded cities and neo-classical landscapes. Encroaching agricultural practices resulted in a new appreciation of nature. Abrams believes that the beginning of the Romantic period was a deliberate revolt against the world views of Descartes and other scientific philosophies of the 17th and 18th centuries. These views “had posited as the ultimate reality a mechanical world consisting of physical particles in motion” (Abrams, 1968, p.9).

However, Thomas believes that the beginning of Romanticism and doubts about man’s relationship with nature were brought about by the following factors:

- Man-centered perceptions were discredited by the more detached and objective study of natural history.

- A closer sense of affinity with animals had weakened old assumptions about human uniqueness.
- New concerns for animal suffering.
- More people (other than the landed gentry) started to plant trees and cultivate flowers for emotional satisfaction (Thomas, 1983, p. 243).

The preference for neat, symmetrical cultivation of land stood as a symbol of civilization and the classic ideal that associated beauty with fertility. As towns continued their encroachment into the rural countryside, attitudes gave way to a new preference for nature undisturbed rather than nature cultivated (Thomas, 1983, p. 253).

These longings provided a clear indication that there were many who felt that, although the natural world should be tamed, it ought not to be completely dominated and suppressed. “This ancient pastoral ideal has survived into the modern industrial world” (Thomas, 1983, p. 253).

In his book, *Man and the Natural World*, Keith Thomas (1983) thoroughly explains the progress of romanticism and subsequent developments in landscape aesthetics: English landscape gardening; the picturesque; and the sublime. These 19th century developments resulted from the changing relationship between man and the natural world and the industrialization that began threatening this new relationship. And, while Capability Brown and the “Gardenesque” movement influenced the work of Andrew Jackson Downing and later American landscape architects, more important to this discussion are values that shaped relationships toward nature in the United States. These values are the picturesque and the sublime. Together they represented a major change in human perception toward scenes of “relative desolation” (Thomas, 1983, p. 264). These developments are important because of their role in the creation of national and state parks in the United States, and, subsequently, visual assessment tools that became the starting point for modern research into landscape perception and landscape aesthetics.

English Values Adopted in 19th Century America

Romanticism in the United States found a very different environment than it had left behind in England. The United States, like England, was also building large, polluted, cities. However, in the United States, the majority of the country was still “wilderness” and undeveloped by European settlers. Roderick Nash’s classic book, *Wilderness and the American Mind*, (Nash, 1967) examines the concept of the American wilderness—“the basic ingredient of American civilization” (Nash, 1967, p. xi). According to Nash, when William Bradford stepped off the Mayflower into a ‘hideous and desolate wilderness,’ he started a tradition of repugnance.

Nash names two components that shaped this tradition of repugnance. Neither of these components was an idea original to the United States. They grew out of English ideas about nature and man’s relationship with nature that are discussed in the previous section. “On the direct, physical level, it {wilderness} constituted a formidable threat to...survival...In addition civilized man faced the danger of succumbing to the wildness of his surroundings and reverting to savagery himself” (Nash, 1967, p. 24). In 1629 when Governor John Winthrop listed reasons for departing ‘into ...the wilderness,’ an important reason was the “the whole earth is the lords Garden & he hath given it to the sonnes of men and with a general Condision, Gen. 1.28: “Increase & multiply, replenish the earth & subdue it” (Nash, 1967, p. 31). In addition to the dual English concepts of man’s domination of nature and its ability to degrade man into savagery, in this uniquely American setting, the Puritans could also fulfill their religious destiny by subduing the vast acres of American wilderness.

These dual American values of fear of the wilderness and the desire to tame it prevailed until American writers adopted the European tradition of Romanticism. From Nash comes as precise a definition of Romanticism as possible. “Romanticism resists definition, but in general it implies an enthusiasm for the strange, remote, solitary and mysterious” (Nash, 1967, p. 47). It was not common man who transported these ideas across the Atlantic Ocean. Rather, it was transported by the educated writers and artists who

spent time traveling through, exploring, and documenting the countryside and brought “highly literary and intellectual inspiration of the new sensibilities” (Thomas, 1983, p. 264).

Enthusiasm for wilderness based on Romanticism, deism, and the sense of the sublime developed among sophisticated Europeans surrounded by cities and books. So too in America the beginnings of appreciation are found among writers, artists, scientists, vacationers, gentlemen—people, in short, who did not face wilderness from the pioneer’s perspective (Nash, 1967, p. 51).

Educated, wealthy English explored and toured the English countryside. They were influenced by the elements of composition used by landscape artists. As in landscape paintings, nature could be viewed in combinations of elements that resulted in a pleasing view. The viewings reminded them of the landscape pictures hanging in their homes or viewed in museums. Consequently, the term “picturesque” came to be applied to nature views. However, Thomas points out that nature sojourners were frequently disappointed, since a natural scene seldom achieved William Gilpin’s picturesque definition as the “pleasing quality of nature’s roughness, irregularity and intricacy” (Nash, 1967, p. 46).

The concept of the sublime took this irregularity even further, when “vast, chaotic scenery” (Nash, 1967, p. 45) could also be pleasing. And, while the sublime did not initially include landscapes,

“gradually eighteenth century aestheticians refined their theories to include the possibility that landscape also had the potential to elicit the sense of the sublime, if it contained sufficient historical references to elevate the scene beyond mere natural effect” (Pregill & Volkman, 1993, p. 248).

The Period of Landscape Disposal: 1785-1877

Romantic Deists added another significant dimension to a new relationship with nature. Deists viewed “pure nature as the clearest medium through which God showed His power and excellency” (Nash, 1967, p. 46). Viewing and experiencing God’s magnificent natural wonders gave man the

opportunity to become more like God, to experience God's presence, and to see his wisdom at work in the design of the natural world.

American nationalism further compounded the young American nation's response to the "untamed" wilderness. Manifest Destiny, as explained by Pregill & Volkman, "defined the environment as just another force to be subdued as the land claims of other nations were eliminated across the continent" (Pregill & Volkman, 1993, p. 604). The federal government's legislation made it possible to give away immense areas of "free" land across the United States. Zube refers to the period between 1785 and 1916 as the period of Landscape Disposal (Smardon, 1983, p. 9). Starting in 1785 with the General Ordinance of 1785, and including the four Homestead Acts of 1862, 1902, 1909 and 1916, over one billion acres of the "public domain" was disposed of.

Landscape Preservation

Following the Landscape Disposal period, the United States entered the antithetical Landscape Preservation phase (Smardon, 1986) In stark contrast to the landscape disposal period was the landscape preservation period when magnificent landscapes were preserved through the creation of national parks. In 1872, Yellowstone National Park was established, with millions of acres dedicated and set apart as a public park.

Establishment of Yellowstone National Park was "the first major effort at the national level to reserve land for social and aesthetic purposes rather than for the economic benefits of individuals" (Ndubisi, 2002, p. 201).

In 1916, the National Park Act "legitimized the protection of large natural areas for their ecological and aesthetic integrity" (Ndubisi, 2002, p. 202).

The establishment of the first national and first state parks provided a stimulus for various states to identify, acquire, and set aside unique land areas for protection. This movement expanded into the twentieth century to embrace not only large, natural and beautiful landscapes, but also parkway systems, sites of historical significance, and small tracts of ecologically sensitive lands. There was increased public recognition that in

addition to being beautiful such lands had recreational values that people could enjoy as well (Ndubisi, 2002, p. 201).

Today the National Park System includes 22, 967, 763.55 acres in thirty-one national parks distributed throughout twenty-four states and the Virgin Islands.

Ameliorate Scenic Ills and Environmental Planning

Even though Zube's next phase, "Ameliorate Scenic Ills" started in 1965 with the White House Conference on Natural Beauty, it wasn't until 1969 and the passage of the National Environmental Policy Act that the United States entered its most current phase, Environmental Planning. *This Environmental Planning phase provided the current impetus for research in landscape aesthetics.*

The first action, passage of the National Environmental Policy Act of 1969 (NEPA) specifically mentions environmental amenities and values.

The purposes of this Act are:

To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the nation: and to establish a Council on Environmental Quality (Sec 2, 42 USC 4321, National Environmental Quality Act, 1969).

Sec 102 B of the act stipulated that all agencies of the Federal Government shall:

Identify and develop methods and procedures, in consultation with the Council on Environmental quality established by title 11 of this Act, which will insure that *presently unquantified environmental amenities and values may be given appropriate consideration in decision-making* along with economic and technical considerations. (Sec 102, 42, USC 4332, National Environmental Quality Act, 1969, emphasis added)

As Ndubisi states, "designers have always embraced aesthetic considerations in arranging natural and cultural phenomena spatially and temporally. However, "NEPA required federal agencies to ensure

'aesthetically and culturally pleasing environments' and to 'identify and develop methods and procedures' for systematically including aesthetic values in land-use decision-making" (Ndubisi, 2002, p. 202).

A second federal action taken during the 1960's contributed to the new interest in landscape aesthetics research. Public policy shifted to include not only preservation of existing, beautiful landscapes, but also to the mediation of existing, blighted landscapes. "The amelioration of ugly landscapes, rather than the protection of beautiful lands, was the primary concern" (Ndubisi, p. 202). And, these "ugly" (Ndubisi, loc cit.) areas were located in big cities. Inner-city redevelopment led to pressure being exerted on the federal government to help metropolitan areas rebuild blighted areas (Gerken, G-9, npd, np).

NEPA, along with environmental legislation passed in the 1970s, propelled the development of methods for perceiving and assessing the landscape, especially within federal agencies that managed public lands. These methods, widely known as VRM's (Visual-Resource Management Systems), were designed to

identify, evaluate, and integrate visual values, along with other considerations, in land use and management decision-making. They were also used to investigate the visual effects of current and proposed land-use decisions and land-management practices (Ndubisi, 2002, p. 203).

Again, we turn to Zube (Smardon, 1986) to guide us through this next stage in landscape aesthetics, specifically landscape assessment. VRM's relied on *professional, expert assessment and formal principles of design* to evaluate the aesthetic value of landscape. The end product was most often a description of the landscape in physical and aesthetic design terms, each with an assigned value for rating aesthetic appeal. Experts were expected to be able to discern the aesthetic appeal of a particular landscape in order to guide decision-making about resource allocation. This *professional* model proved unreliable, and landscape aesthetics looked to the behavioral sciences to provide an alternative to the professional model.

The *behavioral* model relied on psychophysical and psychological expertise to evaluate the aesthetic impact of landscape. The methodology used was experimental and cognitive in nature and sought to understand landscape perception and preference. It was considered to be a more rigorous approach to landscape assessment, and the data was related to attributes and characteristics that the designer could manipulate. It has proven to be useful in guiding decision-making and policy formation.

Zube's third paradigm in landscape assessment, *humanistic*, or *phenomenological*, dealt with the individual's experience of landscape. Although the phenomenological approach resulted in the "greatest depth of understanding and meaning about the experience of landscape" (Smardon, 1986, p. 18), it was of limited utility in decision-making. However, its importance for understanding the aesthetic landscape experience cannot be overlooked. The understanding derived from documenting an individual's relationship with a particular landscape can result in more sensitive design and provide fertile ground for more rigorous behavioral research. These three models are summarized and contrasted in the table below, Table 2.1)

Table 2.1. Models/paradigms in Landscape Assessment

E. Zube's Models/Paradigms in Landscape Assessment adapted from Zube, E., in Smardon, 1986.		
Professional	Behavioral	Humanistic
Formal principles of design. Experts.	Psychophysical Psychological	Phenomenological
Intuitive	Cognitive, Experimental	Experiential
Landscape/Visual Quality	Landscape Perception Preference	Landscape Interpretation
Product usually a description of the landscape in physical & aesthetic/design terms with assigned values on the basis of such descriptions. Questionable reliability.	Data must be related to attributes & characteristics that the designer can manipulate. Most rigorous approach to landscape assessment.	Limited utility in decision-making. Provides the greatest depth of understanding about the meanings and experiences of landscape.

Table 2.1 E. Zube's Models/Paradigms in Landscape Assessment. This table is E. Zube's interpretation of the three distinct methods used to fulfill the requirements of landscape assessment.

Getting Along in the World—the Kaplans' Research

Within the category of Behavioral Landscape Assessment methods (Table 2.1), belongs the research work of Stephen and Rachel Kaplan. A husband and wife team, they began their research careers in the field of operant psychology after receiving PhDs in Psychology from the University of Michigan in 1962. Rachel Kaplan is currently the Samuel Trask Dana Professor of Environment and Behavior in the School of Natural Resources and Environment at the University of Michigan. Stephen Kaplan is currently a Professor of Psychology and Professor of Electrical Engineering and Computer Science at the University of Michigan.

From their early research in learning theory, (R. Kaplan and S. Kaplan, 1969), their interests shifted to the relationship between people and nature (S. Kaplan, R. Kaplan, and J.S. Wendt, 1972). Exploring the mechanisms by which people perceive the natural environment and form cognitive maps became the focus of their work. They have published over 100 articles and three monographs. In the preface to their third monograph, *With People in Mind*, they explain how their research progressed during this time.

When we began studying the relationship between people and nature over twenty-five years ago, we found little research that addressed this topic. It was not known whether people prefer natural environments to other settings. (They do). Nor was it known if there were other benefits beyond the mere fact of enjoyment. (There are). We began doing research in this area with two hopes, namely, that there would be orderly enough patterns to *make scientific research possible*, and that the results would have a *beneficial effect on the design and management of the natural landscape*. The first hope has been realized....by now it is clear that findings in this area show a great deal of stability and consistency...In our second hope, however we were not as fortunate....There has not been an easy way to access the research literature and translate it into usable recommendation. (Kaplan, R., Kaplan, S., and Ryan, R.L., 1998, p. ix.)

The Kaplans' contributions to our understanding of how humans perceive the natural environment start with an understanding that “considers humans as deeply concerned with information” (R. Kaplan and S. Kaplan,

1989, p.3). In order to survive and evolve, humans had to travel long geographical distances and eventually arrive safely back home. According to the Kaplans, (R. Kaplan and S. Kaplan, 1978, p. 5), this purposeful activity required two skills: the ability to grasp a great deal of information; and the ability to act on that information quickly. “In other words, there was a premium on knowledge without contemplation.” This is referred to as a “high knowledge-low contemplation system.”

High knowledge is facilitated by the development of a mental model, the cognitive map, “the structure that holds the information a person has about the environment” (R. Kaplan and S. Kaplan, 1978, p. 55). The building blocks of cognitive maps are the collections of representations already encountered. Accessing these collections of representations and linking them together permits “predictive sequences... ..And the resulting network of representations constitutes a cognitive map of the environment” (S. Kaplan, 1973a: 1976) in R. Kaplan and S. Kaplan, 1978, p. 56.)

Low contemplation is facilitated and motivated by a human’s “desire for clarity” (R. Kaplan and S. Kaplan, 1978, p. 6). “The central concept here is cognitive clarity, a state of mind characterized by a strong focus and the suppression of distraction” (R. Kaplan and S. Kaplan, 1978, p. 84). The ability to process large amounts of information quickly and correctly was important to the survival of humans. They “evolved under intense pressure to handle information adroitly. Without a clear state of mind an individual is in no shape to recognize subtle patterns, to anticipate the future, and most important, to take prompt, decisive action” (R. Kaplan and S. Kaplan, 1978, p. 85).

Within the framework of these two fundamental requirements for successful human-environment interaction, the Kaplans continued their research into the nature and significance of this interaction. This research revealed a preference for natural settings, not just for the content, such as water, views, or mountains, but for the spatial configuration of the content. Exploring the concept of human preference in the environment became important to the Kaplans who saw “preference as an expression of underlying human needs” (R. Kaplan and S. Kaplan, 1978, p. 10).

Aesthetic reactions thus reflect neither a casual nor a trivial aspect of the human makeup. Rather, they appear to constitute a guide to human behavior that is both ancient and far-reaching. Underlying such reactions is an assessment of the environment in terms of its compatibility with human needs and purposes. Thus aesthetic reaction is an indication of an environment where effective human functioning is more likely to occur (R. Kaplan and S. Kaplan, 1989, p. 10).

In this further research, they found that what is basic to perception must also be important to preference. Preference ratings became a tool for understanding perception, and preference became “intimately related to effective functioning (R. Kaplan, and S. Kaplan, 1989, p. 68).

The Preference Matrix

In conducting numerous studies on preference and examination of scenes that were most preferred or least preferred, the Kaplans’ Preference Matrix was developed (S. Kaplan, R. Kaplan, and J.S. Wendt, 1972). This matrix was originally composed of two categories pertaining to humans’ need to obtain information from the environment: Understanding and Exploration. Because humans need to understand the environment they inhabit, humans will seek out environments that enhance their ability to understand. Humans will prefer environments that aid Understanding. Exploration, the second category of human information needs, is explained as follows:

Exploration is an important element in accumulating experience. It inclines one to expand one’s knowledge as well as to increase one’s capacity to understand previously confusing situations. At the same time, it provides a way to deepen one’s grasp, by inquiring into new facets of a familiar situation (R. Kaplan and S. Kaplan, 1989, p. 52).

Two additional factors were then added to the Preference Matrix. These factors related to the availability of the information obtained through Understanding or Exploration. The information that contributed to Understanding or Exploration was either available immediately, or it was inferred or predicted. Addition of the classifications “Immediate” or “Inferred, Predicted” resulted in four distinct combinations or patterns that were given

the following names: Complexity; Coherence; Mystery; and Legibility, as seen in Table 2.2 below.

Kaplan's Preference Matrix		
	<u>Understanding</u>	<u>Exploration</u>
Immediate	<i>Coherence</i>	<i>Complexity</i>
Inferred, Predicted	<i>Legibility</i>	<i>Mystery</i>

S. Kaplan and R. Kaplan, 1989, p. 53.

Table 2.2 The Kaplans' Preference Matrix.

From this table, one can see that environmental Coherence contributes to Understanding and is immediately available. Legibility also contributes to Understanding, but it is inferred or predicted and not immediately available.

Informational Factors in Preference

Complexity: "Complexity is defined in terms of the number of different visual elements in a scene: how intricate the scene is: its richness" (R. Kaplan and S. Kaplan, 1989, p. 53). Complexity had previously been the focus of two divergent traditions in the study of aesthetics. Psychologists using artificial stimulus patterns found that people prefer patterns at the mid range of complexity (R. Kaplan, and S. Kaplan, 1989). Visual resource management systems used by Federal agencies assumed that complexity was "an important component of scenic quality", translating into preference for scenes with greater diversity (R. Kaplan, and S. Kaplan, 1989, p. 53). The Kaplans' initial research in the role of content in preference, (S. Kaplan, R. Kaplan, and J.S. Wendt, 1972) expected to find Complexity to be the major predictor of preference. When it did not account for all the variation in preference, they started exploring other content variables. "Given the substantial variation in preference from scene to scene and the failure of Complexity to account for a

major portion of the variance, there is a strong inclination to search for other predictors of preference” (S. Kaplan, 1972, p.8).

Their search led them to the additional three predictors of preference.

Coherence: “The underlying informational theme in Coherence is the capacity to predict within the scene” (S. Kaplan, 1987, p. 10). Prediction is aided by design elements such as symmetry, repetition, unifying textures and scale (S. Kaplan, 1987, and S. Kaplan, & R. Kaplan, 1989). Coherence provides a sense of order and aids in directing attention. Elements that support Coherence can be processed “with great speed and little need for inference” (R. Kaplan & S. Kaplan, 1989, p. 54).

Mystery: The promise of additional information.

“Something in the setting draws one in, encourages one to enter...thus providing an opportunity to learn something that is not immediately apparent from the original vantage point (R. Kaplan and S. Kaplan, 1989, p. 55).

Scene content that contributes to mystery includes: a disappearing trail; open meadow that is partially obscured by foliage; small changes in landform; foreground that obscures a prominent feature in the background; and enclosure.

Legibility: Legibility was the final informational factor added to the matrix, and was adapted from Kevin Lynch’s concept of legibility, which was introduced in his book, *The Image of the City* (Lynch, 1960). A legible space is a well-structured space that is easy to remember and understand. Navigating within the scene and back to the starting point is easy, and objects within the scene are identifiable. “Legibility thus entails a promise, or prediction, of the capacity both to comprehend and to function effectively” (R. Kaplan and S. Kaplan, 1989, p. 55).

Kaplans’ Theory of Restorative Environments and Attention Restoration Theory

Restorative environments or Restorative experiences are opportunities for reducing the fatigue of Directed Attention (S. Kaplan, 1995, p. 172).

Before presenting the four characteristics that must be present in a

Restorative environment, explanations of Directed Attention and Directed Attention Fatigue (DAF), key components of Attention Restoration Theory (A.R.T.), are necessary.

Directed Attention

Although they would ultimately abandon the terminology used by William James in the 1950's, the Kaplans started and were inspired by James' theories of 'voluntary attention' and 'involuntary attention' (S. Kaplan, 1995, & R. Kaplan and S. Kaplan, 1989). And, whereas James' theories served as a starting point for the Kaplans, modern research in clinical neurology expanded and validated James' ideas and became the basis for the concept of Directed Attention and Directed Attention Fatigue.

According to James, voluntary attention is necessary for mental activities that require effort to be maintained and are not intrinsically interesting. Stephen Kaplan explains further, "the central construct is that of focus, of supporting difficult mental activity in the face of potential distraction" (S. Kaplan, 1995, p. 170). Research work done by clinical neurologists identified a mechanism similar to James's voluntary attention, and named it Directed Attention. Prior research related deficits in directed attention to damage in the prefrontal cortex, a portion of the brain that had been associated with an inhibitory role in mental functioning (Mesulam, 1985, in S. Kaplan, 1995, p. 170). Lezak (1982), in her research in Executive Functioning, considers Directed Attention to be important for a process called Executive Functioning. Directed Attention, like James' voluntary attention, requires effort to be maintained. Kaplan considers Directed Attention to be "central to the smooth and effective operation of basic information processing functions" (S. Kaplan, 1995, p. 171). Consequently, the list is long of the ways in which Directed Attention enhances basic human information processing (S. Kaplan, 1995).

- *Selection*: Directed Attention directly impacts decision-making and problem solving by facilitating selection.

- *Inhibition and affect*: Directed Attention facilitates socially acceptable behavior by inhibiting inappropriate impulses.
- *Perception*: Facilitates perception by enabling a person to concentrate on an object or process that otherwise might not be engaging.
- *Thought*: Directed Attention facilitates the thought process by allowing the individual to “transcend momentary pressures and temptations” (S. Kaplan, 1995, p. 171). Teenagers and their as yet undeveloped prefrontal cortexes are a good example of what happens when this mechanism is impaired.
- *Action*: In a manner similar to inhibition of inappropriate impulses, Directed Attention is also important for supplying patience and the endurance necessary to perform unpleasant tasks, enabling one to focus on long-term personal and societal goals.
- *Feeling*: People for whom Directed Attention functioning has been fatigued and is no longer present will become irritable, and often chose not to be with others or to be helpful to others. (The Kaplans distinguish between fatigued directed attention and stress. Stress often leads to anxiety and the desire to be with others.)
- *Fragility*: Fragility is not a process by which Directed Attention enhances human information processing, but it is a very important characteristic of Directed Attention. Central to the concept of Directed Attention is the understanding that it is a mechanism that can be fatigued.

“Directed Attention is not, in itself, more important to problem-solving than knowledge or perception or action...But unlike these components, *it is fragile*. It is susceptible to fatigue, and as such, is more likely to be deficient than are the other components. It is, in other words, often the weak link in the chain” (S. Kaplan, 1995, p. 171).

Directed Attention Fatigue

The ability to maintain the effort of directing attention can be weakened, which is experienced as Directed Attention Fatigue, (DAF). According to the Kaplans, “any prolonged mental effort leads to Directed

Attention Fatigue” (S. Kaplan, 1995, p. 170). Within the context of Attention Restoration Theory, Directed Attention is a “global inhibitory mechanism such that fatigue from one task transfers to other tasks that subsequently require directed attention” (S. Kaplan, 2001, p. 482).

Most people experience Directed Attention Fatigue as being the inability to concentrate or perform mental tasks that they had previously been performing well. For example, after spending eight hours writing a paper, a student might be unable to keep working and will become easily distracted or irritable. And, while this inability to concentrate for long periods of time might seem counter-productive in our modern world, the Kaplans believe that ability was more valued in our ancestors’ world.

Being vigilant, being alert to one’s surroundings may have been far more important than the capacity for long and intense concentration. Further, much of what was important to the evolving human—wild animals, danger, caves, blood, to name a few examples—was (and still is) innately fascinating and thus does not require directed attention. It is only in the modern world (S. Kaplan, 1995, p. 170).

Attention Restoration Theory (A.R.T.)

If the price paid for maintaining focus is Directed Attention Fatigue and the consequent disruption of essential information processing, then what can be done to restore this vital mechanism? The Kaplan’s experience with wilderness research taught them that there was “ample anecdotal and empirical support for the importance of the surrounding environment in contributing to the restorative process” (R. Kaplan and S. Kaplan, 1989, p. 187). Individuals felt refreshed and ready to tackle everyday responsibilities or larger, personal issues after an “escape” into the natural environment on camping/hiking, etc. trips.

Returning once again to William James’ writings, one can contrast voluntary attention (Directed Attention) with involuntary attention, which requires no mental effort. The Kaplans carry James’ theories further by postulating that involuntary attention, or fascination as the Kaplans have labeled it, serves the individual well by allowing the mechanisms involved in Directed Attention to rest, thereby restoring Directed Attention capabilities.

Also, from their previous research in environmental preference, the Kaplans know that the natural environment has unlimited capacity to provide fascination. The fascination that an environment provides becomes “ a central component of a restorative experience” (S. Kaplan, 1995, p. 172).

In addition to the concept of Fascination that is necessary for a Restorative experience, the Kaplans have identified three additional qualities that must be present. Their definitions follow. While useful in describing characteristics of a Restorative Environment, it should be noted that, “Strictly speaking, these (**Fascination, Compatibility, Extent and Being Away**) are **properties of a person-environment interaction rather than of an environment per se**” (S. Kaplan, 2001, p. 482).

Four Components of a Person-Environment Interaction in a Restorative Environment

Fascination

A scene possessing the quality of **Fascination** will provide two distinct cognitive benefits. First, it will engage the viewer and keep them from becoming bored. Second, it will allow the mechanisms involved in directed attention to rest. **Objects or processes can invoke fascination.** For example, waterfalls and clouds are fascinating objects in themselves. Fascinating processes can be guided by understanding that is already possessed, and lead to further understanding of a bigger picture. Watching a squirrel scurry away with a walnut is engaging, easy to comprehend, and the squirrel is by itself a fascinating object. Object **Fascination** can lead to process **Fascination** by contemplating whether the walnut will be buried or eaten immediately. If the squirrel buries the walnut, the observer’s thoughts might effortlessly move to thinking about the impending change of season and or Thanksgiving, and possibly to reflection about one’s career and family. Figures 2.1 and 2.2 show examples of **Fascination**.



Figure 2.1 *Fascination* Example-Backlit Leaves. Photo by Author.
Dappled sunlight viewed through rustling, green leaves is dynamic, changing effortlessly in the wind.



Figure 2.2 *Fascination* Example-Shadow on Stone Walkway. Photo by Author.
Trees cast intricate, intriguing shadows on the walkway, changing as the sun moves and the wind rearranges the branches.

Extent

Connectedness and scope together define the concept of **Extent**. The Kaplans' description of **Extent** is informed by their early work in cognitive mapping. In order to possess extent, a scene must have enough connectedness to enable building a cognitive map and enough scope to justify making the effort to construct the cognitive map. The parts of the scene make sense, they are connected, and their connectedness and scope can provide a bridge between what one is experiencing in the present, and "what they know about the world as a whole" (R. Kaplan and S. Kaplan, 1989, p. 184).

The most basic requirement for a feeling of extent is an interrelatedness of the immediately perceived elements of the situation so that they constitute a portion of some larger whole...For the experienced individual, the fitting of new patterns into old knowledge serves both as an affirmation of previous knowledge and as a fresh source of fascination, (R. and S. Kaplan, 1989, p. 190).

The photo below (Figure 2.3) is an example of a garden setting that contains **Extent**. It creates a whole other world of connectedness through unique details in a small space. The experience of being in this garden can become a part of the larger whole that is the individual's prior experience in the natural setting that the design seeks to evoke.



Figure 2.3 *Extent* Example-Dry Stream Bed at Swedish Covenant Hospital, Chicago. Photo by author.

Extent is present in this garden, which creates a whole other world. This is not an actual intermittent streambed in the mountain. It is a metropolitan hospital in the middle of downtown Chicago. However, it might be perceived as a real mountain stream, extending the garden setting and connecting the perceiver to their past experiences in a real mountain stream.

Compatibility

For a setting to possess the restorative characteristic of **Compatibility**, there must be agreement between the participant's purposes, the environmental patterns and constraints and the actions required by the environment. "An individual's decision and actions are determined jointly by the individuals purposes or inclinations and by environmental limitations or demands" (R. Kaplan and S. Kaplan, 1989, p. 185).

In order for an environment to exhibit Compatibility, the environment must provide needed information, eliminating the need to second-guess. Prompt and useful feedback from the environment aids in achieving the purpose for being there, and a Compatible environment requires less selectivity (S. Kaplan, 1995, p. 173).

Understanding the concept of **Compatibility** is facilitated by thinking about environments where a lack of compatibility exists. If one is trying to hear a lecturer, and others in front are talking loudly, the setting is not compatible with the individual's purpose for attending the lecture. The individual may not be able to hear the lecturer, or may have to constantly attempt to block out the content of the inconsiderate talkers. This situation calls into play Directed Attention, and prevents the individual from recovering from Directed Attention Fatigue. "From this perspective, person-environment incompatibility turns out to be a problem that is widespread and that extracts high psychological costs" (S.Kaplan, 1983, p. 113).

As can be seen in the photos below (Figure 2.4 and 2.5), **Compatibility** can simply be providing the appropriate seating options—something for everyone. In windy locations with frequent precipitation of every variety, it is important to provide covered seating options so that patients can still enjoy being outdoors even in bad weather. In the example below, the furniture is easily moved from the covered area on days when sitting in the sun is preferred.



Figure 2.4 *Compatibility* Example- Seating Options in Therapeutic Garden at Schwab Rehabilitation Institute, Chicago. Photo by author. Choice of seating is a very important ***Compatibility*** characteristic in therapeutic gardens—alone or in groups, sun or shade.



Figure 2.5 *Compatibility* Example at the Chicago Botanic Garden. Photo by Author. Wide paths that are easy to traverse contribute to ***Compatibility***.

Being Away

Being Away frees one from mental activity that requires directed attention (S. Kaplan, 1995, p. 173). It is a conceptual shift rather than a

physical one, although a physical change may be part of the conceptual shift. The Kaplans have identified three kinds of escape from an informational viewpoint: escape from distraction (which causes directed attention to become fatigued); escape from a particular content; and escape from certain purposes (R. Kaplan and S. Kaplan, 1989). ***Being Away*** is an A.R.T. characteristic that can be found in a small pocket park in a large metropolitan area, such as Paley Park in Midtown Manhattan, (Figure 2.6). Or, it can be experienced as more of a conceptual shift by leaving your work and sitting on a bench in a quiet spot in your own backyard (Figure 2.7).



Figure 2.6 *Being Away* Example-Paley Park.

http://en.wikipedia.org/wiki/File:Paley_Park.JPG

Paley Park is dwarfed by high-rise office buildings and provides the opportunity to enjoy nature, in complete contrast to the buildings that surround it. Leaving the office building to take a break outside in the park is a conceptual shift as well as a physical shift.

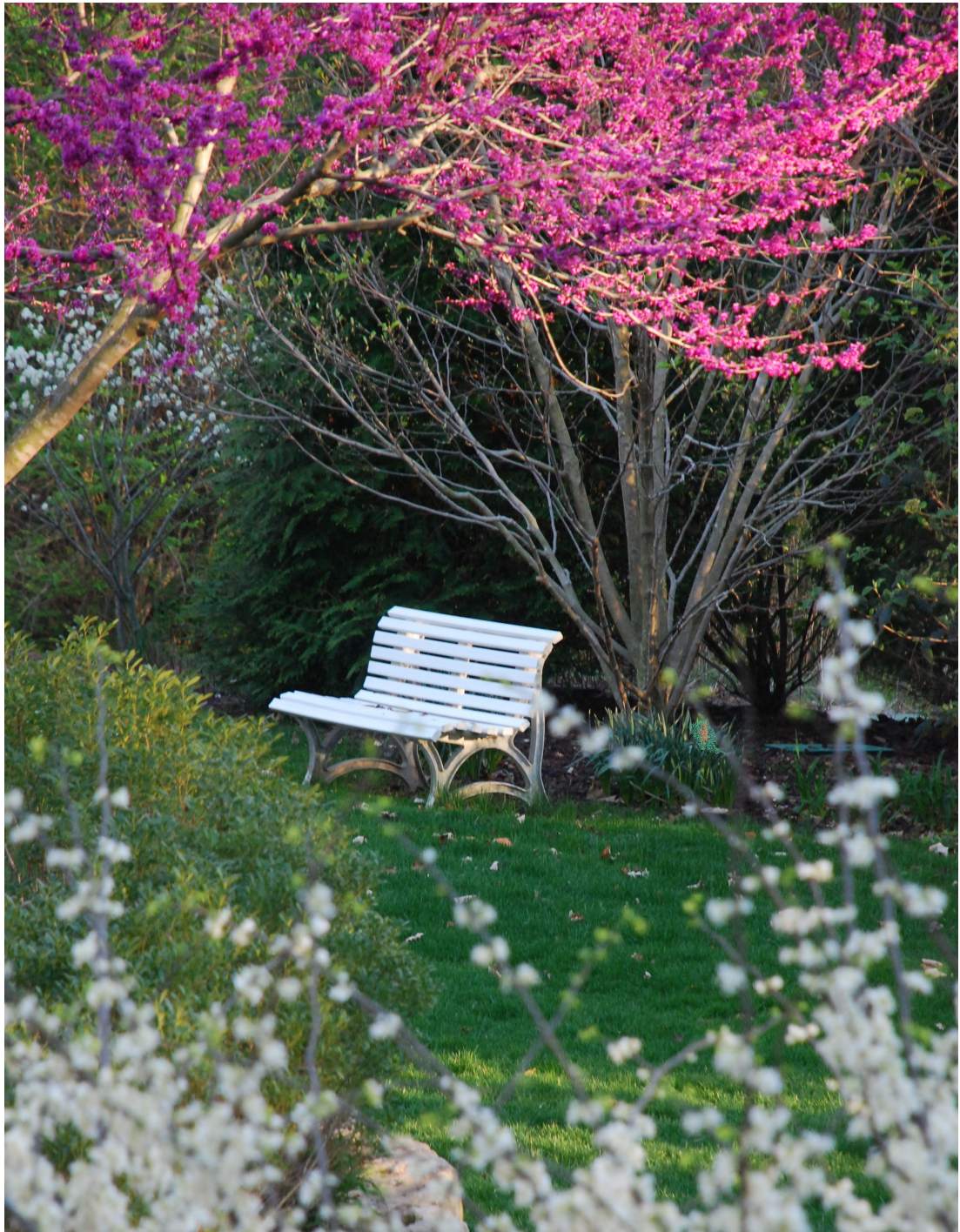


Figure 2.7 *Being Away* Example-Backyard Bench. Photo by Author.

Being Away can be as close as the back yard if you leave your work behind and go outdoors.

When studying restorative environments, it is important to remember that all four characteristics; **Fascination**; **Compatibility**; **Extent**; and **Being Away** need to be present in order to have a Restorative environment. While A.R.T. started with the concept of involuntary attention, or *Fascination*, it is possible to have environments where **Fascination** is present, but the environment will not be **Restorative**. For example, if an engaging pocket park has shade trees throwing dynamic shadows on the ground and water flowing through sculptural miniature viaducts, but has no comfortable seating where individuals can sit, the setting is not **Restorative**. The setting lacks **Compatibility**. Yellow tape delineating a murder scene, blood stains and chalked body outlines would be fascinating and hold one's attention without effort, but the experience would not be **Restorative**.

Preference and Restoration

In explaining Preference in the landscape, the Kaplans identified four characteristics that contribute to a human's preference for certain landscapes: *Mystery*; *Complexity*; *Legibility*; and *Coherence*. In explaining the qualities of a Restorative environment, the Kaplans, once again, identified four characteristics of Restorative environments: **Being Away**; **Extent**; **Fascination**; and **Compatibility**. How are these two sets of four characteristics related? Apparently, they are not related, although it appears that subsequent work by other environmental psychologists might be confusing the two.

Preference seems to be a set of evolutionary inclinations that support safe exploration. Since humans have long depended upon information as a survival mechanism, acquiring additional information and at the same time not being at risk because of not knowing enough about the situation to handle it effectively were adaptive challenges. Restoration seems to be based on environments where there are things that hold one's attention without effort....From our perspective the two concepts focus on different circumstances. There are certainly many settings that can be preferred and offer restoration. The more interesting issues, however, are settings that do not accomplish both. In particular, it is conceptually and practically important to consider environments that can be restorative even if they are not

preferred (R. Kaplan, personal communication, March 27, 2008, used with permission)

Two Theories of Restorative Environments

Research articles based on restoration theory frequently start with an explanation of two theoretical perspectives of restoration (Karmanov, and Hamel, 2008; Laumann, Garling and Stormak, 2003; Hartig and Staats, 2003; Hartig and Staats, 2005, and Bird, 2007). These two theoretical perspectives are the Kaplans' Attention Restoration Theory (A.R.T.) and Roger Ulrich's Theory of Supportive Gardens (Ulrich, 1999). Han (2001) refers to Kaplan's A.R.T. theory as the functional-evolutionary theory of restoration. To Ulrich's theory he give the designation: psycho-evolutionary theory. Both theories are based on an understanding of human responses to nature. These responses have been developed and refined through the process of evolution. Despite the similarities, much discussion has occurred about the differences between the two theories.

According to Ulrich, A.R.T.'s "theoretical perspective emphasizing attention or 'fascination' is inadequate for explaining restorative influences of nature" (Ulrich et al, 1991, p. 224). Ulrich's criticism of the emphasis on fascination centers on his belief that settings could invoke involuntary attention, but not be restorative. "Attention holding properties of nature work both ways; that is, involuntary attention can be a salient component of non-restorative and even stressful reactions to certain natural stimuli" (Ulrich et al, 1991, p. 224). In Kellert's book, Ulrich labels these antithetical reactions biophobic and biophilic (Ulrich, 1993). He also believes that while there exists a "large body of conditioning studies relating to biological preparedness and biophobia" (Ulrich, 1993, p. 87), research in biophilic reactions is lacking and results from psychology's inattention to research in human/natural environment interactions.

Responding to Ulrich's criticism of the inadequacy of the concept of Fascination to explain restorative influences of nature, Stephen Kaplan points out that "Although previous papers have discussed the four proposed

components of a restorative experience, Ulrich and his colleagues have apparently misinterpreted the other three components as alternative sources of fascination” (S. Kaplan, 1995, p. 180). Of course, Kaplan is referring to one essential component of A.R.T.—the requirement that all four characteristics of restorative environments (***Being Away***, ***Fascination***, ***Compatibility*** and ***Extent***) must be present before Restoration can occur.

Citing the increasing empirical evidence of the psychological benefits of nature, Kaplan (1995) proposed an integration of these two dominant theories in order to improve the theoretical basis of the empirical research. His proposed integrative framework focused on resource insufficiency that covered a broad range of factors leading to stress. Hartig (1993) had earlier hoped for synthesis of theory that centered on stress reduction with theory emphasizing the ability to focus attention. Later, Ke-Tsung Han (Han, 2001) provided a framework for integrating the two theories. He emphasized that they applied to different time periods, and that they actually complemented each other. Chang hypothesized that the “psychological processes of recovery from DAF could be found to correspond with the physiological processes of brain and blood pulse activity during and/or resulting from the recovery/restoration process” (Chang et al, 2008, p. 80).

Psychological responses were measured using Hartig’s (1996) Perceived Restorativeness Scale (PRS), and suggested “a degree of congruency between actual PRS scores and physiological responses of human subjects and the theorized examples of restorative environments proposed by Kaplans and others” (Chang, 2008, p, 84). Unfortunately, the PRS and two others (Han, 2003 and Lauman, Garling and Stormak, 2001) have not been validated as a self-assessment tool, despite the title of Hartig’s article, **Validation** of a measure of perceived environmental restorativeness, (Rachel Kaplan, personal correspondence, 2008). This lack of validation unfortunately negatively impacts the research.

Researchers might debate the finer points of Kaplans’ A.R.T. and Ulrich’s Theory of Supportive Gardens and continue to attempt to find

consensus, between the two. However, for me, tasked with attempting to create useable spaces that improve health outcomes, the similarities and compatibilities between the two theories become more discernable when applied to a design process with specific design details. The following discussion illustrates some of the similarities and compatibilities.

A Sense of Control and Access to Privacy (Ulrich) might be facilitated by gardens that also exhibit the quality of ***Being Away*** (A.R.T.). The option to dramatically change locations by going outside certainly gives one a sense of control. If a private place is a priority in the program, a garden might also afford privacy that was not available in the interior of an institutional setting. Again, this would enhance the sense of control through access to privacy. ***Compatibility*** (A.R.T.) also supports the sense of control as the garden contains the characteristics that support the individual's purpose for being there. For example, one might want to enjoy some sunshine on a cool day or shade on a hot day. A garden designed to offer both these options becomes compatible with the individual's desires and reinforces a sense of control. ***Compatibility*** (A.R.T.) would further reduce the introduction of additional stressful components by providing adequate seating that doesn't unnecessarily expose one to the stress of harsh elements such as hot sunlight and heavy winds.

Social Support (Ulrich) can also be facilitated by the characteristics found in ***Compatibility*** (A.R.T.). Large spaces for group functions provide social support. Small, intimate spaces provide the opportunity to share thoughts and feelings with family members, an additional opportunity for a different kind of social support.

Physical Movement and Exercise (Ulrich) could be facilitated in a space that exhibits the characteristic ***Extent*** (A.R.T.). A space with ***Extent*** would be legible and have enough scope to invite movement through the space and to encourage further exploration. For certain elderly or

handicapped populations, that movement would constitute a great deal of physical movement and exercise.

Access to Nature and Other Positive Distractions (Ulrich). Of particular interest to this discussion of the two theories of restoration is this fourth characteristic of Ulrich's Theory of Supportive Gardens. A positive distraction is defined by Ulrich as an "environmental feature or situation that promotes an improved emotional state in the perceiver, may block or reduce worrisome thoughts and fosters beneficial changes in physiological systems such as lowered blood pressure and stress hormones" (Ulrich, 1999, p. 49). The **Fascination** (A.R.T.) qualities that nature provides (dappled sunlight through trees, squirrels darting about, birds, clouds) would also occupy the mind and block worrisome thoughts. Physical exercise and movement would help alleviate some of the physiological components, such as high blood pressure and increased respiration rates that Ulrich includes in his definition of stress. A garden designed to facilitate the feeling of **Being Away** (A.R.T.) would surely help block worrisome thoughts or reduce them, particularly if the garden was an escape from a stressful work, living or school environment. In discussing the similarities between the two theories of restoration, Chang (2008) describes Ulrich's work as establishing a link between psychological and physiological responses in natural environments. It is plausible that in the applied setting of supportive garden design in environments of care, the two theories may be linked for a more thorough understanding of the improved health outcomes for users.

Ulrich's Theory of Supportive Gardens

As previously contrasted with the Kaplans' A.R.T., Ulrich's theory centers on the concept of stress and the ability for the built environment to mitigate and prevent stress in environments of care. While Ulrich is blunt about admitting that research in therapeutic gardens is not scientifically rigorous enough to gain the attention of health care professionals, research in related fields can inform therapeutic garden design while new research provides results that can be replicated. From related fields: environmental psychology; health psychology; behavioral medicine; and clinical psychology

(Ulrich, 1999) comes theory which is integrated with limited existing research on gardens to create his Theory of Supportive Gardens.

The capacity of the garden environment to facilitate stress coping and restoration is the basic premise underlying the conceptual framework of Ulrich's Theory of Supportive Gardens (Ulrich, 1999, p. 36). *Stress is defined as the "process of responding to events and environmental features that are challenging, demanding or threatening to well-being"* (Ulrich, 1999, p. 33). Ulrich's definition of *restoration* is "a broader concept that is not limited to stress recovery situations or to recovery from excessive physiological arousal and negatively toned emotional 'excitement' (anxiety) but could also refer to recuperation from under stimulation or prolonged boredom" (Ulrich, 1993, p. 100).

Ulrich uses a multi-modal combination of physiological and verbal measures to document restoration, or stress recovery as his theory names it. Ulrich believes that the restorative influences of nature involve: "a shift toward a more positively-toned emotional state; positive changes in physiological activity levels; and sustained attention intake" (Ulrich, 1991, p.201).

Stress is further defined as having four components (Ulrich, 1991, 1999):

- *Psychological/emotional responses*: cognitive appraisal; depression, fear; sadness; tension; and anxiety (tension and anxiety dominate the emotional responses (Ulrich, 1999, p. 32)
- *Physiological*: responses in bodily systems; cardio-vascular (increased blood pressure and increases in respiration rates); skeletomuscular (elevated levels of stress hormones and skin conductance)
- *Behavioral*: a wide range of manifestations including: sleeplessness; helplessness; avoidance; decline in cognitive performance including impaired memory; alcohol or cigarette use, social withdrawal; non-compliance with medical regimens (or other regimens necessary for daily functioning)
- *Neuroendocrine*: stress hormones enter the bloodstream (adrenaline and noradrenaline); cortisol (steroid) enters the bloodstream. Blood vessels are constricted and the heart is stimulated.

For Ulrich's Theory of Supportive Gardens, stress becomes the "central mechanism through which gardens potentially can have significant beneficial effects on health outcomes" (Ulrich, 1999, p. 35). This stress reducing mechanism can be found in gardens that enable the following:

- Sense of control and access to privacy
- Social Support
- Physical Movement and Exercise
- Access to Nature and Other Positive Distractions

Terminology of Therapeutic Gardens

As discussed previously, Roger Ulrich's approach to restoration, or stress reduction, focuses on measurable physiological indicators that are commonplace and familiar within medical settings, or therapeutic environments. Unfortunately, despite the clarity within Ulrich's theory, the terminology of therapeutic environments is confusing and inconsistent. It is often dependent on the designer's background and the context of the garden. Clare Cooper Marcus and Marne Barnes (1999) in *Healing Gardens*, use the terms healing and therapeutic interchangeably when referring to gardens that provide the following three specific aspects of the healing process:

- Relief from physical symptoms
- Stress reduction
- Improvement in the overall sense of well-being

Others use the term "therapeutic" when referring to supportive design that is used as part of a treatment intervention (Larson, 2009). "The therapeutic landscape is less focused on healing in the spiritual context and more kin to the disease model of illness as practiced in most allopathic medical systems" (Larson, 2009, n.p.)

The Green Guide for Health Care uses the term, "place of respite" and defines it as "a place on the health care campus to connect health care patients, visitors, and staff to health benefits of the natural environment...To act as a place of retreat and revitalization, both indoor and outdoor places of respite must be disassociated from the direct delivery of medical care"

(Connection to the Natural World, 2007, pp. 1,2,). The exclusion of “direct delivery of medical care” might exclude settings that were specifically designed as part of a physical therapy program.

Despite the confusing terminology within the field of therapeutic gardens that is indicative of the early stages of therapeutic garden design, it is possible to find some consensus thinking about the state of therapeutic garden design. *First and foremost is the opinion that research in healthcare gardens lags behind research in supportive design and improved health outcomes within hospitals* (Ulrich, 1999). Ultimately, this lack of research not only denies patients the benefits of improved health outcomes, but also denies the design profession the benefit of an increased perception of the value of their design services (Research Design Connections, 2010). According to experts, “mounting scientific evidence that environmental features or characteristics can play a role in improving patient health outcomes” (Ulrich, 1999, p. 28) is impacting how health care settings are designed utilizing EBD (Evidence-Based Design). And while therapeutic garden design can benefit from research in this related area, “very little research directly relevant to gardens has used the types of persuasive experimental-scientific methods that are considered sound by the medical community” (Ulrich, 1999, p. 23).

History of Therapeutic Gardens

Despite the concern of today’s experts over the lack of scientific research to guide therapeutic garden design, there exist well-known historical examples of restorative environments that “harnessed the landscape and natural elements to induce reflective and contemplative states of mind” (Thwaites, 2005, p. 527). In 500 BC the Greeks constructed Asklepieian sanctuaries designed to facilitate dreaming, as the subconscious was considered essential to curing physical ailment.

“Asklepieia were constructed with the long axis of the patient ward oriented in an east to west fashion along the north wall of the complex. The southern elevation of the ward was open to the sun and an enclosed courtyard” (Westphal, 2000, p. 20).

Islamic paradise gardens represented the heavenly paradise described in the Koran, and were “places of physical and spiritual replenishment” (Thwaites, 2005, p. 527). In Europe, restorative gardens appeared during the Middle Ages when

“hospitals and monasteries 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” (Cooper Marcus, and Barnes, 1999, p. 10).

Monastic cloister gardens were built during the twelfth to fourteenth centuries and relied on “herbs, daylight, fresh air and reflection” as the healing regimen (Moore, 2007, p. 74). See Figure 2.8 below.



Figure 2.8 Franciscan Monastery, Kretinga, Lithuania. Photo by Author.

This courtyard still has an herb garden and benches for quiet reflection.

After the Renaissance, hospital design became more of a secular responsibility. Design still incorporated the concept of rooms surrounding a central courtyard allowing sunlight and fresh air to be an essential part of the healing process. St Thomas Hospital, London is an outstanding example of a

pavilion hospital, where “outdoor spaces began to be viewed again as an intrinsic component of the healing environment” (Cooper Marcus and Barnes, 1999, p. 13). As can be seen from the photo below, (Figure 2.9), wings were joined together by a service corridor, and the courtyards’ orientation usually faced south.

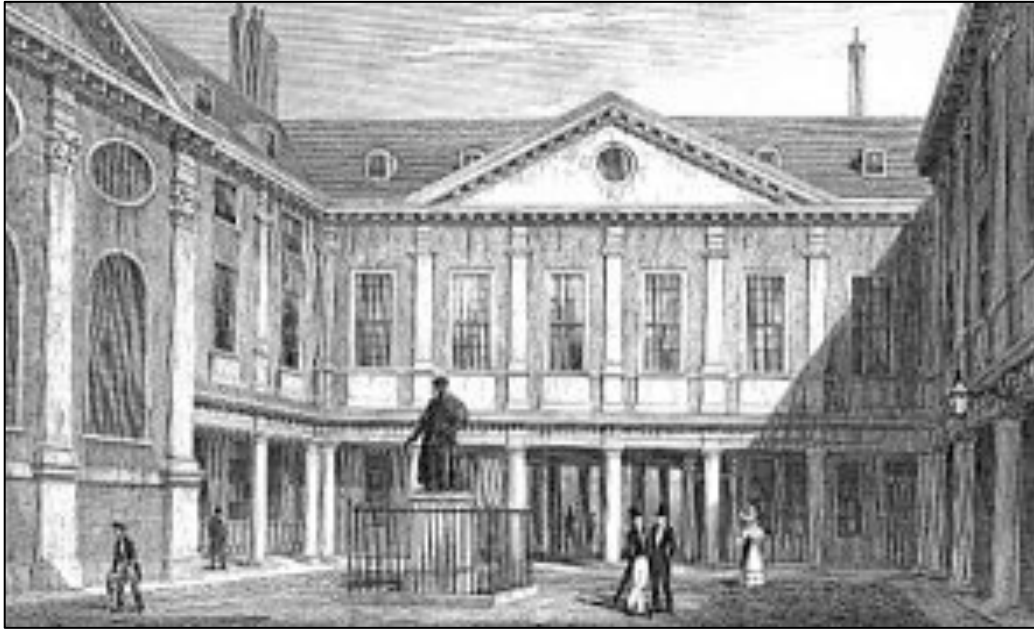


Figure 2.9 Example of Pavilion Hospital, St. Thomas Hospital, London.

<https://sites.google.com/site/vauxhallcivicsociety/home/history/st-thomass-hospital-london-se1>

St. Thomas Hospital showing east and west wings joined by a service corridor and the courtyard’s southerly orientation.

The rapid technological changes of the twentieth century and subsequent focus on cost-efficiency forced natural settings to the periphery of hospitals. With advancements in medical technology and emphasis on curing disease instead of holistic healing, natural settings were no longer considered part of the treatment options. Landscaped settings became a formalized part of the hospital’s public image and were reduced to small areas around the entrance (Thwaites, 2005 and Cooper Marcus and Barnes, 1999). “If it was present at all, landscape became largely cosmetic and bore no relation to historic ideas that natural areas could have a bearing on the healing process,

stress reduction and the general well being of patients, staff and visitors” (Thwaites, 2005, p. 528). Today, at one entrance to Saint Luke’s Hospital, Kansas City, Missouri, nature has been reduced to an island with a sculpture and very formal plantings, as can be seen in the (Figure 2.10).



Figure 2.10 Main Entrance to Women’s Center, Saint Luke’s Hospital, Kansas City, Missouri. Photo by author.

This photo illustrates the complete absence of the therapeutic qualities of nature, which have been replaced by healthcare’s modern technologies.

Cooper Marcus and Barnes (1999) credit increased participation in alternative medicine for the current interest in the therapeutic qualities of nature in healthcare settings. Modern medicine and technological advances accompanied by the lack of holistic approaches to medicine have been supplemented or refused entirely by increasing numbers of patients seeking more alternative treatments. Thwaites, et al (2005) attribute the interest in the therapeutic possibilities of nature to research and evidence-based design and its emphasis on cost containment and the improved health outcomes in natural settings.

Ulrich believes that the demands of modern technology trumped the traditional beliefs about “the importance of including presumed therapeutic features such as gardens” (Ulrich, 1999, p. 27). The institutional and stark hospitals resulted in environments that “are now considered stressful and otherwise unsuited to the emotional or psychological needs of patients, visitors and staff” (Ulrich, 1999, p. 27).

“Resurgent interest recently in healing gardens represents part of a broader international movement that seeks to improve the quality of healthcare by creating new types of facilities that are cost-effective yet emphasize supportive design coupled with patient-centered organizational practices” (Ulrich, 1999, p.27).

And, as hospitals compete with one another for patient dollars, therapeutic gardens are viewed as amenities that will attract more patients.

Dementia and Dementia Gardens

Gardens designed specifically for individuals with dementia and the resulting decrease in cognitive skills are a specialized subset of therapeutic gardens. These gardens present unique challenges, but also share opportunities for many of the same improved health outcomes that therapeutic gardens offer others without dementia.

In their introduction to the *Journal of Housing for the Elderly* (2007, Vol. 21), an issue dedicated to outdoor environments for people with dementia, Benyamin Schwarz and Susan Rodiek stated, “we consider the outdoors to be (an) essential component in the intervention efforts in dementia care” (Schwarz, and Rodiek, 2007, p. 3). Even though dementia patients share many of the same challenges as others who suffer from chronic illnesses, “relatively little is known about how persons with dementia respond to specific environmental features, and how planned activities and environmental conditions can encourage usage and/or benefit residents” (Schwarz and Rodiek, 2007, p. 6).

Even fewer studies have explored what beneficial health-related and behavior-related outcomes may result from having access to the outdoors, partly due to the complexity of measuring physical environment interventions, and partly due to the

difficulty of obtaining reliable and valid data on dementia resident outcomes (Schwarz, and Rodiek, 2007, p. 3).

One can speculate as to the difficulties involved in obtaining reliable and valid data pertaining to health-related and behavior-related outcomes in dementia gardens. One difficulty is the terminal nature of Alzheimer's and other dementias and associated end-of-life issues. The behavior of people with dementia is hard to comprehend and can fall outside the norms of acceptable behavior. Voters in Woodbury, Minnesota, a suburb of the Twin Cities, signed petitions to protest Settler's Pointe, a forty-five-unit facility. Fifteen of the forty-five units would be considered "enhanced care." Residents of this community of 600 residents worried about traffic. They worried that a dementia facility would not be a good fit with their neighborhood. Finally, they worried about the risk of uninhibited residents "disrobing, hitting and biting and kicking and urinating outdoors—all within their children's views" (Span, P., 2010, n.p.).

Facilities for dementia patients are burdened by misunderstandings regarding dementia patients' behavior. The tradition of removing these individuals from their home to residential care focuses on a less-than-hopeful reality about requirements for their on-going care and safety. Some may wonder what is the purpose of research about environments for dementia patients. The very nature of institutional care presents significant roadblocks because of residents' privacy requirements. Access to research participants is difficult, as they may present communication challenges for the researcher.

Currently in the United States, there are 5.6 million individuals diagnosed with Alzheimer's disease, the leading form of dementia, and 172 billion dollars are spent annually in their treatment and care. Alzheimer's disease is the seventh leading cause of death, and unlike other diseases, (prostate cancer, breast cancer, heart disease, HIV and stroke) which collectively showed a 57% decrease in death rate, the death rate from Alzheimer's disease increased 46% from 2000-2006. In 2010, there are 5.5 million Americans 85 and older. By 2050, that number will reach 19 million, (Alzheimer's Association).

Understanding Alzheimer's disease and other forms of dementia is essential to the designer of therapeutic gardens for people with dementia.

The fundamental pathology of Alzheimer's disease is the progressive degeneration and loss of vast numbers of nerve cells in those portions of the brain's cortex that are associated with the so-called higher functions, such as memory, learning and judgment. The severity and nature of the patient's dementia at any given time are proportional to the number and location of cells that have been affected..... At the same time there is a marked decrease in acetylcholine, the chemical used by these cells to transmit messages (Nuland, 1993, p. 91).

Schwarz and Rodiek explain these neurological deficiencies in terms of the some of the problem behaviors that concerned the residents of Woodbury, Minnesota.

Patients with Alzheimer's disease experience high rates of non-cognitive, behavioral, and psychiatric symptoms that may include hallucinations, delusions, depression, physical aggression, pacing, wandering, and sleep disorders. The cause of the disease is still unknown and there is no known cure for it. Today's available pharmacological treatments alleviate symptoms only temporarily, and there is no evidence that non-pharmacological therapies can improve cognitive performance. (Schwarz and Rodiek, 2007, p. 4).

Since Schwarz and Rodiek wrote this in 2007, pharmacological interventions offer more promise. There currently are seven Alzheimer's drugs in clinical trials, and two of the drugs, Bapineuzumab and Solanezumab are in clinical trial phase III. Lilly, Pfizer, Johnson & Johnson and Elan all hope to launch their products in 2013. Unlike existing pharmaceutical treatments that merely address symptoms, these drugs are expected to slow the progression of the disease and decrease the rate of cognitive decline. If the drugs are successful, industry analysts estimate revenues from \$2.3 billion to \$21.6 billion for Bapineuzumab and \$517 million to \$17.5 billion for Solanezumab (Bary, 2012, p. 25). In order for these drugs to be effective in preventing irreparable damage, early diagnosis is critical, but still elusive.

In Chapter 2, I traced what I considered to be the cultural and historical factors that bring us to where the Schowalter project begins. I was particularly interested in understanding our human relationship with and views of nature,

and how that relationship and those views evolved over the centuries. I believe that those changes set the stage for the development of research that supports the design of therapeutic gardens in environments of care. Up to this point, we have journeyed from Grendel's Mere, to Downing's "An Art of Taste" to environmental psychology and the Kaplans' research in landscape preference. Chapter 3 discusses the Schowalter Villa project, how theory was applied and how the Dementia Garden Framework was developed.

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Chapter 3: Process: IMAGE, PRESENT, TEST

And, finally, nearby nature and gardens deserve far more standing than they usually are accorded. Viewed as an amenity, nature may be replaced by some greater technological achievement. Viewed as an essential bond between humans and other living things, the natural environment has no substitutes.

Kaplan, R and S. Kaplan, 1989, p. 203-204.

As evidenced by the previous chapter of this document, there was a lot of background information to master and many challenges facing me as the designer of Schowalter Villa's courtyard. For example, I needed to understand the terminology and status of healthcare garden design and its history. And, I needed to gain an understanding of dementia and its implications for patients' use of the garden; security; staffing; maintenance and cost.

The people at Schowalter were excited about building this courtyard. Many individuals had planned and worked diligently for it--this was not just an academic exercise. I met the staff and residents and interacted with them at meetings. The stakes were high, because this was a real project with well-articulated needs and expectations from wonderful people I knew.

Another crucial challenge for me was deciding which of the many paradigms of dementia garden design to follow when designing the courtyard. As shown in the Background section of this document, the terminology of healthcare garden design is confusing, and the research is inadequate. Once again, advice abounds, but it is often confusing.

The literature on what constitutes the ideal prosthetic outdoor space is both intuitive and prescriptive, offering checklists for administrators as they plan what these spaces should look like, and what should happen inside them. Unfortunately, the advice is often confusing (Cohen-Mansfield, J., 2007, p. 37).

A sampling of research confirms such confusion. For example, Chalfont (2007) offers a "wholistic, interdisciplinary approach to integrating nature into dementia care environments" in the development of a checklist he

calls “PLANET” (Chalfont, 2007, p. 154). Grant and Wineman’s (Grant, and Wineman, 2007) “Garden-Use-Model” is a theoretical framework based on data collected in five sites. Martha Tyson uses a

“system of imaging elements to create naturally mapped outdoor environments that support independent and self-initiated use, engagement with outdoor setting, and social interaction among cognitively impaired residents, staff, and family members” (Tyson, 2002, p. 55).

John Zeisel and Martha Tyson identify five of Kevin Lynch’s criteria for way-finding and orientation that are applicable to dementia gardens: paths; edges; districts; nodes; and landmarks. To these five elements they add: places; views; furnishings; plantings and symbolic cues (Zeisel and Tyson, 1999).

When faced with the challenges of designing a courtyard for Schowalter Villa, the I found myself sharing Cohen-Mansfield’s opinion that the literature dealing with the design of dementia-proof gardens was at times intuitive, at times prescriptive, at times confusing, and the results were often predictable and the opposite of engaging. Schowalter, like many other retirement facilities, already had a courtyard that did not meet its needs. Schowalter’s courtyard was well maintained and used sparingly. However, if the new courtyard was unmaintained and underutilized, it might be experienced as a depressing metaphor for the residents’ lives and a nagging reminder of what had been lost.

Fortunately, the one semester project was straightforward. The staff had a good idea of what they wanted, and the existing courtyard had a lot of possibility. Even better, Schowalter Villa was securing funding to build the courtyard once it was designed. As I continued my background reading, my understanding of healthcare outcomes expanded. So did my knowledge of the process of designing outdoor environments to facilitate functioning in dementia patients. Armed with this knowledge and motivated by a sincere desire to help the Schowalter community enrich the lives of its residents, I began work on the project.

The Project at Schowalter Villa

The staff and residents at Schowalter Villa were excited about redesigning the existing courtyard. The courtyard was located in the oldest area of Schowalter Villa, which is a residential living community in Hesston, Kansas. Schowalter offers a continuum of resident-centered care, from independent living to total health care, in a Christian environment. The Villa is located on an eighty-acre campus and has been serving residents for nearly fifty years. Anticipating growth, the Villa is currently undergoing renovation of existing facilities and expansion through new facilities. The Villa's goal of a 'seamless campus' makes open space design an important part of this growth and renovation.

The Kansas Department of Commerce awarded the Mennonite Board of Mission and Charities of Kansas, (d.b.a. Showalter Villa), \$250,000 in community service tax credits. The Villa has used the donations generated by the tax credits to fund a project entitled 'My Garden, My Home.' They had employed an architectural firm to help them update healthcare facilities. Now they were moving on to the creation of a secure and beautiful garden where residents and children from the adjoining Hesston Intergenerational Daycare Center could enjoy the outdoors together.

The Existing Courtyard

The 'My Garden' site was an existing, exterior courtyard surrounded on four sides by one-story residences that included Healthcare, Assisted Living and Independent Living. The courtyard was located on the northern edge of the eighty-acre campus. Measuring approximately 150' by 180', the well-maintained space was being used sporadically for supervised and unsupervised activities. It also was the site for the beloved barbecue attended each year by 150 Showalter residents and staff. Figure 3.1 shows the existing Schowalter Courtyard and the surrounding buildings where the renovations were occurring.

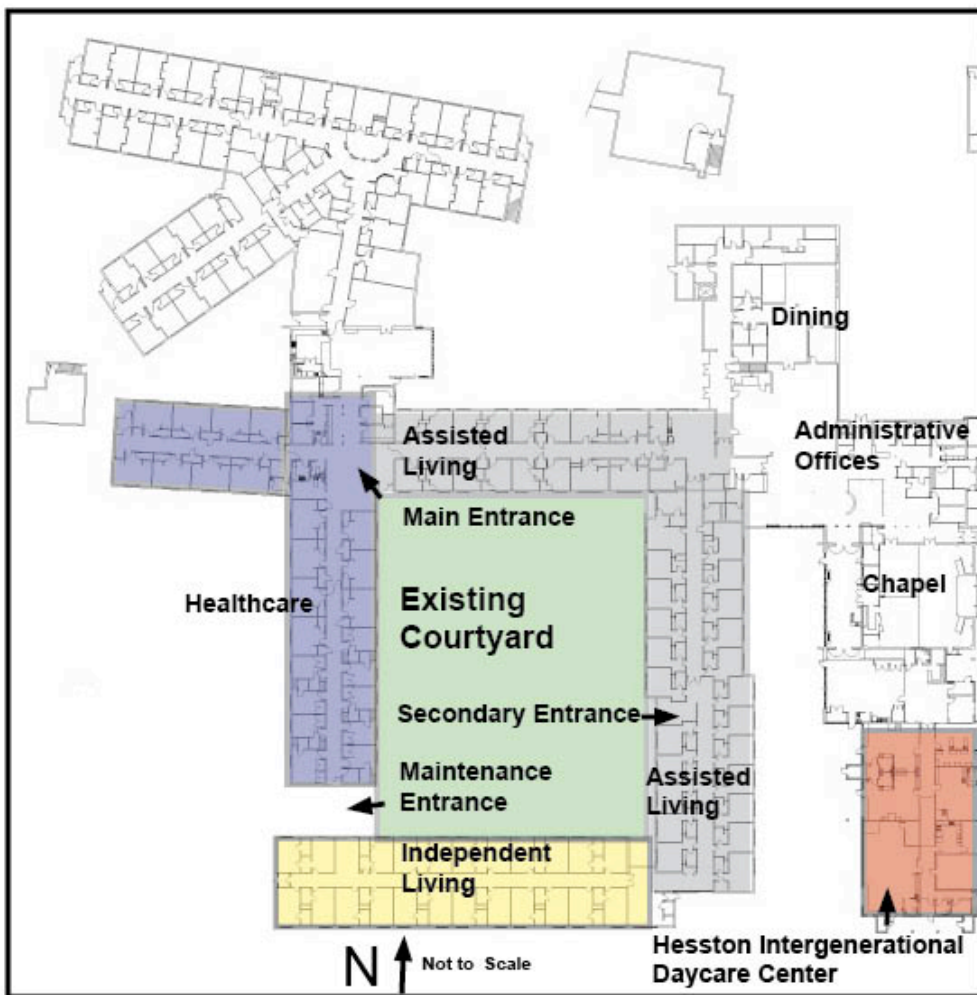


Figure 3.1 Plan of Existing Schowalter Courtyard, 2008.

The Hesston Intergenerational Daycare Center is located close enough to the courtyard to allow the children to visit often. Schowalter provides many other opportunities for interaction with the children, such as eating ice cream cones together and reading together.

The courtyard contained a large gazebo, mature shade trees, and small ornamental trees. The largest trees in the courtyard were mature locust trees, some of which were diseased or dying. One tree had already been removed, and the maintenance staff was planning to remove at least one other because of storm damage. Four-foot wide sidewalks connected the two main courtyard entrances and the gazebo located in the center of the courtyard.

The interior space adjacent to the courtyard's main entrance had recently been remodeled. This space became a public area for residents of Assisted Living and Healthcare. The secondary entrance into the courtyard on the east side also opened into a public space. However, this interior public space was much smaller and was used sporadically for individual and group activities. The photo below (Figures 3.2, 3.3 and 3.4) shows the well-maintained courtyard, the existing gazebo, the two major paths that connected the two entrances that opened into the residential areas.



Figure 3.2 Existing Schowalter Courtyard, April, 2010.

This photo shows existing locust trees which were in poor shape. Photo courtesy of Christa Jahay, Reiger Construction.



Figure 3.3 Existing Schowalter Courtyard, Northeast Corner, April, 2010.

Looking to the east, this photo shows the Assisted Living apartments on the east side of the courtyard. Photo courtesy of Christa Jahay, Reiger Construction.



Figure 3.4 Existing Primary Entrance, Schowalter Courtyard, March, 2010.

The primary entrance into the existing courtyard was in the northwest corner. The recently remodeled public area was located behind the large picture window on the east side. Slope on the existing walk seen in this picture was too steep for individuals in wheelchairs. Photo by author.

The Program

...“I am a person that needs sunshine and fresh air, and I miss the outdoors. I miss sitting outside with my wife and enjoying an afternoon. I would love to sit and eat outside.”...

...“We ended up sitting and visiting together for two hours. It was lovely and we all enjoyed our time outdoors.”...

...“I remember being protected from spring rains as we enjoyed the sounds of thunderstorms and the smell of a wet garden”...

...“Here at the Villa I like to watch the men mow the lawn, the birds and squirrels at the feeders, and the children running and playing outside.”...

*...“I would like to have the opportunity to get outside a little bit everyday”...
... “If there was a fence I could go all around and no one would have to watch me.”...*

Writings from Schowalter residents

In keeping with their Mennonite tradition, many of Schowalter Villa’s residents have rural backgrounds involving daily outdoor work. Unfortunately, some of these residents are no longer able to go outside without assistance or escort. The Schowalter community responded to this desire to be outside by seeking to provide a safe outdoor living space with independent access. The ‘My Garden’ program also recognized the potential for improved health outcomes resulting from increased contact and activity in an outdoor setting, including:

- reduced anxiety and fatigue
- reduced frequency and severity of depression
- pain reduction resulting from increased sunlight exposure
- increased or improved physical functioning, strength and endurance
- increased attention span and ability to concentrate
- improved socialization with other residents both during and outside the programmed gardening times

In February 2010, Showalter staff met and compiled My Garden Guiding *Principles/Requirements*. This list articulated specific program requirements:

- large, open area for picnics and visits by Hesston Intergenerational Daycare children
- patio space to accommodate twenty to thirty dining residents
- space allocated for outdoor cooking
- perennial gardens for active recreation
- a pond less water feature
- clear pedestrian circulation
- universal design with ADA compliance
- a combination of passive and active recreation
- a therapeutic and restorative environment
- security and safety for residents and children
- community feedback and guidance during the design process
- no increase in current maintenance requirements

Additional program requests were identified during a meeting in early February with Judy Burch, KSU MLA student. These included:

- raised planters for gardening activities
- potted plants and trellises
- meditation area
- walking paths for exercise
- a variety of flexible spaces for family visits

I completed a site analysis of the courtyard in March, 2010 to determine the site's compatibility with the program requirements, and a summary copy of the analysis is shown in Figure 3.5

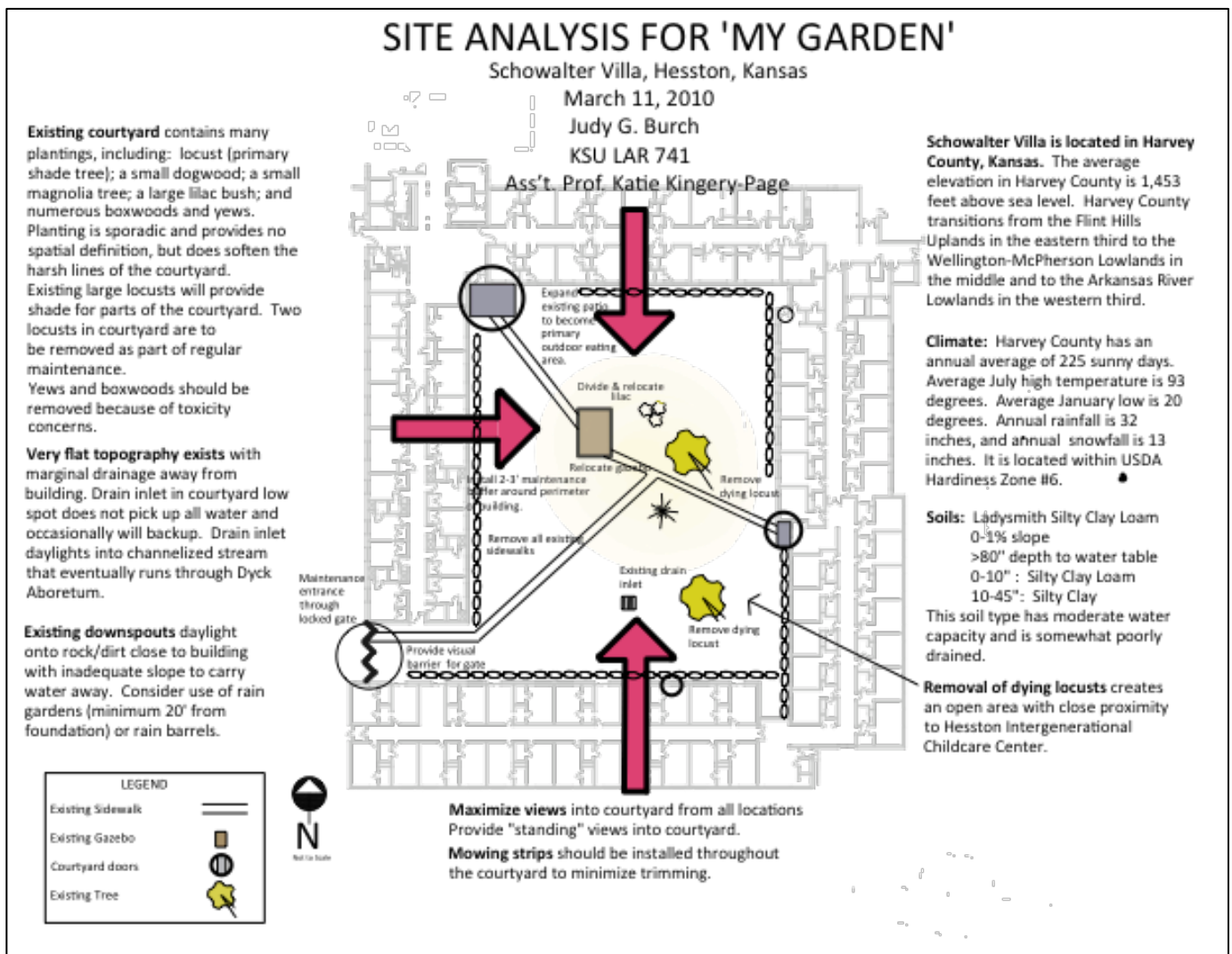


Figure 3.5 Site Analysis for Schowalter Villa Courtyard.

As noted in the site analysis, views into the courtyard were very important for surrounding residents and staff. Also noted is concern over possible elopement issues if the maintenance access is not disguised.

As the site analysis shows, maintenance work to remove dead or dying locust trees must be performed. Existing drainage is inconsistent, and the drainage inlet for the entire courtyard is not located in the lowest point of the courtyard. The drain will occasionally back up. Excessive sloped exists on the portion of the sidewalk connecting the gazebo to the primary entrance. All of these problems can be remediated by regarding the courtyard prior to construction, see Figure 3.6 below.

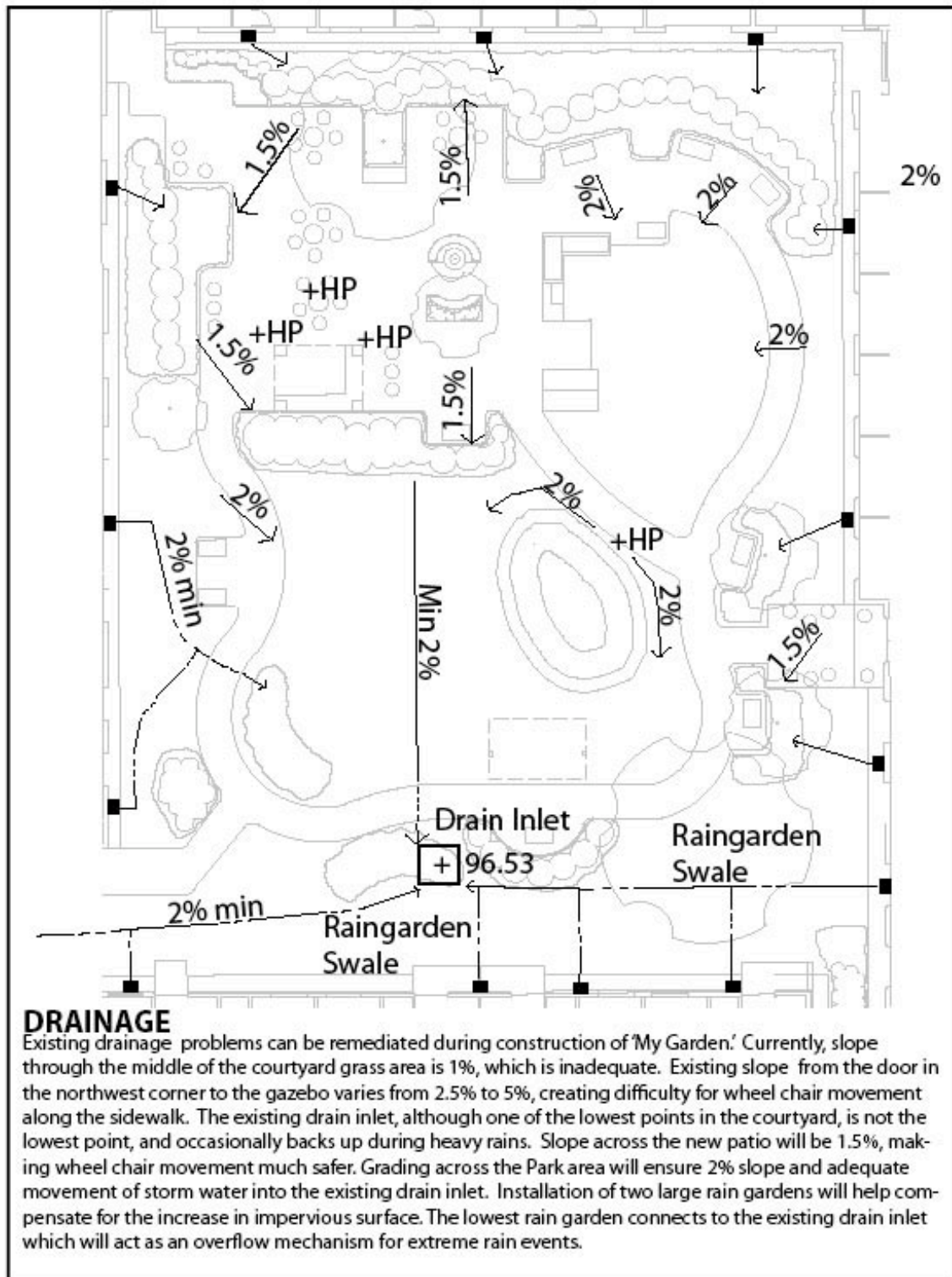


Figure 3.6 Drainage Diagram for Schowalter Courtyard.

Slope across the site is very minimal, but adequate to properly drain and collect stormwater.

The existing courtyard offers exciting possibilities by providing a number of micro-climates within the enclosed space. For example, the primary exposure is southerly, with the main entrance in the northwest corner. The existing configuration is similar to pavilion hospitals, such as St Thomas in London (Figure 2.9) covered in the Background section. Location of the large courtyard in the northwest corner provides warming sun on cool days. The space can also be partially shaded by the building on the west side during warm days. The eastern half of the courtyard offers opportunities for horticultural activities, with good sun exposure throughout the day.

Even before beginning preliminary concept sketches on the project, it was apparent to me that safety for Schowalter's residents was paramount, as indicated by the criteria "security and safety for residents and children" that was included in the initial list compiled by staff and residents. For the residents of Schowalter, safety included many aspects. Unlike the daycare children, who would be supervised while in the courtyard, the adult residents would have access to the garden whenever they desired, assuming that they were mobile enough to go by themselves.

Zeisel's IMAGE, PRESENT, TEST Cycle

While it was obvious that the staff was familiar with specific requirements of "high needs" residents, i.e., those whose cognitive functioning or physical abilities were impaired, I was not familiar with those needs and how they would impact my design. I did not know how to design to keep them safe. I found some of the help I needed in an article by John Zeisel, (2007) included in the special edition of *Journal of Housing for the Elderly*, 21:1, 2007, entitled "Creating a therapeutic garden that works for people living with Alzheimer's." His article outlines a design process that is grounded in the needs of Alzheimer's patients. John Zeisel believes that "the resource for making appropriate design decisions—*empirical knowledge*—lies at the center of this process" (Zeisel, 2007, p. 15, emphasis added). His article also In addition to explaining the neuroscience, Zeisel suggests a process for designing that incorporates knowledge of Alzheimer's into the

design process. Zeisel's background as a designer, researcher, and administrator of healthcare communities gave him a unique perspective on how to design gardens for individuals with dementia. He understands how specific design details elements could be organized to facilitate the creation of successful gardens for people with dementia. His process diagram is adapted and included below, (Figure 3.7). This diagram illustrates how knowledge drives image formation, which is then graphically presented. Next, testing occurs through the presentation of graphic images to the client. The client, also familiar with the needs of dementia patients, provides feedback. This feedback expands knowledge, and a new cycle of reimage and present occurs.

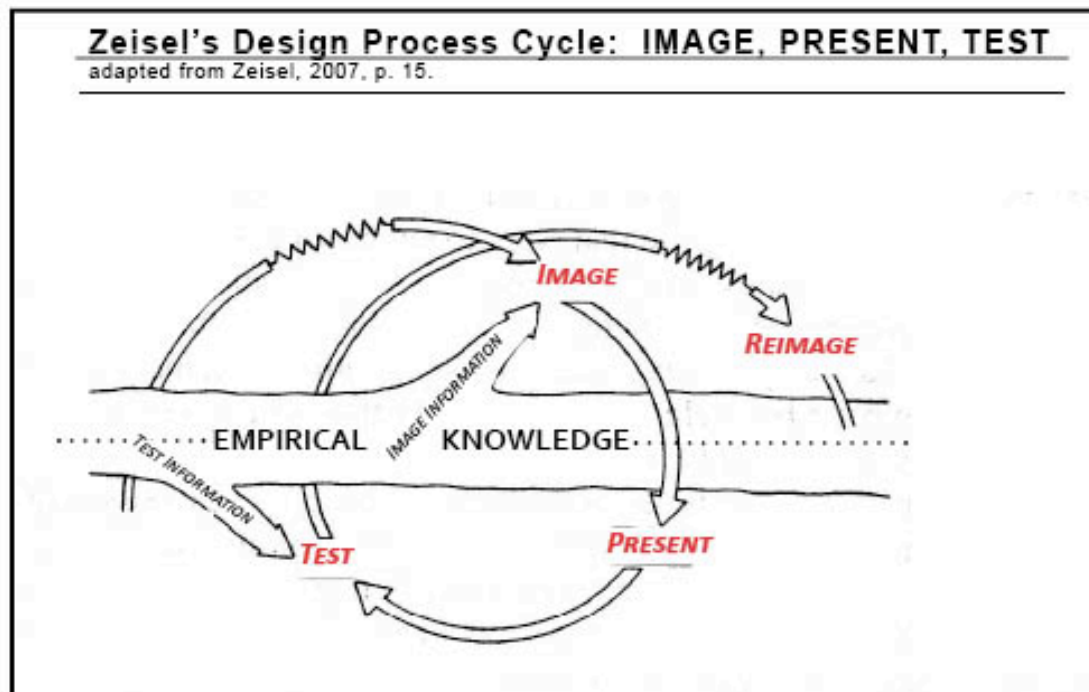


Figure 3.7 Zeisel's Design Process Cycle: IMAGE, PRESENT, TEST.

This diagram shows the three reiterative processes for designing gardens for Alzheimer's patients.

Zeisel's process centers around the three concepts of: **IMAGE;**
PRESENT; TEST.

1. IMAGE: Designers start with a picture of how the users see the world and should include "broad imageable design concepts such as natural mapping and landmarking" (Zeisel, 2007, p. 14). Embedded within the first **IMAGE** category are six important physiological changes in dementia patients:

- Loss of complex sequencing executive function
- Difficulty creating and embedding new cognitive mapping
- Damaged supra-chiasmatic ("timekeeping" nuclei)
- Compromised hippocampal "event tagging"
- Limited thalamus, orbito-frontal cortex and hippocampal impulse control
- Healthy emotional expression amygdala remains operational
- Active "procedural learning" systems (new skills and abilities are embedded through a mix of cognitive and body repetition)
-

Included within the **IMAGE** phase are *Environmental Design Constructs* illustrating design details that compensate for the physiological changes in dementia patients.

- Natural mapping (objects that need no explanation and no manual to operate)
- Temporal Support: because of damaged supra-chiasmatic nuclei, individuals need temporal cues. For example, seasonal plantings reinforce seasonal changes. Activities should take place in the garden at the same time everyday. Include a large, simple clock.
- Learning Support: repetition and routine. It is possible for limited learning to occur under carefully supervised activities.
- Landmarking: clear and evident landmarks connected by clear and evident pathways. Pathways involve little or no

- decision-making and always lead to places of safety.

Entrances should be kept to a minimum, should be designed to look alike and be easily recognizable from all parts of the garden.

2. **PRESENT:** All graphic representations of the garden design should adhere to straightforward design rules.

- Always present the inside/outside together
- Put a park in the garden.
- The re-entry should be continually visible from any place in the garden, which reinforces procedural memory.
- Plan the entrance to and from the garden as a landmark.
- Absolute safety and security is required.
- Lesser paths should intersect main paths at right angles, and a clear hierarchy should be evident.
-

3. **TEST:** Continual improvement through repeated design review.

Every drawing and sketch needs to be evaluated against what is known about dementia, so that designs are improved and treatment goals are met.

After explaining the **IMAGE, PRESENT** and **TEST** reiterative process, Zeisel cautions designers that there are more program elements than have been suggested. Indeed, literature on therapeutic gardens for dementia patients is full of suggestions for what to include, and conversely, what not to include. What most of this literature lacks is the process for designing these program elements in an effective and meaningful way.

There are more presentation rules of thumb, but this is not a design guideline article. This article aims to orient our design minds as best we can towards seeing the world the way someone living with Alzheimer's might, so that resulting treatment gardens have a chance of supporting their brains—giving them a chance for independence, control, understanding, low stress, access to memories related to nature, sense of self, and joy (Zeisel, 2007, p. 32).

IMAGE: Schowalter Villa Design Concept

Utilizing Zeisel's suggestions for the **IMAGE** part of the process I developed a concept for 'My Garden'. This concept grouped the program elements (listed on pages 83-84 of this document) into clearly identifiable, legible and familiar areas for the residents of Schowalter Villa. The concept for Schowalter Villa's 'My Garden' is organized around, "areas with clear meaning in the context of home--front porch..., back porch, and back yard." (Zeisel, 2007, p. 20). In addition to these ordering principles, which centered on the home, the concept for 'My Garden' also included a Park area. A park is another concept, which should be reassuring, familiar and engaging for residents, visitors and staff. Each of these four area was intended to possess unique qualities determined by memories of these locations as well as new opportunities for activities. Connecting each of these areas was a six- and-a-half-foot-wide walking path with plantings designed to facilitate way finding, independence, sensory experiences and pleasant memories of home.

Each of the four areas had design characteristics and purposes that reinforced the concept.

Frontporch: The patio is in the northwest corner—a place to be seen and observe the activities. A place to enjoy the weather, share a cup of coffee or a meal. A place to relax and socialize with guests or other residents. A together place.

Design Characteristics: formal and public; plantings to have year-round structure with opportunities for seasonal plantings which will help reinforce temporal patterns and access memories.

Backyard: The Backyard is where the work is done and where more solitude and privacy are to be found. The vegetable garden is here, as are the raised planters and the tool shed. Here one can be out of the public eye or be in a "together place" when gardening with friends.

Design Characteristics: Flexible, informal, messy, active, seasonal, sunny.

Backporch: The Backporch is more intimate than the Frontporch. This is where residents might slip out in the morning for a cup of coffee, check on the garden, or watch the birds gathered at the feeder.

Design Characteristics: Flexible, private, informal, a take-over area.

Park: The park will be a large, open area for large gatherings and barbecues. Park benches will be provided for sitting alone or with others and enable courtyard users to watch the daycare children on their occasional treks into the park. The park will provide pleasant views into the area from residential rooms and from the other three areas of the courtyard.

Design Characteristics: Simple, open, restorative, solitary, fascinating.

PRESENT: Four Design Alternatives

In early March, Assistant Professor Katie Kingery-Page and I presented four early design alternatives to Showalter residents and staff at Schowalter Villa in Hesston, Kansas. An overall concept for the space and the four design alternatives were communicated to the audience using a computerized presentation. Each design alternative was presented in a diagrammatic plan view and was accompanied by a three-dimensional model. Discussion followed the presentation, with good input and enthusiasm from the staff and residents.

Unscaled, diagrammatic drawings of the four concepts are included as Figures 3.8-3.11. The four design alternatives were:

- 'My Garden': The Heart of the Green
- 'My Garden': Raingarden Ribbons
- 'My Garden': In the Park
- 'My Garden': Encore

Each of the four concepts included the same design elements: a gazebo; a dining area; an enhanced garden area; a wide path for walking; a water feature without a pond; a memory garden; a tool shed; rain gardens; and a butterfly garden. All four concepts also were organized according to the concept with a Frontporch, Backporch, Backyard and Park.

'My Garden': The Heart of the Green

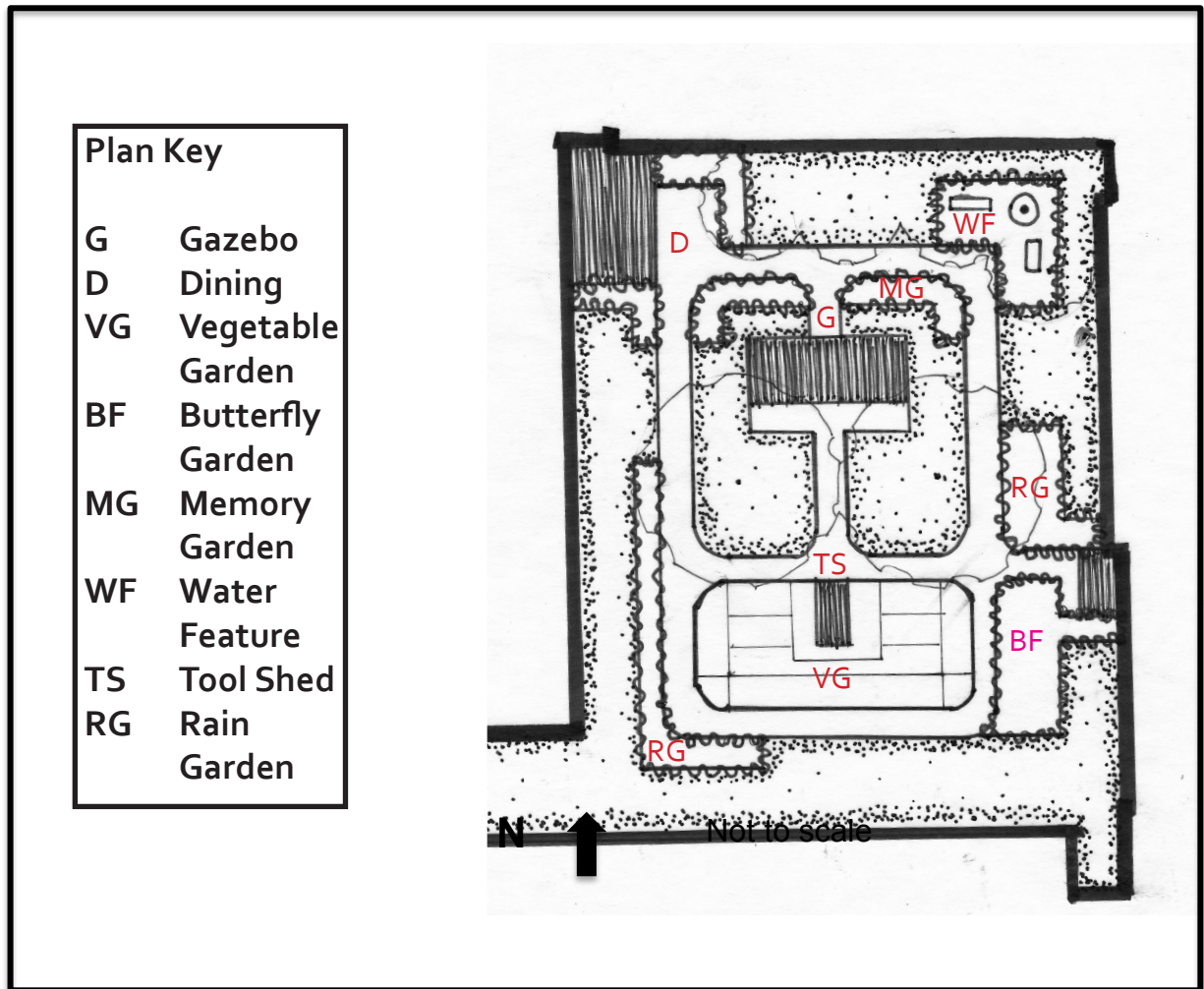


Figure 3.8 'My Garden': The Heart of the Green Concept Diagram

The Heart of the Green Concept was a rectilinear design with the gazebo in the north end of the courtyard, the water feature in the northeast corner, the enabled garden area in the south, and straight paths connecting each area.

'My Garden': Raingarden Ribbons

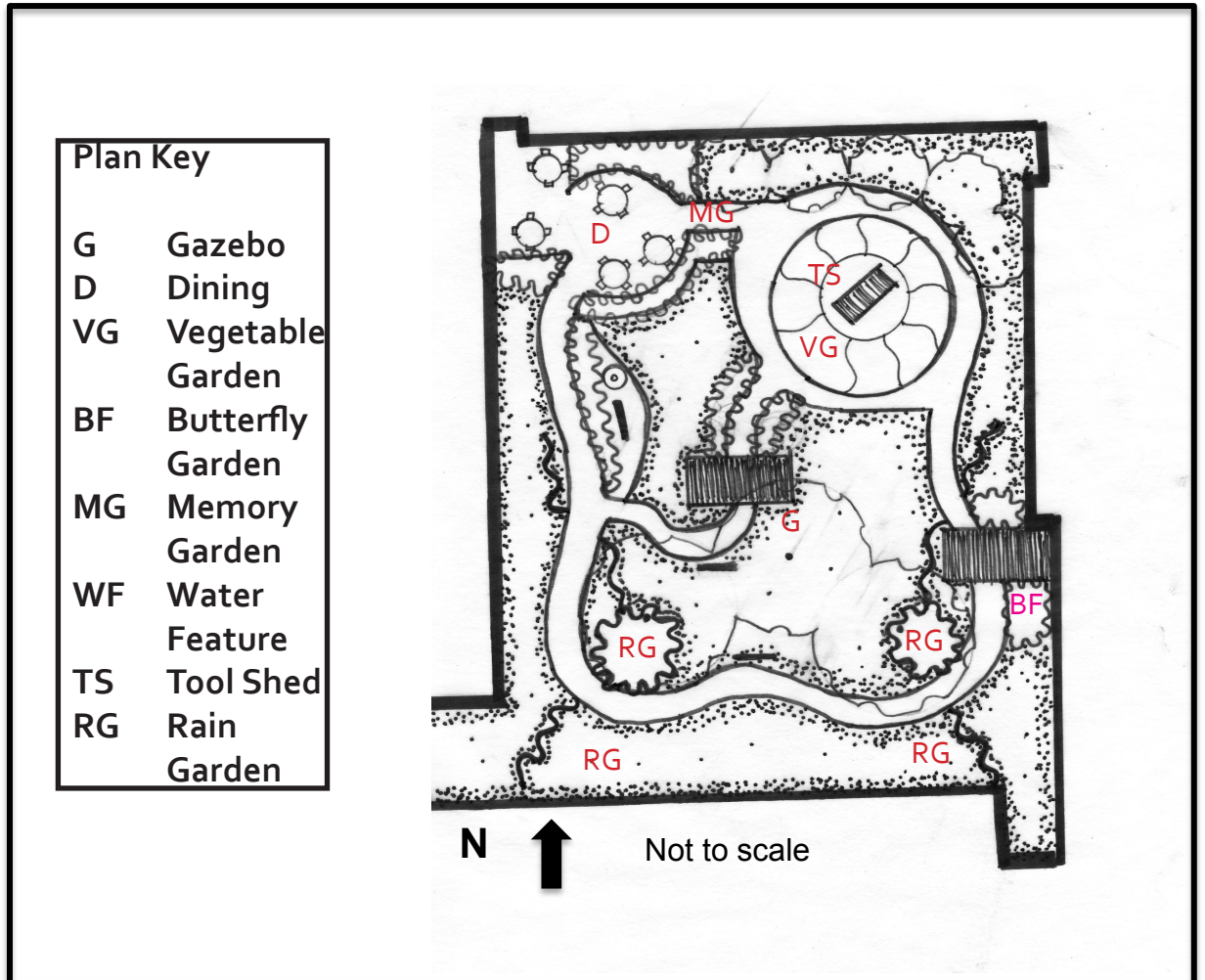


Figure 3.9 'My Garden': Raingarden Ribbons Concept Diagram

Raingarden Ribbons is an arc and tangent design with the enabled garden area in the northeast corner, the gazebo in the middle, the water feature near the dining area, raingarden ribbons running into central raingardens from the perimeter of the building, and curving paths linking each area.

'My Garden': In the Park

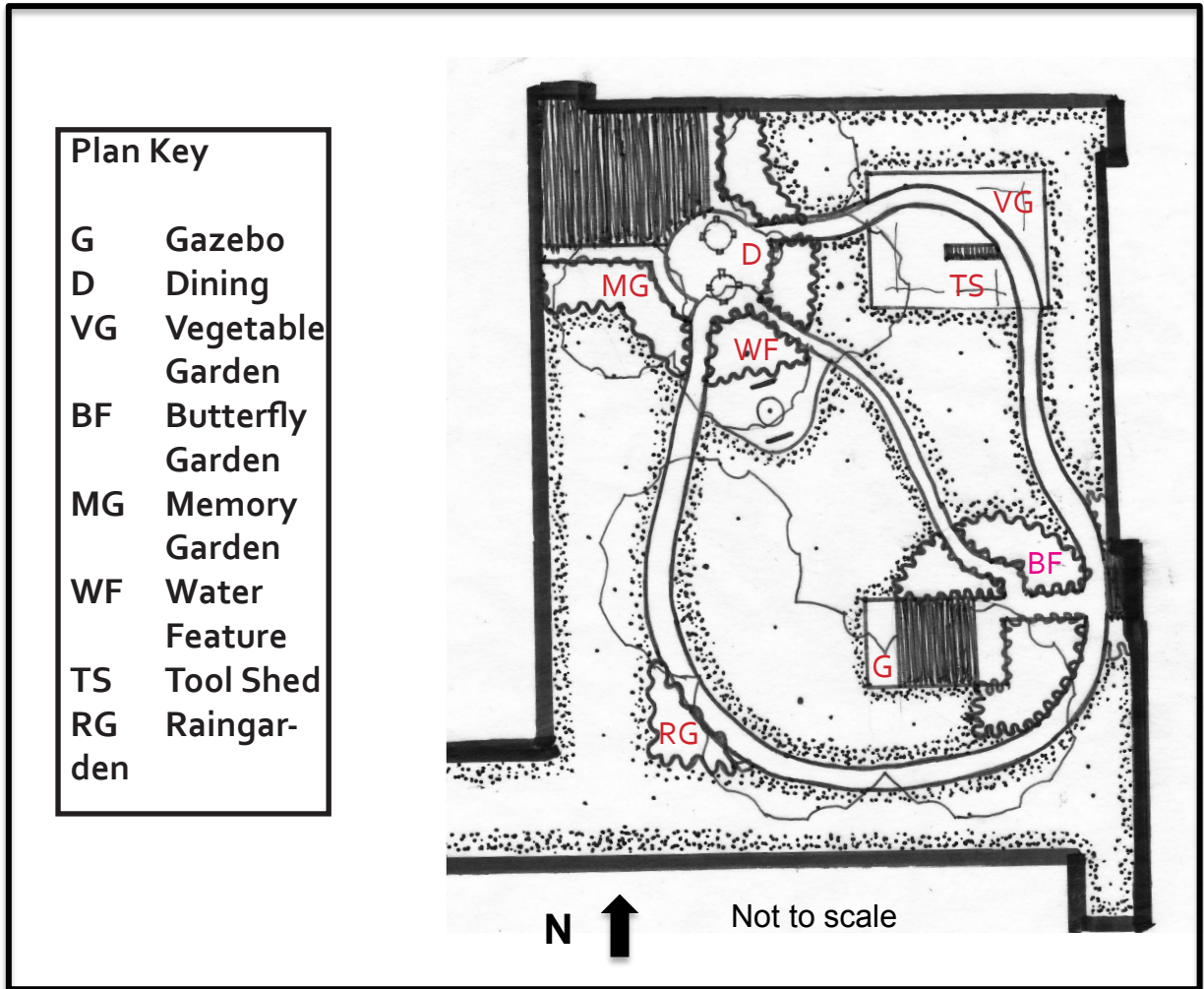


Figure 3.10 'My Garden': In the Park Concept Diagram

A large park dominates this concept, with the gazebo located in the southern end of the courtyard. The enabled garden is in the northeast corner, the water feature is again located near the dining area, and curvilinear paths connect each area. This concept includes a diagonal path, which makes a direct connection between the main entrance and the entrance on the east side.

'My Garden': Encore

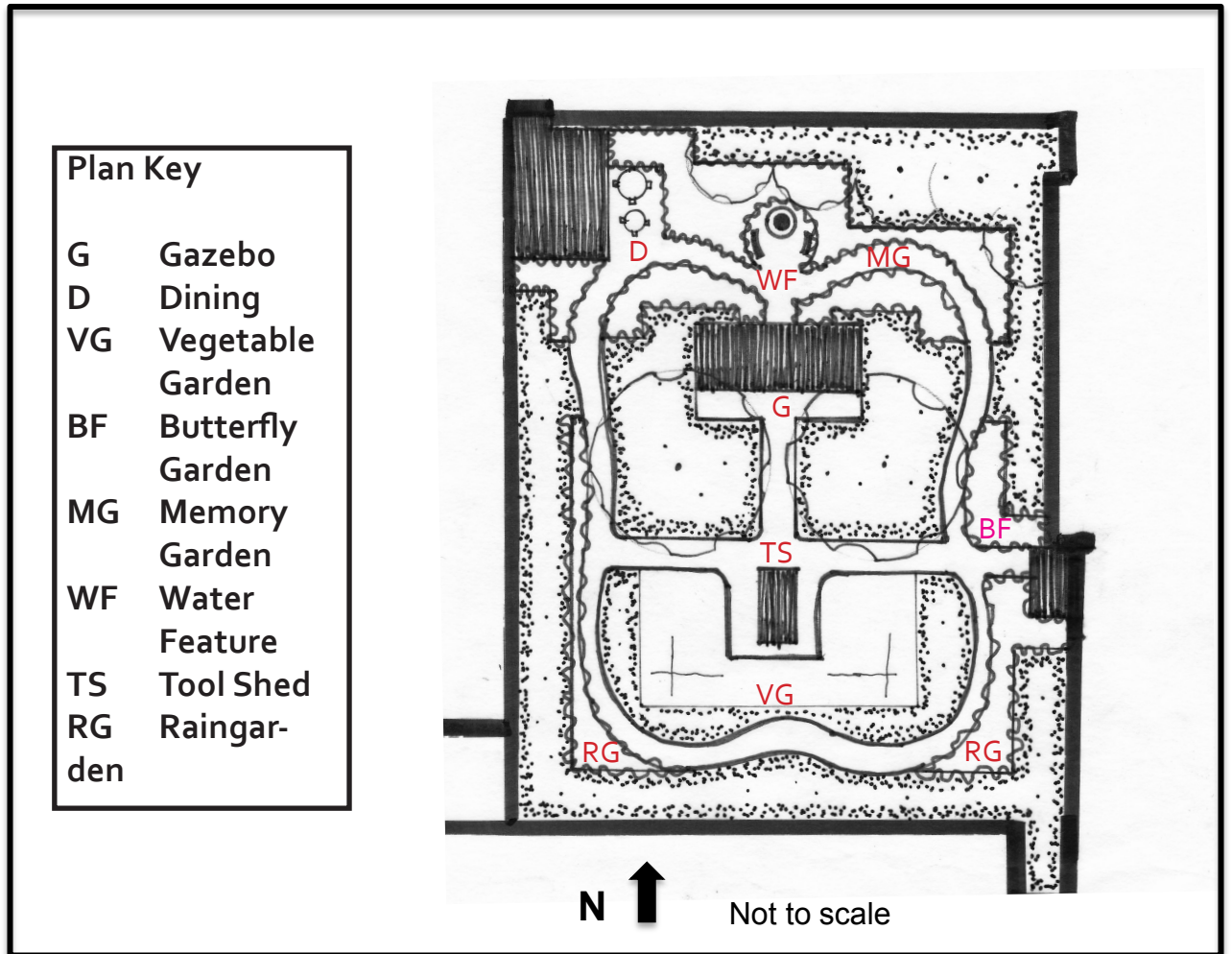


Figure 3.11 "My Garden": Encore Concept Diagram

Encore is a curvilinear version of 'My Garden': The Heart of the Green, with the water feature located on a strong axis that connects to the gazebo and terminates with the enabled garden area.

TEST: Evaluating Design Alternatives

After Assistant Professor Kingery-Page and I presented the four design alternatives, meeting attendees were asked to vote on their favorite alternative. *'My Garden': Raingarden Ribbons* (Figure 3.9) was clearly the favorite alternative, and *'My Garden: In the Park* was a distant second. Each of the other two alternatives received one vote. The discussion that followed resulted in the following clarifications, what Zeisel would call the **TEST** phase of designing dementia gardens. This feedback created more knowledge, which impacted the next phase of the design process.

CLARIFICATIONS:

Park: A large amount of open Park is desirable. Park should be located in the south end of courtyard. Grill should be stored near the gazebo.

Front Porch: Water feature seating should be close to Healthcare entrance and outdoor dining. Outdoor dining needs four to five tables seating six people each. Covered dining cannot touch the building roof because of fire safety regulations. The overhead plane near the Healthcare entrance needs to be reduced because of natural light requirements, Threshing stone water feature is popular.

Backyard: Enabled gardening should include four 4' x 8' raised planters. Locate the gardening area closer to Healthcare entrance. The kitchen staff at Healthcare is interested in having an herb garden located close to the courtyard.

General: Show potential phasing in master plan. Design should accommodate residents with the highest needs. Keep the courtyard low maintenance. Courtyard will be irrigated. Curved paths are appealing. Options for short looping paths are a must. Hierarchy of seating is essential, allowing for different size groups from pairs to small groups, to large groups. Paths should be kept 20-24 feet from the building to ensure privacy.

REIMAGE: Development of Raingarden Ribbons Concept

The next stage of the project was to further develop the Raingarden Ribbons concept. Figure 3.12 illustrates this process.



Figure 3.12 Diagram Showing Development of Raingarden Ribbons Concept.

These diagrams show part of the process of **REIMAGING** the Raingarden Ribbons concept. That concept was chosen during the early March meeting at Schowalter Villa (Figure 3.9).

During this new phase of the project, I found Zeisel's process to be very useful as I started looking in more detail at the program elements. For dementia gardens, it is important to ensure that there are design details that will hold an individual's interest as they traverse the courtyard. These

elements give them a goal, encouraging them to keep moving along the path.

However, some design details are not appropriate for dementia patients, even though they might be interesting. For example, changes in elevation and abstract art are not appropriate in dementia gardens. Complimentary to Zeisel's process and his emphasis on safety and security, is Claire Cooper Marcus' Alzheimer's Garden Audit Tool Kit (Cooper Marcus, 2007), which provides expertise on what works and what doesn't work in a dementia garden. It contributed greatly to the next stage of the design.

TEST: Cooper Marcus' Alzheimer's Garden Audit Tool

The Alzheimer's Garden Audit Tool Kit is a comprehensive list of do's and don'ts--*design details* and *qualities* necessary for a successful therapeutic garden for dementia patients. (A complete copy of the Audit Tool is included in Appendix D). Cooper Marcus has concluded that gardens for dementia care fall into two classes, gardens that work and gardens that don't work. The unsuccessful gardens are placed in three categories:

- gardens designed with apparently little regard for what is known about the use of the outdoors by Alzheimer's patients;
- thoughtfully designed gardens that were "off limits" to residents due to staff policies;
- gardens with good qualities containing problems or omissions, which make it difficult for caregivers to encourage use.

Cooper Marcus believes that therapeutic gardens for dementia patients should be evaluated using post-occupancy testing. However, "time, budget and lack of necessary skills generally render this unfeasible" (Cooper Marcus, 2007, p. 180). Her Alzheimer's Garden Audit Tool was developed to help bridge that gap.

The checklist items originate from various sources. Some checklist items reflect knowledge about the elderly in general (paths wide enough for two wheel chairs, non-glare surfaces). Some checklist items reflect specific knowledge about Alzheimer's and other dementia patients (omission of shadows and pavement color changes to prevent visual cliffing, and no

abstract art). Additional checklist items refer to garden elements intended to lessen the work of staff (spaces large enough for programmed activities, shaded seating in close proximity to the main garden entrance). A fourth source of checklist items is successful garden design, because Cooper Marcus concluded after observations of many dementia gardens that these elements were frequently overlooked. Two elements of what Cooper Marcus considers to be successful garden design elements include use of seasonal plants and a high ratio of green to hard spaces, 70% to 30%. During development of the Garden Audit Tool, Cooper Marcus also consulted Alzheimer's design experts regarding content, format and wording.

The intended uses of the Garden Audit Tool are many:

- A checklist for staff and policymakers interested in learning more about creating higher-quality environments for people with Alzheimer's disease;
- The basis of an evidence-based program (or brief) for a new or renovated garden;
- A reference tool for landscape architects and other designers working to design or re-design quality outdoor space for those with Alzheimer's disease;
- A checklist to enable administrators of an existing facility to determine which specific elements of the outdoor space need improvement;
- A research instrument to study the implications of outdoor environmental quality on the quality of life of resident in an Alzheimer's facility;
- A teaching tool to raise the consciousness of design students regarding the needs of this patient population.

Zeisel, Cooper Marcus and the staff and residents at Schowalter Villa all shared an understanding of the importance that security and safety play in dementia gardens. Zeisel's process cycle: **IMAGE**, **PRESENT** and **TEST** and Cooper Marcus' Alzheimer's Garden Audit Tool were valuable in helping me understand security and safety needs as I worked toward the goal of

designing a safe and secure environment. However, in addition to being safe, the environment needed to be engaging and supportive of articulated health outcomes. All this needed to be accomplished ...”without the whole garden becoming trite or simplistic” Zeisel, 2007, p. 22).

A.R.T. in Environments of Care

As I proceeded with the development of the Raingarden Ribbons design, I endeavored to design a courtyard that was engaging, not trite and simplistic. As I was familiar with the Kaplan’s Attention Restoration Theory, I wondered if it might contribute to the design of an engaging courtyard. Would an environment that was restorative also be more engaging and less trite and simplistic? I began exploring the contributions that A.R.T. might make to the Schowalter courtyard. Cognitive functioning is important for any population, but in elderly populations with or without dementia, this fragile resource needs to be supported. According to A.R.T., restorative environments support Directed Attention.

I found two published articles that placed the concept of A.R.T. within the context of therapeutic environments. Scopelliti and Giuliana (2004) believed that “the theoretical framework proposed by the attention restoration theory (A.R.T.) offers an interesting perspective to address the issue of health.” (Scopelliti and Giuliana, 2004, p. 205). A.R.T. accomplishes this by allowing a better understanding of the characteristics of supportive environments and how they change over a lifetime. In their research, Scopelliti and Giuliana (2004) focus on social interactions and utilize self-measures of perceived restorativeness, which has been shown to be a method for verifying restoration that has not been validated. Nevertheless, the conclusions reached from Scopelliti and Giuliana’s study support the idea that identified environmental features fostering restoration can be included in guidelines for designing healthier environments.

The second published article I found that placed A.R.T. in environments of care was written in 2007 by Keith Diaz Moore, “Restorative dementia gardens: exploring how design may ameliorate attention fatigue,”

Journal of Housing for the Elderly, 21,(1/2) 73-88. In this article he established a correlation between exemplary dementia gardens (gardens which were nominated for their “design quality and responsiveness” (Moore, 2007, p. 73) and A.R.T. characteristics. In other words, the best dementia gardens also contained A.R.T. characteristics. His interpretation theoretically linked five gardens’ design concepts with the four characteristics of A.R.T., to “raise awareness of A.R.T. and its potential implications for designing garden environments and horticultural therapies for people experiencing dementia” (Moore, 2007, p. 73).

Moore examined the role A.R.T. plays in the successful dementia gardens, and his article made me curious about how design characteristics might support A.R.T.. His article encouraged me to explore A.R.T.’s potential for the Schowalter courtyard. Without his article, I would not have attempted to bring A.R.T. to the project. Subsequently, his insight into specific design characteristics greatly enhanced my understanding of how to integrate A.R.T. characteristics into the courtyard. Additionally, I was familiar with the importance of directed attention to cognitive functioning for dementia patients, and his suggestion that design might impact directed attention capabilities was an intriguing one.

Moore’s interest in restoration processes in dementia gardens went beyond a discussion of the benefits to cognitive functioning, specifically directed attention. He linked diagnosis to directed attention by stating that attention and executive functioning tests have significant predictive value in diagnosing DAT (Dementia of the Alzheimer’s Type) in the preclinical phase. Directed attention supports executive functioning, which is the ability to plan and perform sequential cognitive tasks.

While cursory, the growing interest in the role of directed attention in the manifestations that characterize the dementia experience provide an interesting theoretical connection for those interested in therapeutic gardens that serve this population” (Moore, 2007, p. 74).

During his study of the successful dementia gardens, Moore adopted the Kaplans’ definitions of the four characteristics of restorative gardens:

Being Away; Extent; Compatibility; and Fascination, with some strengthening of the characteristics in order to address his research topic. The qualitative data collected by Moore were comments shared with him by an expert panel composed of garden designers and administrators.

“although specific comments may originate from not only expert panel members but the designers of the gardens as well as the administrators of the garden. The comments selected are those that best capture the spirit of the discussion that has taken place among the expert panel members (Moore, 2007, p. 79)

Moore next assigned comments from these experts to the four characteristics of A.R.T.. In the process of assigning the experts' comments, he ultimately assigned design details to one of the four characteristics of A.R.T.. For example, for the A.R.T. characteristic, **Being Away**, Moore concludes that contrast and enclosure become necessary to create the feeling of **Being Away**. Those are two design suggestions that a designer of gardens for people with dementia can understand and incorporate into their design. The outside garden contrasts with the institutional nature of the inside and offers more stimulation. Moore's use of the term enclosure becomes similar to the well-known concept of spatial definition. By defining a distinct garden space or spaces within the garden, other space is excluded, creating a sense of enclosure. Thresholds become very important as elements of spatial definition and way finding. Threshold also becomes an important safety factor influencing ease of use. Moore feels it is important to block visual access to distractions in the surrounding environment. Zeisel (2007) agrees that it is important to shut off visual access to activities outside the garden in order to discourage elopement attempts.

Unfortunately, Moore does not specifically address the problem of not being able to use conventional methods of spatial definition, such as elevation changes, use of walls that would also block visibility, or massed plantings. For designers of dementia gardens, spatial definition and enclosure can be problematic in a setting where visual access is necessary for safety reasons. Designers might be instructed to keep open a visual field from 2'-4' in height to allow residents to be seen while in the garden, as was the case in

Schowalter's Courtyard. Paving texture changes and elevation changes are also not appropriate in dementia gardens, adding to the challenges of creating a sense of enclosure.

As used by Moore, **Fascination** includes the conventional aspects of natural environments that provide soft fascination: variation in sun, shade and shadows. Moore also adds the concept of detail, specifically "other *artfully* (emphasis added) executed details enrich patterns of engagement to the finest grain" (Moore, 2007, p. 81). Once, again, Moore is suggesting design characteristics that are easily understood, utilized and in agreement with both Zeisel's process and Cooper Marcus' Garden Audit Tool.

Moore's concept of **Compatibility** emphasizes fit and support and the physical components that create the garden. This is very much in agreement with Cooper Marcus' Garden Audit Tool (2007). Moore divides these **Compatibility** components into three categories:

- *Physical components*: wide, level, non-glare paving; many seating options including moveable seating; high ratio of softscape to hardscape; and great diversity in planting material and planting beds.
- *Sensory Properties* include: dealing successfully with glare and contrast issues. (People with dementia can misread changes in lightness/darkness as being actual elevation changes. Also, their eyes take longer to adjust to outdoor light.) Moore also includes other senses-- olfactory, tactile and auditory-- in this category.
- *Spatial Properties*. Choices in spatial qualities should be simple to make, clear and limited in number, although they should include the opportunity to be alone or to interact in groups.

Extent is the A.R.T. characteristic that Moore takes the most license with, adapting it to become a more inward-looking definition of **Extent** as a sensory exploration. This is consistent with the physical and neurological limitations of dementia patients.

The modification to Extent came from my attempt to synthesize the comments arising from the expert panel. So, indirectly, I am sure this shift is in response to their desires to meet the needs of those with dementia, but I think more directly, it illustrates

their professional thinking regarding garden design and the concept of extent (Moore, 12-10, personal correspondence, used with permission).

In this context, the focus is on the haptic system that “involves the integration of many senses, such as touch, positional awareness, balance, sound, movement and memory of previous experience” (Moore, 2007, p. 81).

Moore’s expansion of the concept of **Extent** has potential for dementia garden design or garden design for individuals with other physical limitations. **Extent** becomes less of a broad, physical characteristic that requires movement through a space, and becomes more of an internalized personal experience. **Extent** would be facilitated by smelling a fragrant rose, which might be easier to achieve in a therapeutic garden setting than would the Kaplans’ definition of **Extent**.

Additional design details that Moore specifically mentioned include theme gardens, such as memory gardens with distinct characteristics that serve as “therapeutic mnemonics, cueing what is expected”(Moore, 2007, p. 81). A complete list of the exemplary gardens studied by Moore and the experts who evaluated them is included in Appendix C.

Moore found from his research that exemplary gardens contained the four A.R.T. characteristics. He did not take time to speculate why this is. Perhaps good designers instinctively design to create restorative environments. They know what people want. Research has shown the tendency for people to prefer restorative environments (Ulrich, 1984; Korpela, 1991; Newell, 1997; Galindo and Hidalgo, 2005; Hartig and Staats, 2005). Designers of successful dementia gardens might tap into an intuitive understanding of what makes a garden restorative. Since humans tend to prefer environments that are restorative, those experiences might support the designer’s intent. Moore does speculate that the “importance of sustaining engagement with the garden becomes much more evident and may assist in hypothesizing why some gardens are thought to be more restorative than others” (Moore, 2007, p. 86). Moore also points out that design concepts within the **Compatibility** category receive the most attention during the

design process, since **Compatibility** is also “foundational to the typical user needs approach” (Moore, 2007, p. 86).

After familiarizing myself with Moore’s concept of A.R.T. in gardens, for dementia patients, I returned to the task at hand—designing the courtyard at Schowalter. Discussions exploring the incorporation of A.R.T. into the Schowalter courtyard followed with Professor Keane and Assistant Professor Kingery-Page. I believed that the list of do’s and don’ts for therapeutic dementia gardens that I was currently compiling for my use could also contain elements that either directly support A.R.T. characteristics or could be readily adapted to support A.R.T.. Attempting to incorporate design elements that support A.R.T. in the courtyard at Schowalter Villa subsequently became an integral part of the next step in the project:

REIMAGE: Incorporating A.R.T. into the Schowalter Courtyard

The feedback I received from the March presentation of the four concepts for the Schowalter courtyard suggested ways to optimize functional use of space through the layout of program elements and refinement of the intended program. Two weeks of alternative plan development and analysis followed the March presentation of the four concepts. Stakeholder feedback was considered and applied in light of the following criteria:

1. Does the program addition or revision reflect a realistic future for the courtyard in light of maintenance and activity staffing? The courtyard garden budget does not accommodate increased staffing.
 2. Does the layout of program elements achieve the four A.R.T. Characteristics?
 3. Does the layout of program elements facilitate safety and security by allowing acceptable sight lines through the garden and correct understanding of needs of dementia patients?
- I also revisited the design characteristics of each of the four areas, which had been delineated during concept formation. Zeisel encourages designers to design the outside with the inside, so that

relationship was explored further. (Figure 3.13). The public space inside the main entrance to the courtyard had recently been enlarged, and a corresponding outside public space would enhance the experience inside. This outside public area immediately adjacent to the newly expanded interior space was the Frontporch patio. Program specifications required an area large enough to accommodate 20-30 people for dining or socializing.

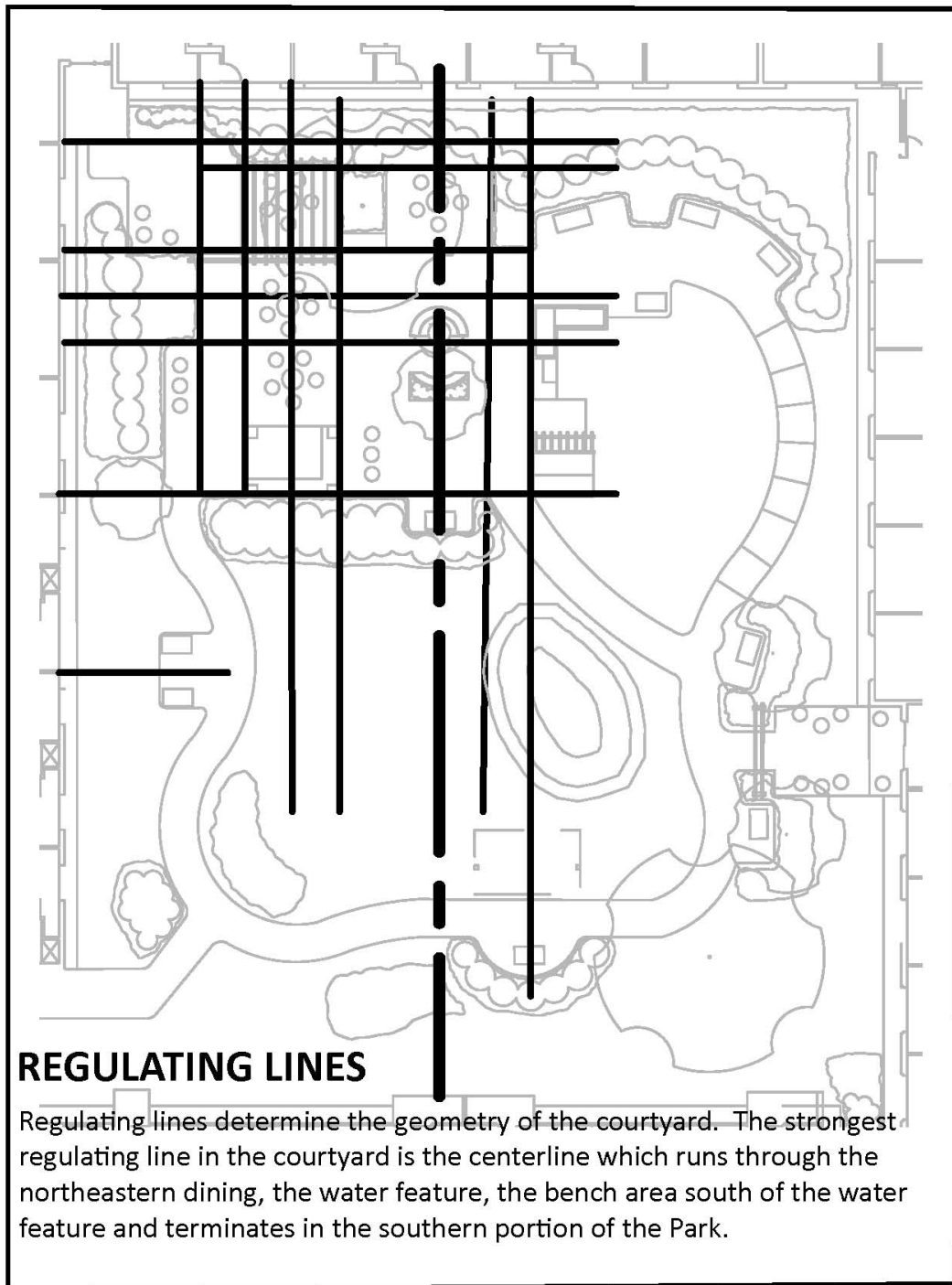


Figure 3.13 Regulating Lines Diagram in Schowalter Courtyard.

Zeisel recommends designing the outside with the inside, and this diagram illustrates how the existing building's geometry impacted the courtyard.

PRESENT: Development of the Raingarden Ribbons Alternative

After exploring many alternatives for development of the Raingarden Ribbons concept that had been favored by Schowalter staff and residents, one plan was deemed to be the best alternative by Assistant Professor Kingery-Page. I then revised plan and drew it in greater detail at a scale of 1"=10'.

On April 8, CAPD faculty members, Professor Susanne Siepl-Coates and Dr. Timothy Keane reviewed the current plan during an informal critique session. Their suggestions for improvement to the design included:

- Attention to path hierarchy Simplification of the circulation pattern while retaining simple, looped options (This suggestion shows awareness of the needs of dementia patients).
- Emphasis of the four major activity areas based on the Concept. This improves legibility and improves understanding.
- The placement of enabled gardening planters and tool shed should define the space.
- Benches should be grouped, acknowledging need for social support.
- Rectilinear design of Front Porch should be retained.
- The diagonal connection between two entrances is desirable.

The drawing critiqued during the April 8 mid-crit is shown below (Figure 3.14).

The importance of a large patio for dining with adequate seating was emphasized, once again. Providing room for the turning radius of wheelchairs is very important, and contributes to the size of the patio. Figures 3.14, 3.15 and 3.16 provide more detail about the importance of seating options in the Frontporch section of the courtyard.

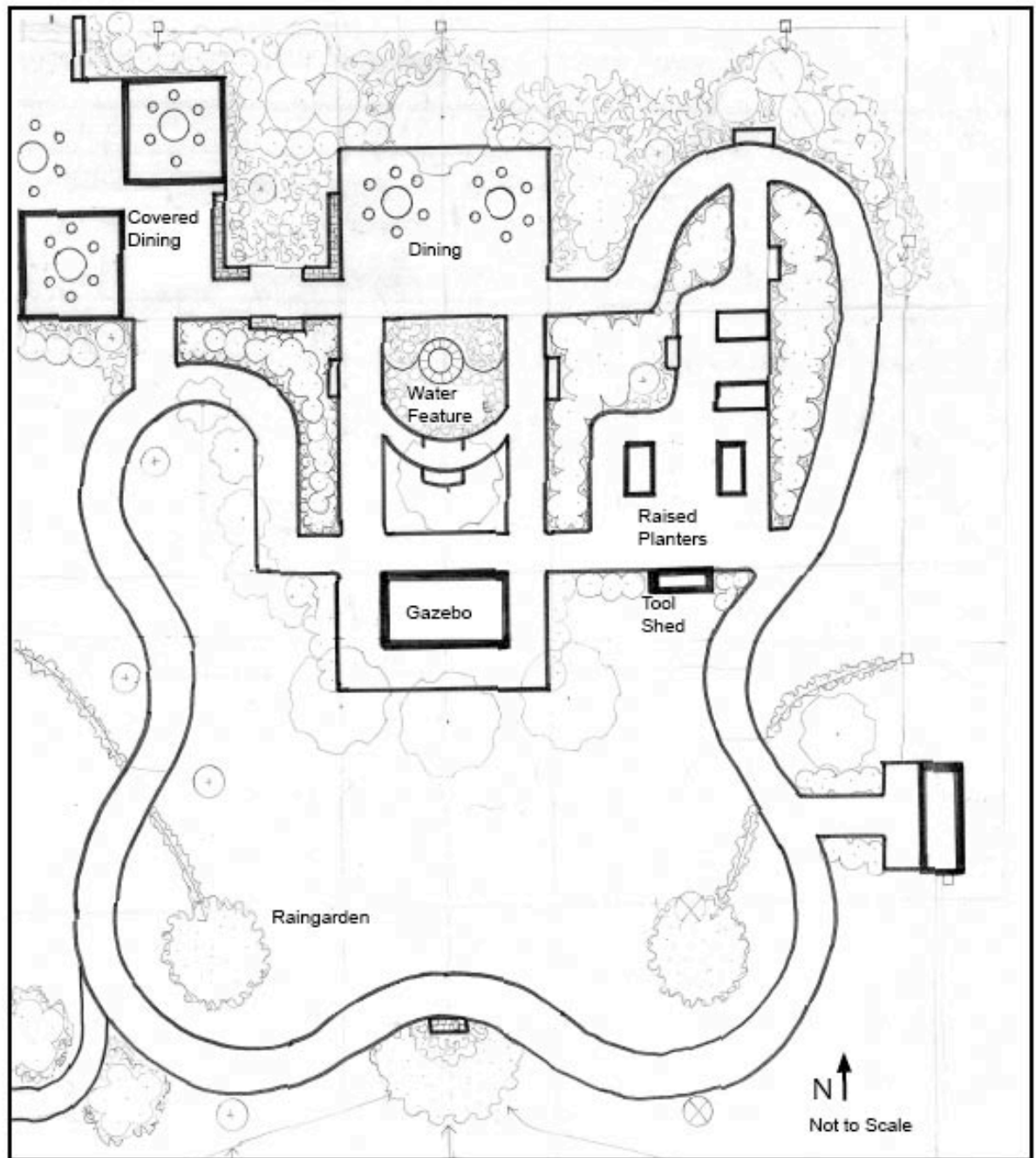


Figure 3.14 April 8 Mid-Crit Drawing.

This drawing included more detail than the previous concepts (Figures 3.8-3.11) and showed planting plan ideas. Work focused on location and scale of program features: raised planters; tool shed; water feature; gazebo; covered dining and dining.

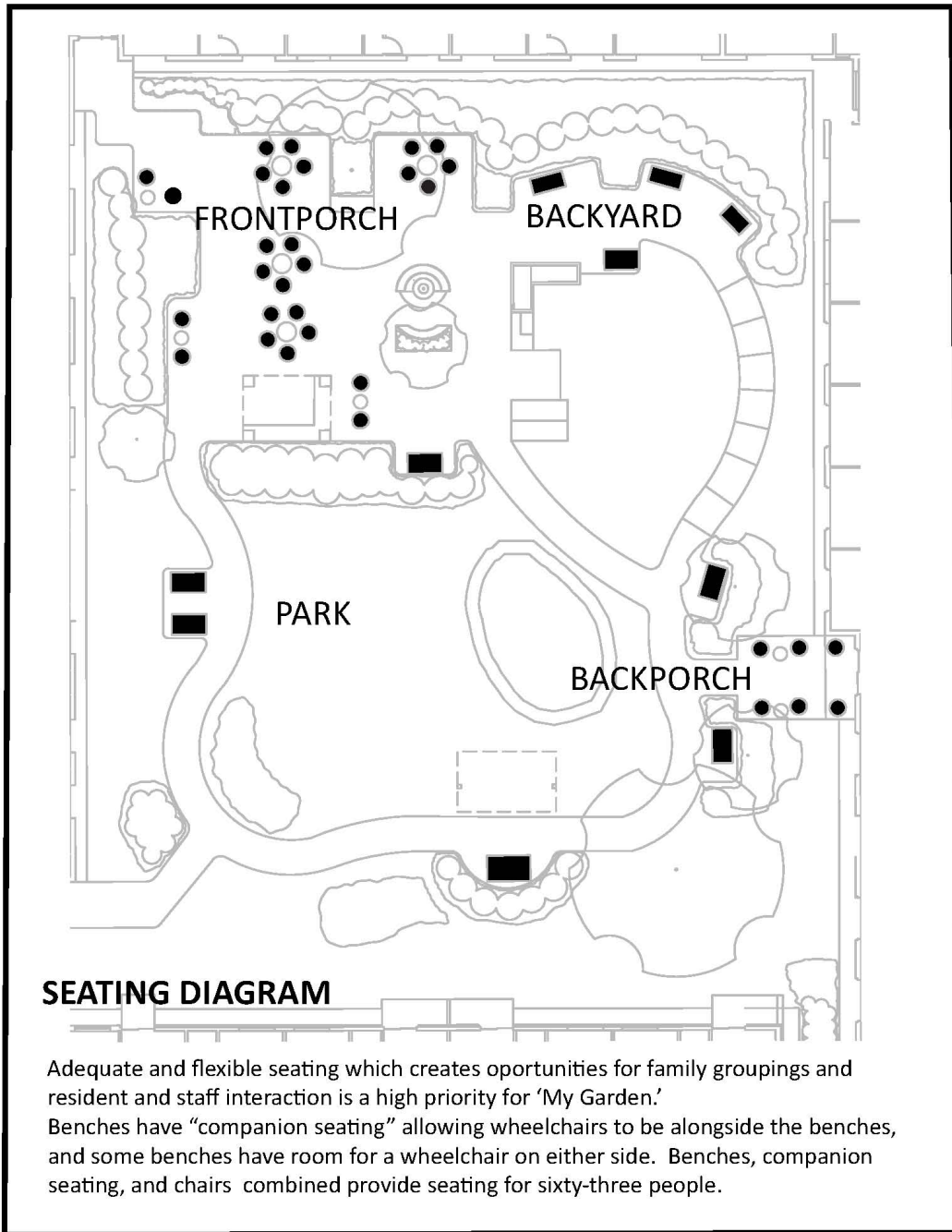


Figure 3.15 Seating Diagram for Schowalter Courtyard.

Adequate seating with many choices was a well-articulated program requirement for the courtyard and greatly impacted the design of the courtyard.



Figure 3.16 Frontporch Perspective by Katie Kingery-Page. Design by Author.

Schwalter wanted enough seating for 20-30 people in the Frontporch area adjacent to the main entrance into the courtyard. Schwalter staff hoped to occasionally serve meals to residents and visitors outside on the patio. The seating had to be flexible in order to accommodate varied uses. The proposed outdoor kitchen can also be seen in the upper right corner of Figure 3.16.

TEST: Meeting with Schowalter Staff and Residents

On April 14, a long-distance meeting was held utilizing “Go-To-Meeting” software. Assistant Professor Kingery-Page and student author Judy Burch were in Manhattan, Kansas. Schowalter residents and staff were in Hesston, linked via phone and computer. During the meeting, the revised plan was reviewed. A copy of the plan is included below (Figure 3.17)

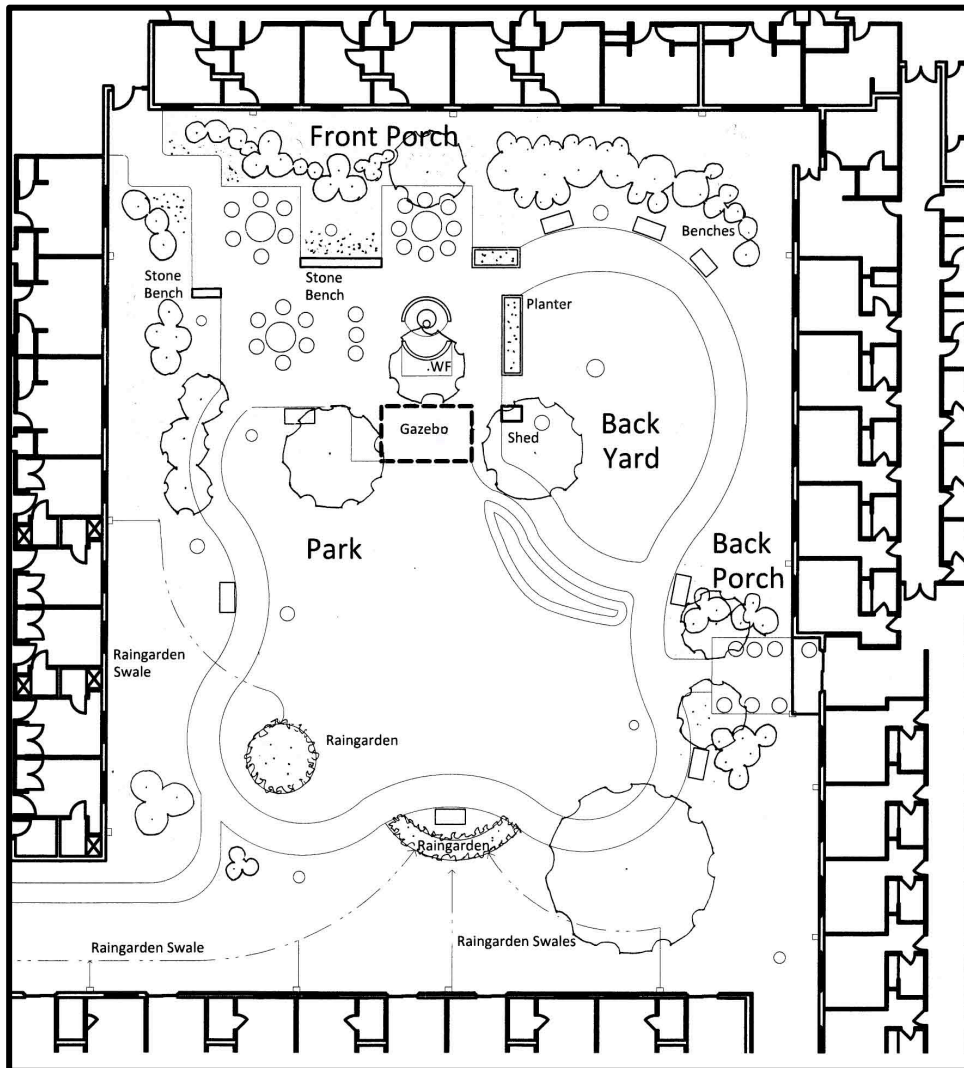


Figure 3.17 Plan Drawing for April Presentation of Courtyard.

Significantly more detailed than the last drawing, (Figure 3.14), this drawing shows benches, tables, a hill for the children to play on, raised planters and a preliminary planting plan.

Specific program elements were discussed at length during the April 14 meeting, including covered dining. The consensus was that covered dining need not be totally weatherproof and should be located close to the Healthcare entrance in the northwest corner. (See Figures 3.15 and 3.16) The need for an outdoor kitchen was also discussed, and the kitchen might be postponed until money permitted, (Figure 3.19). The kitchen was intended to be used by Schowalter kitchen staff for occasional meals for residents and visitors and to be “rented” by residents for outdoor barbecues. Although costly, this feature was very popular with Schowalter staff and residents. Also popular was the expansion of an existing, small courtyard at the secondary entrance on the east side of the courtyard. The courtyard was ideally located near Independent and Assisted Living. Residents were looking forward to having a place to sit outside close to their apartments, (Figure 3.18).



Figure 3.18 Backporch Perspective by Katie Kingery-Page. Design by Author.

This perspective shows the expanded patio on the east side, a design detail that was very popular at the April 14 meeting.

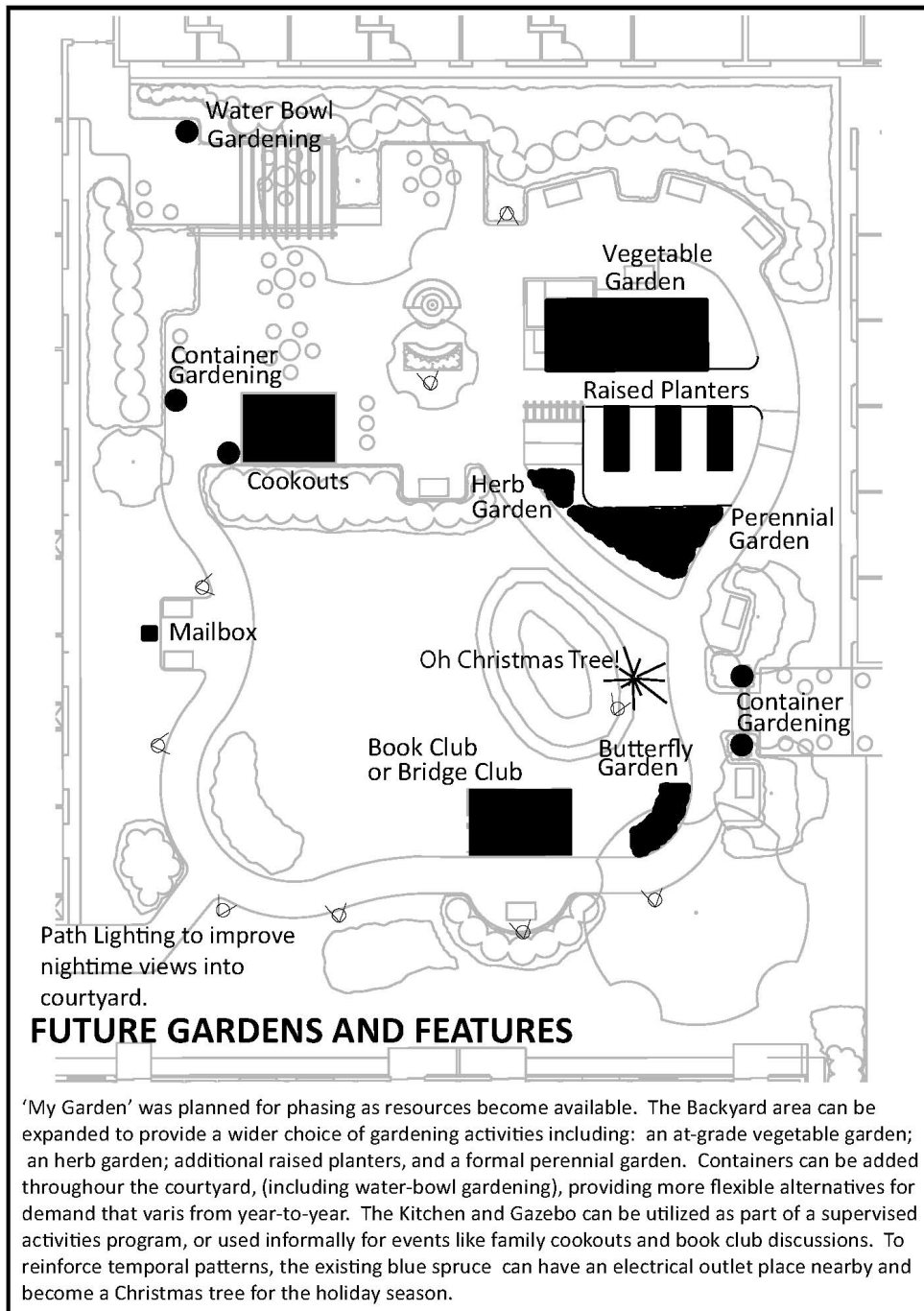


Figure 3.19 Future Gardens and Features Diagram for Schowalter Courtyard.

This diagram captures some of the program elements that awaited additional financial resources before they could be built. The outdoor kitchen was a high priority, even though the cost was significant.

Also discussed during the April meeting were privacy issues for residents adjacent to the courtyard. The most public areas were adjacent to interior public areas, and paths were kept a maximum distance from the building, Figure, 3.20 below.

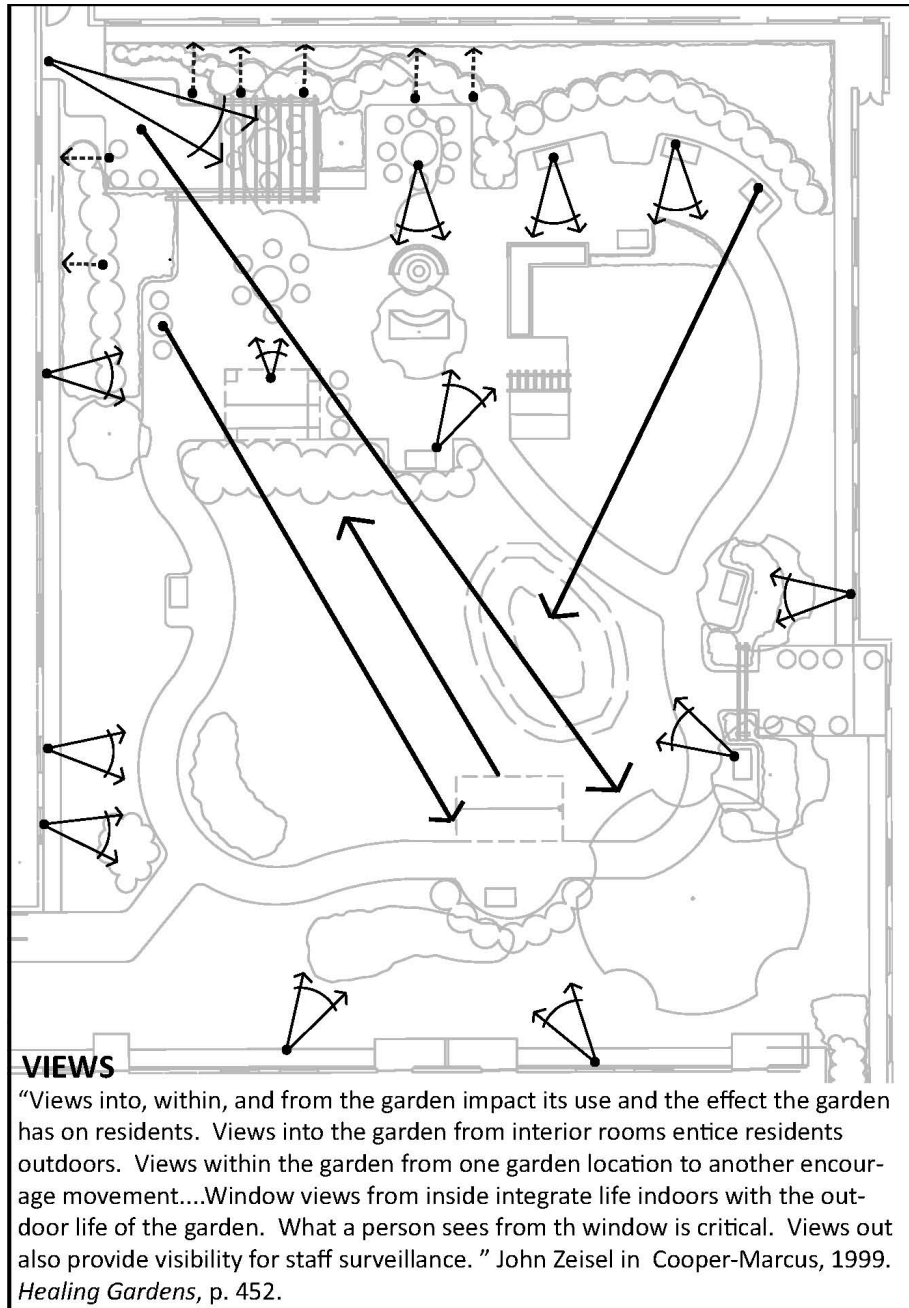


Figure 3.20 Views Diagram in Schowalter Courtyard.

Plantings help screen the public areas for residents adjacent to the very public areas of the courtyard.

PRESENT: A.R.T. Characteristics

Throughout the preceding stage of plan development and prior to the April 14 meeting, I continued to incorporate the four A.R.T. characteristics (***Being Away, Fascination, Extend*** and ***Compatibility***) into the Schowalter courtyard.

As an example of incorporating A.R.T. characteristics, the decision was made to include a potting shed constructed of native Kansas limestone and built by masons—an expensive project. The stone potting shed contained strong A.R.T. characteristics: ***Being Away***—the rough, earthy textures of the native stone contrasted sharply with the institutional, manmade materials throughout the interior of Schowalter. Stone contrasts with interior materials by its longevity and permanence. The stone potting shed had the potential to evoke memories of fields containing natural limestone outcroppings or memories of buildings constructed of limestone, such as many of Kansas' county courthouses and churches.

Building the stone potting shed would facilitate other A.R.T. characteristics. For example, the process of building the potting shed would have provided hours of ***Fascination*** for the residents, visitors and staff. ***Extent*** would also have been supported, as it would have added another strong, visual element to the courtyard, giving it more depth and the promise of new things to discover. Even ***Compatibility*** would have been supported, because the potting shed would allow residents to engage in gardening activities, one of the reasons they might have chosen to enter the courtyard. The shed included a potting shelf that was accessible from wheelchairs, another ***Compatibility*** characteristic. Or, perhaps residents would just want to come and watch others who were gardening, a ***Fascination*** characteristic. Figure 3.21 is a perspective of the Backyard area with the proposed stone potting shed.



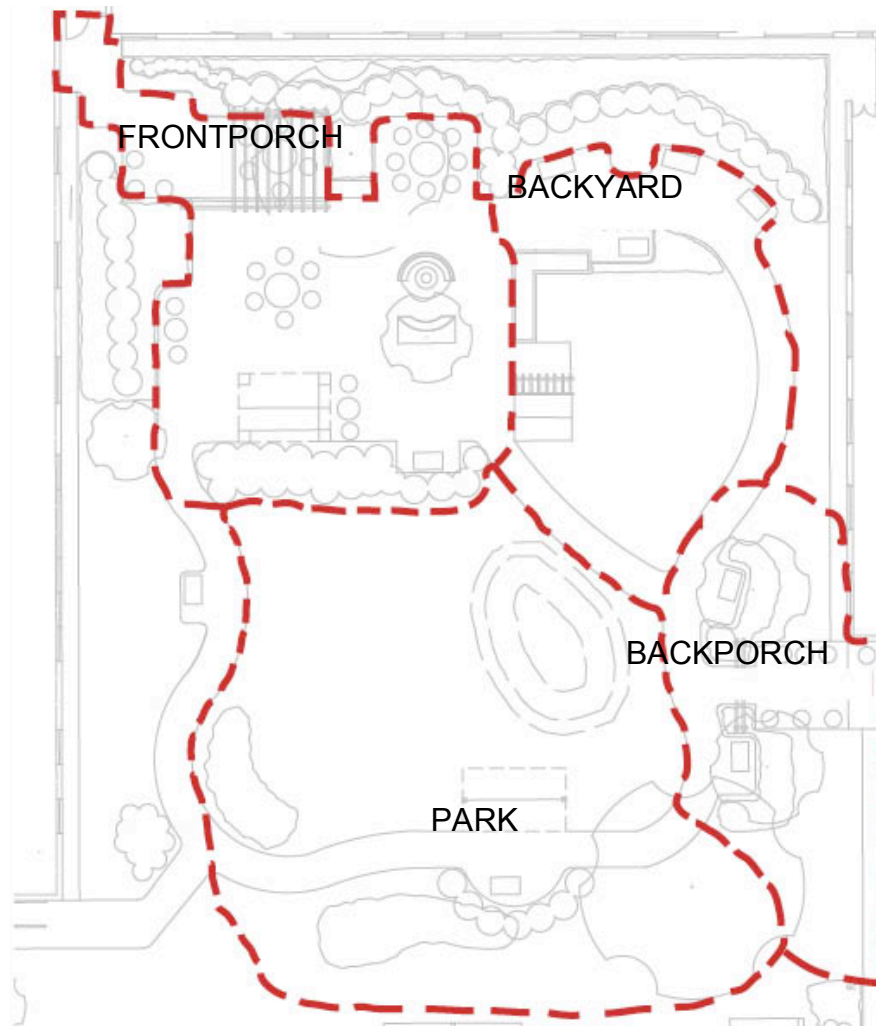
Figure 3.21 Backyard Perspective by Katie Kingery-Page. Design by Author.

In this perspective, the rough, natural texture of the stone potting shed can be seen. Because it contrasts with the materials and textures commonly found in residential facilities, it enhances the feeling of ***Being Away***. The potting shed also supports **Compatibility** and **Fascination** because of the opportunities for gardening and watching others garden and play.

Because I thought it would be an effective way to communicate to the client the decisions I made supporting A.R.T., I decided to graphically represent the four A.R.T. characteristics that were included in the Schowalter courtyard design. This proved to be an interesting and valuable process in guiding design decision-making in much the same way that a design concept does, but with much more credibility and depth.

This credibility and depth were facilitated by the knowledge that design characteristics that support A.R.T. are not merely “aesthetic” decisions. These decisions are intended to improve health outcomes and functioning for the residents. As stated previously, it was hoped that one of these health benefits might be to facilitate attentional capacity. Research by environmental psychologist Rita Berto concluded that “attentional capacity can be regenerated only in environments high in restorativeness” (Berto, 2005, p. 258). I also hoped the A.R.T. qualities might become elements of engagement for a population that often has many challenges affecting their ability to engage.

Graphic representations of A.R.T. characteristics in the Schowalter Villa courtyard garden were drawn using four diagrams, one for each A.R.T. characteristic. The base for each diagram was identical, a greyed out plan of the courtyard. For each individual A.R.T. characteristic, design details were graphically depicted. For example, for the A.R.T. characteristic **Extent**, the four separate areas of the courtyard were delineated, because they support the characteristic **Extent**. The four areas of the courtyard as specified in the concept (Front Porch; Backyard; Backporch and Park) are outlined in red on the **Extent** diagram. Grouping activities into specific areas in the courtyard and assigning specific design characteristics provides scope and connectedness, which is necessary for **Extent**. Extent is the first diagram in the series (Figure 3.22) and the other three A.R.T. characteristics follow (Figures 3.23-3.25).



EXTENT: Being in a whole different world that is physically different, with its own rules and properties, and mentally different. Mentally different worlds are impacted by both knowledge and fantasy. Not limited in scope or extent. In 'My Garden' the four areas: Park; Backporch; Backyard and Front porch provide scope and extent through residents' prior experiences, knowledge, and activity choices.

Figure 3.22 *Extent* Characteristics in Schowalter Courtyard.

Extent is the most challenging A.R.T. characteristic in a therapeutic garden. Scope and connectedness are difficult to achieve with limited space and physical and cognitive abilities.

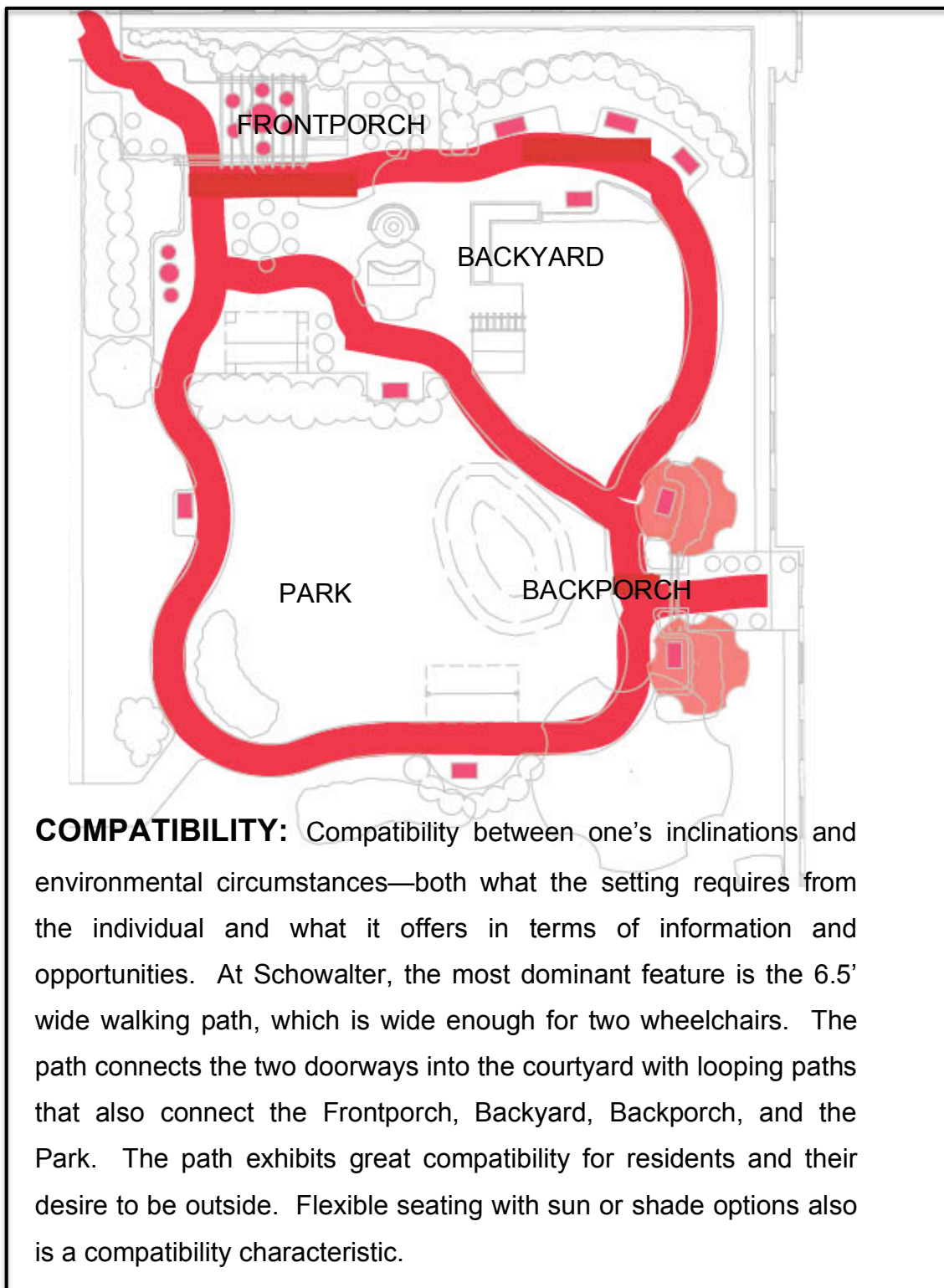


Figure 3.23 *Compatibility* Characteristics in Schowalter Courtyard.

Compatibility is all about choices. **Compatibility** is facilitated by a design that supports the specific needs of users, whether they are walking or in a wheel chair, sitting in the sun or sitting in the shade, in a group or alone.

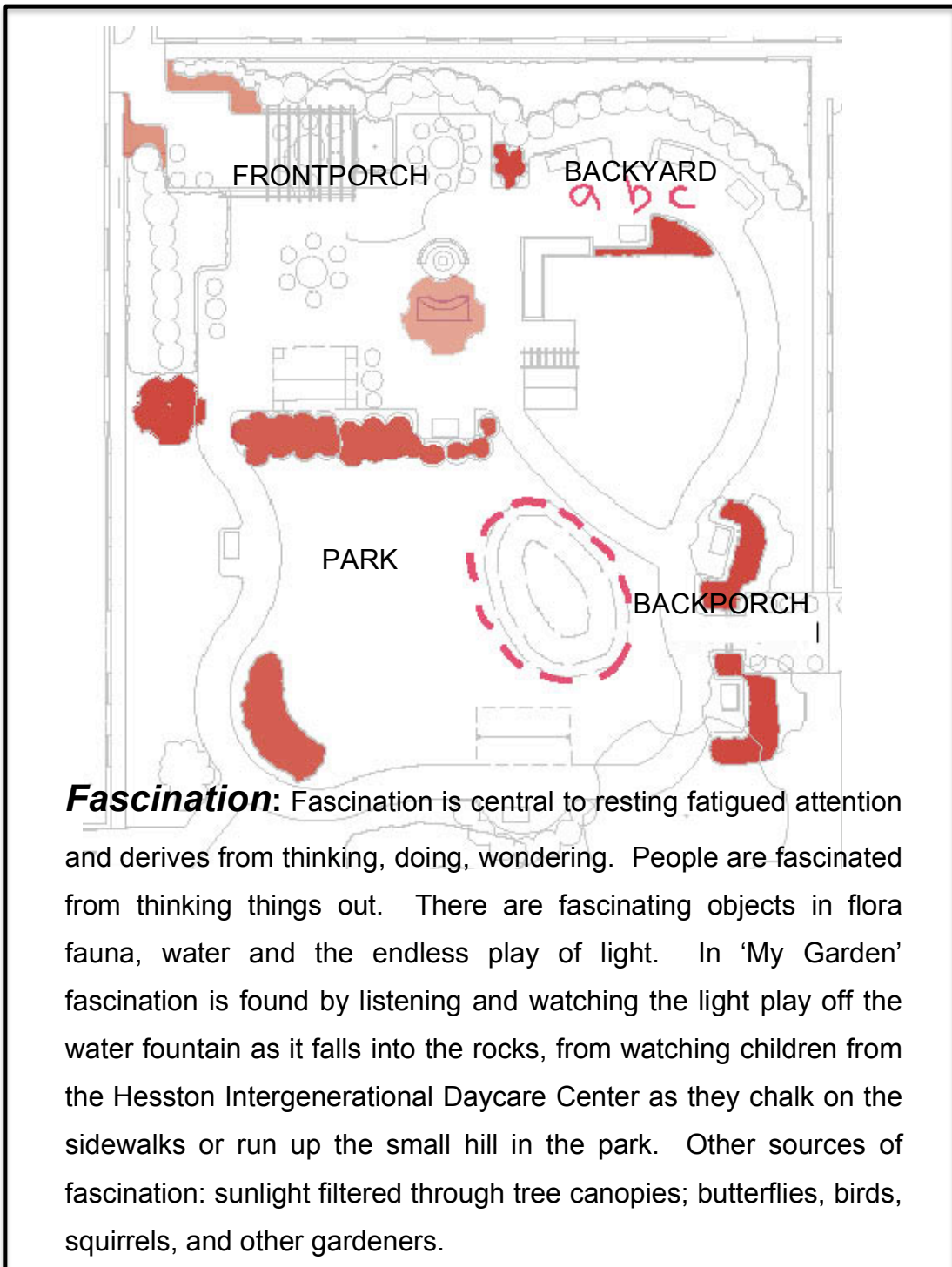
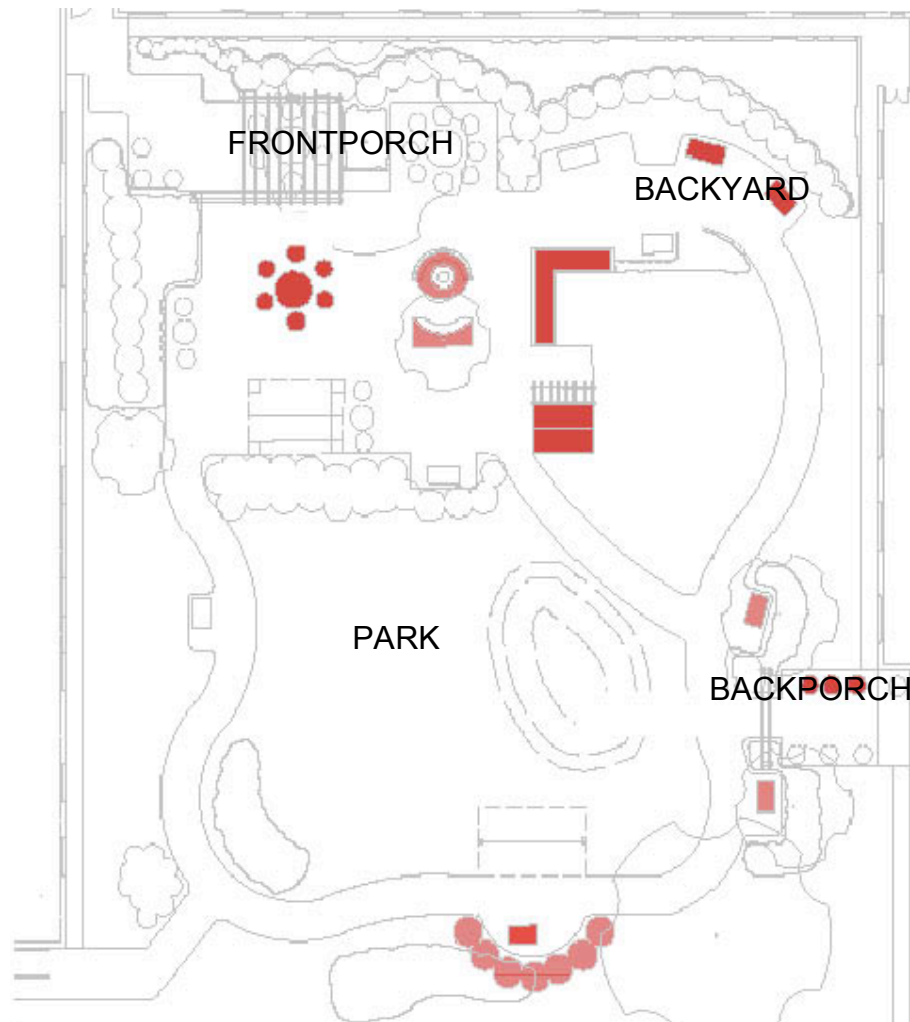


Figure 3.24 *Fascination Characteristics* in Schowalter Courtyard.

Fascination is an easy A.R.T. characteristic in an outdoor courtyard where nature is evident and accessible. The addition of fascinating human activities (daycare children and gardeners) expands the concept beyond the fascination of nature alone.



Being Away: Recovering from mental fatigue requires that one be away from the source of the fatigue. ***Being Away*** can be physical or mental. Not all “away” locations are restorative, as they must possess all four ART characteristics. In ‘My Garden’, the aesthetic qualities associated with being outside and having choices about where to sit, (alone or in a group), what to look at, and the rustic stone potting shed offer a break from the routines of indoor life.

Figure 3.25 *Being Away* Characteristics in Schowalter Courtyard.

Being Away was another easy A.R.T. characteristic to incorporate into the courtyard, because the outside contrasted markedly with residential life inside.

The Dementia Garden Framework

Throughout the design process for Schowalter Villa's 'My Garden' project, I had been relying heavily on the Kaplans' A.R.T. (1989), Moore's exemplary dementia gardens (2007), Cooper Marcus' Alzheimer's Garden Audit Tool (2007) and Zeisel's process. They had proven to be very useful in guiding me through the semester. The project was finished in May 2010. During a presentation at Schowalter Villa, illustrative drawings—a final plan and planting plan—were delivered. These plans are included as Figures A.1 and A.2 in Appendix A.

The project was finished, but my interest in therapeutic gardens was just beginning. I continued reading, and in May 2010, I attended a one-day seminar on Healthcare Garden Design at the Chicago Botanic Garden. Experts in healthcare garden design presented compelling information about the impact such gardens can have on health outcomes. Clare Cooper Marcus spoke about her experiences and showed many examples of poorly designed, underutilized therapeutic gardens. It was this kind of experience that led to the development of her Alzheimer's Garden Audit Tool (2007).

Roger Ulrich also presented at the seminar. Ulrich started exploring the relationship between health and nature in 1984 with his ground-breaking research on post-surgical recovery time (Ulrich, 1984). He continues as an articulate and effective spokesman for evidence-based design in environments of care. He speaks the language of administrators as he provides information on how design can impact their profitability and improve health outcomes.

In May, 2011, I had the opportunity to attend the 8-day Certificate of Merit seminar at the Chicago Botanic Garden. Twenty-one attendees, most were landscape architects, spent the week listening to lecturers: Cooper Marcus; Marne Barnes; Joan Westphal; Roger Ulrich; Teresia Hazen; Rob Hoover; Naomi Sachs; Jack Carman and others. We visited local healthcare gardens, and we designed a renovation for an existing garden as a group project. So, my learning and experience continued to be strengthened.

As I kept reading on restorative environments in healthcare settings, I repeatedly encountered references to Ulrich's Theory of Supportive Gardens (Ulrich, 1999). As noted previously in this document, his theory of restorative environments was frequently cited as being at odds with the Kaplans' A.R.T., (Karmanov, 2008; Laumann, 2003; Hartig, 2003; Hartig, 2005, and Bird, 2007). I wondered if the two theories were really incompatible, and if I had mistakenly overlooked Ulrich's theory during the design of the Schowalter courtyard. As I became familiar with Ulrich's Theory of Supportive Gardens (1999) I began to understand how it could strengthen the process, design details and theory that I had used during the design of the Schowalter courtyard. Also, because it is a well-respected and often-cited theory, it would add credibility.

I decided to try and formalize the relationship between theory, process and design details that had proven helpful to me during the Schowalter project. I decided that the Garden Audit Tool could serve as an integrating device, just as it had proven to be a way forward for me earlier as a novice designer of therapeutic environments, see Tables 3.1, 3.2, 3.2, 3.4 and 3.5. During the process of formalizing the relationship between theory, process and design detail, the Garden Audit Tool served as a guide to incorporating A.R.T. characteristics into dementia garden design while keeping track of all the do's and don'ts. To Cooper Marcus' Garden Audit Tool was added input from the four additional sources that should, by now, be familiar to the reader:

- Roger Ulrich's Theory of Supportive Gardens (Ulrich, 1999);
- Kaplans' A.R.T. (Kaplan, Kaplan and Ryan, 1998; S. Kaplan, 1995; and R. and S. Kaplan, 1989);
- Moore's (2007) research on exemplary dementia gardens.
- Zeisel's Process (2007)

The process of integrating these elements into a more structured framework started by looking at each of Cooper Marcus' specific design details. I then decided which, if any, of the four A.R.T. characteristics would be supported if the design detail were included in the garden. If Cooper

Marcus' guideline was believed to meet one of the four of A.R.T. characteristics (***Being Away***, ***Extent***, ***Fascination*** and ***Compatibility***), it was listed on that characteristic's individual page in the Framework (Tables 3.2-3.5).

For example, the 38th design detail in Cooper Marcus' Audit Tool is "Seating options available for person alone or couple" (Cooper Marcus, 2007, p.188). It was placed within the A.R.T. ***Compatibility*** category, (Table 3.3) as it supports the garden user's purpose for being in the garden, which is consistent with ***Compatibility***.

As another example, Cooper Marcus' 26th design detail "high ratio of green to hard surfaces in garden" (Cooper Marcus, 2007, p. 186) was placed in the A.R.T. category ***Being Away***, (Table 3.2). By emphasizing the natural aspect of the courtyard, the courtyard contrasts with the unnatural indoors. This supports the conceptual and physical change inherent in the ***Being Away*** characteristic of a person-environment interaction in a restorative environment.

As yet another example, the 30th design detail of Cooper Marcus' Audit tool, "provision of a rich multisensory experience (vision, touch, hearing, smell) to activate the senses" (Cooper Marcus, 2007, p. 187) was placed in the ***Extent*** category as it contributes to a sense of extension in time and place, (Table 3.4). I kept systematically working through the Garden Audit Tool, placing most of the design details within one of the four A.R.T. characteristics. Some were not used because they pertained exclusively to maintenance issues. And, while maintenance is critical and can even be seen as a Compatibility characteristic, inclusion of specific maintenance items seemed inappropriate.

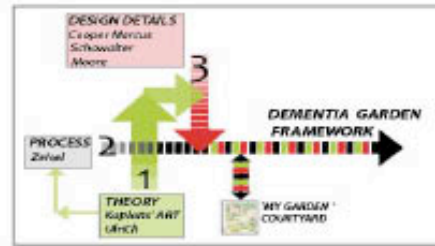
Not all of the Design Details listed in the Dementia Garden Framework originated with Cooper Marcus' Garden Audit, although most did. A limited number of the Design Details came from the Kaplans, some came from Moore's efforts to find A.R.T. characteristics in five selected therapeutic gardens (2007), some came from Ulrich's Theory of Supportive Gardens (1999), and some came from Zeisel (2007).

For example, in Table 3.2, the **Being Away** page, the Design Detail “environment in complete contrast to the inside” has a “Z” in the right column. That Design Detail originated with Zeisel, and a “Z” is used to designate that. And, although it is similar to the previous discussion of Cooper Marcus’ 70/30 ratio of green to hardscape in the garden, Zeisel is the only one who states it in quite that way.

Many of the Design Details have multiple letters listed in the right column, indicating that they can be attributed to more than one source. For example, the first Design Detail in the **Being Away** page. (Table 3.2), is “Visibly accessible from inside the building so that residents can see the garden when going about their daily activities inside.” In the right column on the **Being Away** page, this Design Detail has both a “C” for Cooper-Marcus, (it originated in her Garden Audit Tool) and a “U-Nature.” It supports Ulrich’s theory of supportive gardens by providing access to nature, and the “U-Nature” is placed in the column to indicate that. Access to Nature is one the five criteria of a supportive garden, according to Ulrich (1999). Since this is one of Ulrich’s criteria, a notation was made in the right column. The same process was followed for Zeisel’s (2007) process and Moore’s (2007) article.

By looking at the entire framework, it appears that there is a great deal of compatibility and synergy between the five components that were combined in the Framework. In other words, they work well together, and they reinforce each other. One might conclude that for the Design Details where multiple sources are listed, that particular Design Detail is very significant. There is consensus among multiple experts about including it in a therapeutic garden for people with dementia. That is one of the Framework’s strengths. It derives its credibility from multiple sources and includes theory; design detail and process—a complete package. Another strength is the focus on person-environment *interactions* that the Kaplans’ A.R.T. seeks to facilitate.

DEMENTIA GARDEN DESIGN: A Framework to Facilitate Kaplans' ART in Environments of Care



SOURCE KEY

- CM:** Cooper Marcus, C., 2007. Alzheimer's Garden Audit Tool. *Journal of Housing for the Elderly*, Vol. 21, Nos. 1 & 2, pp. 179-191.
- K:** Kaplan, S. & R., & Ryan, R.L., 1998. *With People in Mind: design and management of everyday nature*. Washington, D.C.: Island Press.
Kaplan, S., 1989. The restorative benefits of nature: toward an integrative framework. *Journal of Environmental Psychology*, 15, 169-182.
Kaplan, S. & R. 1989. *The experience of nature: a psychological perspective*. Melbourne: University of Cambridge.
- M:** Moore, K.D. Restorative dementia gardens: exploring how design may ameliorate attention fatigue. *Journal of Housing for the Elderly*, Vol. 21, Nos. 1 & 2, pp. 73-88.
- U:** Ulrich, R.S., 1999. Effects of gardens on health outcomes: theory and research. In C. Cooper Marcus and M. Barnes, *Healing gardens*. New York: John Wiley and Sons, pp. 27-86.
Theory of Supportive Gardens:

Nature:	Access to Nature
Control:	Sense of Control
Exercise:	Physical Movement & Exercise
Privacy:	Privacy
Support:	Social Support
- Z:** Zeisel, J. 2007. Creating a therapeutic garden that works for people living with Alzheimer's. *Journal of Housing for the Elderly*, 21: 1, 13-33.

ART CHARACTERISTICS

Being Away: Recovering from mental fatigue requires that one be away from the source of the fatigue. Being away can be physical or conceptual. Escape from distraction; escape from a particular content; and escape from certain purposes. "Distinct from the quotidian," (M, p. 80).

Extent: Being in a whole different world that is physically different with its own rules and properties, or mentally different, or in your mind and impacted by both knowledge and fantasy. Goes beyond richness in stimuli to coherence in stimuli to the degree that the experience engages a substantial portion of one's mind, (M, p. 81). True focus on the "haptic system which involves the integration of many senses, such as touch, positional awareness, balance, sound, movement, and the memory of previous experiences, (M, p. 82). Sense of extension in time and space, (K, 1998, p. 71).

Compatibility: Compatibility between one's inclinations and environmental circumstances: both what the setting requires from the individual and what it offers in terms of information and opportunities.

Fascination: Central to resting fatigued attention, deriving from thinking, doing, wondering. People are fascinated from thinking things out. There are objects of fascination in flora, fauna, water and endless play of light. "Quiet fascinations do not totally dominate one's thoughts. They permit reflection; they make it possible to find out what is on one's mind," (K, 1998, p. 69)

Table 3.1 Dementia Garden Framework Overview.

The first page provides a key and an introduction to the following four pages.

Being Away

Design Detail	Source
Visibly accessible from inside the building so that residents can see the garden when going about daily activities inside.	C, U-Nature
Attractive garden view from entry patio.	C, K, U-Nature
High ratio of green to hard surfaces, 70/30	C, U-Nature
Memory plants to promote reminiscing.	C, Z
Environment in complete contrast to building interior.	Z
Outdoor, night lighting to enable use on warm evenings or provide views at night.	C, U-Exercise/Nature
Opportunity for staff to find a place to take a break out of sight of residents.	C
Privacy from resident rooms adjacent to space.	C, U-Control/Privacy
Space boundaries provide complete enclosure and a permanent, attractive framework to garden.	M, Z
Contrast.	M
Shelter.	M
Increase in stimulation.	M, Z
Enclosure.	C, M, K, & Z
Threshold.	M
Provision of a flat lawn area large enough for an informal grouping of moveable chairs, a game of croquet, or for young residents to sit or lie on.	C, U-Exercise/Nature
Seating at frequent intervals along main path.	C, U-Exercise/Control/ Nature
Potential to observe wildlife.	C, M, U-Nature
Space is free from intrusions of unpleasant/incongruent sounds	C, M
Distinct textures underfoot.	K
Vertical features.	K
Framed views of distant features.	K
Removal of distractions.	K, M
Creation of distinct rooms.	K, M, Z

*C: CooperMarcus...K: Kaplans...M: Moore...U: Ulrich...Z: Zeisel
Privacy/ Control/ Nature/ Exercise/Support*

Table 3.2 *Being Away* Details in Framework.

This table shows the design details that have been placed in the ***Being Away*** category.

Fascination

Design Detail	Source
Solarium with plants, birds, etc., overlooking the garden to provide a semi-outdoor experience year round.	C, U-Nature
High ratio of green to hardscape, 70:30.	C, U-Nature
Great diversity of plants selected for seasonal interest, sensory variety, shade qualities, screening, wildlife habitats, etc.	C, M, U/Nature
Choice of seating in sun/shade throughout most of the year.	C, M, U-Control
Near view from most seats is attractive & interesting (varied plant materials by color, leaf shape, height, etc.), variety of objects that might be interesting to look at(bird feeder, bird bath, sculpture)	C, M,U-Nature
Features that evoke memories for residents.	C, M, Z
Small scale design changes so that a person moving slowly would have a variety of visual experiences (enclosed/open/sunny/shaded/ varied plant materials, etc.	C, M, U-Nature, Z
Potential to observe wildlife (plants that attract birds, butterflies, bird feeders, bird bath, etc.	C, M, U-Nature
Bubbling fountain where moving water can be watched and listened to, or a simple water wall where water can be touched.	C, M,U-Nature
Garden is very attractive, well-maintained, and rich with amenities.	C, M
Vegetation introduced in a variety of ways.	C, M, U-Nature
Provision of rich multi-sensory experiences.	C, M, U-Nature, Z
Patterns, whether they are created by natural forces (wind, water, sun), seasonal change, or other dynamics intrinsic to the natural world.	M
Shade patterns from trees.	M
Consideration for seasonal qualities of plantings.	M
Detail: small fountain, ornamental grate over drain inlet, "other artfully executed details enrich the patterns of engagement to the fine grain."	M, Z
Activities: gardening, fishing.	K,U-Exercise/Control,Z
Setting itself: fresh snow; sun glistening on a drop of rain; shade patterns; places to stop and notice nature.	K
Views from inside: tree observed throughout the seasons.	K, U-Nature
Wood, stone and old.	K

C: Cooper Marcus...**K:** Kaplans...**M:** Moore...**U:** Ulrich...**Z:** Zeisel
Privacy/ Control/ Nature/ Exercise/Support

Table 3.3 Fascination Details in Framework.

This table lists the design details that have been placed in the **Fascination** category.

Extent	
Design Detail	Source
Solarium adjacent to garden where residents can enjoy a semi-outdoor experience year round.	C, U-Nature
Simple, looped pathway system that permits walking alone.	C, U/Exercise
Appropriate destination points (gazebo, seating arbor, large shade tree that can be used for programmed activities.	C, U-Support
High ratio of green to hardscape.	C, U-Nature
Provision of a flat lawn area large enough for an informal grouping of moveable chairs, a game of croquet, or for young residents to sit or lie on.	C, U-Exercise/Nature
Vegetation introduced in a variety of ways: raised beds; vine-covered arbors and trellises; perennial borders; tubs of annuals; trees; hedges, etc.	C, U-Nature
Provision of a rich, multisensory experience (vision, touch, hearing, smell) to activate senses.	C, M
An area specifically designed for supervised gardening activity program (raised beds, potting shed, tool shed, various large containers, gathering area, access to drinking fountain.	C, U-Support/Nature
Memory plants.	C, M, Z
Seating options for a person alone or couples	C, M, U-Support
Seating for groups larger than two to sit and easily converse.	C, M, U-Support
Choice of seating in sun/shade throughout most of day/year.	C, M, U-Control, Z
Small scale design changes so that a person moving slowly would have a variety of visual experiences (enclosed, open, shaded, varied plant materials, etc.)	C, M
Educational interpretive material that might be of interest to visitors or residents (plant labels, plan of garden, etc.)	C
Garden is very attractive, well-maintained and rich with amenities.	C, M
Provision of markers or landmarks along the pathway.	C, M, U-Exercise/Control
Potential to observe wildlife.	Z
	C, M, U-Nature
Distinct gardens with 'coherent articulation of the purpose of each place.	M, Z
Range of activity levels.	M, U-Exercise
Activity stimulation.	M, Z
Details of nature.	K, M, U-Nature
Circuitous pathways that create the sense of a larger area.	K
Views placed so that entire garden can't be seen from one place.	K
Fine textures and darker colors in background.	K
Bolder textures and lighter colors in foreground.	K
<i>C: Cooper Marcus...K: Kaplans...M: Moore...U: Ulrich...Z: Zeisel Privacy/ Control/ Nature/ Exercise/Support</i>	

Table 3.4 Extent Details in the Framework.

This table shows the design details that have been placed in the *Extent* category.

Compatibility

Design Detail	Source
Seventy four percent of Cooper Marcus' Garden Audit Tool belongs in this category, as it deals with maintenance issues. This category becomes very important to ensure that the design intent is carried out and maintained. Poor maintenance will adversely compromise characteristics that provide a restorative environment.	
Door is easy to find.	C, M, U-Control
Door to garden is easy to operate.	C, U-Control, Z
Door is usually unlocked.	C, U-Control/Exercise
Entry threshold is flat and smooth.	C, U-Control/Exercise, Z
Provision of a level pathway system including exit from building and patio.	C, M, U-Exercise
Handrail along all or part of pathway system for those with balance problems.	C, U-Exercise
Non-reflective path surface (tinted concrete).	C, M
Appropriateness of pathway surfaces for wheelchairs.	C, U-Control/Exercise
Consistent pathway color to prevent visual clifing.	C, U-Exercise, Z
Pathways wide enough for 2 wheelchairs to pass.	C, U-Nature
Provision of markers or landmarks along the pathway.	C, M, U-Exercise, Z
Garden receives at least 1/2 day of sun for plants to flourish.	C
Avoidance of toxic plants.	C, Z
Avoidance of messy trees.	C
Plants are maintained to keep walkways clear of hazards.	C, U-Exercise
Provision of plants popular during resident's childhood.	C, M, U-Nature
Avoidance of abstract shapes.	C
Seating for groups larger than two to easily converse.	C, U-Support/Control, Z
Appropriate seating design.	C, U-Control
Comfort of seating material.	C, Z
A bench or chair for two in a private niche.	C, U-Support
Seating at frequent intervals along main paths.	C, U-Exercise
Moveable seating available, easily moved.	C, U-Control
Avoidance of any garden structure that casts shadows.	C, Z
Lighting so space can be used for walking and sitting on warm evenings-or viewed from inside when dark.	C, U-Nature/Exercise/ Control
Appropriateness of space to local climate.	C
Appropriateness of space to local culture.	C
Degree of privacy for those inside rooms adjacent to garden.	C
Maintenance gate is disguised.	C, M, Z

C: Cooper Marcus...K: Kaplans...M: Moore...U: Ulrich...Z: Zeisel
Privacy/ Control/ Nature/ Exercise/Support

Table 3.5 Compatibility Details in the Framework.

This table shows the design details that have been placed in the **Compatibility** category.

Use of the Framework by Others

When I started the semester project at Schowalter, I didn't plan on developing a tool to be used in the design of gardens for individuals with dementia. However, starting with the project and continuing on through individualized reading and learning, the Framework was developed. It was developed as a means to formalize the relationships between theory, process and design details in dementia gardens.

Beyond my use as an academic exercise, the Framework has potential that is worth exploring through use by others. One of the Framework's strengths is its ability to operationalize theory in a straightforward manner. It could be easily understood by other designers. And, i.e., If others can become familiar with the theory through use of the Framework, the opportunity for feedback will exist. This feedback will allow the Framework to gain validity, value and efficacy as it provides valuable information about what worked and what did not work.

For example, users of the framework would provide feedback on how the framework was adapted to a specific setting. If you use it, please let me know how it worked, and how you used it. How did the context impact your use? For example, was your use of the Framework impacted by other factors, such as:

- size of the garden;
- geographical location;
- site analysis;
- budget for the project;
- the garden's location within the context of the entire community;
- the community's goals for all of its residents and not just those with dementia; cultural heritage of residents;
- specific program requirements, garden concept,
- plant pallet;
- and artistic intent.

There are many other factors affecting each setting. How could the Framework be improved to meet the requirements of different settings? What other Design Details can be added to the Framework? How do maintenance concerns impact the selection of Design Details?

I believe that with this type of feedback, the Framework can continue to be developed and utilized in a variety of ways in a variety of settings. It might be incorporated into a class on therapeutic garden design. It might be used to persuade reluctant administrators to add a therapeutic garden by making the argument for improved cognitive functioning and health outcomes. It certainly could be used to generate multiple research studies that attempt to understand the role that specific design details play in restorative environments for people with dementia. The Framework could also be used in much the same way that Cooper Marcus' Alzheimer's Garden Audit Tool is used—for example, as a checklist for administrators or as a learning tool to raise awareness for landscape architects.

However, because the Framework focuses in a systematic way on the interaction between the individual and the environment, it promises benefits beyond those of a checklist. The Framework attempts to systematically create a person-environment interaction that will improve health outcomes and create a more robust and engaging outcome environment. Its potential for creating this engaging environment and improving health outcomes derives from theory that is the foundation for the Design Details. These theories are well-respected in settings outside the therapeutic garden for dementia patients. Perhaps it is time that they moved inside the therapeutic dementia garden. The Framework's use by other designers could make that happen.

Chapter 3 Citations

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Chapter 4: Conclusion: From a Visual “Art of Taste” to Person-Environment Interactions

As mentioned throughout this document, designing a garden for people with dementia is a demanding task for a novice designer. It might also present a challenge for an experienced designer unfamiliar with the requirements of therapeutic gardens. Creating effective therapeutic gardens for dementia patients requires knowledge of how dementia affects clients. It also requires a repetitive cycle of design development and evaluation to ensure the safety of clients. For many reasons, safety is critical for success.

Safety is not the only criteria for success, however. The educated designer has to have an awareness of the interactions that will occur in the garden. The space has to be engaging. This is potentially the biggest challenge. Residents must have a pleasant experience while they are in the garden. They have to want to stay once they get there, and they must want to go back. The garden needs access (threshold design is important), the sidewalks should be tinted to decrease glare problems, no toxic plants can be included, the entrances need to be legible and visible.... the list continues. The absence of these details makes the experience negative, and the space will not be engaging. Neither will the staff support use of the garden.

On the surface, designing a dementia garden for individuals with dementia seems simple and straightforward. However, creating engaging spaces for dementia residents is not simple or straightforward. As Zeisel (2007) cautioned previously in this document, it becomes challenging to create spaces that are not trite or simplistic.

Because I was familiar with research indicating that: people prefer restorative spaces: restorative spaces improve cognitive functioning by decreasing Directed Attention Fatigue; and dementia patients have limited cognitive functioning, I decided to pursue integrating A.R.T. into my design project. This decision was reinforced by two articles I read that addressed A.R.T. in environments of care, (Scopelliti, M. & Giuliana, M.V. 2004, “Choosing restorative environments across the lifespan: a matter of place

experience”) and Moore, (2007, “Restorative dementia gardens: exploring how design may ameliorate attention fatigue.”)

What is interesting about examining A.R.T. is the enriched sense one has of what such a garden should be like if indeed the intent is to restore attentional abilities. The importance of sustaining engagement with the garden becomes much more evident and may assist in hypothesizing why some gardens are thought to be more restorative than others (Moore, 2007, p. 86).

To reinforce how A.R.T. might accomplish this engagement, consider again the inclusion of a stone masonry tool shed in the final illustrative plan for Schowalter Courtyard, (Figure 4.1). The shed was an important programming element that the Schowalter staff requested. An inexpensive, easy-to-obtain, prefabricated shed from a big box building supply store was suggested. As can be seen in the perspective below, that style of shed was not recommended. Instead, the plan specified a potting/storage shed constructed with local limestone. Limestone outcroppings are common across Kansas. The limestone potting shed would hopefully trigger memories for the residents, similar to Moore’s expanded definition of **Extent**. Rejecting use of the less expensive and more institutional tool shed would support the quality of **Being Away**. The interior of Schowalter’s building, like most residential settings in environments of care, could be categorized as easy, predictable, and economical. *Not* repeating that pattern in the courtyard would, hopefully, make residents feel like they are truly in a different world. Also, the process of building the potting shed could be very interesting when viewed from adjoining windows, perhaps even provide **Fascination**. The potting shed as designed also illustrates some of the Kaplans’ design characteristics: wood, stone and old (even though it is not old, it is intended to look old).



Figure 4.1. Backyard Perspective by Katie Kingery-Page, Schowalter Villa, May, 2010. Design by author.

The perspective shows the Backyard section of the courtyard, including the limestone potting shed, raised planters and grouped seating for social interaction.

This Framework resulted from an academic endeavor that synthesized archival research with an exploratory design project. The Dementia Garden Design Framework theoretically creates successful therapeutic environments containing restorative characteristics that support the Kaplans' A.R.T.

The Framework also contains design elements and qualities that meet Roger Ulrich's criteria for supportive gardens. When integrated together into the Framework, each component (the Garden Audit Tool, A.R.T. characteristics, and Ulrich's Theory of Supportive Gardens) can collectively attain many of the goals for therapeutic gardens within environments of care. From Ulrich's Theory of Supportive Gardens we know that expected health outcomes resulting from restoration from stress include:

- decreases in depression, sadness, tension and anxiety;

- decreased blood pressure and stress hormone levels;
- improvements in sleep habits, improvement in compliance with medical regimens,
- improvements in sociability (Ulrich, 1999).

If a therapeutic garden for dementia patients is designed to facilitate the four characteristics of A.R.T., one would also expect less stress and preservation of limited capability for directed attention. Kaplan has suggested that the “loss of attentional resources in turn elicits a physiological response, which other investigators refer to as stress” (Kaplan, 1995, p. 178). A setting that allows patients to utilize diminished cognitive abilities could be less stressful because the attentional resources are supported.

In the Background section of this document we learned that research for therapeutic gardens lags behind research into therapeutic environments within hospitals (Ulrich, 1999) and (Schwarz, and Rodiek, 2007). Because healthcare administrators expect rigorous, EBD research, this gap in research impacts the leverage that garden designers have when advocating for therapeutic gardens. Post occupancy testing of the Schowalter Courtyard would be very informative and contribute to this nascent understanding. However, as Cooper Marcus (2007) stated previously, lack of funding prevents post-occupancy testing in most healthcare garden design projects.

Additional research questions remain. Can restorative environments be used in the critical, early diagnosis of dementia as Moore (2007) suggested? Would dementia patients prefer gardens that are Restorative to gardens that do not contain A.R.T. characteristics? If the preference for the Restorative gardens exists, is it because of increased cognitive functioning? How would individuals with normal cognitive functioning differ from cognitively impaired individuals in their responses to the same environment? What is the relationship between cognitive mapping and executive functioning, and can the A.R.T. characteristic **Extent** facilitate this in individuals with dementia?

As mentioned in the introduction, 172 billion dollars are spent every year in the United States in the care of individuals with dementia (Alzheimer’s Association). Susan Rodiek has suggested that the outdoors might become

an “essential component in the intervention efforts in dementia care” (Schwarz, B., and Rodiek, S., 2007, p. 3). Berto believes that

It is possible to design urban and indoor environments (schools, hospitals, environments for old people, etc.) to be more ‘comfortable’ from a cognitive point of view and to manage natural environments in ways to encourage recovery from mental fatigue, (Berto, 2005, p. 258).

The primary challenge to designing therapeutic gardens for individuals with dementia is not merely to make them look good, i.e., to make them aesthetically pleasing. The challenge is to create an environment that is engaging and where functioning can be enhanced. As stated previously in this document, the Kaplans believe that restorative environments do both.

Aesthetic reactions thus reflect neither a casual nor a trivial aspect of the human makeup. Rather, they appear to constitute a guide to human behavior that is both ancient and far-reaching. Underlying such reactions is an assessment of the environment in terms of its compatibility with human needs and purposes. Thus aesthetic reaction is an indication of an environment where effective human functioning is more likely to occur (R. Kaplan and S. Kaplan, 1989, p. 10).

Even with many questions remaining about the inclusion of A.R.T. characteristics in therapeutic gardens for individuals with dementia, I feel that A.R.T. characteristics help facilitate environments where effective human functioning can take place. And, A.R.T. characteristics are very compatible with other design elements that have been suggested by therapeutic garden designers. The Dementia Garden Framework is one approach to facilitating A.R.T. characteristics in gardens for people with dementia. I hope others will be willing to use the Framework, and I hope they will provide feedback on the Framework’s ability to help preserve effective human functioning in environments of care.

It was my experience that attempting to integrate A.R.T. characteristics into the design process improved the design. Systematically requiring consideration of the experience of being in the space and holding that experience up to understandable criteria informs and enriches the design. A.R.T. characteristics are not object characteristics, or spatial characteristics.

They are characteristics of *person-environment interactions*. It is not enough to understand formal design principles-- how symmetry, texture, rhythm and negative space are present in the design. The designer needs to understand the *person-environment interactions* that the space will create. Will it be engaging? Will it be trite? Will it be restorative?

That is the poetry of restorative garden design. The design details are carefully selected and artfully combined with the same intensity as word choice in poetry. When a poet selects a word, each word must work alone or with other words to evoke the feeling the poet is hoping to create. This feeling is evoked by the reader's interaction with the poem. Richness and depth are required of each word. The experience of the poem is elicited by feelings from prior experiences and the reader's own personal response to the poem. The creation of a restorative garden depends on details that also are layered and must work together synergistically. The details in a restorative garden should be as carefully chosen as the words in a poem. The details must contribute to the safety of the experience. They need to be comprehensible within the capabilities of the garden user. They need to meet the environmental parameters of the site. Most importantly, they focus on what will occur in the *interaction* between the garden user and the environment—a restorative interaction.

Chapter 4 Citations

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Appendix A: Supplemental Drawings for Schowalter Villa ‘My Garden’ Courtyard

The final plan, planting plan and plant list (Figures 0.1-0.3) were prepared as part of the design process for Schowalter Villa ‘My Courtyard.’ They were an essential component of the work produced for the client and graphically communicated the design through illustrative drawings. These illustrative drawings are antecedents to construction documents with grading, measurements and specifications that must be completed prior to construction.



Figure A.1 Final Illustrative Plan, Schowalter Villa 'My Garden' Courtyard, May, 2010.

Planting Plan:

Cooper Marcus' Audit Tool was very helpful in guiding planting plan decisions. Cooper Marcus recommends:

- Design for a high ratio of green to hard surfaces, 70:30.
- Plan for a flat lawn area with moveable seating that can be grouped
- Include a diversity of plants with seasonal interest, sensory variety.
- Create rich multisensory experiences.
- Include an area for supervised gardening activity program
- Avoidance of toxic plants. Many plants that will not kill someone if eaten can still be very undesirable in a dementia garden. Other plants that are not commonly thought of as toxic, such as tulip bulbs, can be dangerous if ingested. Multiple toxic plant lists need to be consulted before the final plant selection is made.
- Avoidance of messy trees and shrubs that will litter sidewalks.
- Use of plants that trigger positive memories, i.e. memory gardens
- Garden should receive at least ½ day of sunlight so that plants will flourish. (Cooper Marcus, 2007, 186-187.)

Plans to include an automated irrigation system within the courtyard greatly expanded the planting pallet. Existing trees and the enclosed nature of the courtyard also mediated some of the harshness of the climate in Hesston. The goal of keeping maintenance at current levels presented more of a challenge to plant selection. Large areas of ground cover and large areas of shrubs attempted to address this maintenance concern. Shrubs that required little pruning were selected, and these shrub areas were massed and separated from the lawn area.

PLANT LIST

SHRUBS:

Cornus hesseyii	"Golden Glow"	Dogwood
Cornus sericea	"Alleman's Compact"	Dogwood
Hydrangea aborescens	"Annabelle"	Hydrangea
Hydrangea quercifolia	"Pee-wee"	Oakleaf Hydrangea
Syringa meyeri Palibin		Dwarf Korean Lilac
Hypericum patulum	"Hidocote"	Hypericum St.Johnswort
Caryopteris x clandonensis	"Kew Blue"	Blue-mist spirea
Ilex glabra	"Nordic"	Inkberry

TREES:

Ulmus parvifolia	"Burgandy"	Lacebark Elm
Ginko Biloba	"Autumn Gold"	Ginko
Cercis Canendensis	"Forest Pansy"	Redbud
Cercis Canendensis f. alba	"Royal White"	Whitebud
Amelanchier x grandiflora	"Rubescens"	Apple Serviceberry

VINES:

Hydrangea anomala subsp petiolaris		Climbing Hydrangea
------------------------------------	--	--------------------

GROUND COVER:

Pachysandra procumbens		Pachysandra
Liriope spicata	"Lilac Beauty"	Liriope

WATER FEATURE:

Astilbe x arendsii	"Venus"	Astilbe
Itea virginica	"Henry's Garnet"	Virginia Sweetspire
Myosotis scorpiodes		Forget-me-not
Lysimachia nummularia	"Aurea"	Creeping Jenny

PERENNIALS:

Mondara didyma	"Raspberry wine"	Beebalm
Hosta planta	"Big Daddy"	Hosta
Hosta planta	"Golden Tiara"	Hosta
Rosa virginiana	Meidiland Rose	Knock-out Rose
Penstemmon digitalis	"Husker Red"	Penstemmon

RAIN GARDENS:

Panicum virgatum		Switchgrass
Echineacea purpures		Coneflower

Figure A.3 Planting Plan List for Schowalter, May 2010.

Appendix B: Schowalter Villa Update

In the summer of 2011, Schowalter Villa began construction of the renovated courtyard. The site was graded to improve slope and drainage throughout. The diseased locust trees were removed prior to construction. A concrete circular pathway which adhered to the original design was installed. Also installed were a large patio in the Frontporch area and a smaller patio in the Backporch area. For economic reasons, the concrete was not tinted. The existing gazebo was relocated into the Park area of the courtyard, (Figure B13). Wooden structures were built in the Frontporch area to provide covered seating and in the outdoor cooking area, (Figure B.11).

On October 9, 2011, a “planting party” was held. Many enthusiastic gardeners from Schowalter arrived early in the morning to install the plants that had been supplied by local nurseries, (Figures B.4-B.5) Assisting the planters was Schowalter’s therapy-dog-in-training, Zoey, (Figure B.12).

The original planting plan produced by the author was not used. The new plant pallet was composed primarily of daylilies, red knock-out roses, Russian sage, rudebeckia and lilac. Redbud trees were installed adjacent to the Backporch patio as specified on the original planting plan (Figure B.6), and they plan on adding more trees later.

The planting party was very well organized. Planting beds had been prepared and covered with weed barrier. Participants were instructed in the techniques of cutting the weed barrier prior to planting. By noon, with the weather threatening much –needed rain, the installation was complete.

To date, \$160, 000 has been spent on renovation of the courtyard. That figure includes considerable concrete work, an automated irrigation system, built structures, security cameras, plant material and benches, trashcans, tables and chairs. Schowalter hopes to obtain more tables as funding permits. The dedicated maintenance staff is coaxing the new lawn along, hoping it will be ready for the demands of its first Kansas summer.

Raingardens, which will help compensate for the courtyard’s increased amount of impervious surface, have recently been installed.



Figure B.4 Volunteers Helping with Planting October 8, 2011.



Figure B.5 Getting Organized to Start Planting on October 8, 2011.



Figure B.6 Planting Near East Entrance, October 8, 2011.



Figure B.7 Planting Near the Outdoor Kitchen.



Figure B.8 Schowalter Courtyard, October, 2010, Showing Pullout for Wheelchair and Bench.



Figure B.9 Schowalter Courtyard, October, 2011, From Maintenance Access Looking Northeast.



Figure B.10 Schowalter Residents Watching Planting in Courtyard, October, 2010.



Figure B.11 Schowalter Courtyard, October, 2011, View through Dining Area.



Figure B.12 "Zoey," Schowalter's Therapy Dog--In-Training.



Figure B.13 Schowalter Courtyard, October, 2011, Gazebo and Visitors.

Appendix C: List of Exemplary Gardens and the Experts that Evaluated the Gardens

Moore, K. (2007). Restorative dementia gardens: exploring how design may ameliorate attention fatigue. *Journal of Housing for the Elderly*, 21:1, 73-88.

Moore's research originates with a meeting in 2005, when the Acer Institute and Legacy Good Samaritan Hospital in Portland, Oregon, held a symposium designed to build a knowledge base and knowledgeable community that could develop standards for therapeutic gardens.

While the implementation of rigorous, multi-site objective studies utilizing psychometrically validated instruments has proven onerous (e.g., time consuming, lack of funding and resources) within the therapeutic garden domain, it was felt that a project that called upon recognized experts in the field to identify exemplary gardens through consensus would move the knowledge base of the field in a positive direction. Hence was born the Exemplary Dementia Garden Project (Moore, 2007, p. 77).

Twelve experts composed the expert panel that selected five therapeutic gardens for people with dementia. The experts were:

- Elizabeth Brawley, Design Concepts
- Margaret Calkins, IDEAS
- Jack Carman, Design for Generations
- Nancy Chambers, New York University
- Nancy Chapman, Portland State University
- Teresa Hazen, Legacy Health System
- Rob Hoover, HBLA
- David Kamp, Dirtworks
- Annie Kirk, Acer Institute
- Patrick Mooney, University of British Columbia
- Martha Tyson, Design Consulting
- Joanne Westphal, Michigan State University

The five nominated therapeutic garden case studies were:

- Alzheimer's Association Memory Garden at Monroe County Hospital (Rochester, N.Y.)
- Cathedral Village (Philadelphia, PA)
- Converse Home (Burlington, VT)
- Portland Memory Garden (Portland, OR)
- Sedgewood Commons (Falmouth, ME)

Appendix D: Alzheimer's Garden Audit Tool

The following eight pages are reprinted here with permission from the author, Clare Cooper Marcus.

Cooper Marcus, C. (2007). *Journal of Housing for the Elderly*, Vol. 21:1, 179-191.

Alzheimer's Garden Audit Tool.

Cooper Marcus, C., (2007). *Journal of Housing for the Elderly*, Vol. 21:1, 179-191. Used with permission of the author.

Name of Auditor _____

Date _____

Therapeutic Garden Audit for Alzheimer's Facility

Name of Garden: _____

Location of Garden: _____

Scoring System:

- | | | |
|----|---|--|
| 0 | = | Feature not present (e.g., no entry path)
Quality missing (e.g., not familiar, hostile) |
| 1 | = | Poor to fair |
| 2 | = | Moderately good, could be improved |
| 3 | = | Very successful |
| NA | = | Not applicable |

Score garden according to each of the following issues and add notes as appropriate.

A. LOCATION AND ENTRY TO GARDEN:

Score:

1. Visibly accessible from inside building so that residents can see the garden when going about their daily activities inside.

Score:

2. Door to garden is easy to find.

3. Door into garden is easy to operate.

4. Door is usually unlocked.

5. Threshold of entry door is flat and smooth.

Alzheimer's Garden Audit Tool.

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- | | | |
|--------|-----|--|
| | 6. | Provision of shaded entry patio with seating just outside the door for those who want to come outdoors but cannot venture further. |
| | 7. | Attractive garden view from entry patio since this space may get used more than garden itself. |
| | 8. | Entry patio is large enough to accommodate several people in wheelchairs, together with tables and chairs for programmed group activities. |
| | 9. | In regions with significant bug problems in summer, entry patio is screened and lit at night. |
| Score: | | |
| | 10. | Location of entry patio/screened porch to receive late afternoon sun, thus avoiding long shadows that accompany increased agitation at that time of day ("sundowning"). |
| | 11. | Provision of a conservatory or solarium with plants, birds in cages, etc., looking over garden where residents can enjoy a semi-outdoor experience year-round, bright, natural light beneficial to health. |
| | 12. | A single entry door to garden, designed as a "landmark" so that those using garden can easily see where they have to return to get back indoors. |
| | 13. | The whole garden can be viewed from inside the building by staff going about their daily activities or from a nurse's station (if there is one). |

B. LAYOUT AND PATHWAYS

- | | | |
|--|-----|---|
| | 14. | The layout of the garden is easy to see and understand to minimize confusion for those who are not functioning well. |
| | 15. | Provision of a simple looped, circular or figure-of-eight pathway system with no dead ends or confusing choices whether to turn left or right to return home. |
| | 16. | A simple, clear garden layout with one or two destination points, since Alzheimer's residents experience disorientation, or short-term memory loss as it relates specifically to a sense of physical location, and can become easily disoriented and agitated in unfamiliar settings. |

Alzheimer's Garden Audit Tool.

Cooper Marcus, C., (2007). *Journal of Housing for the Elderly*, Vol. 21:1, 179-191.

Score: <input type="text"/>	17. Appropriate destination points, such as a gazebo, seating arbor, or large shade tree, that can be used for programmed activities.
<input type="text"/>	18. Provision of a level pathway system including exit from building and patio, since residents may exhibit lack of coordination and balance (apraxia) but are still impelled to move without apparent goal or purpose (wandering behavior).
<input type="text"/>	19. Handrail along all or part of pathway system for those with balance problems.
<input type="text"/>	20. Non-reflective path surface since aging eyes have a hard time dealing with glare. Tinted concrete is good solution.
<input type="text"/>	21. Appropriateness of pathway surfaces for wheelchairs, walkers, reclining geri chairs, shuffling feet of the frail elder, etc. Brushed concrete or asphalt provide appropriate traction.
<input type="text"/>	22. Consistent pathway color, since an Alzheimer's resident reacts to contrasting ground plane colors as if there were a change in depth ("visual cliffing," an example of agnosia, or the inability to understand and use sensory information).
Score: <input type="text"/>	23. Raised edges to pathways to prevent wheelchair user from rolling into planted area.
<input type="text"/>	24. Pathways wide enough for two wheelchairs to pass (at least six feet).
<input type="text"/>	25. Provision of "markers" or landmarks along the pathway to assist in spatial orientation and allow staff or family members to measure how far a patient can walk.
C. PLANTING	
<input type="text"/>	26. High ratio of green to hard surfaces in garden — ideally around 70:30.

Alzheimer's Garden Audit Tool.

Cooper Marcus, C., (2007). *Journal of Housing for the Elderly*, Vol. 21:1, 179-191.

<input type="checkbox"/>	27.	Provision of a flat lawn area large enough for an informal grouping of movable chairs, a game of croquet, etc., or for young residents to sit or lie on.
<input type="checkbox"/>	28.	Provides a great diversity of plants selected for seasonal interest, sensory variety, shade qualities, screening, wildlife habitats, etc.
<input type="checkbox"/>	29.	Vegetation introduced in a variety of ways: raised beds, vine-covered arbors and trellises, perennial borders, tubs of annuals, trees, hedges, etc.
Score:		
<input type="checkbox"/>	30.	Provision of a rich multisensory experience (vision, touch, hearing, smell) to activate the senses.
<input type="checkbox"/>	31.	An area specifically designed for supervised gardening activity program (raised beds, potting shed, tool shed, various large containers, gathering area, access to drinking fountain, close to building entry, etc.).
<input type="checkbox"/>	32.	Garden receives at least half a day of sun in order for plantings to flourish.
<input type="checkbox"/>	33.	Avoidance of toxic plants in gardens for late-stage Alzheimer's patients, since people tend to revert to infancy and put everything in their mouth at this stage in the disease.
<input type="checkbox"/>	34.	Avoidance of trees whose fruit or leaves could cause slipping/trip hazards on pathways.
<input type="checkbox"/>	35.	Plants are maintained so that walkways are clear of hazards such as branches too low, shrubs "spilling" onto hardscape, etc.
<input type="checkbox"/>	36.	Provision of plants popular during youth of residents for potential to promote reminiscing (e.g., roses and lilac in New England).
Score:		
D. SEATING		
<input type="checkbox"/>	37.	Avoidance of plant shapes, structure, shadows, statues, etc. that might trigger delusions since Alzheimer's patients may perceive things that don't exist, and become agitated.

Alzheimer's Garden Audit Tool.

Cooper Marcus, C., (2007). *Journal of Housing for the Elderly*, Vol. 21:1, 179-191.

<input type="checkbox"/>	38.	Seating options available for person alone or couple.
<input type="checkbox"/>	39.	Seating available for groups larger than two to sit and easily converse.
<input type="checkbox"/>	40.	Appropriate seating design (e.g., with back and arms for ease of pushing up from a seated position).
<input type="checkbox"/>	41.	Comfort of seating material (wood, fabric or hard plastic preferable; steel, aluminum or concrete, least preferable).
<input type="checkbox"/>	42.	A bench or chairs for two in a niche that gives the illusion of privacy, since this may encourage social interaction.
<input type="checkbox"/>	43.	Choice of seating in sun/shade throughout most of day/year.
Score:		
<input type="checkbox"/>	44.	Seating at relatively frequent intervals along main paths; every 15 feet is necessary for those who are quite frail, and to encourage those who pace or wander excessively to take a rest.
<input type="checkbox"/>	45.	Near view from most seats is attractive/interesting (varied plant materials by color, leaf shape, height, etc.; variety of objects that might be interesting to look at—bird feeder, bird bath, sculpture, etc.).
<input type="checkbox"/>	46.	Some moveable seating available, easily moved, but still sturdy enough to prevent tipping.
E. OVERALL DESIGN AND DETAILS		
<input type="checkbox"/>	47.	Provision of features that might evoke memories for residents. Depending on location, cultural background, etc., these might include a garden shed, mail box, vegetable garden, barbecue, bicycle or small piece of farm equipment (fixed to ground).
<input type="checkbox"/>	48.	Small scale design changes so that a person moving slowly would have a variety of visual experiences (enclosed/open, sun/shaded, varied plant materials, etc.).

Alzheimer's Garden Audit Tool.

Cooper Marcus, C., (2007). *Journal of Housing for the Elderly*, Vol. 21:1, 179-191.

- | | |
|----------------------|---|
| <input type="text"/> | 49. Avoidance of any garden structure (arbor, trellis, pergola) which might cast statted shadows which can be misinterpreted as "troughs" or changes in depth. |
| Score: | |
| <input type="text"/> | 50. Potential to observe wildlife (e.g., plants that attract birds, butterflies; bird feeder, bird bath, etc.). |
| <input type="text"/> | 51. Incorporates a bubbling fountain where moving water can be watched and listened to; or a simple water-wall where water can be touched. |
| <input type="text"/> | 52. The extent to which this outdoor space might allow a resident, visitor or staff member to experience an environment in complete contrast to the building interior. |
| <input type="text"/> | 53. The extent to which this outdoor space offers users the opportunity to make choices (other than walking routes, which can cause confusion), thus allowing residents a sense of control (e.g., choice of seating arrangements, variety of sub-spaces, etc.). |
| <input type="text"/> | 54. The extent to which this outdoor space is nurturing, calming, familiar, and homelike, not an "artistic statement" or "envelope-pushing" design that might be unfamiliar or jarring to residents. |
| <input type="text"/> | 55. Educational/interpretive material that might be of interest to visitors or residents (e.g., plant labels, plan of garden, etc.). |
| Score: | |
| <input type="text"/> | 56. Garden is very attractive, well maintained, and rich with amenities (gazebo, glider, bird bath, flower beds) so that family members might be encouraged to visit more often, and take their relative outdoors. |
| <input type="text"/> | 57. Lighting so that space can be used for walking, sitting, etc. on warm evenings; or viewed from inside when dark. |
| <input type="text"/> | 58. Opportunity for staff to find a place to take a break or eat a brown-bag lunch where they might feel truly "away" from their work, and out of sight of residents. |

Alzheimer's Garden Audit Tool.

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<input type="checkbox"/>	59. Appropriateness of space to local climate
<input type="checkbox"/>	60. Appropriateness of space to local culture (e.g., using local plants, construction materials, decorative images).
<input type="checkbox"/>	61. Degree of privacy from resident rooms/windows looking out onto space.
<input type="checkbox"/>	62. Degree of privacy for those inside rooms adjacent to garden.
Score:	
<input type="checkbox"/>	63. Building edge encloses garden as much as possible, so that the degree to which garden has to be fenced is minimized.
<input type="checkbox"/>	64. Boundaries of space provide complete enclosure with trees and tall shrubs screening view of fences or walls and forming a permanent attractive framework to the garden.
<input type="checkbox"/>	65. Gate into garden for maintenance staff, and/or serving as an emergency exit is subtly disguised with planting.
<input type="checkbox"/>	66. Outdoor space is free from intrusions of unpleasant/incongruent sounds (e.g., traffic, loading dock, loud air conditioners, etc.).
G. MAINTENANCE AND AMENITIES	
<input type="checkbox"/>	67. Maintenance quality of built features, furnishings and landscape.
<input type="checkbox"/>	68. Maintenance quality of plant materials (plant health).
<input type="checkbox"/>	69. Availability of litter receptacles and (where appropriate) ash trays.

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Score:

70. Maintenance quality of litter pick-up.

71. Availability of phone or communication device (in weather proof box) for emergencies.

72. Availability of nearby toilets with signage to same in garden.

73. Provision of a specific outdoor smoking area in this garden or elsewhere.

74. Storage facility for maintenance staff.

Additional features, design elements, qualities that you think should be added to this audit tool:

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Appendix E: Thesis Readings

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