

RESTORING THE NIGHT

by

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A REPORT

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## **Abstract**

Restorative landscapes, healing gardens, and therapeutic gardens can improve mental and physical health. They relieve stress, slow us down and make us appreciate the present moment (Kaplan 1995). Research confirms these benefits: “A restorative environment provides measurable physical and/or psychological benefit to human health” (Krinke 2005, 107). Unfortunately, few restorative landscapes are designed for night time use, though stress and the need for healing occur at all hours of the day and night. To that end, the purpose of this research is to create a set of lighting design strategies that will enable designers to create restorative landscapes for nighttime use and demonstrate how they can be applied.

A literature review synthesizing the information on healing garden types, outdoor lighting techniques, and their relationship to Attention Restoration Theory, identified four main components required for a space to be considered restorative. Two precedent studies allowed the author to explore the components of Attention Restoration Theory and healing garden types. The lighting principles that afford these four components and healing garden types that are best suited for an urban public space were layered in a final design to create a restorative urban space that is functional at night.

The set of design strategies created with the support of this research was applied to Occidental Square, a public park in Seattle, Washington. The applied design strategies are represented and demonstrated through the site design. With these tools in hand, designers can create spaces for those in need of rejuvenation, restoration, and tranquility not only during the day, but also at night.





RESTORING  
THE NIGHT

Jeannette Cieszykowski  
Master's Project + Report  
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Major Professor / Mary Catherine Kingery-Page  
Committee Members / Anne Beamish + Neal Hubbell

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Mom I want to particularly thank you, for always expressing your endless love and support even when I am being difficult. I love, care, respect, and appreciate everything you have done for me over the years. I hope this report can be a small piece of proof that none of this could have happened without you being there for me.





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# ABSTRACT

Restorative landscapes, healing gardens, and therapeutic gardens can improve mental and physical health. They relieve stress, slow us down and make us appreciate the present moment (Kaplan 1995). Research confirms these benefits: “A restorative environment provides measurable physical and/or psychological benefit to human health” (Krinke 2005, 107). Unfortunately, few restorative landscapes are designed for night time use, though stress and the need for healing occur at all hours of the day and night. To that end, the purpose of this research is to create a set of lighting design strategies that will enable designers to create restorative landscapes for nighttime use and demonstrate how they can be applied.

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identified four main components required for a space to be considered restorative. Two precedent studies allowed the author to explore the components of Attention Restoration Theory and healing garden types. The lighting principles that afford these four components and healing garden types that are best suited for an urban public space were layered in a final design to create a restorative urban space that is functional at night.

The set of design strategies created with the support of this research was applied to Occidental Square, a public park in Seattle, Washington. The applied design strategies are represented and demonstrated through the site design. With these tools in hand, designers can create spaces for those in need of rejuvenation, restoration, and tranquility not only during the day, but also at night.



The image features a dark, abstract background composed of various shades of purple and blue. A prominent, bright, curved line of light, resembling a lens flare or a stylized horizon, sweeps across the middle of the frame from the bottom left towards the top right. The background is filled with numerous overlapping, semi-transparent geometric shapes, primarily triangles and polygons, in various sizes and orientations, creating a complex, layered effect. The word "DELINEATE" is centered in the upper half of the image, rendered in a clean, white, sans-serif, all-caps font. The overall aesthetic is modern, digital, and minimalist.

DELINEATE



## INTRODUCTION

Living and working amongst the high activity of an urban community can be mentally and physically exhausting. “Stress in the workplace and home, the breakneck pace and complexity of the ‘information age’ and a growing lack of connection to the cultural world drive many to seek a life of greater silence, peace and simplicity” (Krinke 2005, 10). “According to Attention Restoration Theory, many of our daily tasks require mental effort in order to direct our attention toward the required objects and processes while avoiding distractions and delaying extraneous thought and activities. This effort draws on cognitive resources that can be exhausted, but which can be restored in the appropriate environment” (Clayton and Myers 2011, 85). Restorative landscapes are an example of an appropriate environment that can aid in relieving the mental and physical stresses of everyday life. Research confirms that these environments relieve

stress, slow us down, and make us appreciate the present moment (Kaplan 1995). “A restorative environment provides measurable physical and/ or psychological benefit to human health” (Krinke 2005, 107).

A small body of literature elaborates on the topic of restorative landscapes, but unfortunately little to no research is devoted to their potential and application for use at night. In many parts of the world the sun sets hours before people begin to head home from work. Where can those in need of mental and physical restoration retreat within a safe, naturalistic setting after dark in an urban area?

The purpose of this research is to create a set of lighting design strategies that will extend the benefits of a restorative landscape by making it available for nighttime use and to demonstrate how the strategies can be applied.

The background is a dark, almost black, space filled with various geometric shapes in shades of purple, blue, and magenta. A prominent, bright, diagonal line of light cuts across the scene from the upper right towards the lower left, creating a strong sense of depth and movement. The word "RESTORE" is centered in the upper half of the image, rendered in a clean, white, sans-serif font.

RESTORE

## RESTORATIVE LANDSCAPES

This chapter discusses the very basic information needed to understand Attention Restoration Theory. It also introduces the components that must be present within a landscape for the landscape to be considered restorative.

In Attention Restoration Theory, the concept of a “Restorative experience” or “Restorative environment” refers to opportunities that reduce the fatigue of directed attention (Kaplan 1995). Restorative landscapes restore mental fatigue caused by overuse of voluntary attention.

### VOLUNTARY ATTENTION

William James first defined “Voluntary attention” and “involuntary attention” in 1892. His concept stated

that “Voluntary attention was to be employed when something did not of itself attract attention but it was important to attend to nonetheless” (Kaplan 1995, 169). According to James, the only way to support the lack of desire or lack of desire to complete the necessary task is to protect one from all outside competing thoughts (Kaplan 1995). Some writers refer to “voluntary attention” as “directed attention” (Kaplan and Kaplan 1989).

Voluntary attention causes mental fatigue. For example, some students find themselves applying voluntary attention when studying for a test. Studying is not always an attractive task, but students who wish to do well on

an exam study nonetheless. After a short amount of time they may experience some mental fatigue as a result of applying voluntary attention.

### INVOLUNTARY ATTENTION

“Involuntary attention, requiring no effort, is likely to be resistant to fatigue. Furthermore, while the individual is in involuntary mode, directed attention should be able to rest” (Kaplan 1995, 172). If an object seems exciting or appealing to users, they will unconsciously direct their attention to the object, applying less mental and physical effort (Kaplan and Kaplan 1989).

Involuntary attention, or “fascination,” can be divided in to two forms. For example, “there is the ‘hard’ fascination

of watching auto racing and ‘soft’ fascination of walking in a natural setting” (Kaplan 1995, 172). Soft fascination is commonly paired with natural settings. The time for reflection that natural settings offer further enhances the benefits of recovering from directed attention fatigue (Kaplan 1995).

**FASCINATION** is but one component of a restorative setting. Attention Restoration Theory posits that for a natural setting to be restorative, it must evoke four responses: “being away,” “extent,” “fascination,” and “compatibility” (Kaplan 1995).

## COMPONENTS OF A RESTORATIVE SETTING

### BEING AWAY

The feeling of being away means a break from everyday tasks. “Being away” might connote a vacation, getting away entirely from the ordinary. This could also mean a stop or change in any form of mental activity (Kaplan and Kaplan 1989, 183). Research shows that most people prefer a natural setting for extended restorative escapes, but a distant destination is not always the most accessible option for those living in an urban area. Therefore, natural environments that are easily accessible are an important resource to offer urban environments (Kaplan 1995).

### EXTENT

Extent is the scope of one’s feeling of connectedness to a surrounding. Extent is the act of being “in a whole other world,” either perceptually or physically. Kaplan uses the example of being in a movie theater, wherein “...there is a promise of continuation of the world beyond what is immediately perceived” (Kaplan and Kaplan 1989, 184). Extent does not necessarily have to include large spans of land. Trails and paths can be designed to give the illusion of a larger space (Kaplan 1995).

### FASCINATION

Fascination arouses the subconscious. “A fascinating stimulus is one that calls forth involuntary attention...” (Kaplan and Kaplan 1989, 184). It allows people to

function without any directed attention that causes mental or physical fatigue (Kaplan and Kaplan 1989). “Many of the fascinations afforded by the natural setting qualify as ‘soft’ fascination: clouds, sunsets, snow patterns, leaves in the breeze” (Kaplan 1995, 174). These soft fascinations are easy to enjoy but do not require directed attention.

## COMPATIBILITY

Compatibility is achieved when the users’ purpose is fulfilled by their surroundings. Non-compatibility would be a “library reading room filled with individuals who are socializing,” making it difficult for someone trying to read a difficult text to retain any of the important information (Kaplan and Kaplan 1989, 186). By contrast, “if one’s

purposes fit the demands imposed by the environment, and the environmental patterns that fascinate also provide the information needed for action, compatibility is fostered” (Kaplan and Kaplan 1989, 186).

Natural settings and human inclinations seem to share a special resonance. Many find functioning in a natural setting more effortless than in “civilized settings,” though there is more familiarity with the latter (Cawte 1967).

The above-discussed components of Attention Restoration Theory have been used to guide the design of many successful restorative landscapes. Unfortunately, little research focuses on restorative landscapes that can be utilized at night.

The background is a dark, almost black, space filled with various geometric shapes in shades of purple and blue. A prominent, glowing diagonal line runs from the upper right towards the lower left, creating a sense of depth and movement. The word "LOCATE" is centered in the upper right quadrant, rendered in a clean, white, sans-serif font.

LOCATE

## INTRODUCTION TO SITE

Occidental Square, a public park in Seattle, Washington, was selected as the test site for this study's design of lighting principles for nighttime-accessible restorative landscapes. Figures 3-1 - 3-5 are pictures of Occidental Square taken by the author. One motivation for this site selection was its proximity to a design project site being worked on by Kansas State professor Siepl-Coates' studio. The studio, "Re-Considering the Unity of Health and Environment: Creating Models for Sustainable Inter-Generational Living, focuses upon designing for human well-being. The design proposals will address common architectural concerns as well as... address ways in which the proposed environment can support life-enhancing experience, healthy ways of life and generally contribute to an improved sense of quality of life" (Siepl-Coates, Fall 2013-Spring 2014). The studio's site is located adjacent to Occidental Square in Seattle, Washington.

Occidental Square is located in Pioneer Square, Seattle's oldest neighborhood and commercial district. Pioneer Square started as a part of the original "Skid Road...where logs cleared from surrounding forests were cut and moved to the bay." In its prime, Pioneer Square found itself "the center of banking on the West Coast" during the 1897 Klondike Goldrush ("Project For Public Spaces: Hall Of Shame" n.d.).

After a fire destroyed the district in 1889, the district the city spent two decades rebuilding Pioneer Square. The redesign resulted in the implementation of many architecturally significant buildings. Nevertheless, after World War I, the economic and commercial success shifted North of Pioneer Square, leaving the area a part of the new "Skid Road." During the past few decades, Pioneer Square has faced threats of being torn down and rebuilt to become a more modern downtown area. The town fought back, and in 1987, Pioneer Square became a part of



Figure 3-1: Looking South at Occidental Square by author



Figure 3-2: Looking East at Occidental Square by author



Seattle’s historical district as well as “one of the nation’s best-preserved Victorian Era downtown districts...” (“Project For Public Spaces: Hall Of Shame” n.d.).

Unfortunately, the current state of Occidental Park is holding back the district’s potential of becoming a downtown hotspot, even earning it a place in the Project for Public Spaces’ (PPS) “Hall of Shame.” Despite Occidental Park’s close proximity to popular shops and restaurants, illicit activity deters any potential activity. Most identify it as a transition space. With no real identity of its own, Occidental Park is lacking in activities, amenities, and vibrancy (“Project For Public Spaces: Hall Of Shame” n.d.).

PPS conducted two site analyses and recommended the following:

- “A more active management program that would work with local businesses and institutions to highlight their assets in the square through regular events, a market, and other activities and uses.”
- “Create smaller ‘places’ within the square, building on what is already there, which would provide more reasons for people to use the square.”
- “Add color and flowers.”

Also mentioned in the site analyses was the lack of interaction between the surrounding buildings and this park (“Project For Public Spaces: Hall Of Shame” n.d.). Stronger connectivity to these neighboring buildings may give people more of a reason to use the park.



Figure 3-3: Ivy entrance to mall in adjacent building by author



Figure 3-4: Small shops adjacent to Occidental Square by author



Figure 3-5: Restaurant adjacent to Occidental Square by author



The background features a dark, almost black, field with a prominent diagonal band of light. This band transitions from a deep purple at the top to a bright, glowing white at the bottom. Scattered throughout the scene are various semi-transparent, geometric shapes, including squares and triangles, in shades of purple and blue, creating a layered, crystalline effect.

EXPLORE

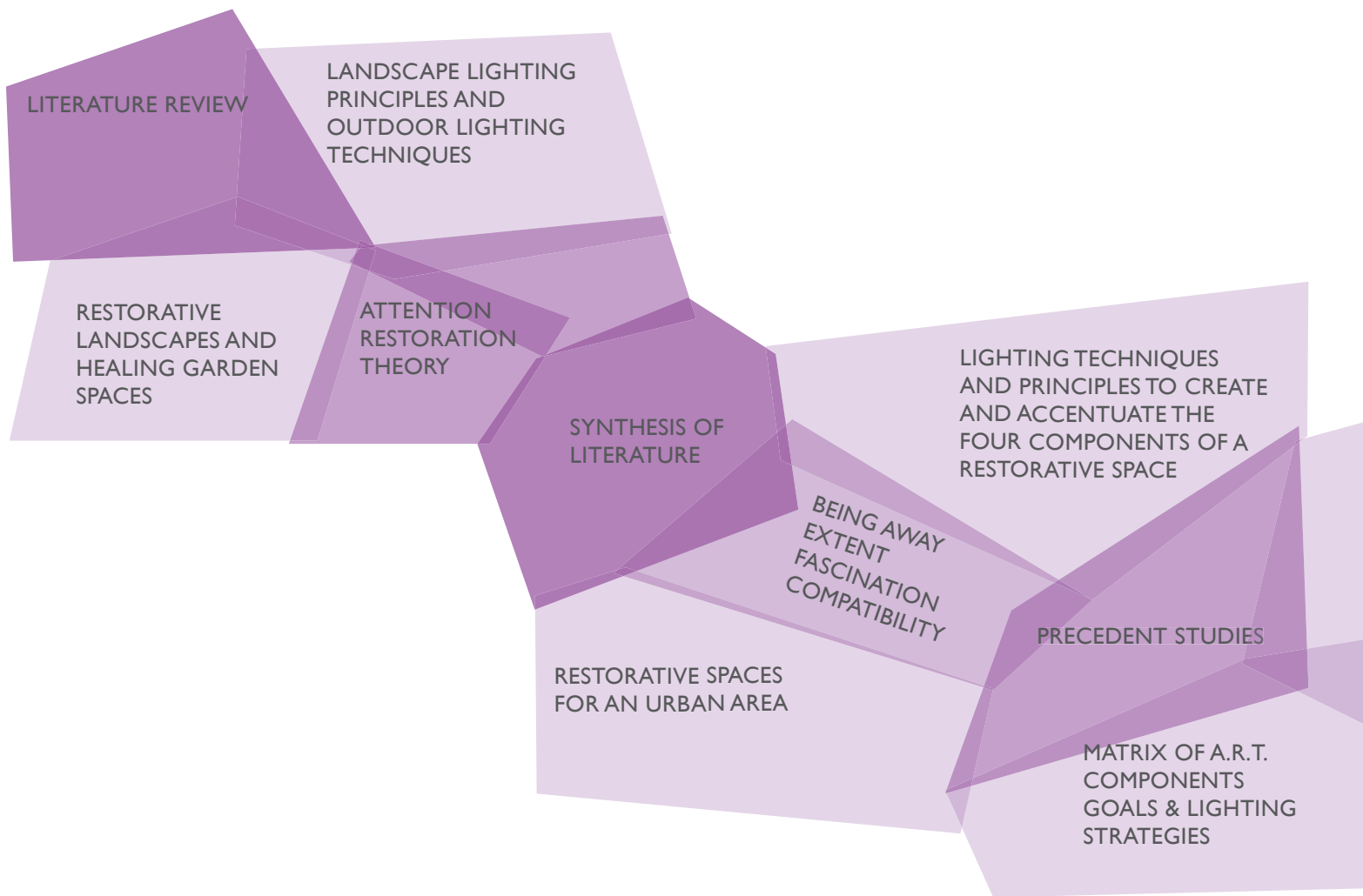


Figure 4-1: Process Diagram by author

## THE PROCESS TO FINDING LIGHTING STRATEGIES

Figure 4-1 shows the process the author took to answer the objective of this research project which is to find lighting strategies that accentuate or support the four components of a restorative setting. Designers can then apply the lighting strategies to restorative landscapes, extending the restorative benefits into the night.

### Reviewed literature:

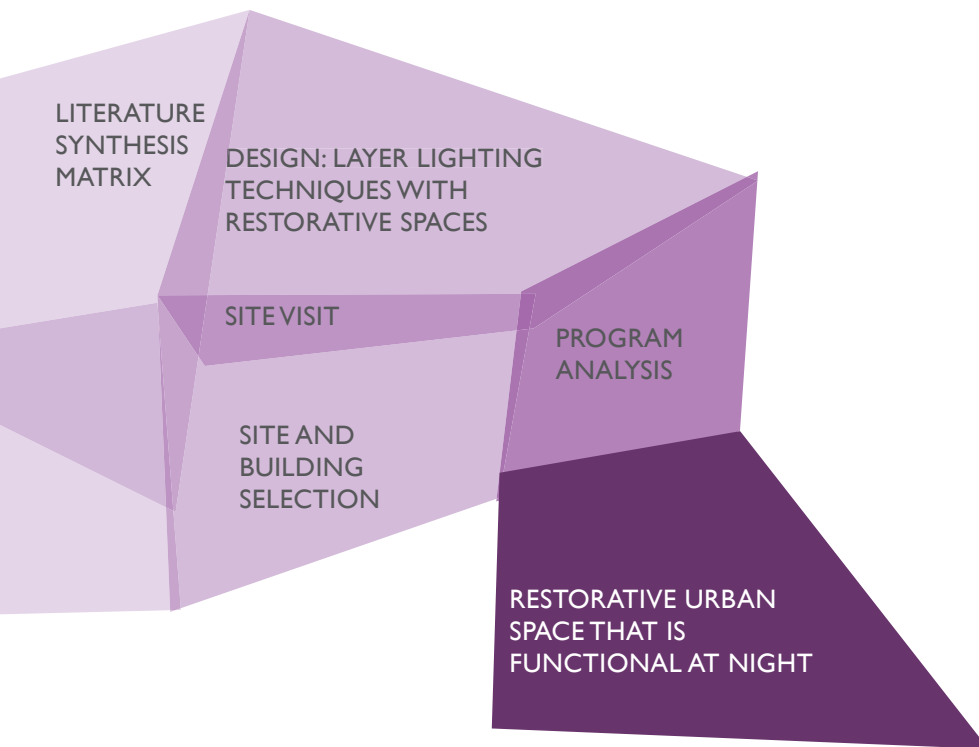
- Attention Restoration Theory
- Restorative landscapes
- Healing garden typologies
- Landscape lighting principles
- Lighting techniques

**Compiled information** on lighting techniques and principles that accentuate the four components of a restorative landscape and healing garden spaces that applied to urban areas.

**Researched precedent studies** to learn how a restorative landscape and urban public space are created and what details and programming aid in their success.

**Created a Literature Synthesis Matrix.**

**Created a second matrix** stating the four main components of Attention Restoration Theory, their definitions, and the lighting strategies that will be used to achieve that goal or meaning.



**Selected a site** and chose an architecture student's inter-generational housing unit design to be used as context for the park design.

**Drafted a design framework** that layers the lighting strategies with the healing garden typologies.

**Conducted a site visit** and analysis for Occidental Square as well as Bloedel Reserve.

**Completed a program analysis.**

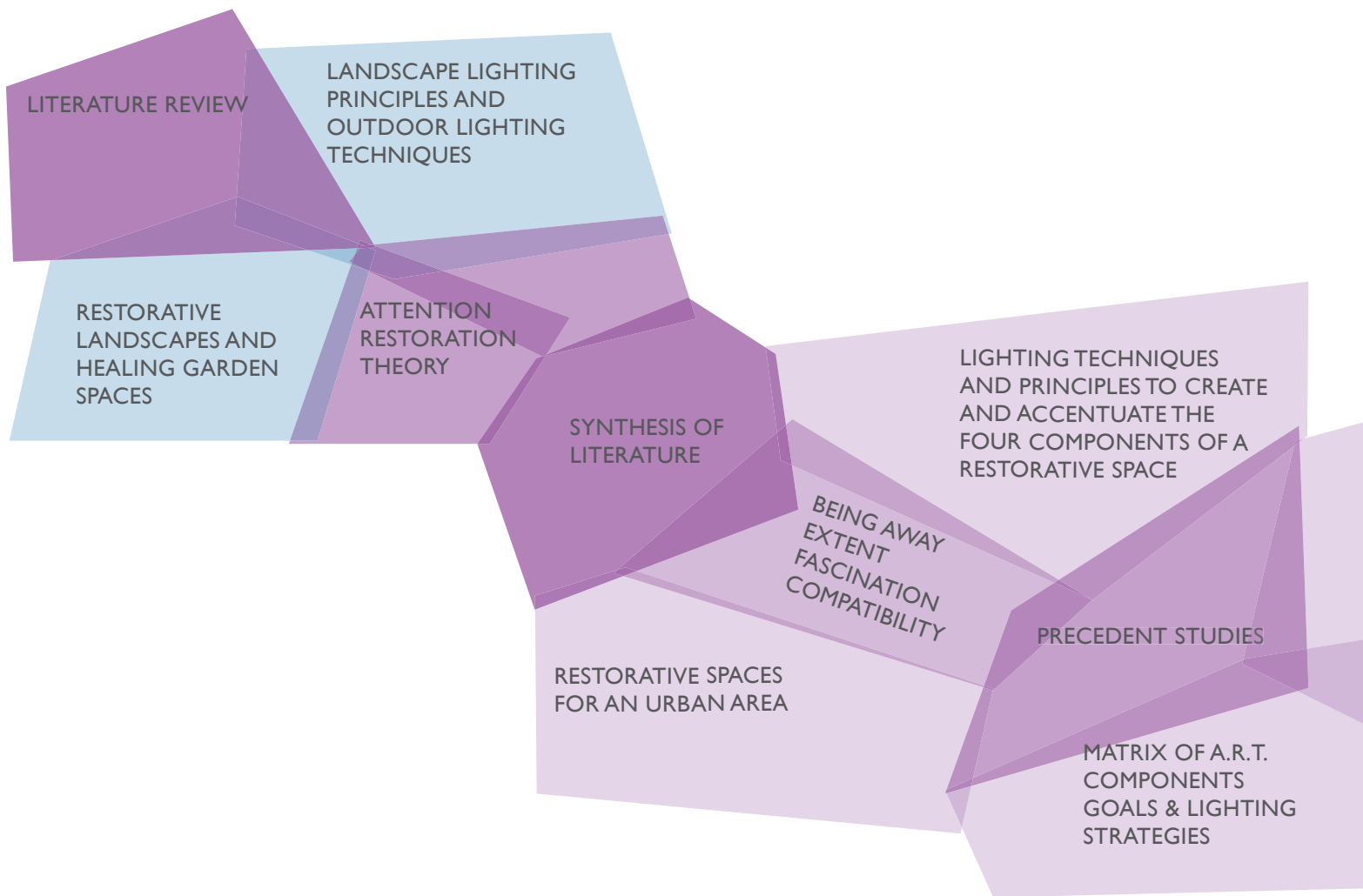
**Created a design application** represented through a site plan and a series of rendered perspectives with call outs identifying the healing garden space shown. The call outs

also state which lighting strategies are applied and how they accentuate the four Attention Restoration Theory components.



The image features a dark, abstract background with a prominent green geometric shape, possibly a stylized letter 'A' or a similar form, that glows and has a gradient. The text 'LITERATURE REVIEW' is centered horizontally and overlaid on this green shape. The text is in a clean, white, sans-serif font. The overall composition is minimalist and modern.

LITERATURE REVIEW



**Figure 4-2:** Process Diagram by author

The literature review focused first on restorative landscapes (highlighted in blue in Figure 4-2):

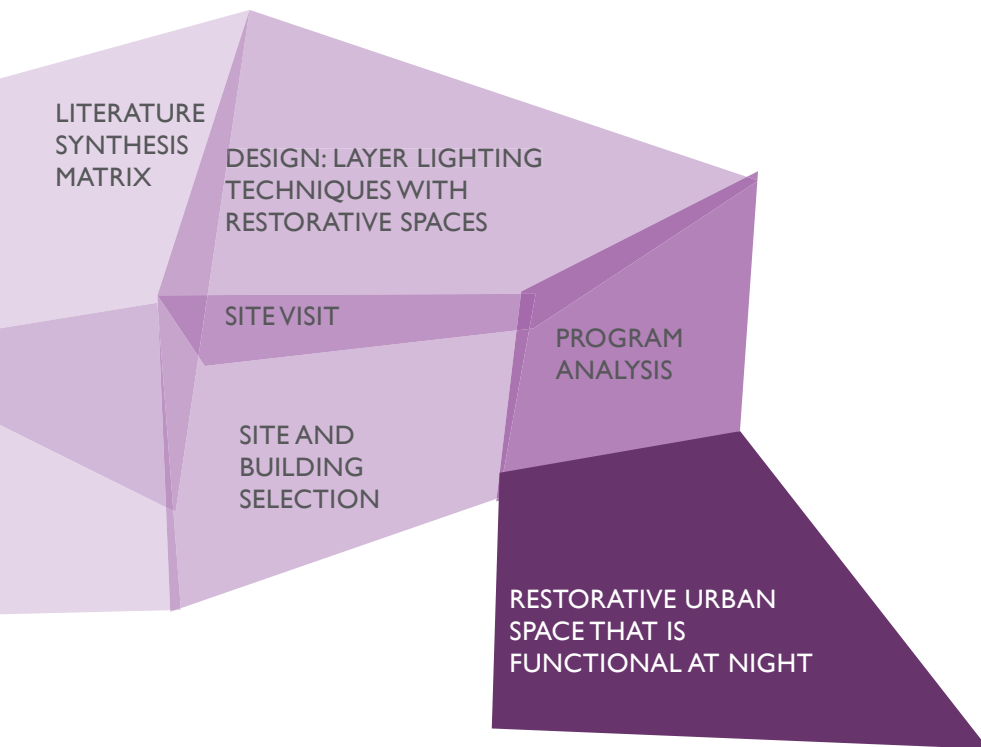
- What is a restorative landscape?
- What are its benefits?
- What components must be present for a landscape to be restorative?

As discussed in chapter three restorative landscapes are a place for people to retreat to restore mental and physical fatigue caused by overuse of involuntary attention. For these spaces to be considered restorative they must include four different components being away, extent, fascination, and compatibility.

Once this information was learned the author continued

to research healing space typologies. Clare Cooper Marcus and Marni Barnes (1999) published a book titled *Healing Gardens: Therapeutic Benefits and Design Recommendations*. Within the book the authors define a set of healing garden spaces. The spaces implemented within the final site design were chosen from Marcus and Barnes' set.





The literature review was then expanded to include information on landscape lighting principles and outdoor lighting techniques. The following questions guided the review of lighting literature:

- How can light provide or support the qualities of a restorative landscape?
- How does the eye perceive light?
- Does more light create a safer environment?
- How do different lighting techniques affect the mood and comfort of the space and user?
- How can natural or physical elements in a landscape and lighting work together?

## APPROACHES TO DESIGNING A RESTORATIVE LANDSCAPE

Restorative landscapes are designed or manipulated natural spaces meant to help better a person's health. Restorative landscapes are generally found in secluded places, near hospitals and rehab centers, and are becoming more common in urban settings. According to Gerlack-Spriggs, Kaufman, and Warner (1998, 7):

“Restorative gardens are meant for the healthy as well as for the sick. For the healthy, such gardens encourage sociability among companions, promote relaxation and contemplation for the solitary visitor or create a sense of community among residents who live in quarters around the garden. For the sick of body or troubled in spirit, the same garden relaxes and soothes and thereby encourages the body and the mind to restore themselves.”

In *Healing Gardens: Therapeutic Benefits and Design Recommendations*, Clare Cooper Marcus and Marni

Barnes (1999) provide a simple breakdown of different approaches to designing a restorative landscape and common typologies that are found within the landscapes. The book focuses especially on healing gardens that are meant for spaces near hospitals. The general design process for healing gardens and the spaces listed can be applied and used when designing an urban restorative space, such as the one for this project. There are three different approaches to designing a healing garden or restorative landscape: the traditional approach, botanical or ecological approach, and the people-oriented approach.

The **TRADITIONAL APPROACH** includes historical precedents, regional attributes, and statement art.

**Historical precedents** refer to designs that incorporate different styles and traditions in hopes of creating a rejuvenating or healing experience. Examples include Japanese Zen, tea, paradise, and monastic cloister gardens, or gardens incorporating a labyrinth (Marcus and Barnes 1999).

Integrating [regional attributes](#) can help develop a base design or inspire design decisions. “Incorporating local icons or attributes can offer a sense of cohesion and connections with the surroundings...” For example, sites close to water can utilize blues or aquatic life (Marcus and Barnes 1999, 98).

[Statement art](#) is more difficult to use because art is open to interpretation. “Examples of statement art are installations that are created with the intent of conveying a message or making a mark on the land...” (Marcus and Barnes 1999, 98).

**BOTANICAL OR ECOLOGICAL APPROACHES** are taken when a garden’s purpose is sustainability or to incorporate medicinal plants. For Marcus and Barnes, sustainability means creating “an ecosystem within the built environment that is in harmony with nature’s own support systems, one that will return what it takes, so that the life cycle may continuously flow without depleting the resources of the environment” (Marcus and

Barnes 1999, 101-102). Some designers include plaques or literature describing the sustainable methods being used throughout the garden; other designers leave it up to the users’ subconscious and natural environmental harmony to create a sense of healing (Marcus and Barnes 1999).

The final approach is the **PEOPLE-ORIENTED APPROACH**, which is comprised of personal experience, clinical practice, and/ or research.

The [personal experience approach](#) is sometimes taken by landscape architects who are motivated by their own personal medical experiences or by empathy for the patients who repeatedly find themselves facing the stresses of a hospital experience, stresses such as increased fatigue, uncomfortableness, and the desire to escape (Marcus and Barnes, 1999).

Those who design with the [clinical practice approach](#) take known information about users’ illnesses and strategically design with the users’ needs in mind. For example,

when designing for someone with Alzheimer's disease, "Designers are aware of the patient's (with Alzheimer's) need to pace and their reduced ability to make choices... therefore they create a path for pacing with no dead-ends and few forks necessitating decision making" (Marcus and Barnes 1999, 105). Another example of the clinical practice approach can be found in most recreational spaces for children where principles of developmental psychology guide the design decisions. These designs incorporate subareas that allow the user to select his or her activity and location based on the developmental stage of growth that needs attending..." (Marcus and Barnes 1999, 105).

The third type of the people-oriented approach to designing a healing garden or restorative landscape is based on [research](#), but said research has not been fully developed. No data proves healing gardens actually heal, but there are strong indications that they do. In a research approach, designers create a restorative space, analyze the observed effects or feedback from users, and

then create another design based on the results. Because the data is based on peoples' reactions and opinions, many variables make the research approach difficult or inconsistent (Marcus and Barnes 1999).

Because restorative landscapes are built for a wide variety of people it is important to "understand how people see their environment and how they react to it..." (Marcus and Barnes 1999, 88). Choosing the design approach is the first step, but the designer must be aware of what the potential needs and feelings are that need to be addressed. It is crucial to think about the first impression the landscape makes on potential users and passersby. A design that incorporates users' wants and needs will result in a compatible and desirable space (Marcus and Barnes 1999).

## **SYMBOLIC VALUE IN A LANDSCAPE**

Environmental psychologist William Ittelson and his coauthors brought to light the idea of “symbolic value” that the environment holds and humans perceive. “Part of the information picked up by our sensory organs—the sounds, sights, and smells in the environment—are external stimuli that are not directly identified by the conscious mind. They are cues that enter the psyche at a subliminal level” (Marcus and Barnes 1999, 88). For example, the placement of a gate and especially an open gate symbolizes an inviting space. A closed gate or lack thereof symbolizes just the opposite: a private space with no trespassing. “This symbolism, which is primarily culturally determined, becomes part of how we define ourselves in relation to our environment” (Marcus and Barnes 1999, 88).

To create a supportive and healing environment for either a vulnerable patient population or a population wanting to decrease their mental fatigue, “the symbolic

meaning contained within the surroundings must be unambiguously positive” (Marcus and Barnes 1999, 91). The surroundings need to be inviting and positive.

## HEALING SPACES

The final design of this project was guided by a set of typology created by Marcus and Barnes. When defined the authors envisioned these spaces to be placed near hospitals or other types of healing facilities. Designers should not feel obligated to implement every space within their design. Rather, they should consider which spaces will best support the users and activities for that site.

**LANDSCAPED GROUNDS:** The most spacious outdoor area. This space is an extensive open space, often between buildings, and can be used as a transition space occupied during a lunch break or for reading a book (Marcus and Barnes 1999).

**LANDSCAPED SETBACK:** Most often used as a buffer between the street and an entry comprised of lawn, shrubs, and trees. This space is usually solely aesthetic and is not meant to be occupied by people (Marcus and Barnes 1999).

**THE FRONT PORCH:** This type may include “an overhang or porch roof, a turnaround for vehicle pickup and drop-off, seats, directional signs, a postbox, phone, bus stop...” It is the space that makes the first impression and can set the mood of the person about to enter (Marcus and Barnes 1999, 124).

**ENTRY GARDEN:** A landscaped area close to an entry and designed for use (Marcus and Barnes 1999).

**COURTYARD:** One of the first spaces seen to welcome the visitors and has boundaries on all sides (Marcus and Barnes 1999).

**PLAZA:** An outdoor space, predominantly hardscape, furnished for use, but with little green space (Marcus and Barnes 1999).

**ROOF GARDEN:** A more private space typically for only the building users with views in several directions (Marcus and Barnes 1999).

**ROOFTERRACE:** A long, narrow space located on the side of a building, predominantly hardscape with some aesthetic vegetated elements (Marcus and Barnes 1999).

**HEALING GARDEN:** An outdoor or indoor garden most commonly found in or adjacent to hospitals. Healing gardens are specifically designed for healing purposes by the designer (Marcus and Barnes 1999).

**MEDITATION GARDEN:** A small, quiet, enclosed space labeled for meditation purposes only (Marcus and Barnes 1999).

**VIEWING GARDEN:** A garden that is not entered but viewed from inside the building (Marcus and Barnes 1999).

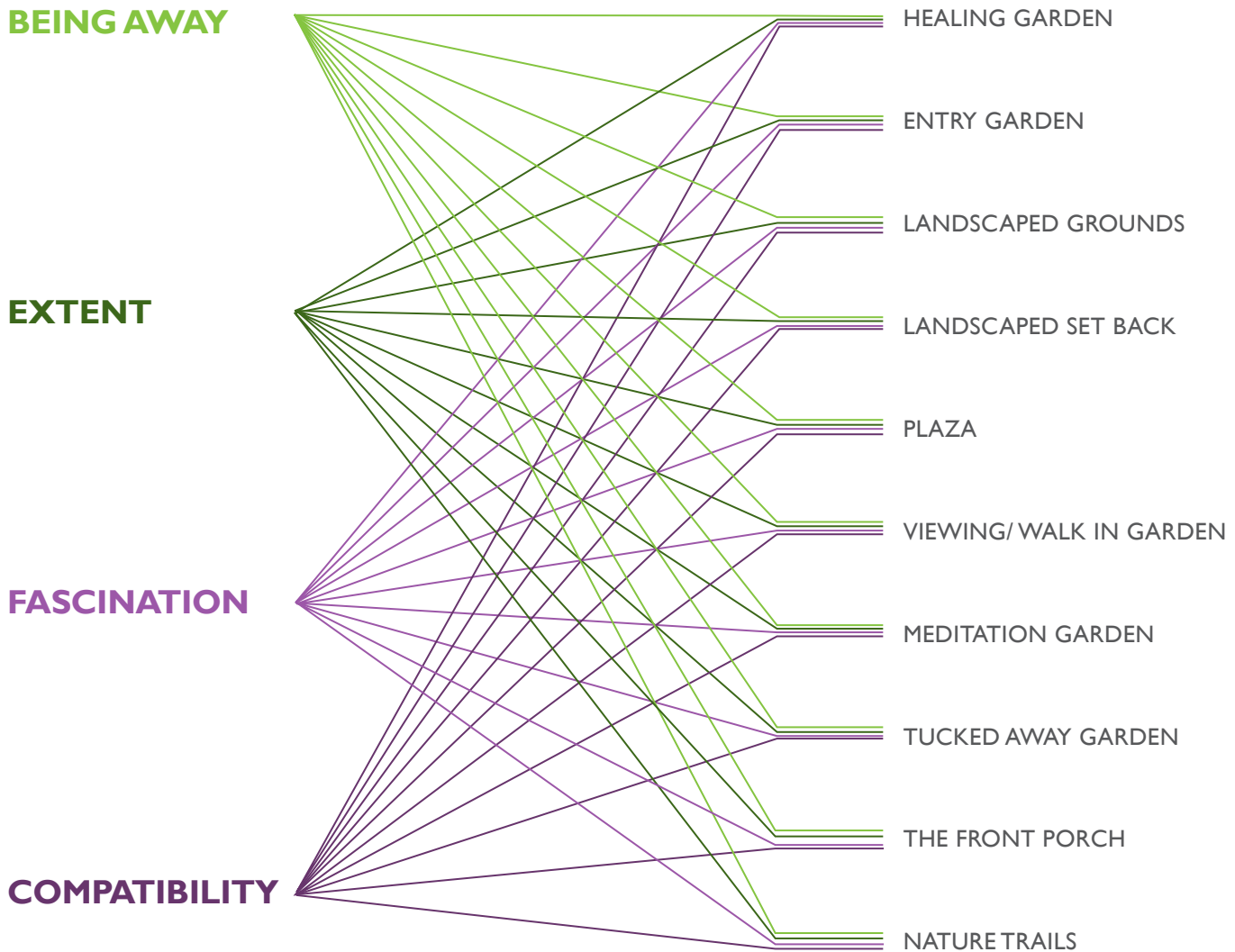
**VIEWING/WALK-IN-GARDEN:** A garden that can be viewed from inside the building but can be occupied by only a few people at a time (Marcus and Barnes 1999).

**TUCKED AWAY GARDEN:** An outdoor garden not connected to a building but within a reasonable distance (Marcus and Barnes 1999).

**BORROWED LANDSCAPE:** A naturally vegetated or designed space on adjacent properties that can be enjoyed by the user of the abutting site (Marcus and Barnes 1999).

**NATURE TRAILS AND NATURE PRESERVES:** An easily accessible, designed path that guides the user through nature (Marcus and Barnes 1999).

**ATRIUM GARDEN:** Where temperatures discourage visiting outside or inside natural space “...an indoor garden—heated or air-conditioned—can provide an attractive substitute” (Marcus and Barnes 1999, 152).



**Figure 4-3:** Matrix illustrating the relationship between healing spaces the Attention Restoration Theory components

For a space to be considered restorative it must achieve all four components. Figure 4-3 demonstrates how each of the healing spaces listed by Marcus and Barnes fulfill the four components of Attention Restoration Theory. The six healing spaces not connected to the four components were not included in the final design of Occidental Square. Chapter seven expands on why some spaces were implemented in the final design and why others were not.

- ROOF GARDEN
- ROOF TERRACE
- COURTYARD
- BORROWED LANDSCAPE
- ATRIUM GARDEN
- VIEWING GARDEN



## LANDSCAPE LIGHTING

An understanding of lighting and its importance in an urban landscape is crucial when designing an urban restorative landscape for nighttime use. A successful lighting design creates a sense of safety, security, and mood, whether it be romantic, playful, or serene (Maurer 2013).

Effective lighting for a restorative landscape must accomplish a sense of safety, security, and mood while also being compatible with the four restorative landscape components: being away, extent, fascination, and compatibility.

## BEING AWAY

To feel away may mean the absence of everyday tasks, but it may also include the feeling of solitude and serenity. During the day solitude and serenity may be appreciated by users because they can still see and hear activity around them. At night, when there is less activity, some may find the solitude and serenity to be unsettling. People must feel safe and calm within a restorative space for it to be successfully restorative. Lighting in a space has a large impact on orientation, security, and visual quality of a space after dark (Gehl 2006).

## EXTENT

Extent is the scope of one's feeling of connectedness to a surrounding. Not only can the design of trails and

paths give the illusion of a large space, so can the correct lighting design. Light can highlight the shape and contents of a space. According to Moyer, “It visually expands or limits depth and directs the eye through the space according to the relationship of brightness between one object or area and another” (Moyer 2005, 21).

During the day the feeling of being in the wilderness with an endless extent of land may be ideal, but at night “people are said to be more comfortable in a space where they are aware of their boundaries.” There is no correct intensity of light, but enough is needed so that the edges of the space are lit (Moyer 2005, 16).

Light can create shape, emotional response, and even a new reality in a familiar space through the use of composition, which is important to the aspect of perceptual extent (Moyer 2005).

## FASCINATION

“Soft fascination... has a special advantage in terms

of providing an opportunity for reflection, which can further enhance the benefits of recovering from directed attention fatigue” (Kaplan 1993). As a result, fascination is a key component of an effective restorative landscape. “Light introduces emotional qualities to the space such as romance, mystery, drama, and excitement. It sculpts the focal object emphasizing specific aspects or altering the daytime appearance to create a different experience” (Moyer 2005, 21). Restorative landscapes are known for their tranquil and natural qualities. With the right use of lighting, fascinating qualities of vegetation can be accentuated. Light can afford soft fascination with emotional cues.

## COMPATIBILITY

Lighting’s effectiveness directly correlates with Kaplan’s definition of compatibility. Landscape lighting has three basic objectives: to provide safety, security, and aesthetics (Moyer 2005).

**Safety-** “provide a clear view of potential obstacles in the environment” (Moyer 2005, 19). Lighting acts as a guide and a pathway, which in turn creates the conditions for safety (Landry 2008, 43).

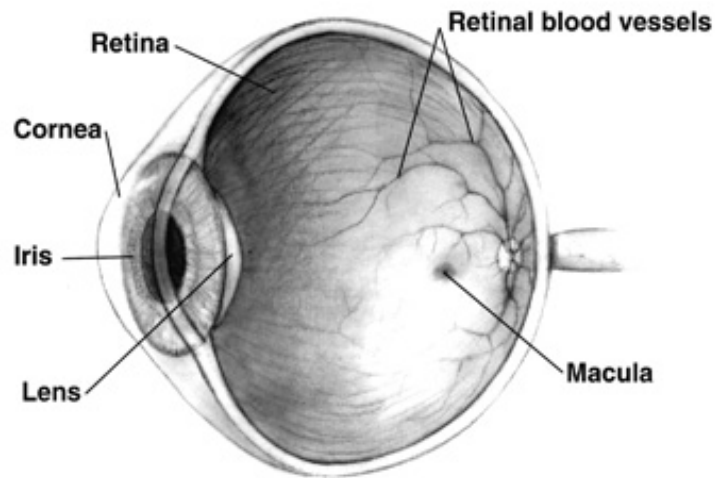
**Security-** “light can be a deterrent to an intruder and it adds psychologically to an inhabitant’s feeling of protection” (Moyer 2005, 19).

**Aesthetics-** “...allow enjoyment of the environment” (Moyer 2005, 19).

“If one’s purposes fit the demands imposed by the environment, and the environmental patterns that fascinate also provide the information needed for action, compatibility is fostered” (Kaplan and Kaplan 1989, 186). On the study site, Occidental Square, the author did not feel compatible, safe, or secure. The author was there to study the site but because of the uncomfortable conditions did not stay long.

Every public space at night requires a different type, style, and amount of lighting. Lighting within public spaces at

night is crucial to a space’s appeal and sense of safety. Lighting is most effective when it meets the needs of the space and the people who use it. The light relates to the space’s purpose. “The size of the crowd and required lighting level will vary by activity. The designer needs to identify the use clearly and respond to the visual needs that accompany the tasks in each area. This may mean that the light level and distribution will vary from one to another in the property” (Moyer 2005, 211).



**Figure 4-4:** Eye-diagram - Reproduced from the National Eye Institute - Copyright free, labeled for reuse with modification

## THE IMPORTANCE OF DESIGNING FOR THE EYE

A public space is observed first at a distance. If the area is poorly lit, passersby may not even realize it is there. Lighting can help create an inviting flow that instantly encourages outsiders to come in. “Providing identification and attraction to enter the space through the use of light heightens the potential use of the space” (Moyer 2005, 212).

Designing and utilizing lighting effectively and successfully requires knowledge of how the eye works. Figure 4-4 shows a diagram of an eye with its different parts labeled.

“The eye sees images of brightness. Light enters the eye and strikes the retina. These receptors generate photochemical reactions that travel along the optic nerve to the brain. The brain collects these signals and translates them into pictures” (Moyer 2005, 13). The eye is constantly adjusting to bright light and to dim light.

The eye is first drawn to the brightest location, but significant

contrast between light and dark confuses the eye as it tries to focus on both. “When a viewer focuses on the light object for several seconds to several minutes, dark adaptation may be broken. Then when shifting view to a dark area, the eye will have to start adapting again.” A quick shift is crucial in any situation where a person is concerned about personal safety or questioning if there is a threat nearby (Moyer 2005, 13-15). This is due to the fact that there is a moment in time when one cannot distinguish what is around them.

A disproportionate and unbalanced combination of lighting can confuse the eye and cause strain on the iris from constant shifts in size (Moyer 2005). The purpose of restorative landscapes is to restore effectiveness that has been lost due to stress, mental, and/or physical fatigue. Providing an even light level throughout a site or gradual transitions between light levels and spaces aids in human comfort and minimizes fatigue.

## **CORRELATION BETWEEN SAFETY AND INCREASED LIGHTING?**

A user of a restorative landscape should leave feeling mentally and physically relieved of stress and mental fatigue. Darkness can increase mental fatigue and uneasiness. Accordingly, designing a set of lighting principles for a restorative landscape requires a thorough understanding of the impact artificial lighting has on a person's sense of safety and security.

“One of the main goals for artificial lighting is to create a safe and secure nighttime environment” (“Light Pollution and Safety” 2009). It is easy for designers to haphazardly pick and place lighting features and once the space is entirely lit, determine the space complete. Poor lighting planning can result in glare, over illumination, wasted money, and ultimately wasted space.

Large parking lots, ATMs, and parks require lighting to help users feel safe and secure, but there is such a thing as too much lighting. “If the lighting is overly bright with

much glare the [excess lighting] actually make[s] it easier for a criminal to hide in the deep shadows produced by objects in the harsh glary light and encourage crime rather than discourage it” (“Enhanced Security” n.d.).

“Smart lighting techniques increase security by creating even illumination rather than harsh glare” (“Enhanced Security” n.d.). Glare reduction is the most important goal of effective nighttime lighting. According to The Illuminating Engineering Society of North America (adapted by VOLT), there are three forms of glare (“Glare Reduction” n.d.).

**DISABILITY GLARE** - Also known as veiling luminance, disability glare is caused by lights that shine directly into one's eyes. Disability glare is blinding.

**DISCOMFORT GLARE** - Discomfort glare does not necessarily reduce one's ability to see an object (as is the case with disability glare), but it produces discomfort. It is caused by high contrast or a non-uniform distribution of light in the field of view.

**NUISANCE OR ANNOYANCE GLARE** - Nuisance glare causes complaints, such as the "light shining in my window" phenomenon.

Glare is a common problem, whether because lighting was given little priority or designed poorly. The human eye is naturally drawn to the brightest spot in a room, and if glare is present it will be noticed. Effective night lighting eliminates glare and illuminates the target resulting in much better "seeing" conditions in the nighttime environment ("Glare Reduction" n.d.).

If the lighting of a space makes users feel unsafe or uncomfortable in any way they will have no desire to stay. There are efficient lighting plans with specific illumination

goals as well as references, such as the IES handbook, that help designers and developers choose the correct lighting levels and sources that create safe and secure environments ("Light Pollution and Safety" 2009). Glare is easily avoidable with lighting fixtures that are fully shielded. "These fixtures are no more expensive than poorly designed lighting and most lighting manufacturers have a line of fully shielded fixtures" ("Glare Reduction" n.d.).

The real task is to be safe, not just to feel safe. The International Dark-Sky Association (2009) has compiled the following list of suggestions to achieve feeling of safety as well as actual safety:

- Put light where it is needed, during the time period it will be used, and at the levels that enhance visibility.
- Shield lights to reduce glare and harsh shadows.
- Use motion sensors that "alert" us to activity after hours.

- Replace high-wattage bulbs with lower wattage bulbs that are shielded to illuminate specific areas.
- Use dimmers, which provide the light needed to accomplish nighttime work without extra expense.

These suggestions are helpful for small spaces and in theory, but do these solutions have proven results? More specifically, does more lighting result in less crime and therefore more safety? “There is a widely held belief in the law enforcement community that improved street lighting will reduce both the fear of crime and the actual incidence of crime” (Morrow and Hutton 2000, 1). In fact, no solid evidence supports the hypothesis that improved street lighting, or more lighting in general, reduces crime. “However, the public often welcomes increased street lighting as a possible deterrent to crime” (Morrow and Hutton 2000, 1).

One well-known and thorough study is “The Chicago Alley Lighting Project” conducted by the Illinois Criminal

Justice Information Authority. This study was conducted to “measure the effect of increased alley lighting on crime rates in two eight-square block areas” (Morrow and Hutton 2000, 1-2). The Authority compared the crime rates within Ward 28 six months before and six months after the lighting improvements were made. The data that resulted after the lighting installations was then compared to crime rates in Ward 16 that had no lighting improvements, but was of a similar size with similar socioeconomic, demographic, and crime data to Ward 28 (Morrow and Hutton 2000).

Both the experimental and control areas saw similar increases in all offense categories, but the overall increases in the experimental area appear to be more pronounced with a 40% increase compared to the 19% increase in the control area. During this experiment the Authority also recorded the number of reported incidents during the day to the number of reported incidents at night. “Both the experimental and control areas saw increases in reported incidents at night and

decreases in reported incidents during the day” (Morrow and Hutton 2000, viii).

Because both the experimental and control areas received an increase in reported evening incidents and a decrease in daytime reported incidents, there was no definitive answer as to whether or not the alley lighting had any effect on crime activity (Morrow and Hutton 2000).

“The more likely explanation for the increase in reported incidents in the experimental area after installation of improved alley lighting is that more residents and police officers are now more aware of criminal activity taking place...” Therefore the increase in reported crimes may just mean there were more crimes reported due to better visibility, rather than more crimes committed (Morrow and Hutton 2000, ix).

“An additional impact of increased alley lighting that was not measured in this study is the perceptions of residents. Improved lighting in areas that were previously dark and

vulnerable to crime may make residents feel more secure in their neighborhoods” (Morrow and Hutton 2000, ix).

In summary, despite the perception that increased lighting improves safety, little research convincingly supports this. Still, if one’s experience of a restorative landscape is to be effective, it seems that perception — whether grounded in research or not — is ultimately the most important consideration.



## **VISUAL COMFORT**

Research on visibility and physiological variables has found a correlation between the amount of brightness and difficulty of a task.

“As a corollary to improved visibility, it follows that a visual task that is difficult to see will require more exertion and effort than one that is well-defined and adequately illuminated. Over a period of time, this factor of strain affects the degree of fatigue in a working individual and is manifested in such symptoms as carelessness, lack of interest, and errors” (Flynn and Mills 1962, 34).

If a worker is already mentally fatigued from the exertion of directed attention under proper lighting conditions, imagine the mental state of the mentally fatigued in poor lighting conditions. A space designed to decrease mental fatigue and be restorative must ensure that lighting is compatible with the users' needs. Studies that considered variables such as “size of detail, brightness,

contrast, and length of time as fundamental factors of ‘seeing’... show the correlation between amount of light and ease of visibility tasks (Flynn and Mills 1962, 34). The results showed more light was better for more intricate visibility tasks. A change or increase in one of the variables will consequently affect the performance and ease of the other variables. Not only can improved lighting make it easier to perform a visual task, but it can also make the visual task more enjoyable to perform (Flynn and Mills 1962).

## CONTRAST IN LIGHTING AND ITS EFFECT ON SPATIAL ENVIRONMENTS

Not only does lighting aid in performing visual tasks, it can also determine the mood of the space. An object or space can be scary, inviting, dull, or exciting all because of the lighting quality, color, and technique. “Light can have a strengthening or reinforcing affect similar to that of background music in creating an appropriate emotional environment and a complementary psychological setting” (Flynn and Mills 1962, 39).

With the correct lighting techniques, the four qualities of a restorative landscape (being away, fascination, extent, and compatibility) can be accentuated to ensure that users experience a restorative landscape and its benefits at night, while also feeling safe and secure.

### DIFFUSION AND THE LOW CONTRAST ENVIRONMENT:

a space with a general brightness and little to no shadows or bright focus areas. This technique is good for a

space that holds “casual circulation, loosely controlled congregation assembly, or the free selection of points of interest...an area suitable for difficult and sustained visual tasks” (Flynn and Mills 1962, 41).

**HIGH CONTRAST ENVIRONMENT:** Similar to the environment of a play where one actor holds a spotlight in a dimly lit room, everyone’s attention is directed to the spotlight. “The ‘personality’ of the lighted space is such that it tends to dominate the observer, directing and holding his attention and interest” (Flynn and Mills 1962, 41).

**“SPOTTY” HIGH CONTRAST ENVIRONMENT:** This technique is meant for a multi-purpose area using high contrast to guide the eye to the main activities (Flynn and Mills 1962).

The human eye is attracted to the brightest spot in a room therefore a hierarchy of lighting levels can not only create the emotional response to an environment, but when used correctly can also

create the circulation within a space (Flynn and Mills 1962).

“Psychological reactions are also involved in these changes: high intensity illumination, for example, contributes to a sense of increased activity and efficiency; low intensity lighting tends to create an attitude of relaxation” (Flynn and Mills 1962, 42). The hierarchy of light levels is important to provide circulation and emphasize important features, but another layer of lighting levels that needs to be considered is how the light transitions as the user moves throughout the space. It can be uncomfortable and dangerous for the users’ eye to have to frequently adjust from a light space to dark space and back. When there is an abrupt light transition it can temporarily cause blindness, restricting the user from seeing the surroundings (Flynn and Mills 1962).

## LIGHT AND SHADOW IN THE EXTERIOR ENVIRONMENT

In an outdoor space, irregular shaped objects such as trees, shrubs, ground cover, and water elements must be lit in a way that is compatible with the goal of the site. For example, in a restorative landscape at night, it may be unsettling to sit in a space with dark, long shadows that may be interpreted as dramatic and scary. “Three-dimensional form is ‘seen’ as a relationship between highlight and shadow...by changing the directional quality of the lighting system changes the visual impression of depth and form” (Flynn and Mills 1962, 46).

Surfaces and controlled creative light establish the scale and continuity of an outdoor space. They greatly influence the visual definition of an exterior space. “The creative use of controlled light to establish patterns of brightness and color can develop and extend the visual setting, affecting the enjoyment of the space...” (Flynn and Mills 1962, 74-75).

**TREES:** Trees are typically the largest element in an outdoor landscape and therefore can be used as “major brightness elements and ‘surfaces’ to develop a sense of scale, of visual limitation, or of direction...(75).” The canopy can be used to the designer’s advantage when defining the space.

**SHRUBBERY AND FOLIAGE:** Shrubbery and foliage have an effect similar to that of trees in establishing a vertical plane. Well-lit shrubbery and foliage can establish the visual limitations of the horizontal plane.

**SCREENS:** An alternative to a natural shrub screen, built screens can also define a space while also giving the space a focal point or element of uniqueness.

**WATER:** Along with its calming attributes, “...water acts either as a mirror or as a clear transmitting material, reflecting or transmitting clear images of lighted surfaces and objects...” Its reflective qualities can be utilized if a diffusedly lit environment is desired.

**SECURITY:** The level of security in a space is not determined by the number of lighting fixtures within a space. “Areas involving real or imagined problems of personal safety or property security can be visually and psychologically improved through vertical brightness patterns...” (Flynn and Mills 1962, 84).

**SCALE:** Because of their size, buildings they often dominate and define outdoor space. Light techniques draw attention to the more minor but important elements of a site such as “guard rails, shrubbery, foliage, etc...the lighting produces an environment and scale conducive to pedestrian circulation”(Flynn and Mills 1962, 85).

Artificial lighting is a new, dynamic design tool that with the slightest use can have a drastic effect on the users’ sense of safety, security, orientation, and emotional response to a space. It is important to understand these effects when designing a restorative landscape that has to be sensitive to its users.

## THE LAYERS OF LIGHT

The light map for this project was guided by content from an IAPD 625 class about the basics of lighting design taught by Professor Neal Hubbell, specifically concepts discussed in class lectures on January 22 and January 30, 2014: The four layers of light and the lighting design process.

The four layers of light concept is particularly suited for a building's interiors, but many of the ideas can be adjusted to fit an outdoor landscape. The four layers of light are:

- The **AMBIENT LAYER**: the overall illumination throughout a space
- The **FOCAL LAYER**: the illumination of important features of a space such as artwork or water feature
- The **TASK LAYER**: illumination implemented to aid in whatever task may be taking place in the space, commonly very close to that activity
- The **DECORATIVE LAYER**: not necessary for a space, but the decorative layer of illumination adds an extra “sparkle” to the design and catches peoples’ eye

As one begins light mapping or the lighting design process, the first step is to determine a space's desired ambience. A more dramatic ambience requires a high contrast between task and focal light. For example, a dimly-lit path through an outdoor environment complemented by much brighter focal lights on trees creates long, dark shadows, giving the space a dramatic ambience. Using warmer lamps and few extreme contrasts throughout a site will create a calmer setting.

Next, the designer should determine how the lighting should enhance the 3-D vegetative and architectural massings in the space.

The next step is to determine how the lighting would be best integrated within the space. If the trees are all uplit, should the luminaires be flush with the surface

underneath or should there be a luminaire attached to the bottom branches?

In “The Architecture of Light,” Sage Russel (2008) introduces the concept of “light maps.” Just as there are maps for walking and driving, a light map is a map for the eye. By strategically implementing a variety of light levels a designer can indirectly guide the user through the space. The human eye is attracted to the brightest spot in the room. Therefore, light level changes are subtle cues that move the user through the space.

According to Russell the keys to creating a successful lighting map are:

- Think only in terms of light. Don't worry about practicality, constructability, luminaire location, or even the luminaire itself.
- Think about the quality of light and where it goes
- Focus on surfaces and objects and how they receive light (123).

When creating a light map, the designer should visualize a user walking through the space. Deciding this choreography forces the designer to take a step back and look at the site as a whole. “The choreography step is a quick and simple application of light on just a few large surfaces or objects in space to create distinct destinations that serve as lighted goals for people to move towards” (Russell 2008, 128).

As one draws “light” onto a plan or section view of a design, different angles can represent different types or techniques of lighting. For example, a radial gradient can suggest an overhead luminaire. A linear gradient fading up can suggest the washing of the wall in light. For every part of the design and particularly the lighting decisions and goals, it is important to include notations and descriptions of the desired affect (Russell 2008).

“The goal of the light map is to communicate ideas to others and to create a visual map of light that will help to make luminaire decisions easier” (Russell 2008, 129).

## DIRECTIONAL LIGHTING

*“A means of generating light has long been recognized as a basic need in man’s attempts to control his environment... A source of illumination is therefore basic to visually-oriented man – to his activities, to his ability to perform, and to his sense of well-being and security” (Flynn and Mills 1962, 7).*

Society has come a long way since the gas lamp. Research and advances in technology have made a variety of lighting fixture, color, and brightness options possible. With so many options almost any space can be lit to satisfy almost every activity. “Today’s designer, then, must make decisions in fields that offer no precedent...” or framework to what the perfect lighting design for a specific space is (Flynn and Mills 1962, 7). Every designer takes a different approach to lighting design. Every space requires a different design objective unique to its space. For example, there is not a “one size fits all” lighting design that fits every room in a museum. Different art and different galleries aim to express different ambiances.

Designers have to consider many variables to create the perfect ambience, but in a well-integrated space, the observer is unaware of these variables such as

illumination, brightness, contrast, and sometimes even the mechanics and fixtures of the light source (Flynn and Mills 1962). Instead, the user should be focused on his or her feelings toward the architectural environment and in this case the restorative qualities of the natural environment. One of the challenges of lighting design is choosing the correct equipment that will create the appropriate “relationship between light, space, and vision in order to define the design objectives and insure appropriate distribution and direction of light” (Flynn and Mills 1962, 16).

“Ultimately the visual interpretation of the space is strongly influenced by the quality and character of the lighting system (16).” Flynn and Mills (1962) define six different directional lighting techniques that change the character of the space (16-21):

**DOWNWARD CONCENTRATING:** Lighting units directed downward with narrow distribution of light. This technique tends to “de-emphasize ceilings and vertical surfaces...” The overall effect created is generally a low-lit space with high brightness accents.

**DOWNWARD DIFFUSING:** “A luminaire that provides a downward distribution of light will spread or diffuse



the beam pattern if its design includes an internal spread, reflector, or a diffusing cover panel of plastic or glass...” These pieces cause the light to be casted at wide angles creating less of a concentrated effect.

**UPWARD CONCENTRATING:** Similar to downward concentrating, a lighting unit is directed upward casting a concentrated beam of light to accent certain qualities of the space or create a pattern or area of interest. “Similar lighting units produce uniform brightness by being placed farther from the surface...” being lit. Also, when beams overlap the light can cover a wider area.

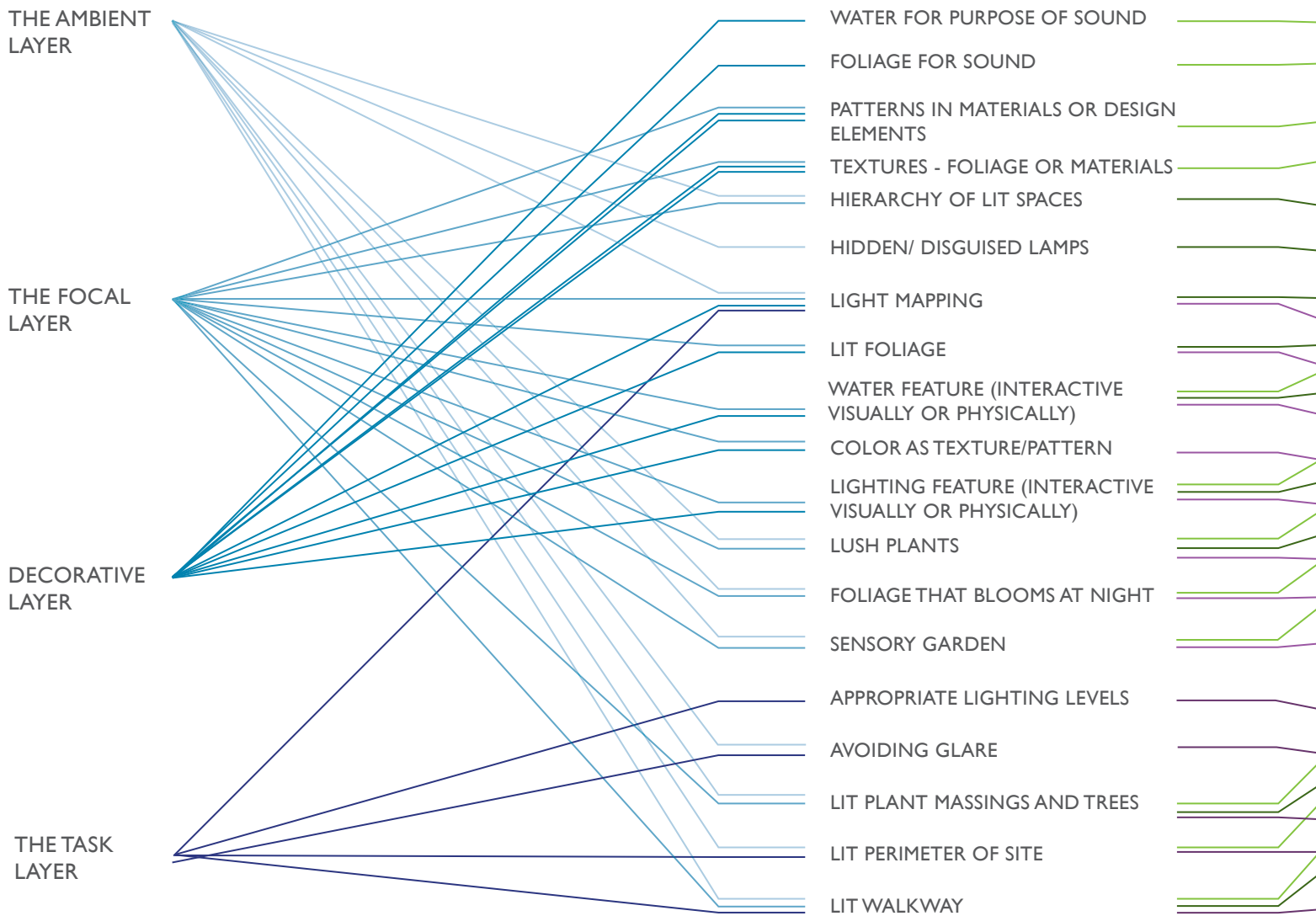
**UPWARD DIFFUSING:** This technique is used to achieve a general brightness within a space as well as to highlight structural or elevated detail. Because of the vertical distance from ceiling to floor this technique tends to create a “relatively flat, low-contrast environment” and may not be the most efficient way to light the “horizontal work plane.”

**MULTI-DIRECTIONAL CONCENTRATING:** This technique implements concentrated beams of light in multiple directions creating a non-uniform brightness. “This reduced diffusion of light results in an impression

of moderate contrast and brightness concentration.”

**MULTI-DIRECTIONAL DIFFUSING:** Similar to multi-directional concentrating except lighting “units include open-top or plastic-enclosed luminaires which emit light in several directions simultaneously—toward the ceiling, walls, and floor.” This technique produces a low shadow, low contrast environment with a general brightness.

When considering what lighting fixtures to use and what directions to cast the light, one must also consider the surface textures of the room. Objects or surfaces that reflect or transmit light are considered a secondary light source. The darker the surface the more light is absorbed and vice versa. Darker surfaces such as granite absorb light and lighter surfaces such as concrete reflect light (Flynn and Mills 1962).



**Figure 4-5:** Matrix showing the relationship between the layers of light, lighting strategies, and the Attention Restoration Theory components by author

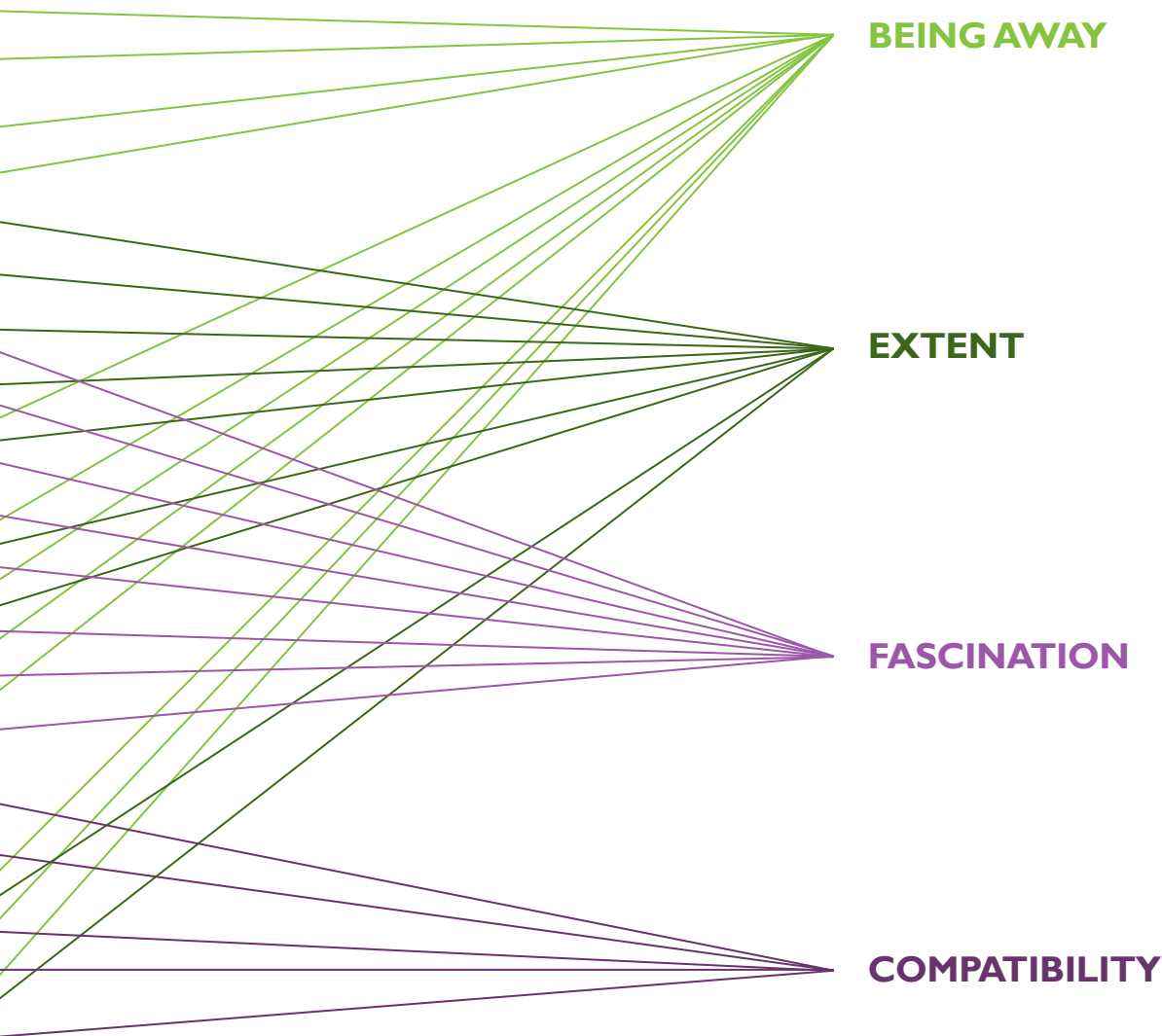
## LIGHTING LITERATURE SYNTHESIS

Figure 4-5 is of a matrix that organizes some of the lighting literature and can be read from left to right or right to left. The first column, on the left, lists the layers of light. Leaders from each of the four layers of light point to the lighting strategies that fall within their layer.

The second column lists the lighting strategies that create or accentuate the four Attention Restoration Theory components and were chosen to be implemented within the final design. Strategies that were repeatedly mentioned throughout various lighting literature sources were noted. The author then chose the final strategies based on their ability to create or accentuate the four main components of restorative spaces.

Each leader pointing back to the layers of light column shows which layer that strategy falls under. Leaders that point to the right indicate which of the four components (if not all four) that strategy accentuates.

Many sources on lighting literature recommended the same strategies for creating specific moods that compliment the four Attention Restoration Theory components. For example, multiple sources agreed that glare was uncomfortable to the eye and can cause momentary blindness.



A person's safety, security, and ableness within a space fall within the definition of the compatibility component. Therefore, a leader joins the **AVOIDING GLARE STRATEGY** to the **COMPATIBILITY** component.

The avoiding glare strategy is also connected to the **TASK LAYER**, within the layers of light column, because when designing lighting within the task layer the designer has to be aware of what levels are most compatible with the activity that will potentially be occurring within the site. Avoiding glare will make for a more successful experience for the user.

An abstract graphic in the bottom right corner of the page. It features a dark green, semi-transparent, angular shape that resembles a stylized 'L' or a corner of a cube. The shape is composed of several overlapping, slightly offset planes, creating a sense of depth and movement. The color transitions from a very dark green at the edges to a lighter, more vibrant green in the center. The overall effect is modern and architectural.

# PRECEDENT STUDIES

The precedent studies for this case were: Bloedel Reserve, chosen due to its status as a successful restorative landscape in Seattle, Washington, and Bryant Park, an urban public park in New York. Bryant Park was chosen as a precedent study because of its similarities with Occidental Square before its redesign.

In addition, several interactive lighting installations as well were also researched because of their potential to inspire soft-fascination and intrigue the human senses, which are each important qualities to a restorative landscape.



**Figure 4-6:** The Mid Pond at Bloedel Reserve photo by author

## **BLOEDEL RESERVE**

In *Contemporary Landscapes of Contemplation*, Rebecca Krinke analyzes Bloedel Reserve and compares the reserve’s designs to the principles of a contemplative landscape (Figure 4-6). She elaborates within a section of her book on the connection between contemplative and restorative spaces.

This study considers a restorative landscape as an environment that is meant to better human mental and physical health through the components of being away, fascination, extent, and compatibility. It is important to note that these attributes “are properties of a person-environment interaction, rather than of an environment per se” (Krinke 2005, 132).

According to Webster’s Dictionary, “contemplation” means, “to view or consider with continued attention” (Krinke 2005, 1). Many of the aspects of a contemplative landscape are similar to the qualities of a restorative landscape. “Both theories imply that restoration from stress or perceptual fatigue should be fostered by setting having stimuli, such as plants, that are low in intensity and incongruity...that reduces arousal and processing effort” (Krinke 2005, 133).

Krinke directs much of her analysis to the contemplative qualities of the Reflection Garden located towards the end of Bloedel Reserve’s journey. She also calls attention to many of the Reserve’s qualities that directly relate to the four components that define a restorative landscape.



**Figure 4-7:** Amongst the forest at Bloedel Reserve photo by author

Understanding Krinke’s notion of contemplative landscapes as well as addressing the Kaplans’ (1995) four attributes of a restorative experience aid in understanding how Bloedel Reserve succeeds in the contemplative category and manifests the restorative experience in physical form (Krinke 2005). Therefore, the author will combine Krinke’s analysis along with the author’s experience of the site to express Bloedel Reserve’s restorative qualities.

Bloedel Reserve is the former estate of Prentice and Virginia Bloedel who resided there from 1951 until 1986. In 1988 the reserve became open to the public. The reserve occupies about 150 acres of land on Bainbridge Island, just west of Seattle, Washington (Figure 4-7).

After taking over his father’s timber business, Prentice Bloedel became a “pioneer in renewable resources and sustainability... He took an early retirement from the MacMillan Bloedel Timber Company in 1950 to devote the last half of his life to the creation of these gardens” (“The Bloedel Reserve Map & Guide” n.d.). Bloedel was diagnosed with polio as a young man. Many think this may have inspired his fascination with the relationship between nature and human health. He had an understanding ahead of his time when it came to the therapeutic powers of gardens and landscapes (“The Bloedel Reserve Map & Guide”). Bloedel’s philosophy states,



**Figure 4-8:** Visitor Center View at Bloedel Reserve by author

“The Reserve’s primary interest is in the relationship between plants and people. There is a generally acknowledged, but little understood, ability of plants and landscape to evoke a wide variety of deeply felt emotions, ranging from tranquility to exhilaration... It is a place in which to enjoy and learn from the emotional and aesthetic experience of nature the values of harmony, respect for life and tranquility” (Krinke 2005, 110).

### BEING AWAY

The Bloedel Reserve is on an island (Figure 4-8) and until recently reservations were required to ensure there were not an abundance of people visiting at one time. “Intensifying the feeling of entering a rarified realm, parking is well hidden by a skillful manipulation

of topography and planting. There is very little pavement — most cars park on a lawn area” (Krinke 2005, 112). A contemplative experience is facilitated by a narrow mulch path. The three mile mulch path throughout the reserve is planned out strategically so that when the path is followed by people correctly, bunches of people will not form.

At the beginning of the walk the author noticed the absence of the obvious “botanical and ecological approaches” described by Marcus and Barnes (1999). No signs labeled vegetation or marked directions, immediately setting the reserve apart from a common botanical garden experience. “The commitment of time to walk the three mile loop through the forests and gardens enhances the feeling of leaving the world behind” (Krinke 2005, 113).





Figure 4-9: Map of The Bloedel Reserve Grounds reproduced from The Bloedel Reserve Map & Guide



Figure 4-10: Photo taken once out of the forest facing the sheep sheds by author

## EXTENT

Extent suggests a balance between order and mystery. The setting or activity should reveal that there is more to explore than what is easily visible to the eye. “Extent as a feeling of being connected to a larger whole can also be understood in more conceptual terms, as when an environment assists one in feeling connected to larger systems or ideas, such as nature or natural processes, or the human relationship with nature” (Krinke 2005, 134).

An example of extent at Bloedel Reserve is the entry and the end of the reserve as the path brings visitors back to their original location. According to the sequence shown on the map (Figure 4-9), one would first pass the sheep sheds and at the very end approach the meadow on

the way back to the parking lot or guest entry (heading northwest).

The path directly adjacent to the sheep sheds and the path adjacent to the meadow, though only about 400 feet apart, are concealed from each other by a shallow hill as seen in Figure 4-10. The span of turf is large enough that one does not realize just how high the hill rises until the end when, upon re-orientation, it becomes clear that the turf is acting as a screen or divider.

This accentuates the feeling of extent. One feels as though he or she has been walking for a while and has ended up on the other side of the reserve, but in reality, the combination of the strategically designed path



**Figure 4-11:** Photo taken at the beginning of journey by author

Behind the tree that stands alone are the sheep sheds and to the left of the path, right as it is lost behind the hill is where one emerges from the trees at the end of their journey. Once again another view that emphasizes extent through simple design decisions .

sequence and play with topography creates the illusion of a greater extent than really exists (Figure 4-11).

The illusion of extent that is strategically created by the layout of the paths combined with the physical grandeur of the natural surroundings encouraged the author to think about the relationship between humanity and nature. While walking through the reserve, it is hard to not think about the larger natural systems or the extent of nature. The paths that intertwine the landscape and the small spaces meant for pausing don't seem contrived. Even the benches placed throughout the grounds seem as though they've grown overtime with the trees and surrounding vegetation.

## COMPATIBILITY

For successful compatibility the user should feel safe within the setting, but not bored. The setting should fit the demands of the user. The setting of Bloedel Reserve eliminates all activities that do not focus on the reserve's core missions – which are namely contemplative walking and sitting (Krinke 2005). Most of Bloedel Reserve's visitors wish to peacefully walk alone, with a friend, or partner. Therefore, as a contemplative and restorative setting, the reserve directly satisfies the users' needs and expectations. Figure 4-12 shows a contemplative space amongst the forest. Benches found throughout Bloedel Reserve are placed strategically so whomever is seated, their view is directed towards a particular scene within the vegetation.



Figure 4-12: Contemplative space at Bloedel Reserve, by author

## FASCINATION

Bloedel Reserve offers many forms of soft fascination, including the natural forms of soft fascination found throughout the forest and The Reflection Pool discovered at the end of the journey.

Contributing Bloedel Reserve designer Richard Haag purposefully left some of the reserve's more disrupted features such as fallen and uprooted trees (See Figures 4-13 - 4-15). "These uniquely beautiful yet damaged pieces are carefully left, placed, and naturally framed" (Saunders et al. 1998, p. 9). Scenes that are not often seen naturally occurring in nature and damaged vegetation are left as art pieces that afford soft fascination.

At the end of the journey is the Reflection Pool.

"The Reflection Garden is enclosed by walls of clipped hedges (Figure 5-16), not the typical architectural wall that was designed to keep the unpredictable outside world at bay. Here the wood grove looms over the top of the hedge, inviting the undomesticated in, but at a safe distance" (Krinke 2005, 129).

Finding a place of such perfection inside a forest is a very unique experience. We commonly see manicured lawns attached to homes, recreational fields, or large maintained gardens and parks, but rarely in the center of a natural forest. "The Reflection Garden seems to be a gift to us, a place that invites us to be refreshed by beauty and perhaps stimulated to reflect on self and nature" (Krinke 2005, 30).



**Figure 4-13:** Solo Tree at Bloedel Reserve by author

While it is physically possible to walk around the Reflection Pool, many people do not. A healthy balance of restrictions heightens the feeling of separation from the outside world and encourages contemplative or reflective thought (Krinke 2005).

When sitting at the reflection pool one does exactly that — reflects (Figure 6-16). Some may be hesitant and assume that a space encouraging one to reflect would immediately cause users to reflect on their problems or to do list. However, because of the pool's unstill water and space's complexities, one's attention is kept on the present moment. The users instead focus on the subtle movements in the water, the leaves falling in to the water, and the trees swaying in the breeze whose reflections are caught in the pool. This specific space at Bloedel Reserve also triggers



**Figure 4-14:** Uprooted Tree at Bloedel Reserve by author



**Figure 4-15:** Suspended Roots at Bloedel Reserve by author

the feeling of being away. “The yew hedge holds back the forest with geometric precision, while the mirror-like pool invites quiet contemplation.” The yews create a personal space separated from the rest of the garden, helping one feel screened and away from their surroundings (Krinke 2005, 119).

“We use directed attention to manage our jobs and daily lives, and it requires a great deal of energy, not just to focus on the task at hand but to screen out all the various stimuli that compete for our attention” (Krinke 2005, 133). The simple palettes of many contemplative and restorative spaces support the certainty that many people struggle with “mental overload” by providing the opposite, an escape to a simpler environment as an escape. According to Bloedel, “The reserve breaks the



**Figure 4-16:** Hedge Barrier at Bloedel Reserve, by author

connection with the outside world and conditions the mind” (Krinke 2005, 112).

To get to Bloedel Reserve one must drive through, towering trees, on quiet winding roads to reach the remote entrance of the reserve. Occidental Square is located in a busy part of Seattle’s downtown historical district, surrounded by intricate infrastructure. At Bloedel Reserve one could spend hours without seeing another person or hearing the noise pollution that comes with a city. Like most public spaces within dense cities, very rarely is Occidental Square ever quiet or empty.

Though they are two opposite sites it was important to experience a successful restorative space first hand. The strategic design of the paths that created intrigue, extent,



**Figure 4-17:** Reflection Pond looking back, by author

and the feeling of being away were the key qualities of the reserve’s design that the author took away. Also it was inspiring to see the seamless relationship between natural spaces and designed spaces with minimal hardscape where the user feels safe, not stranded and lost. Rather, one simple mulch path keeps the user feeling safe and comfortable.

These simple design moves reassured the idea that a successful restorative space could be implemented amongst an urban setting.



**Figure 4-18:** Bryant- Park - Chairs, by Dan DeLuca - Reproduced from Flickr - Copyright free, labeled for commercial use and modification

## URBAN PLACE PRECEDENT BRYANT PARK

Bryant Park was once a public park in New York, New York, which due to its design and social context attracted illicit activity and discouraged active use by a broad community. After only a few years it was barricaded by police every evening by 9 p.m. Now Bryant Park is one of the best “new” urban parks in the world (Halbur et al. 2011).

The landscape architect who led the design of Bryant Park’s restoration, Laurie Olin, stated, “Thousands of people cooped up in rooms and corridors need a place where they can change their depth of focus and be in nature while in the heart of the city” (“Landmark Award: 2010 ASLA Professional Awards” 2010). This reiterates the ideas of Ulrich, Bloedel, and the Kaplans that nature is important to peoples’ well-being.



**Figure 4-19:** Bryant-Park, by Dan DeLuca - Reproduced from Flickr - Copyright free, labeled for commercial use and modification

Preparing for the restoration of Bryant Park the city turned to many well-known urbanists and landscape architects including William Whyte, known for his extensive research on public spaces and OLIN, the firm responsible for the redesign. (“Landmark Award: 2010 ASLA Professional Awards” 2010). After his observation of the site Whyte concluded: “Many of the problems were a direct result of the park’s historic design. He suggested simple yet effective changes to the site, such as removing iron fences and shrubbery to make the space more physically and visually accessible...access is the nub of the solution” (“Landmark Award: 2010 ASLA Professional Awards” 2010). Figures 4-18 and 4-19 show the openness and adaptability allowed to users within the park.

OLIN responded by increasing lawn space and substituting iron fences for herbaceous perennials and



**Figure 4-20:** 2013 Bryant Park Nights- Reproduced from Flickr user specialoperations - Copyright free, labeled for commercial use and modification

evergreens placed against walls to increase aesthetics and eliminate barriers. A through-block crossing was also created to welcome visitors and rid the site of its uninviting reputation (“Landmark Award: 2010 ASLA Professional Awards” 2010).

Much of the park’s success stems from exactly what PPS stated that Occidental Square is missing: compatibility with its users. Bryant Park’s current elements “support a range of activities and uses for the people who work, shop, or live nearby, as well as those who are just visiting” (Halbur et al. 2011) (Figure 5-20). It is an inviting, open space, great for a break from the constant activity of New York City.

In addition to its obvious new success, attracting visitors, “Bryant Park demonstrates the direct correlation between open space and land value. After the restoration, building leases and land values of properties near the park increased dramatically” (“Landmark Award: 2010 ASLA Professional Awards” 2010).

Occidental Square in Seattle finds itself with similar qualities to Bryant Park, prior to its renovation. The square has a great central location, but unfortunately the square’s occupants and lack of amenities are stunting its potential. A successful green space in Seattle’s historical district would not only increase activity and appeal and improve aesthetics, but would also increase its worth. Bryant Park’s history proves that with the proper renovations a neglected site can be reinvented to be the newest hot spot.



**Figure 4-21:** Floral - Reproduced from designboom - Copyright free, labeled for commercial use and modification

## **INTRIGUING ‘SOFT FASCINATION’**

Lighting within public spaces at night is crucial to a space’s appeal and the users’ perception of its safety. Making the lighting features interactive enhances soft fascination.

William James described involuntary attention stimuli as including “strange things, moving things, wild animals, bright things, pretty things, metallic things, words, blows, blood, etc.” (Kaplan and Kaplan 1989, 179).

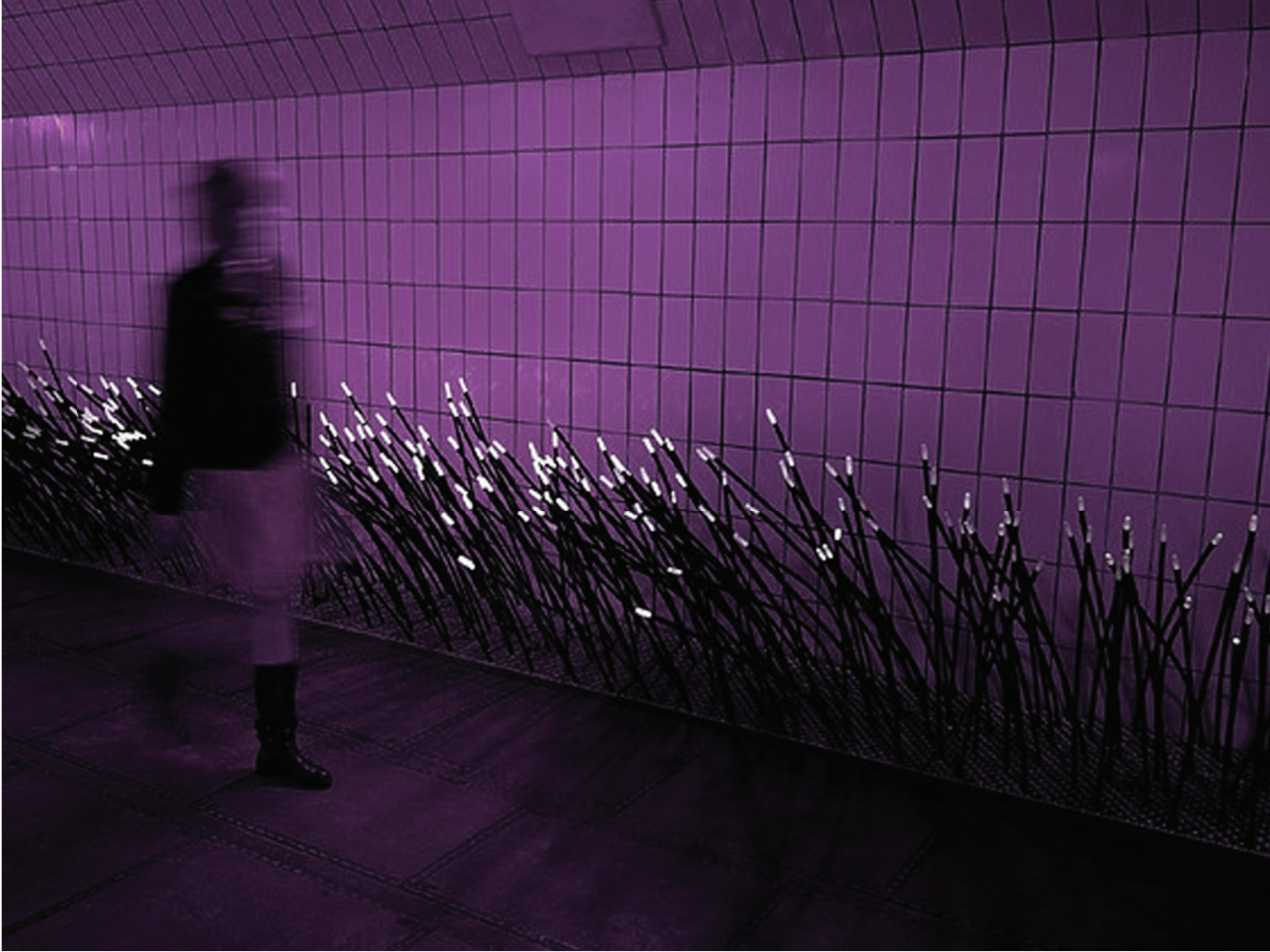
For this project the author would like to draw attention to “moving things, bright things, and pretty things” (Kaplan and Kaplan 1989, 179). Through interactive lighting features involuntary attention can be triggered. This is not to say that an entire restorative landscape should revolve around one interactive lighting feature, because it may

appeal to only some. The interactive lighting feature can also be used as a way to light the site and fulfill lighting’s three main objectives: safety, security, and aesthetics.

Interactive lighting installations have successfully promoted users’ interaction with the object and space:

Lighting designers such as Dan Roosegaarde and Super Nature Design are already experimenting with interactive lighting. In some of his work, Roosegaarde uses the physical touch/heat of bodies to activate his lighting installations (“TEDxEutropolis - Daan Roosegaarde - Interactive Landscapes” n.d.).





**Figure 4-22:** Dune 4.1Maastunnel - Reproduced from Flickr user Studio Roosegaarde - Copyright free, labeled for commercial use and modification

Super nature design has an interactive light piece called “floral” as seen in Figure 4-21 “Floral’ provides a vivid sense of calmness and harmony as an integrated experience. It captures new memories in layers that reflect a time frame as an evocative gesture for our cognitive senses. The intervention allows us to look into new perspectives and understand the wisdom of nature” (Caula August 30, 2012).

“Dune,” as shown above in Figure 4-22, is an interactive lighting installation that reacts to human sound, touch, and motion. “This hybrid of nature and technology is composed of large amounts of fibers that brighten according to the sounds and motion of passing visitors” (STUDIO ROOSEGAARDE 2012).

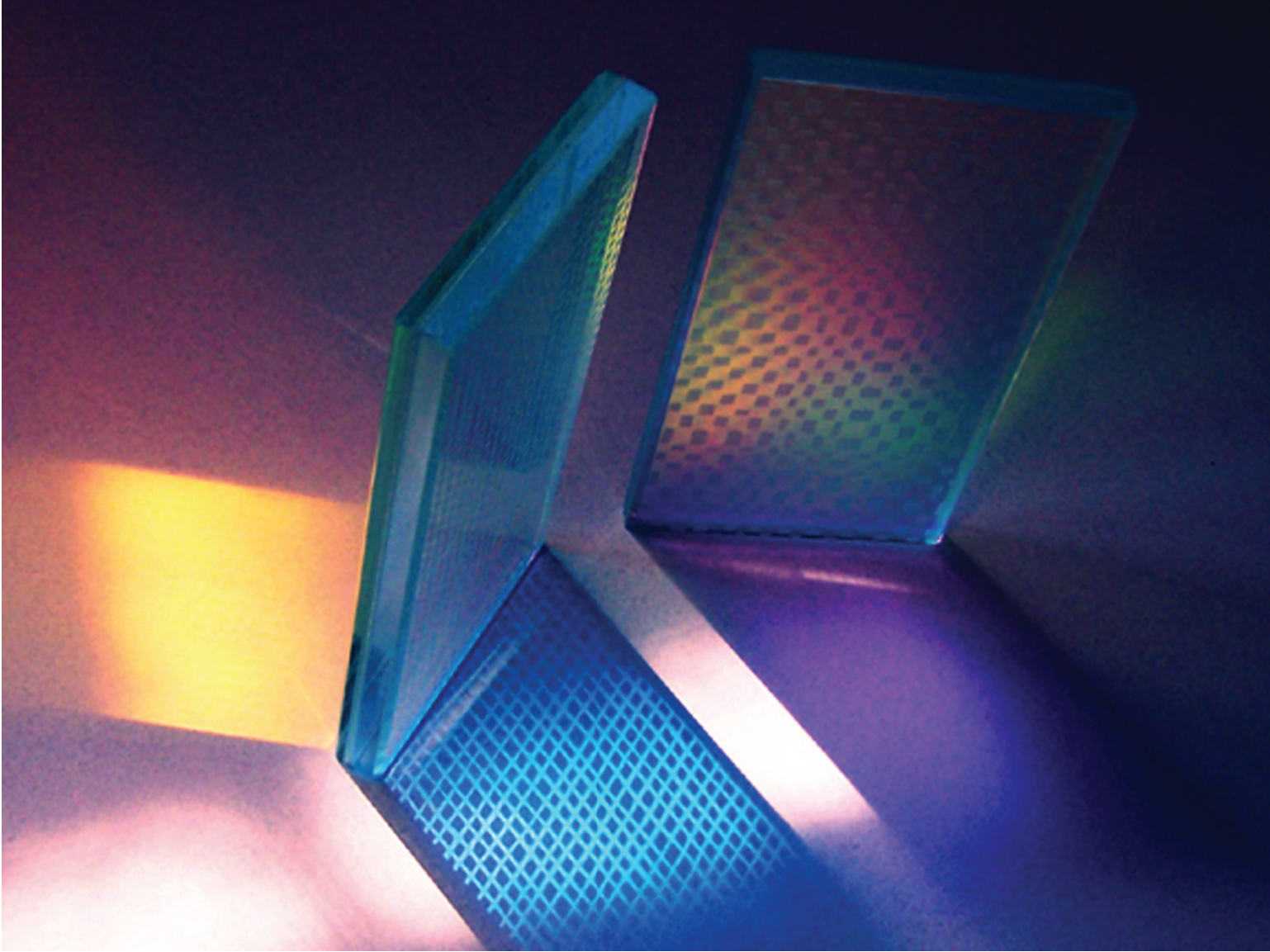
Another example of an interactive lighting installation is Susanne Seitinger’s, who for her dissertation work placed small round devices that lit up throughout the city of Zaragoza, Spain. These devices could be moved, placed, arranged, or organized to different members of the community. Seitinger saw a positive response to these randomly placed, tangible lights.

Seitinger’s pixel experiment poses the question, “Does designed and interactive lighting always need a purpose or will people enjoy it just as much if not more if it just ‘is?’” Stated by Lucy Suchman (2007), there are a host of projects that do not all serve a particular function, but rather serve to the enacted experiences among people, objects, and spaces:

“The effects are created through the particular possibilities provided by an artful integration of persons, objects, spaces, fantasies, remembered experiences, and technologies to evoke and explore human encounter but not to replicate it” (280-281).

Each of these interactive lighting features were chosen as precedents because they address nature, the subconscious, and soft fascination in some way. For example, “Dune” or an installation similar to “Dune” could be implemented into a site taking on a shrub-like form. Whether surrounding benches or lining pathways on site, the installation, when within close proximity to human activity, would be activated and intrigue the nearest user.

Seitinger’s pixels would encourage physical interactivity with predominantly younger age groups, while observers could enjoy a purely visual form of interactivity from a distance. Whether visual or physical interactivity is occurring, one is still distracted from everyday tasks, and soft fascination sets in to restore users’ mental fatigue.



**Figure 4-23:** Optichroic® Dichroic Glass Reproduced from Bendheim - Copyright free, labeled for commercial use and modification

Another way to inspire soft fascination would be to utilize dichroic glass. “The word dichroic is derived from two Greek roots, ‘di’ for two and ‘chroma’ for color... literally meaning ‘two-colored’” (“Trezora Glass” 2014). What is unique about dichroic glass is that the color of its surface changes depending on the angle at which the glass is being viewed (Figure 4-23) Also, the reflected color is different depending on the side at which the glass is viewed at (“What Is Dichroic Glass?” 2014).

Reflective color works under artificial and natural light, making it an ideal candidate for a space aiming to welcome users at all hours of the day and night. If carefully thought out, the reflections from the dichroic glass can be manipulated to reflect a particular pattern

that complements the design scheme. For example, if one has a series of modules or rectangles in their design, beams can be placed within the glass to reflect a similar rectilinear pattern.

The image features a dark, almost black background. A prominent, glowing diagonal line runs from the upper left towards the lower right, transitioning from a deep purple to a bright blue. Scattered across the scene are various semi-transparent, geometric shapes, including triangles and squares, in shades of purple and blue, creating a layered, abstract effect. The word "DEVELOP" is centered in the upper half of the image, rendered in a clean, white, sans-serif font.

DEVELOP

## RESTORATIVE SPACES NEEDED IN URBAN SETTINGS

The father of landscape architecture, “Frederick Law Olmsted, not only understood the possibility that the capacity to focus might be fatigued, he also recognized the need for urban dwellers to recover this capacity in the context of nature” (Kaplan 1995, 170). Urban areas are populated with business men and women who are stressed and face mental fatigue daily. The average work day ends at 6:00 p.m. Figures 5-1 - 5-3 are shade studies of the chosen site at 6:00 p.m. For Seattle, much of the year people are not getting off of work until the sun has set. Where can those who are stressed and facing mental fatigue retreat in a safe and natural environment?

Studies have shown that the physiological response to stress is higher in a simulated urban environment than in those that were predominantly natural (Clayton & Myers, 2011). “Despite the predominance of research in natural settings, however, there is evidence that some urban or built environments provide the attributes necessary for a restorative experience, and thus have the ability to ‘create a sense of peace and calm that enables people to recover their cognitive and emotional effectiveness” (Kaplan et al. 1993, 726).

Therefore, the author sought a site:

- Within an urban community
- Surrounded by high foot traffic
- Located in an area where walking and public transport are common so that people passing the space find it convenient to stop and occupy

The site chosen, Occidental Square, in Seattle, Washington, was brought to the author’s attention by Professor Siepl-Coates, whose studio was working on a design project directly

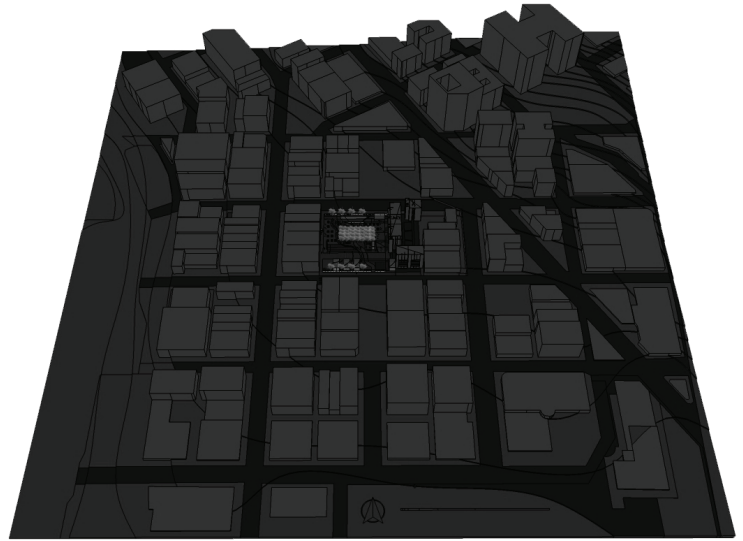


Figure 5-1: January 6:00 p.m.

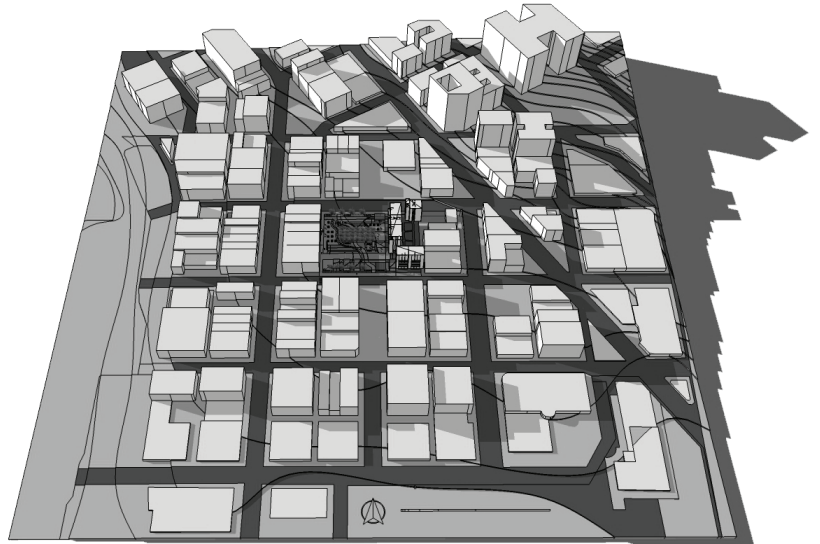


Figure 5-2: Mid June 6:00 p.m.

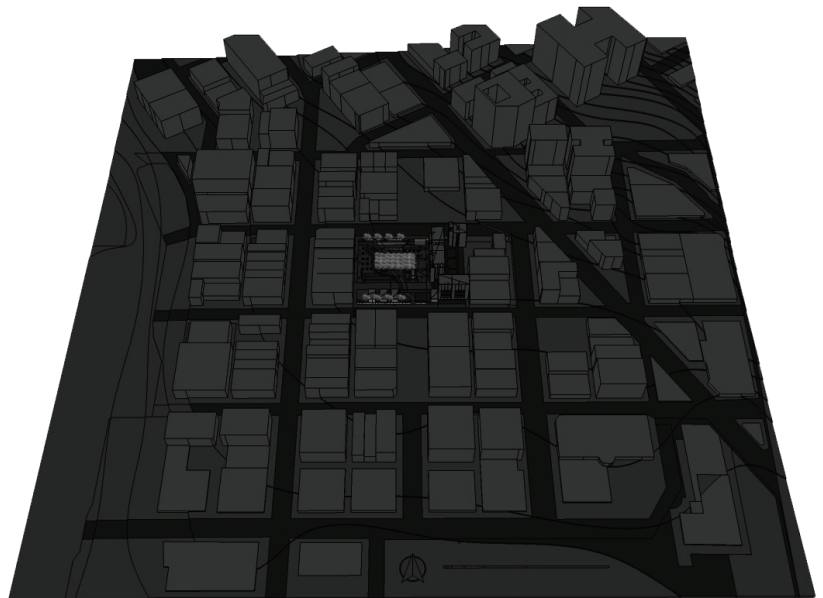


Figure 5-3: October 6:00 p.m.

adjacent to Occidental Square. This area is about five blocks North of Century Link Stadium in downtown Seattle, and about five blocks East is a high traffic ferry port and ocean views (Figures 5-4 and 5-5). The site met many of the author's desired site qualities, and consequently was chosen for this project. The proposed installation of a nearby inter-generational housing unit will provide a constant audience for the redesigned park. Thus several assumptions are made for the purposes of this study:

It is assumed that...

- The proposed inter-generational housing unit will exist in what is currently a parking lot, shown in Figure 6-6
- The existing Occidental Square, also shown in Figure 5-6, will not include any of its current amenities.
- Occidental Square will be directly available to the inter-generational housing unit and general public as a restorative landscape.

The author's main reason for choosing this site was the context and opportunity to collaborate with Siepl-Coates' architecture studio. It was not for the qualities of the existing site. With that in mind, Occidental Square was assumed available for the total redevelopment process.

First and foremost it was important to design a restorative landscape with the applied synthesized lighting principles. The observations made during the site visit and issues that arose when discussing the site with Professor Siepl-Coates' studio created variables for the author to consider while designing. For example, additional amenities and design moves that needed to be addressed that are not necessarily commonly found in restorative landscapes, but are important to urban public spaces or

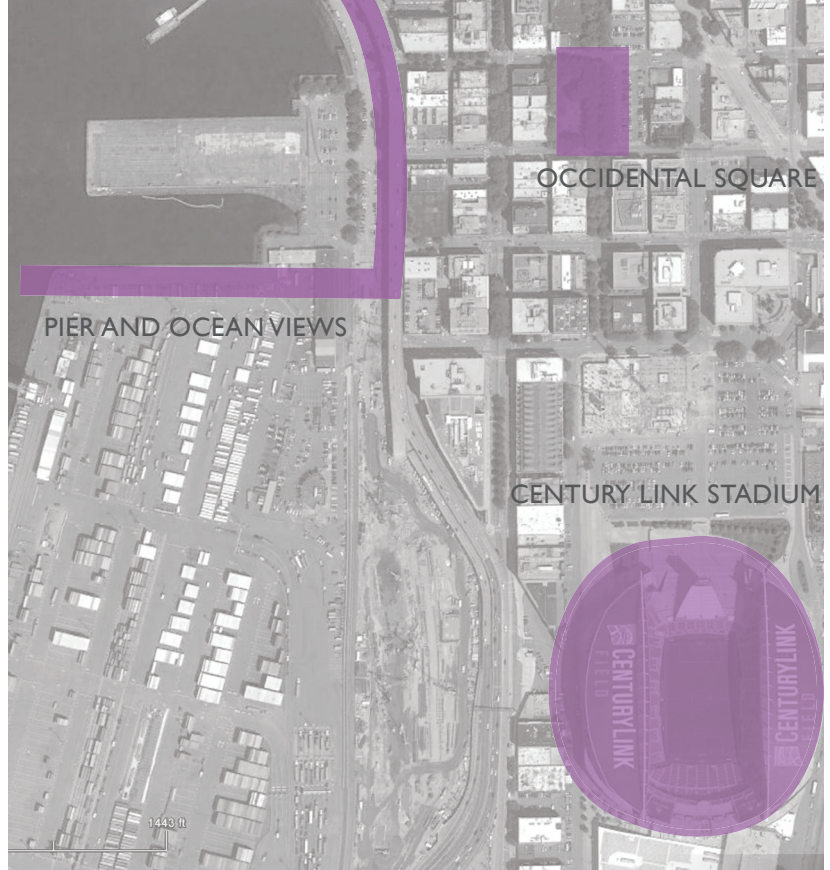


Figure 5-4: Site location with context



Figure 5-5: Site location in relation to Siepl-Coates' studio site

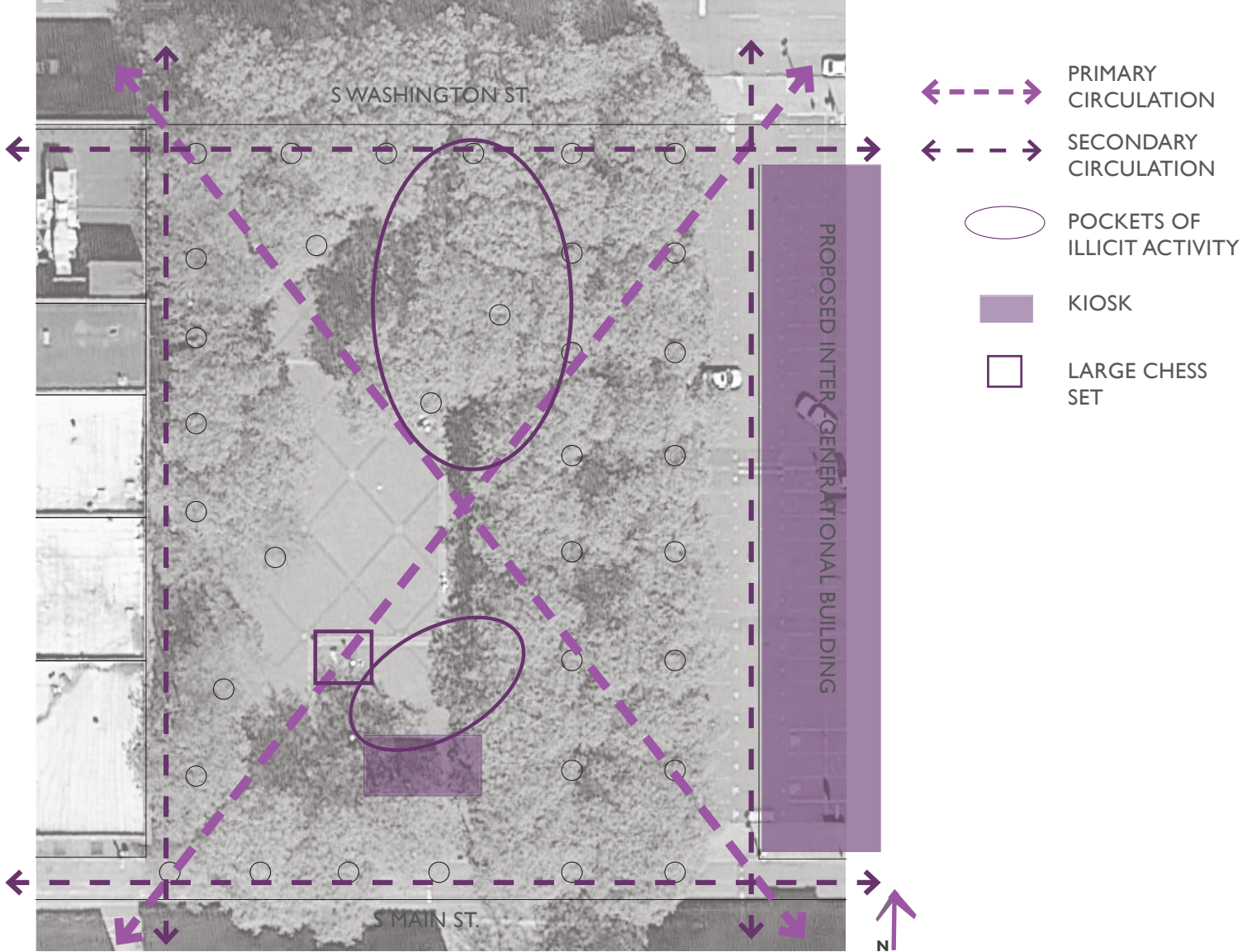


Figure 5-6: Site Analysis Diagram

specifically important to Occidental Square and the residents of the future inter-generational housing unit. The analysis of Occidental Square, conducted by PPS, and their suggestions to engage surrounding infrastructure, create a hierarchy of spaces within the park, and increase vegetation were also considered (“Project For Public Spaces: Hall Of Shame” n.d).

A site visit to Occidental Square took place November 25-29, 2013. Before arriving on site, a list of necessary analysis questions and measurements was made. The author intended to record current light measurements after dark and observe peoples’ activity within Occidental Square during the day and night.

Due to current site conditions, fostering illicit activity, and little to no activity by surrounding businesses, the site was unsafe for a thorough analysis of its qualities after dark. Even during the day it was uncomfortable to be in the space taking pictures and truly taking the time to observe the site. It became immediately clear that those who regularly occupied Occidental Square were not used to others spending time in their space and were hesitant to share.

Consequently, lighting measurements could not be recorded and a thorough analysis of the current conditions after dark was not made. While on site the author was able to observe general pedestrian patterns and how the people interacted with the site.

The image features a dark, almost black background. In the lower half, there are several overlapping, semi-transparent green geometric shapes, primarily triangles and polygons, creating a layered, crystalline effect. A bright, glowing light source is positioned in the lower-left quadrant, casting a strong, diagonal beam of light across the scene. This beam illuminates the green shapes and creates a gradient from dark green to a bright, almost white light. The overall composition is abstract and modern, with a focus on light and geometric forms.

HEALING SPACES  
APPLICATION



**BEING AWAY**

**EXTENT**

**FASCINATION**

**COMPATIBILITY**

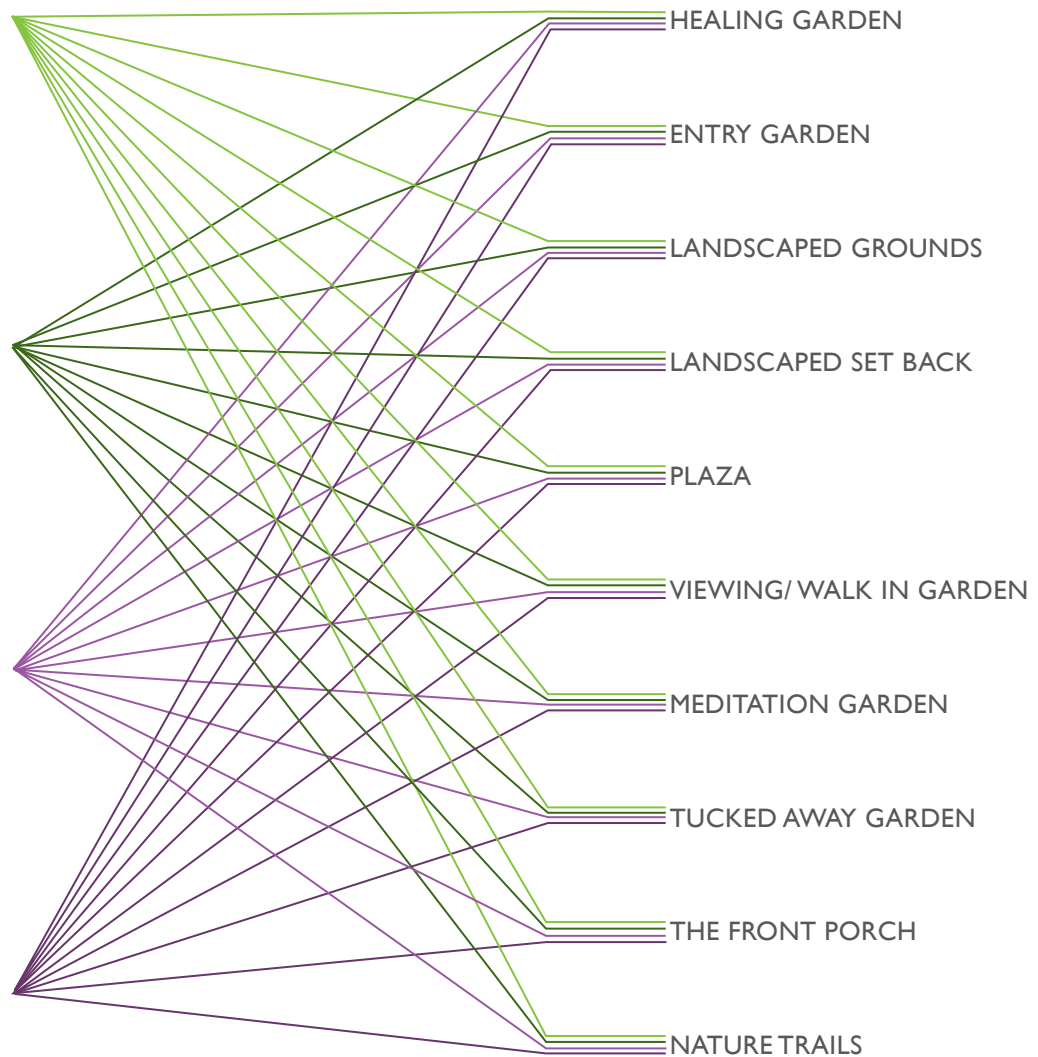


Figure 5-7: Matrix showing healing spaces relationship to the Attention Restoration Theory components

The following section describes the author's design process and rationale. How the healing spaces were placed and manipulated will also be discussed.

For an urban restorative landscape to be successful at night, it must first be successful and attractive to people during the day. Before designing, the author reviewed PPS's suggestions (as stated in Chapter 3) on how to improve the perception and activity of Occidental Square. The author then referred back to the healing spaces, shown in Figure 5-7, that were most suitable for a public, urban setting, such as Occidental Square.

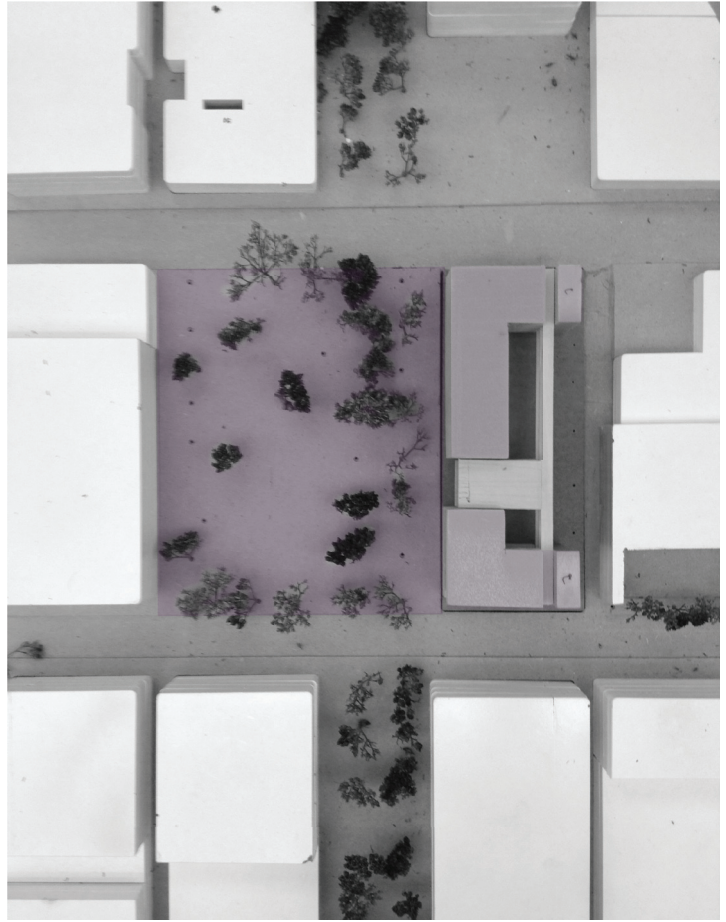


**Figure 5-8:** Study model of inter-generational housing unit by Ian Kilpatrick

## DESIGN DEVELOPMENT

Figures 5-8 and 5-9 show a model of the inter-generational housing unit (assumed in place for this project) within a larger site context model. This building was designed by Ian Kilpatrick, a fifth-year architecture student in Professor Siepl-Coates' studio at Kansas State University. The design concept for his building was adaptability. The overall form was modular, consisting of one main axis that opened up directly to Occidental Square. The building holds three commercial shops on the first floor and one office space. The upper levels are all residential units. The residential units facing west each have their own balconies overlooking Occidental Square.

Because the site for the new restorative landscape is centrally located within the city the author had to



**Figure 5-9:** Plan view of Ian Kilpatrick's inter-generational housing unit study model

consider the variety of people and activities that could potentially occur on the site. Some will utilize the space for its main purpose as a restorative landscape. The current Occidental Square experiences heavy amounts of pedestrian circulation. Therefore, the author had to consider how to reroute the pedestrians who use the space for circulation purposes so as not to disrupt those using the space for its restorative qualities. Also, both adjacent buildings have commercial shops open to the public that will attract customers.

The site design process began on trace with a series of line drawings and bubble diagrams (Figures 5-10 and 5-11). The main axis was extended from the inter-generational housing unit to create an underlying grid and some circulation paths. An underlying grid for the

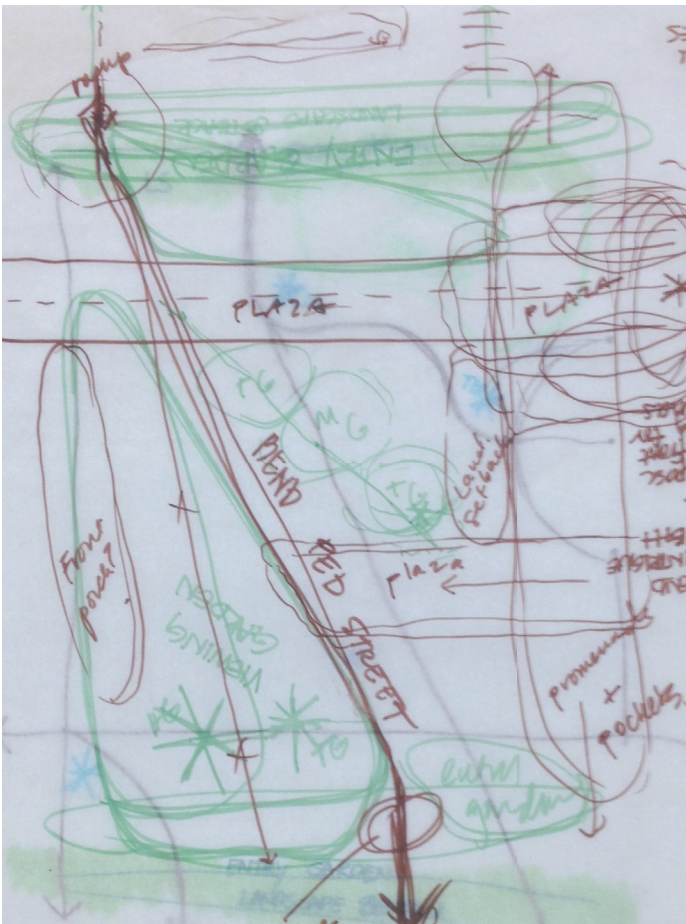


Figure 5-10: Beginning of design process by author



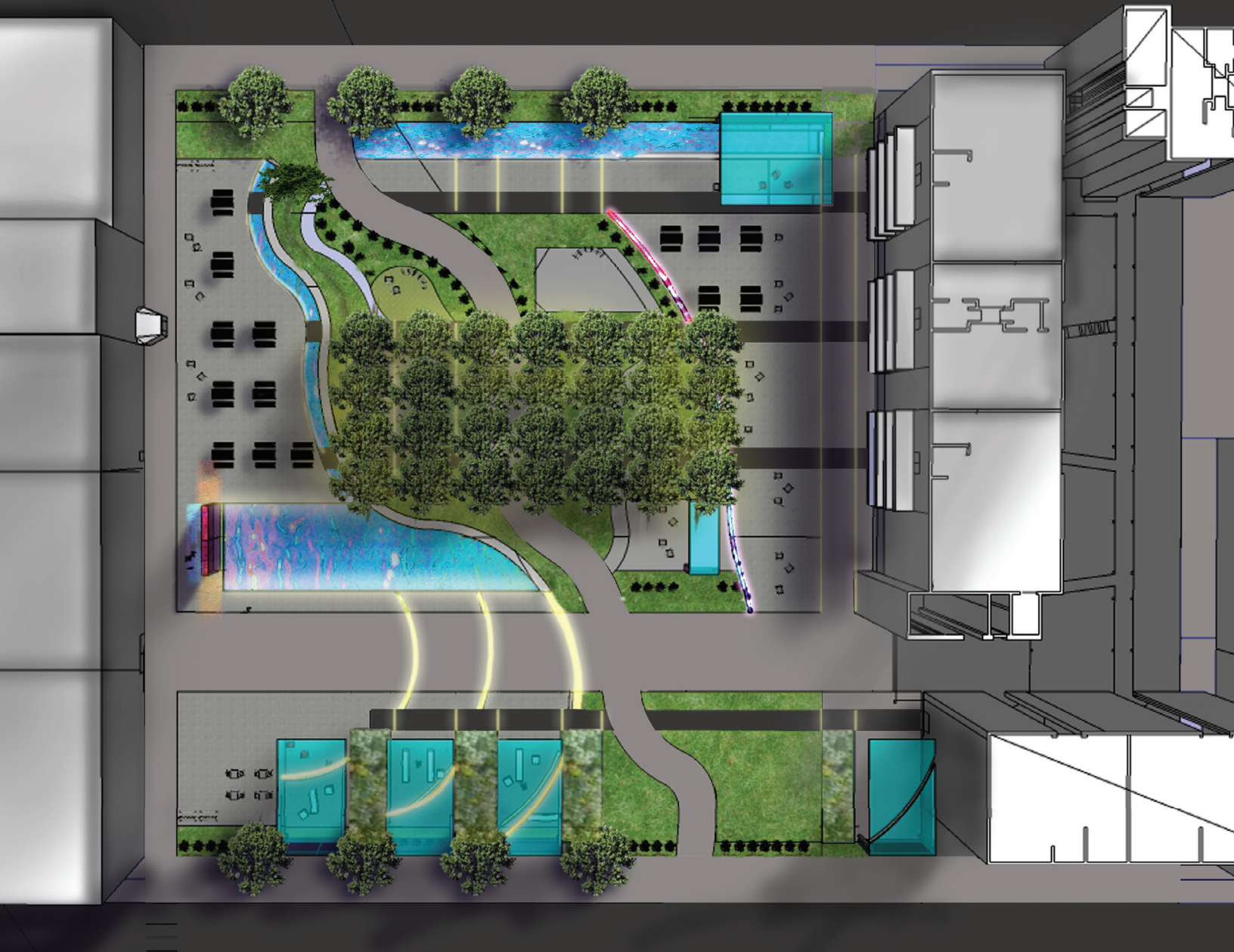
Figure 5-11: Clay study model by author

design, was first made with the architect’s concept of adaptability and rectilinear forms in mind. The “traditional [healing garden] approach, applying regional attributes” as discussed in chapter 4 was taken: The curves in the design reflect the direction the topography, the Pacific Ocean is only a few blocks west of the site, the largest water feature on the site is located closer to the west with the topography going down towards it.

The author then began diagramming the healing spaces onto the site, layering the healing spaces and creating a cohesive unified site rather than a site broken into a bunch of smaller healing spaces.

“A landscape is more than the enumeration of the things in the scene. A landscape also entails an organization of these components” (Kaplan and Kaplan 1989, 10). While layering the healing spaces defined by Marcus and Barnes (1999), the author went through a series of design iterations before selecting a final design. Throughout the design process the author frequently collaborated with her committee members to be sure the spaces were being applied in the most effective and cohesive way.

There is no right or wrong way to implement the healing spaces, but if done arbitrarily the designer risks creating conflicting spaces, a disconnected site, or an incompatible environment for the users, which would ultimately result in a non-restorative space.



**Figure 5-12:** The layering of healing spaces defined by Marcus and Barnes 1999; (above) Proposed plan, (right) diagram of healing spaces. Please refer to pages 81-82 for fully annotated site plan.

ENTRY GARDEN

LANDSCAPE SETBACK

TUCKED AWAY GARDENS

NATURE TRAILS AND NATURE PRESERVES

HEALING GARDEN

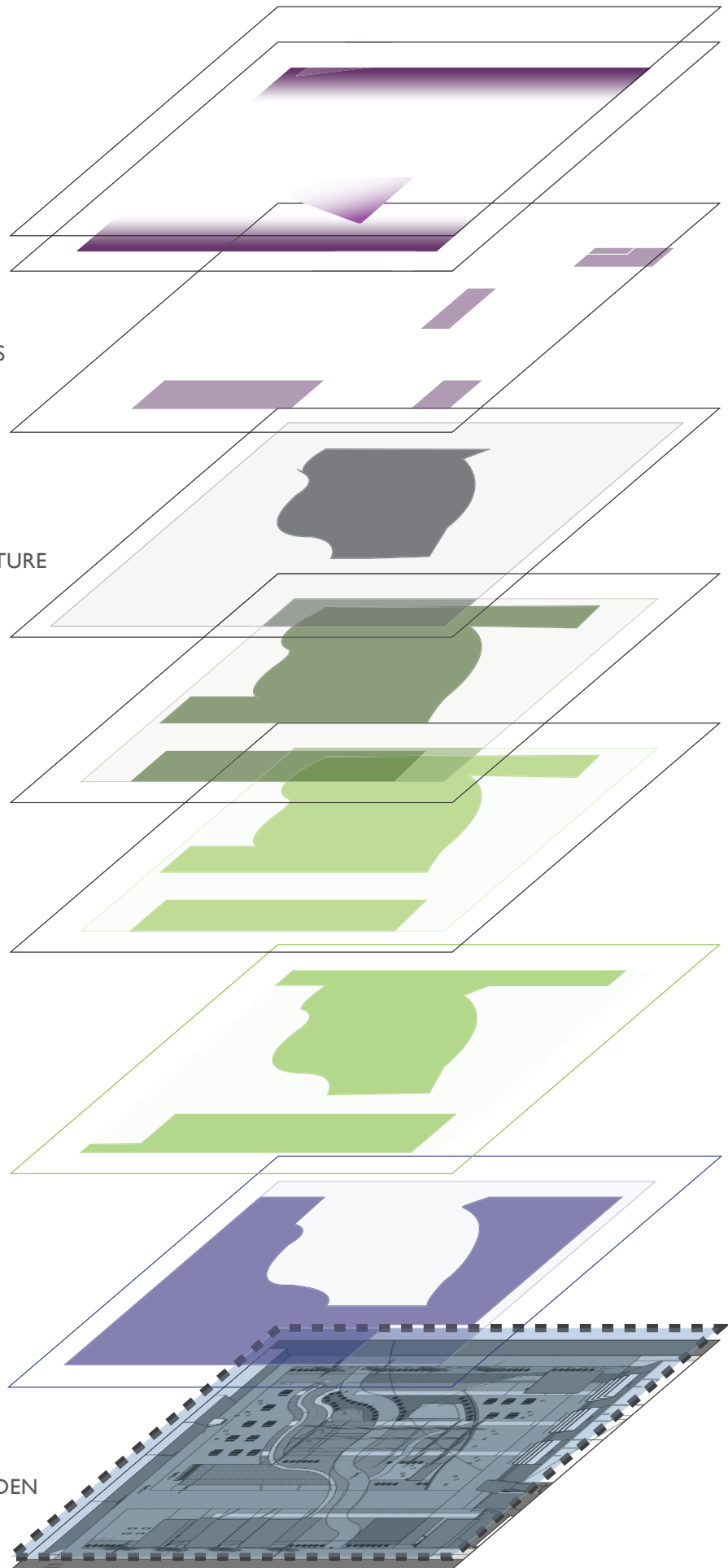
MEDITATION GARDEN

LANDSCAPED GROUNDS

PLAZA

VIEWING/WALK-IN GARDEN

FRONT PORCH

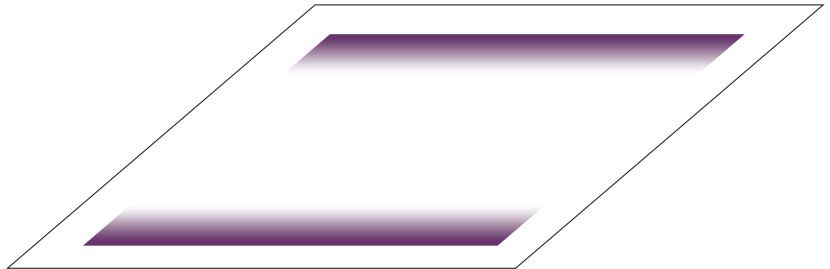


The healing spaces defined by Marcus and Barnes (1999) were envisioned as spaces that would exist around hospitals and other healing facilities. For the purposes of this project, the author chose the spaces that were applicable to an urban, public, restorative landscape. Therefore, the author redefined some of the spaces to make clear what the intention behind their placement was.

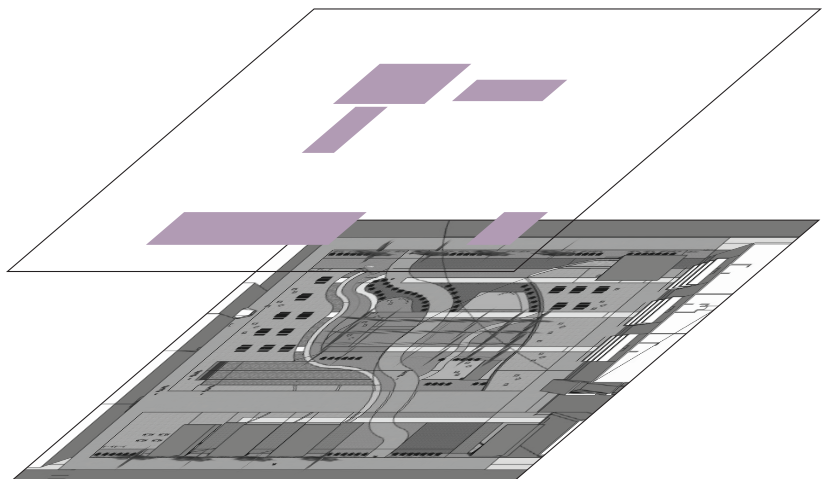
**ENTRY GARDEN:** A landscaped area close to an entry and designed for use (Marcus and Barnes 1999). The author implemented the entry garden as Marcus and Barnes described, but considered the entry garden and landscape setback to be integrated. Due to Occidental Square's central location, there are multiple entries. While on site Main Street, at the southern edge of Occidental Square, saw more pedestrian and vehicular activity; therefore, the southern entrance was determined to be the main entry.



**LANDSCAPED SETBACK:** Most often a narrow buffer between the street and an entry comprised of lawn, shrubs, and trees. This space is usually solely aesthetic and is not meant to be occupied by people (Marcus and Barnes 1999). Because there is a pedestrian sidewalk on site the author did not feel the need for a traditional landscape setback. Instead it is more spacious, still with some linear plantings to act as a soft sound and physical barrier, but it also includes the entry garden. Therefore, the author expects for people to occupy this space.



**TUCKED AWAY GARDEN:** An outdoor garden not connected to a building but within a reasonable distance is the definition provided by Marcus and Barnes (1999). The tucked away gardens for this project are all of the spaces that can be found under an overhead, dichroic glass structure, surrounded by an assortment of flowers that bloom at night, tall grasses, or shorter shrubs. They are more private than the open plaza, but more public than the quieter meditation spaces.

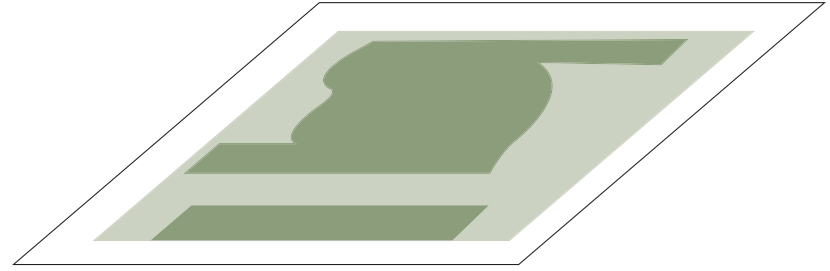


## NATURE TRAILS AND NATURE PRESERVES:

An easily accessible path that guides the user through nature (Marcus and Barnes 1999). The center of the site has a small organized central grove for easy accessibility and can be seen as a small forest within the city.



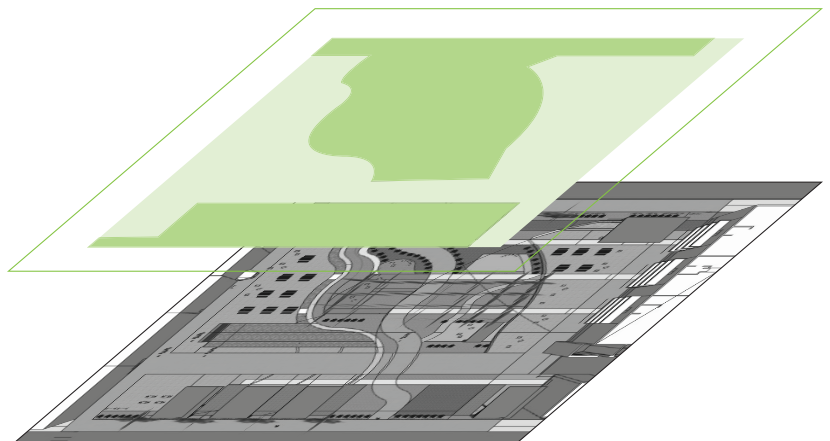
**HEALING GARDEN:** Healing gardens are specifically designed for healing purposes (Marcus and Barnes 1999). For this project the healing garden and meditation garden were considered one in the same. Because this site was not built for a hospital or facility that specializes in a particular illness, the author tried to be considerate of all ages, levels of health, and ableness.



For example, as mentioned by Marcus and Barnes (1999), designing paths with no dead-ends accommodates the need to pace that Alzheimer's patients have and avoids causing any agitation. Paths should be continuous with the exception of paths that lead to more private, solitary spaces where even then there is enough room to circulate and not feel stopped.

The texture and material of paths were also decided with wheelchair and walker ease in mind. The main circulation paths are a textured concrete, to increase friction in wet weather. The active plaza spaces and some tertiary paths that wind through the grove are a gray brick or granite, and there is also the option of a few mulch paths and meditation spaces.

**MEDITATION GARDEN:** A meditation garden is a smaller, quiet, enclosed space for meditation purposes only (Marcus and Barnes 1999). Throughout the site there are a variety of meditation spaces that have different amounts of enclosure depending on the user's preference. Overall, the whole central, vegetated portion of the site can be used as a meditation garden.

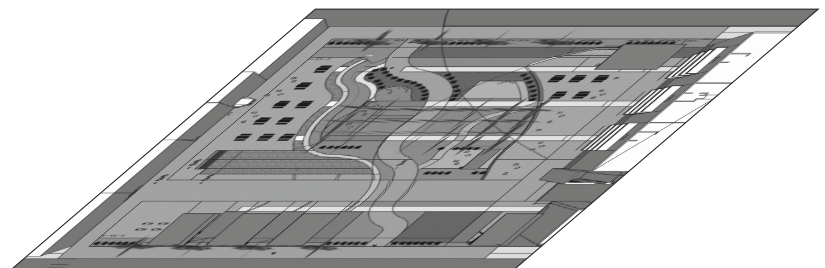
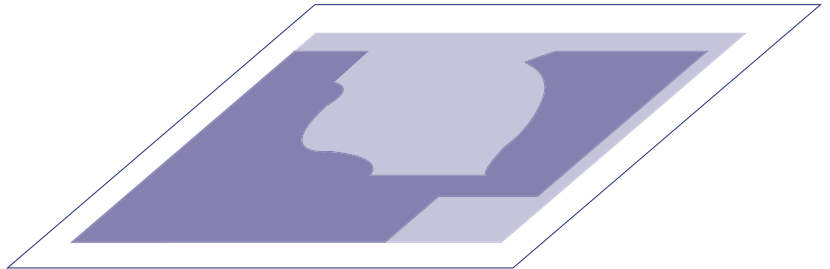


The vegetation within the site gets gradually denser towards the center of the site where the meditation and healing gardens are. This creates a gradual transition between the public and private spaces for pedestrians throughout circulating the site. Some users may find themselves wanting to be more secluded than others.

**LANDSCAPED GROUNDS:** The most spacious outdoor area. This space is an extensive open space, often between buildings, and can be used as a transition space occupied during a lunch break or for reading a book (Marcus and Barnes 1999). The landscaped grounds within Occidental Square is anywhere there is vegetation, and as mentioned previously, gradually gets denser towards the center of the site.

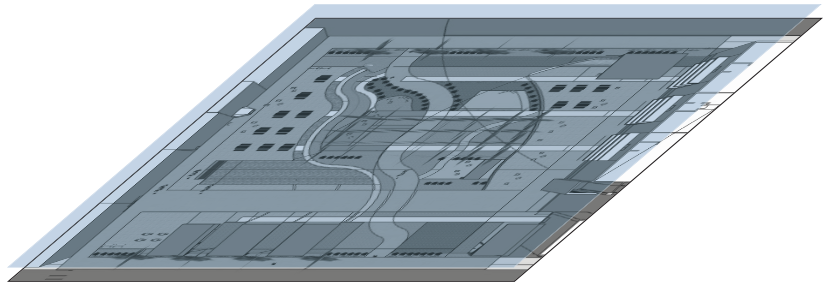
**PLAZA:** An outdoor space, predominantly hardscape, furnished for use, but with little green space (Marcus and Barnes 1999). The author designed with this definition of a plaza in mind.

All of the hardscaped areas include a variety of moveable chairs. The movable chairs make it easier for the user to be comfortable and invokes the compatibility component. They can be adapted to fit any size group, which complements the architect's design concept of adaptability within his building. The hardscape closest to the restaurants and mall is furnished with high top tables and chairs. The larger hardscape spaces can be found closer to the perimeter of the site where more public/higher activity spaces are anticipated to occur.

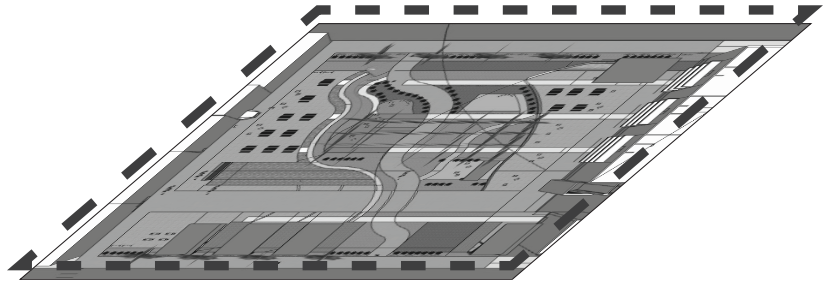




**VIEWING/WALK-IN-GARDEN:** Viewing garden and walk-in-garden have very similar definitions. Marcus and Barnes (1999) state that the garden can be viewed from inside the building but can be occupied by only a few people at a time. The author implemented the viewing/walk-in garden with the same intentions as the front porch. Residents of the inter-generational housing unit and occupants of other surrounding buildings may see the site as solely a viewing garden. Other pedestrians not as familiar with the area may utilize the space purely for circulation convenience. Either way, the whole site is filled with a variety of fauna for viewing pleasure.



**THE FRONT PORCH:** The whole site in this case is considered a front porch. The many multi-story buildings surrounding the site allow users to experience the view from above and not just at eye level. Rather than creating a circle drive for people waiting to be picked up, the author considered the residents that live above the first floor who are waiting for a visitor on their personal front porch.



The courtyard, atrium garden, roof garden, roof terrace, and borrowed landscape were five spaces not implemented in Occidental Square.

A **COURTYARD** is one of the first spaces seen and is enclosed on all sides. Occidental square is closed off only on the East and West sides. The dichroic glass structures, tall grasses, and shrubs create soft barriers on the North and South sides of the site to give some privacy, but they do not completely block a person's line of sight into or out of the space.

The **ATRIUM GARDEN** is a healing space located indoors which does not benefit the purpose of this project. This restorative landscape is public to benefit everyone.

## A ROOF GARDEN and ROOFTERRACE

would be more appropriate for the private use of the occupants. Typically, roofs are not open throughout the night for public use.

Lastly is the BORROWED LANDSCAPE, which can be found on adjacent properties and can be enjoyed by the users occupying the surroundings. In this case, as somewhat implied by the entire site being considered a front porch or viewing/walk-in garden this restorative landscape could also be a landscape that is borrowed.

The image features a dark, abstract background with a prominent, glowing green beam of light that curves across the lower half. The beam is composed of several overlapping, semi-transparent green shapes, creating a sense of depth and movement. The overall aesthetic is modern and technical.

# LIGHTING APPLICATION

Though the site design has to be mostly complete before one can make final decisions on lighting specifics, creating a site design and lighting design is an interactive process.

In IAPD 625, an introductory course to the basics of architecture and interior lighting. Professor Neal Hubbell discussed the four steps of the lighting design process. Just as the definitions of the healing space types had to be manipulated to apply to an outdoor space, so do some of the lighting design steps and concepts.

#### I. Choose the desired ambience for each space.

Because this is a restorative landscape where people retreat to when needing to restore mental or physical fatigue, a relaxing ambience was chosen for the spaces.

#### II. Decide how the lighting should enhance the 3D character of the architectural forms.

The main pathway will have a general illumination for compatibility reasons and to begin that hierarchy of light that is determined by light mapping.

#### III. Decide how the lighting should be best integrated in with the architecture

Several sources in the literature review suggested that often the landscape lighting has a greater effect when the sources of the light are hidden. Disguising or hiding the light sources can help accentuate the extent component. Depending on what is being lit and the technique being used, the absence of a lighting fixture will encourage the user's imagination to wander and enjoy the natural features rather than the technical features.

#### IV. Decide and document the visual functions and tasks that will occur within each space.

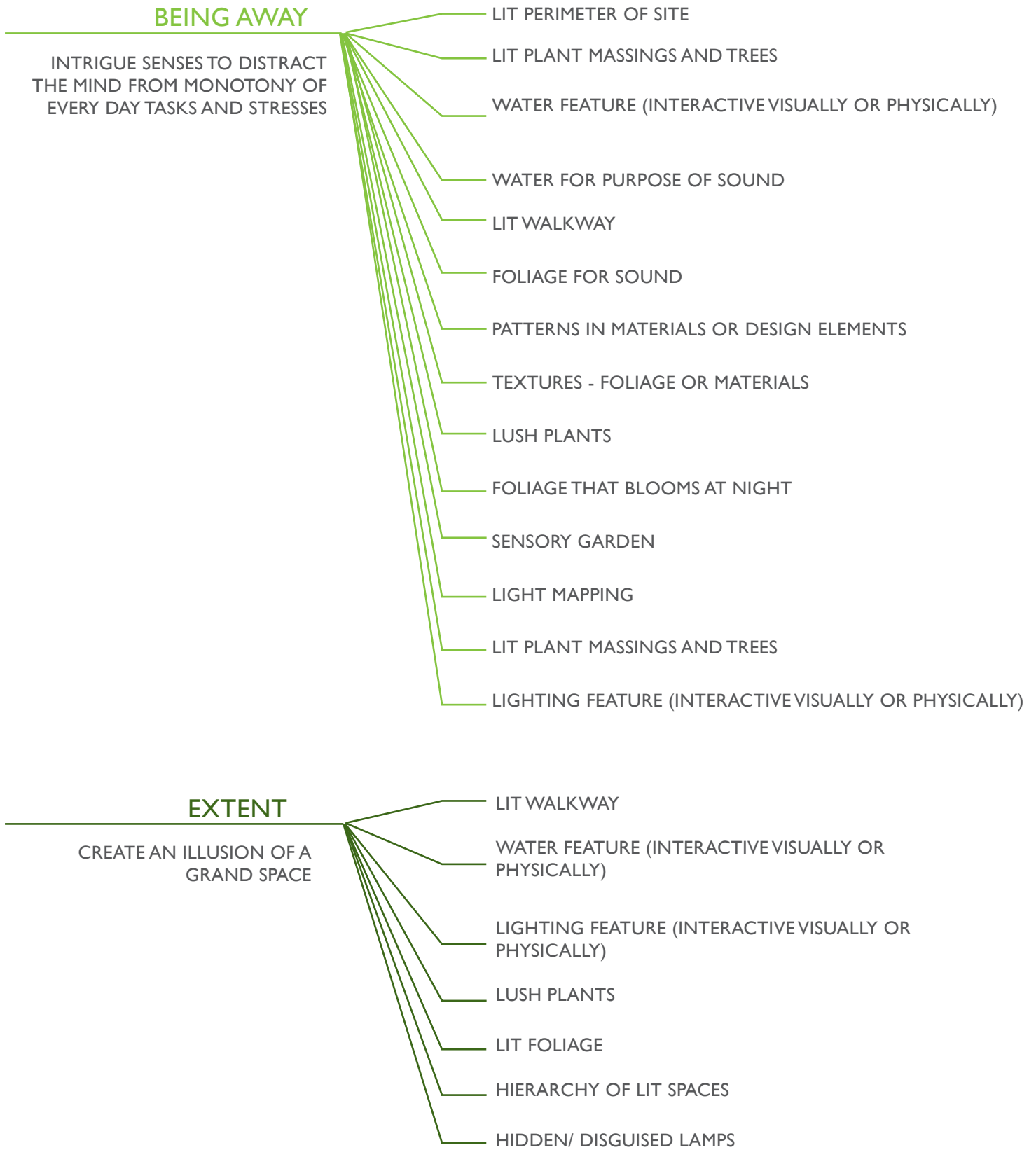
Much of this project is simply creating a soothing space for people to rest, though the site is located in the center of two buildings with

shops and restaurants on their first floors. The appropriate lighting for heavy pedestrian traffic combined with groups of people socializing in the plaza will have to be chosen.

Before completing the four steps of the lighting design process the author found it beneficial to begin light mapping.

As mentioned in Chapter four, Ittelson, an environmental psychologist, discussed the idea of “symbolic value” and the part of a person’s subconscious that picks up on cues given by the environment (Marcus and Barnes 1999). The author returned to the design to identify the spaces meant to suggest these cues. Light can be used to enhance the cues; for example, a break in vegetation can imply an entrance. Light mapping helps to organize the spaces and indirectly choreograph the users’ experience.

To accomplish the goals implied by the four components of Attention Restoration Theory, the author synthesized a chart relating each goal to a lighting strategy as shown in Figure 5-13.



**Figure 5-13:** Diagram of lighting strategies paired with an Attention Restoration Theory component

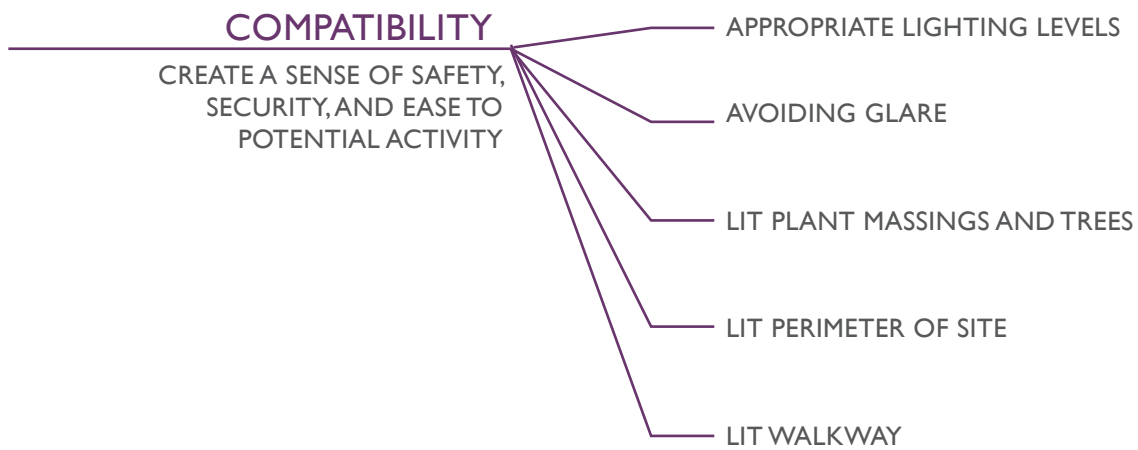
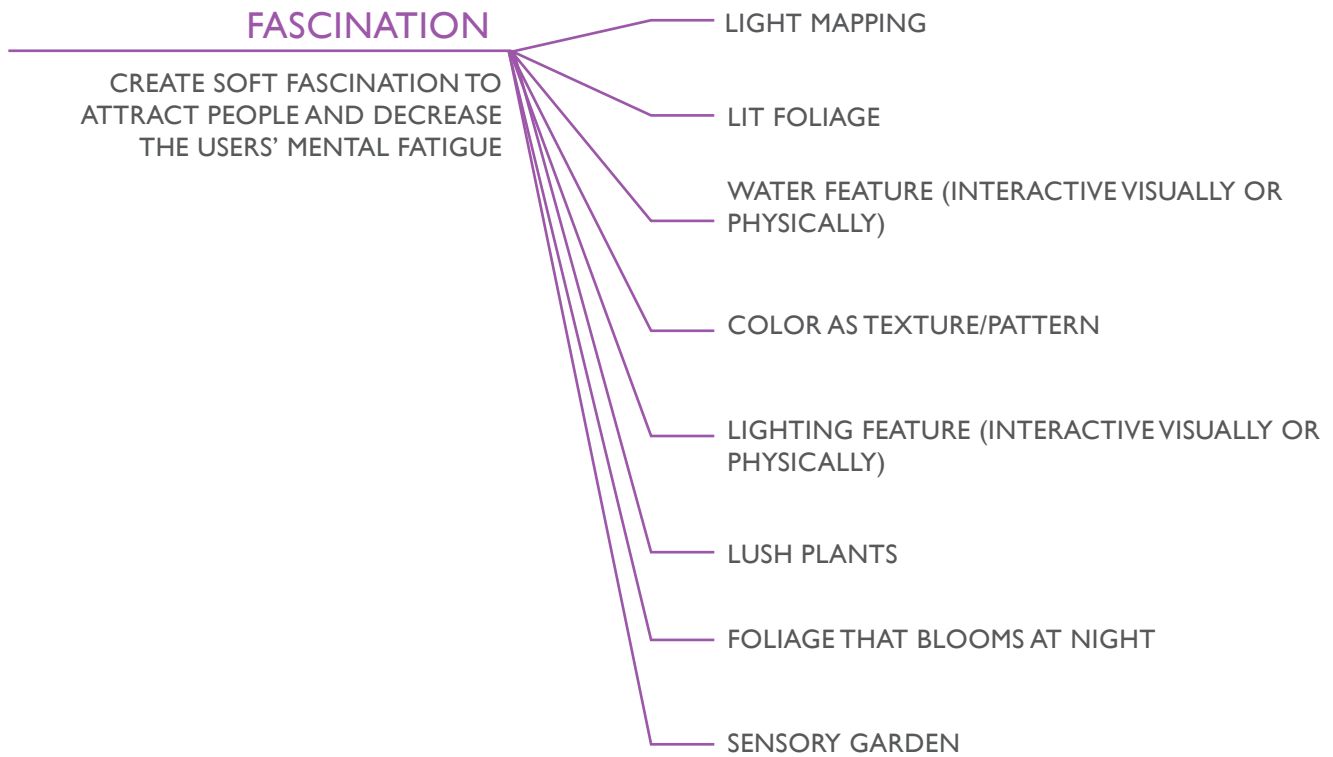




Figure 5-14: Plan of final design by author

**PROGRAMS DISCUSSED IN PERSPECTIVES**

- |                              |  |
|------------------------------|--|
| <b>1</b> CENTRAL GROVE       | <b>5</b> ASSUMED INTER-GENERATIONAL HOUSING UNIT |
| <b>2</b> TUCKED-AWAY GARDENS | <b>6</b> MAIN ENTRY                              |
| <b>3</b> WEST PLAZA          | <b>7</b> MAIN WATER FEATURE                      |
| <b>4</b> EAST PLAZA          | <b>8</b> INTERACTIVE WATER FEATURE               |



## DESIGN APPLICATIONS TO AFFORD THE MAIN ATTENTION RESTORATION THEORY COMPONENTS



**B**

### BEING AWAY

- Variety of vegetation
- Hierarchy of spaces
- Vegetation to establish boundaries

**E**

### EXTENT

- Strategically designed paths
- Range of lighting levels to create depth within the space
- Varigated heights of vegetation

**F**

### FASCINATION

- Dichroic glass structures
- Interactive water features
- Night-blooming plants

**C**

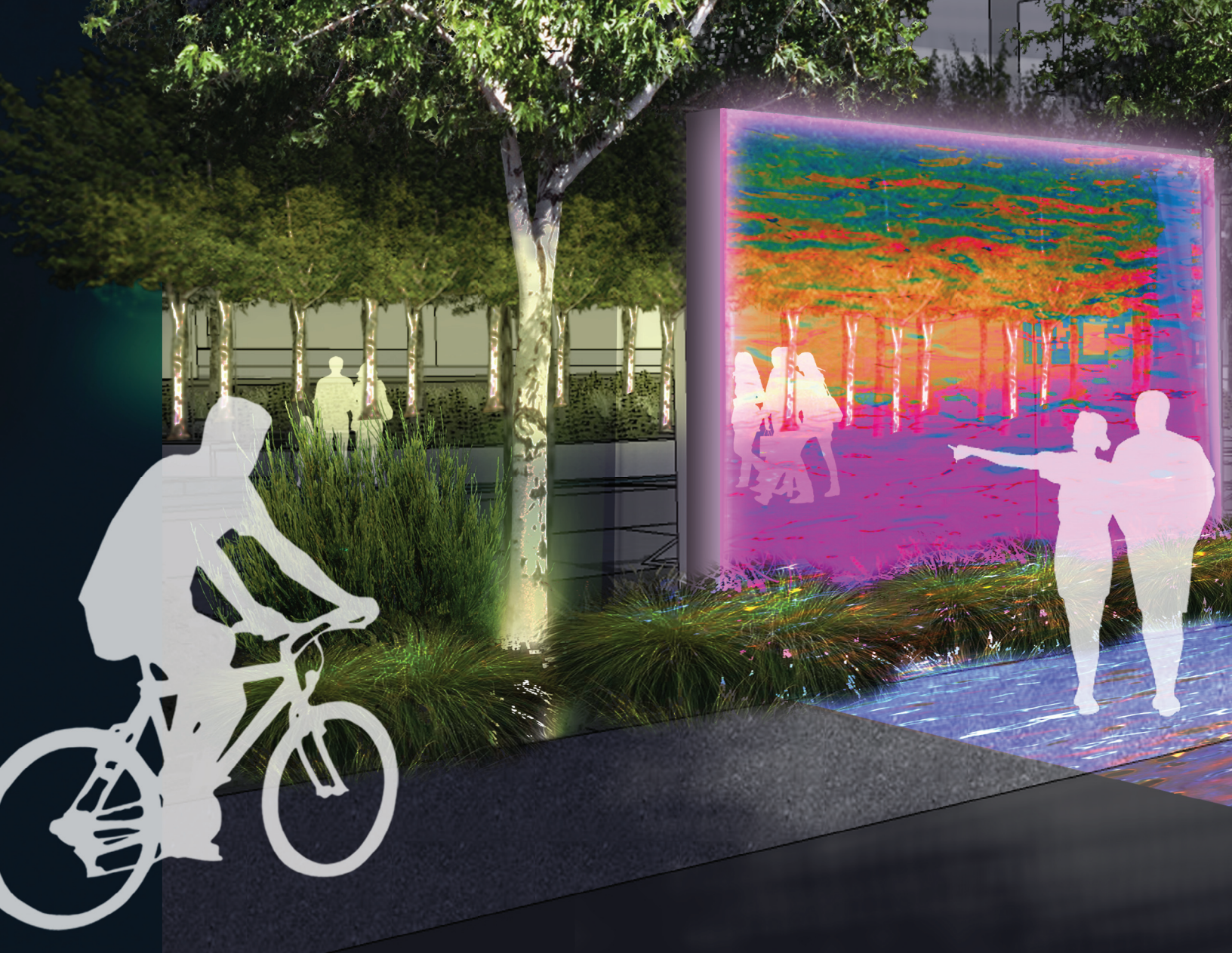
### COMPATIBILITY

- Variety of seating options (large stones, berms, moveable seating)
- Appropriate lighting levels for each space
- Hierarchy of paths for easy accessibility



## DESIGN DEMONSTRATED

The final pages of this chapter show rendered perspectives of four main healing spaces within the final site design. There are two spreads dedicated to each perspective. The first spread gives a brief description that explains which lighting techniques and design decisions, learned from the literature review, were used and why. The second spread shows an annotated version of the previous perspective. Leaders point out the specific lighting strategies (chosen by the author to create or accentuate the four main components of Attention Restoration Theory) implemented in the design. Design elements that evoke the feeling of being away, extent, fascination, and compatibility are also labeled.

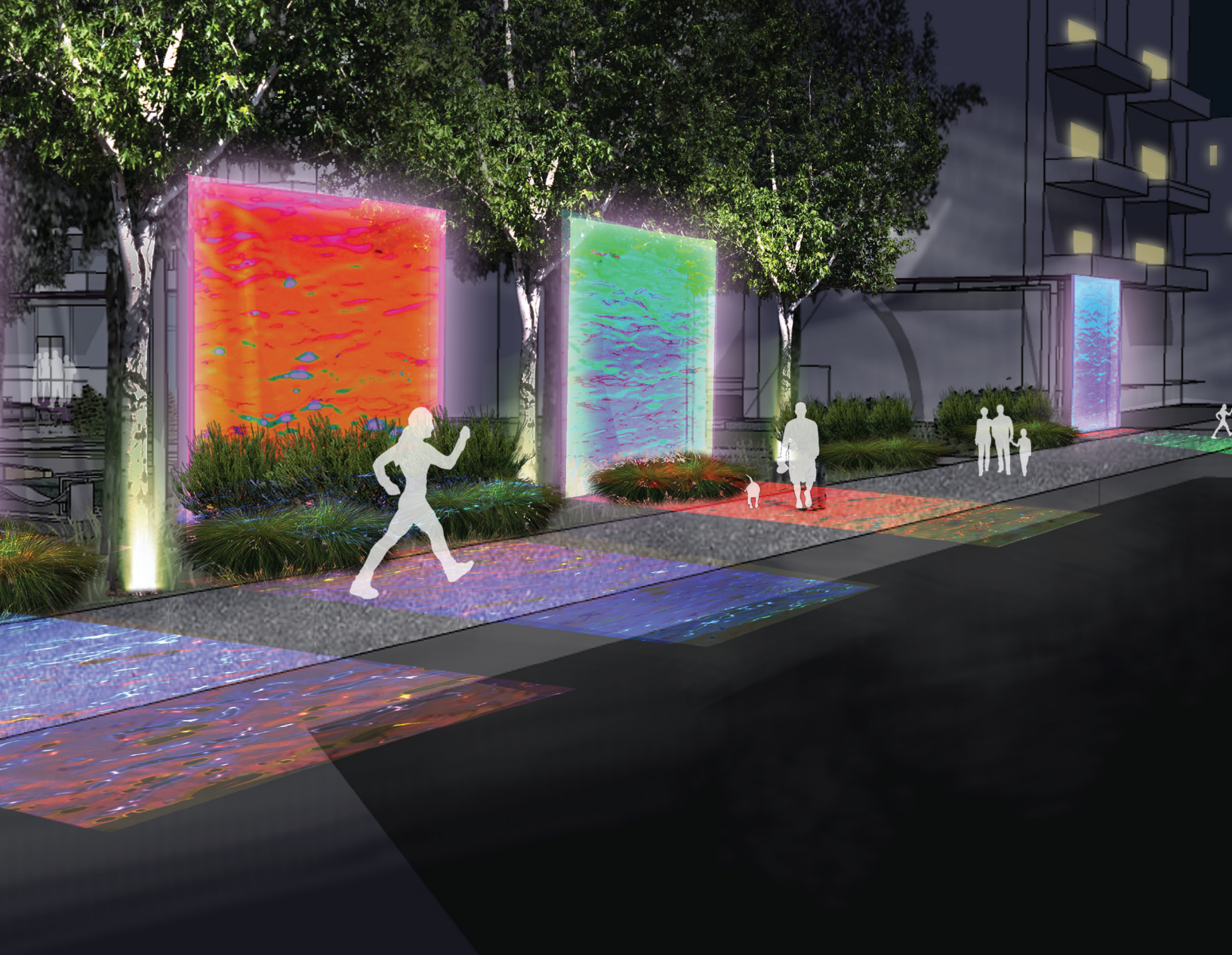


**Figure 5-15:** Perspective of main entry at the southern edge of site by author

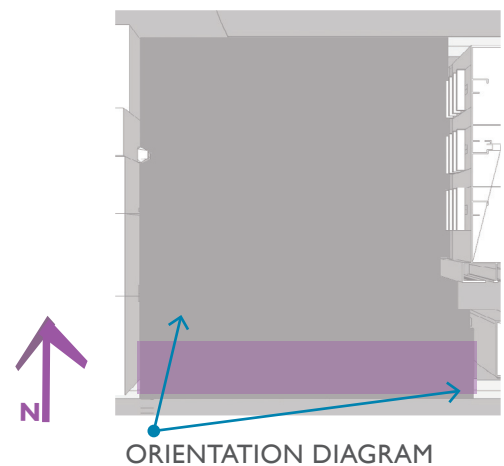
Figure 5-15 is a perspective view of the southern **LANDSCAPE SETBACK** and **ENTRY GARDEN** from Main Street facing east. The landscaped setback is comprised of uplit three-foot-tall grasses and about five foot-tall-shrub massings. The massings create a soft visual barrier to allow privacy for the user's within the site, but still allow views out of the garden to prevent users from feeling completely secluded. This barrier also creates a sound buffer.

The dichroic glass structures accomplish many of the lighting strategies chosen to accentuate and create the four components of Attention Restoration Theory. The dichroic glass structures:

- Create a visually interactive lighting feature to intrigue soft fascination and make those passing by want to enter
- Establish a soft boundary which makes the users of the space feel comfortable and safe
- Create a sense of safety and security that is **compatible** with the goals of a restorative landscape
- Serve as an aesthetically pleasing alternative to bollards that light the adjacent sidewalk



The break in repetition of dichroic glass structures and vegetation pattern employ 'symbolic value' (Chapter 4) and suggest an entry into the restorative space. The bright colors and well lit landscape setback were used to create a welcoming and safe environment inside.



## LIT PERIMETER OF SITE

## LIT WALKWAY

## VISUALLY INTERACTIVE LIGHTING FEATURE

### Dichroic Glass Structures

- Lit from behind by washlights to evenly distribute light over the whole dichroic glass structure for even reflections

## UPLIT PLANT MASSINGS AND TREES

## HIDDEN/ DISGUISED LUMINAIRES

- Each tree has a high wattage spotlight luminaire that is concealed between the grasses, illuminating the bottom of each tree canopy, aiding in creating a soft boundary for users of the landscape
- An upward concentrating, linear fixture will be used to compliment the linear plant massings





Figure 5-16: Perspective of main entry at the southern edge of site by author

**HEALING SPACES REPRESENTED**

- VWG** VIEWING/ WALK-IN GARDEN
- FP** FRONT PORCH
- HG** HEALING GARDEN
- MG** MEDITATION GARDEN
- SB** LANDSCAPE SETBACK

**ATTENTION RESTORATION THEORY COMPONENTS**

- B** BEING AWAY
- E** EXTENT
- F** FASCINATION
- C** COMPATIBILITY

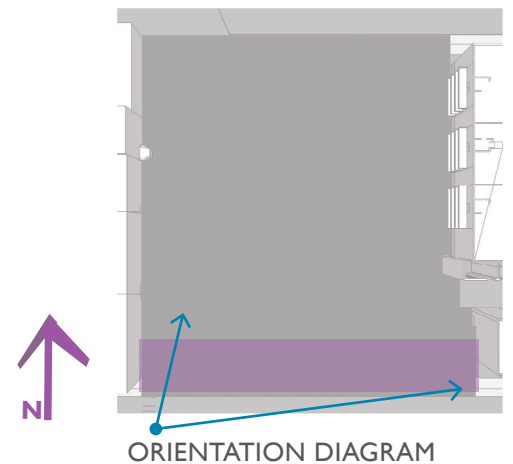




Figure 5-17: View from within the central grove facing main entry by author

The central grove, shown in Figure 5-17 and 5-18, is the primary space within the site therefore it is one of the brightest spaces within the site. The canopies of the closely placed trees form a natural vertical boundary (Chapter 4).

Each lamp, upwardly diffusing the trees, does not necessarily emit a high number of lumens. Rather, closely placed lamps create a general ambience within the grove. The contrast of light within the bosque and adjacent spaces is what makes the bosque appear as the brightest space within the landscape.

It is important that the lamps are not too strong to **AVOID GLARE** and ensure **compatibility**. Choosing the

**APPROPRIATE LIGHT LEVELS** for the surrounding spaces is also important. If the contrast is too strong or there is not a gradual change in light the user may experience temporary blindness when walking from space to space.

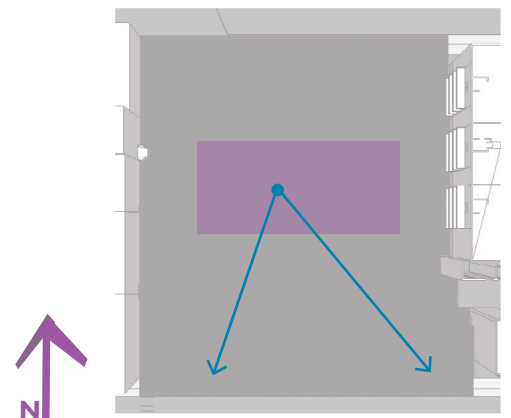
A tree similar to the Weeping Birch or American Sycamore is envisioned for the central bosque. A tree with an elaborate branching pattern, thin leaves that create sound in the wind, and/ or textured bark will accentuate the feeling of **being away, extent, and fascination**.

Each tree is uplit, while the light slightly grazes the textured bark. The grove is an aesthetically pleasing backdrop to those who are occupying the plaza spaces.



The close massing of trees creates an illusion of a grander space beyond, or **extent**.

The secondary, granite paths respond to the underlying grid and entrances of the inter-generational housing unit. Lush plantings along the paths and throughout the site create a soothing sound in the wind and also a buffer to diminish noise from the activity in adjacent spaces.



ORIENTATION DIAGRAM

## LIT WALKWAY

- Thin, inset LED strips are placed in the granite walkways. The LED strips emit a soft glow that directs users' attention to the healing and meditation spaces within the grove, adjacent to the main path.

## LUSH PLANTINGS

## FOLIAGE FOR SOUND

## INTERACTIVE LIGHTING FEATURE

- “Dune”, an interactive lighting feature created by Daniel Roosegaard (Chapter 5) is strategically interwoven between the plant massings. The fibers of the lighting feature illuminate in response to surrounding movement to add a layer of **soft fascination** and aid in lighting the space.

## LIT PLANT MASSINGS AND TREES

## HIERARCHY OF LIT SPACES

## AVOIDING GLARE

- The spotlights illuminating each tree are given the appropriate wattage so as to collectively create a general ambience within the space while being sure to avoid glare.



Figure 5-18: View from within the central grove by author



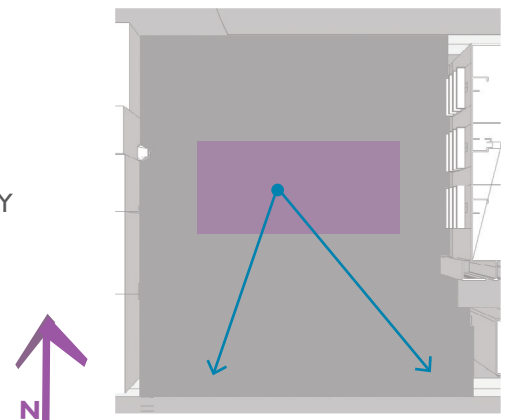


### HEALING SPACES REPRESENTED

- VWG** VIEWING/WALK-IN GARDEN
- FP** FRONT PORCH
- LG** LANDSCAPED GROUNDS
- NT** NATURE TRAILS
- TG** TUCKED AWAY GARDEN
- HG** HEALING GARDEN
- MG** MEDITATION GARDEN

### ATTENTION RESTORATION THEORY COMPONENTS

- B** BEING AWAY
- E** EXTENT
- F** FASCINATION
- C** COMPATIBILITY



ORIENTATION DIAGRAM

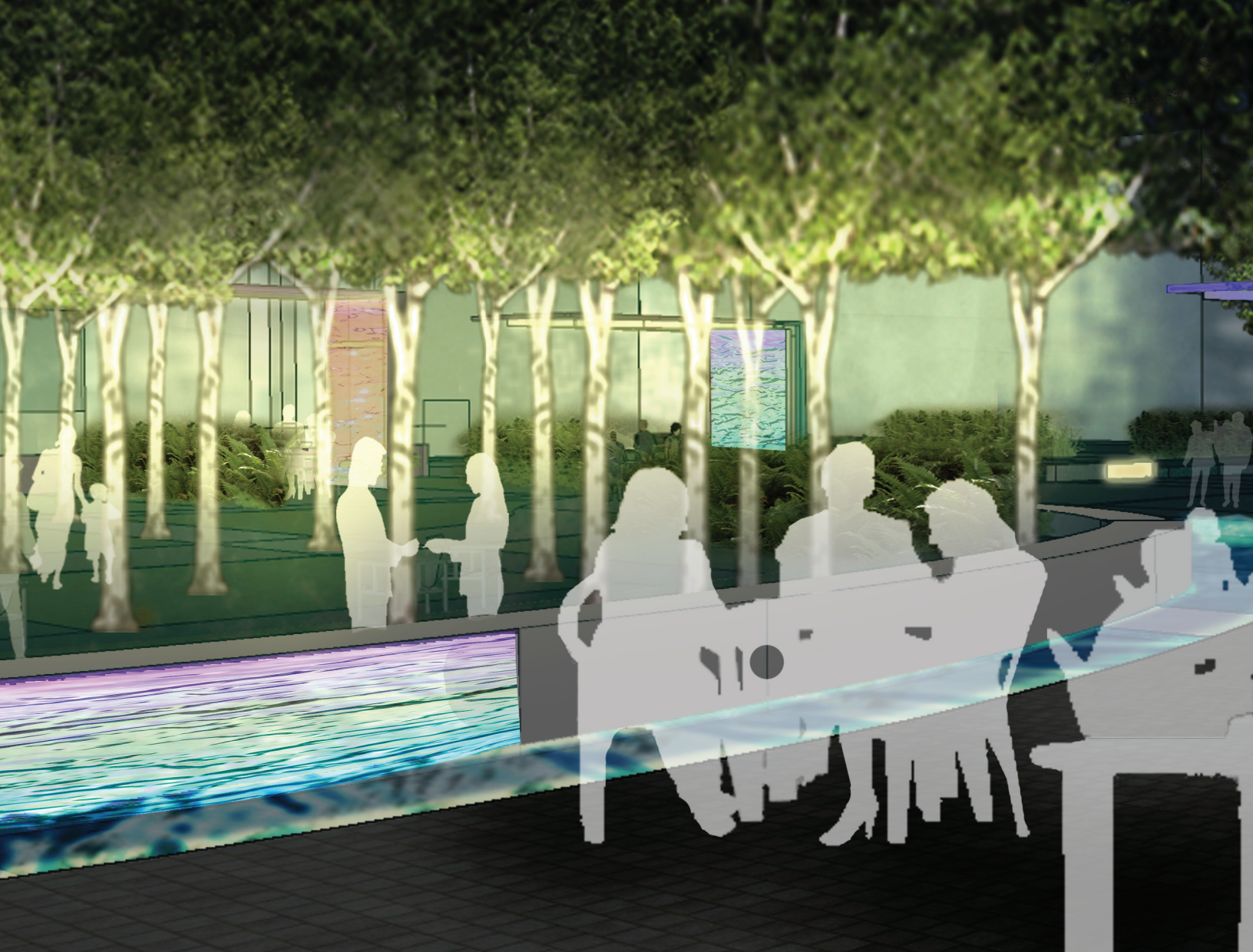


Figure 5-19: West plaza space at night by author

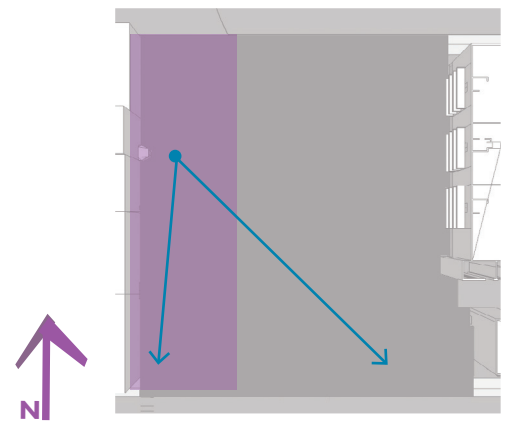
Figures 5-19 and 5-20 are perspective views from the West **PLAZA** space facing southeast towards the grove, **TUCKED AWAY GARDENS**, and main water feature.

The West plaza was designed to be the more public side of the site. It is located just outside of some small shops, the mall, and a restaurant. There are tall tables and chairs for those eating at the restaurant or for workers nearby that would like to enjoy their lunch break outdoors.

The softly lit grove is adjacent to the plaza space offering a view that allows pedestrians within the plaza space to as though they are away from the city and amongst nature. This accentuates the components of **being away** and **extent**.

The main water feature is constructed of vertical dichroic glass structures. Water runs over the front of the internally lit dichroic glass structure casting even more dynamic reflections onto the hardscape and pool of water. Water from the water feature runs along a short seat wall that divides the plaza space from the meditation spaces. The wall acts as a physical barrier, while the sound from the water creates a soothing sound barrier.

The refraction within dichroic glass creates a visually interactive structure. The color changes depending on the angle it is being viewed from encouraging pedestrians to walk around the structure and enjoy its aesthetic from all angles.



ORIENTATION DIAGRAM

## HIERARCHY OF LIT SPACES

### VISUALLY INTERACTIVE WATER FEATURE

- The walls within the pool are lit by fiber optics allowing for the pool of water to change color.

### WATER FOR SOUND

### COLOR AS PATTERN

- Internally lit dichroic glass structure

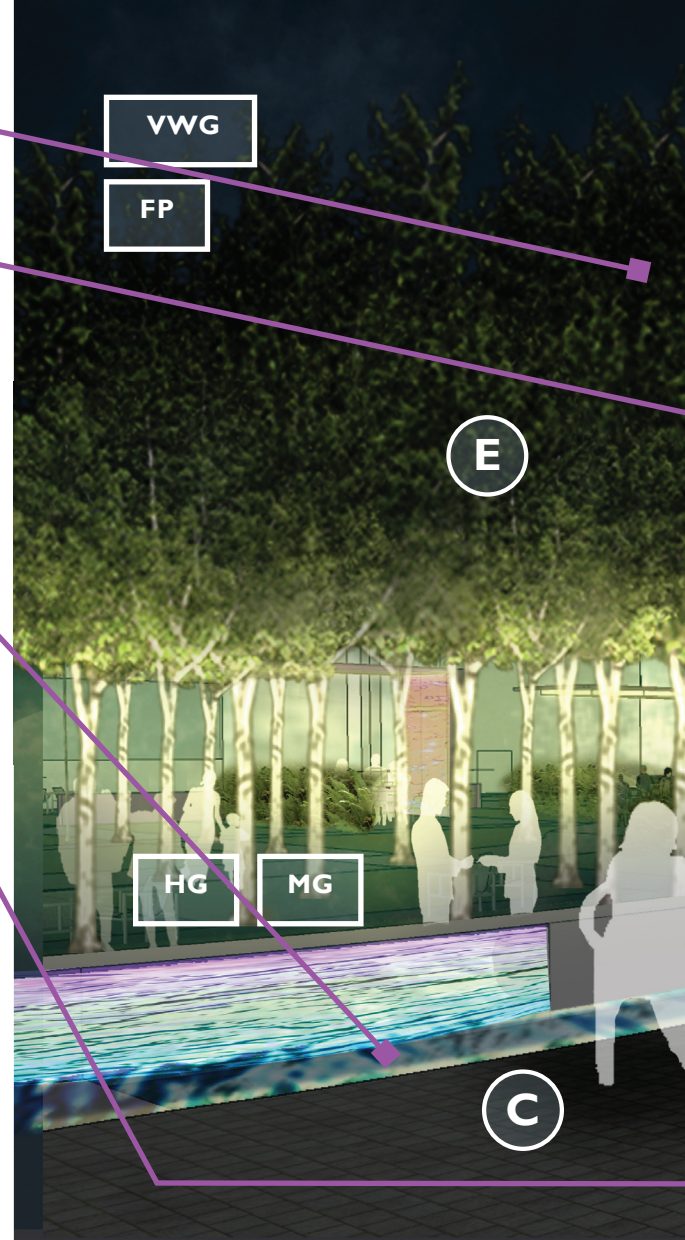




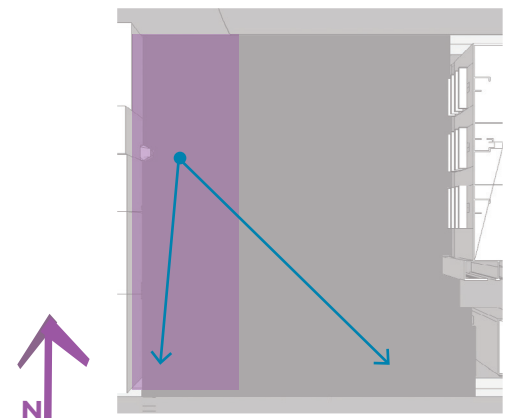
Figure 5-20: West plaza space at night by author

### HEALING SPACES REPRESENTED

<b>VWG</b>	VIEWING/WALK-IN GARDEN
<b>FP</b>	FRONT PORCH
<b>HG</b>	HEALING GARDEN
<b>MG</b>	MEDITATION GARDEN
<b>P</b>	PLAZA
<b>EG</b>	ENTRY GARDEN
<b>TG</b>	TUCKED AWAY GARDEN

### ATTENTION RESTORATION THEORY COMPONENTS

<b>B</b>	BEING AWAY
<b>E</b>	EXTENT
<b>F</b>	FASCINATION
<b>C</b>	COMPATIBILITY



ORIENTATION DIAGRAM



Figure 5-21: Perspective view of Meditation and Healing Garden by author

Figure 5-21 and 5-22 are perspective views from the grove of a **MEDITATION** and **HEALING GARDEN** space.

The silhouettes of figures in the perspective demonstrate how the strategically designed paths that meander through the landscape create the illusion of a larger space and accentuate the components, **being away** and **extent**.

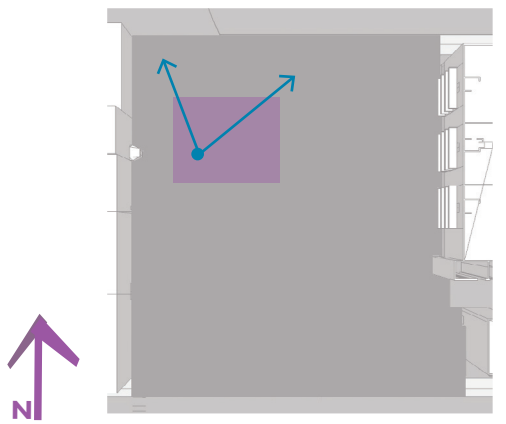
A well-lit perimeter of the site was important to ensure the users of the restorative landscape felt safe and oriented while occupying the space at night.

Night-blooming plants are implemented through out the restorative landscape which adds another strategy

that supports the component of fascination. The night-blooming plants also intrigue users who occupy the space during the day to return at night.

A variety of surface textures (concrete, brick, granite, mulch, and grass) are used throughout the site to indicate a change in space as well as create subtle sounds when walked on.

The trees chosen for the site are similar to aspens or white birch trees that have a white, flaky bark. Because lighter colors reflect light more light than they absorb (Chapter 4) the bark will appear to have a soft glow when illuminated, again intriguing soft fascination.



ORIENTATION DIAGRAM

## LIT PERIMETER OF SITE

- Exposed, low level lamps
- The trees and shrubs uplit by high wattage spotlights, along the perimeter of the site illuminate the boundaries of the site to make the users feel safe and secure.

## NIGHT-BLOOMING PLANTS

## TEXTURES AS FASCINATION

- An upward diffusing lamp would be used to graze the bark, accentuating its texture

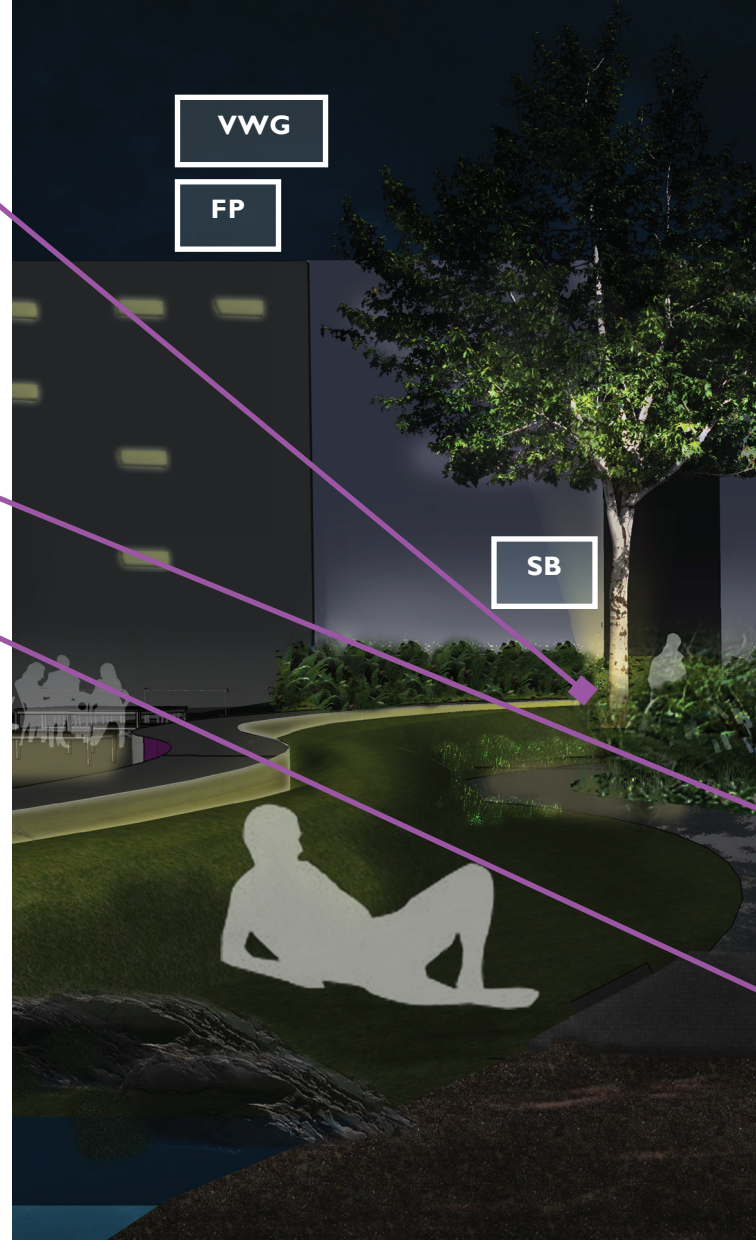






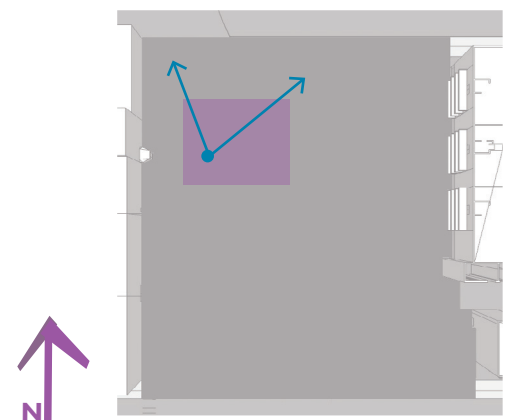
Figure 5-22: Perspective view of Meditation and Healing Garden by author

### HEALING SPACES REPRESENTED

<b>VWG</b>	VIEWING/WALK-IN GARDEN
<b>FP</b>	FRONT PORCH
<b>HG</b>	HEALING GARDEN
<b>MG</b>	MEDITATION GARDEN
<b>SB</b>	LANDSCAPE SETBACK
<b>NT</b>	NATURE TRAILS
<b>LG</b>	LANDSCAPED GROUNDS

### ATTENTION RESTORATION THEORY COMPONENTS

<b>B</b>	BEING AWAY
<b>E</b>	EXTENT
<b>F</b>	FASCINATION
<b>C</b>	COMPATIBILITY



ORIENTATION DIAGRAM



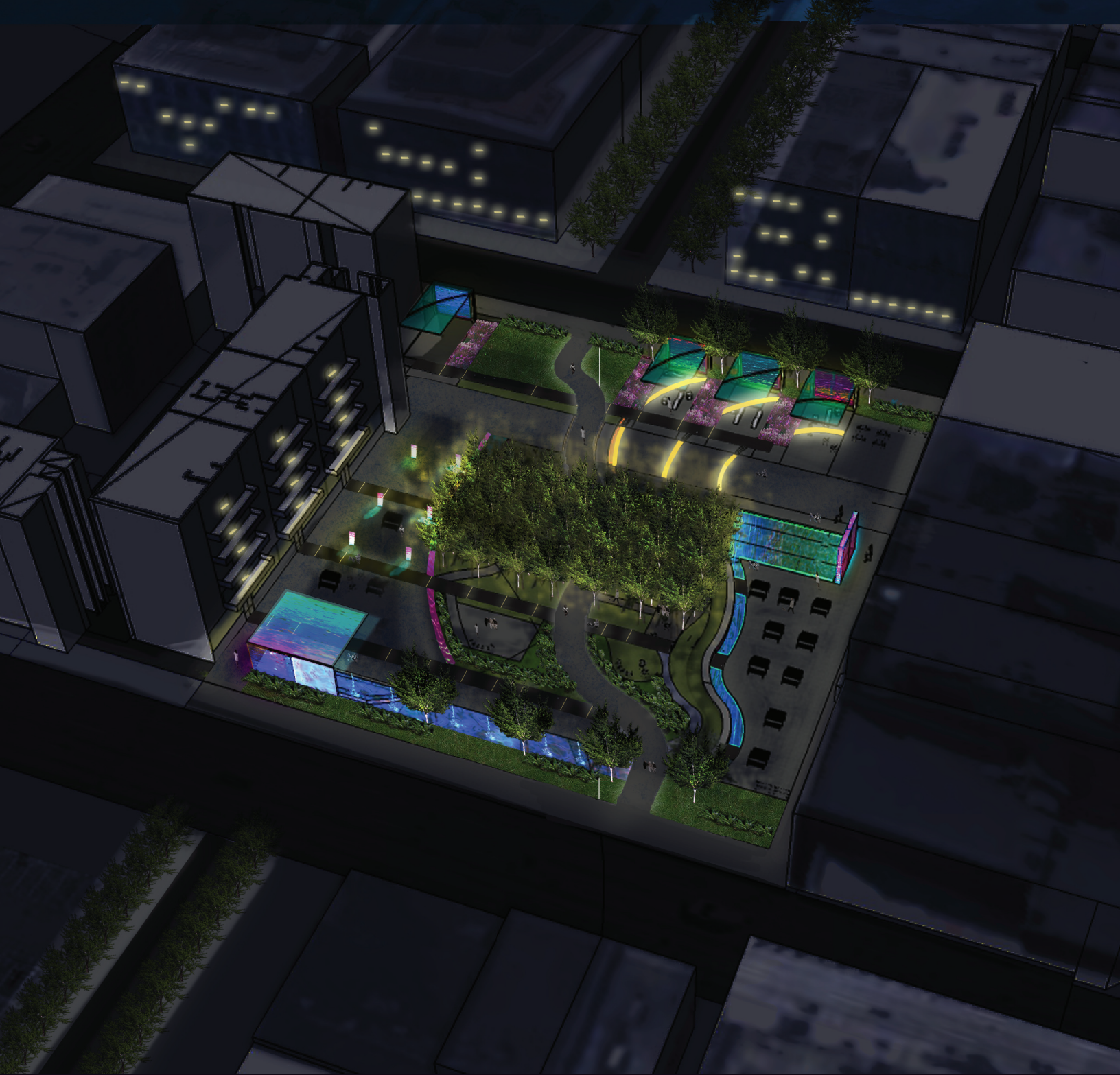


Figure 5-23: Aerial perspective of final design by author

The background features a dark, almost black, space filled with various geometric shapes in shades of purple, blue, and magenta. These shapes, which include squares, rectangles, and irregular polygons, are scattered across the frame. Two prominent, bright, diagonal light rays cut through the scene, one from the top-left towards the bottom-right, and another from the top-right towards the bottom-left, creating a sense of depth and movement. The overall aesthetic is modern and abstract.

# REFLECTIONS

In *The Experience of Nature: A Psychological Perspective* the Kaplan's provide studies and strong insight on the importance of the relationship between humans and nature. "...There is on the whole ample anecdotal and empirical support for the importance of the surrounding environment in contributing to the restorative process" (Kaplan and Kaplan 1989, 187).

The initial objective of this project was to create a set of lighting guidelines for restorative landscapes at night. The author had to first grasp what attributes made a landscape restorative. Rachel and Stephen Kaplan (1995) have identified four such attributes: Being Away, Extent, Fascination, and Compatibility. Knowing that these four components defined a landscape as restorative

encouraged the author to reevaluate the objective of the project.

The purpose of this project was therefore redefined to create a set of lighting design strategies that accentuate and create the four components of a restorative landscape so that the landscape's restorative benefits can be experienced by users at all times of the day and night.

The advances in artificial lighting to date allow designers to utilize light within their designs for many purposes beyond illumination. With the appropriate lighting techniques the designer can immediately set the mood for a space. Lighting can be used to provide safety, security, and comfort for activities and users within a

space, highlight prominent features within a design, as well as add a layer of intrigue or “sparkle.” Light can emit an inviting, relaxing glow over a space, welcoming users in and then strategically guiding them through the space while invoking soft fascination.

After extensive research of landscape lighting techniques and principles the author concluded that lighting can also be used to create restorative landscapes and their qualities that reduce mental and physical fatigue.

Though it is exciting to be one of the first to delve in to the complex idea of the potential application for restorative landscapes at night, it is challenging with a limited amount of time to collect information on all there

is to consider before designing a successful restorative landscape, let alone one for nighttime use. Due to the short period of time allotted for this research the author had to retain a very limited scope.

The author had to be objective on the lighting strategies chosen for the design. The design for Occidental Square is one example of how the lighting strategies chosen can be applied. Every restorative landscape will have different requirements and every designer will have his or her opinion on which strategies are applicable.

With more time the author would have preferred to test and elaborate more on the specifics of the lighting strategies chosen. For purposes of this project,

the specifics of wattage and luminaire type were not addressed, because there was not sufficient time to compile a strong amount of research that would support the reasoning behind specifications.

For any ambience there are a plethora of strategies and luminaires that would be too much to discuss in this report. For example, up-lighting is a very common lighting strategy found in landscapes, and one lighting manufacturer alone could potentially offer 20-plus combinations of luminaire, color temperatures, and lamp type options.

In addition to a limited amount of time and scope, the distance between Occidental Square and Kansas State

University made it difficult to frequently visit and observe patterns and activities taking place on site and the site within its urban context. The distance also eliminated any option of testing lighting strategies on site. If the design were to have been implemented it would have been very beneficial to observe the effectiveness of the design or the users' perception of the space.

Towards the end of the author's design process she attended a lecture on April 2, 2014, given by environmental psychologist and designer Sally Augustin. Environmental psychologists focus on the relationship between humans and their surroundings, not just within nature. She presented a wealth of knowledge on the complexity of people and why their emotional response

to place matters. She briefly touched on each of the five senses and how the smallest design decisions can be interpreted differently depending on a person's gender, ethnicity, upbringing, and the context of where he or she was raised. Much of the information she discussed, specifically on emotional responses to different colors and textures, could have aided the final design of Occidental Square. To that end, if this project were to continue the author would be more critical of the colors and materials in amenities as well as light chosen to ensure they afford the restorative landscape.

*Postscript: Overall, I am very excited about the outcome of the design for Occidental Square. I am also very excited to offer my findings to the researchers and designers within the Landscape Architecture profession. I believe that restorative landscapes at night have an immense amount of potential to evolve from a concept to an essential space found within the future of urban contexts.*





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