



HOUSE OF SCREENS

BY
JENNIFER STARKEY

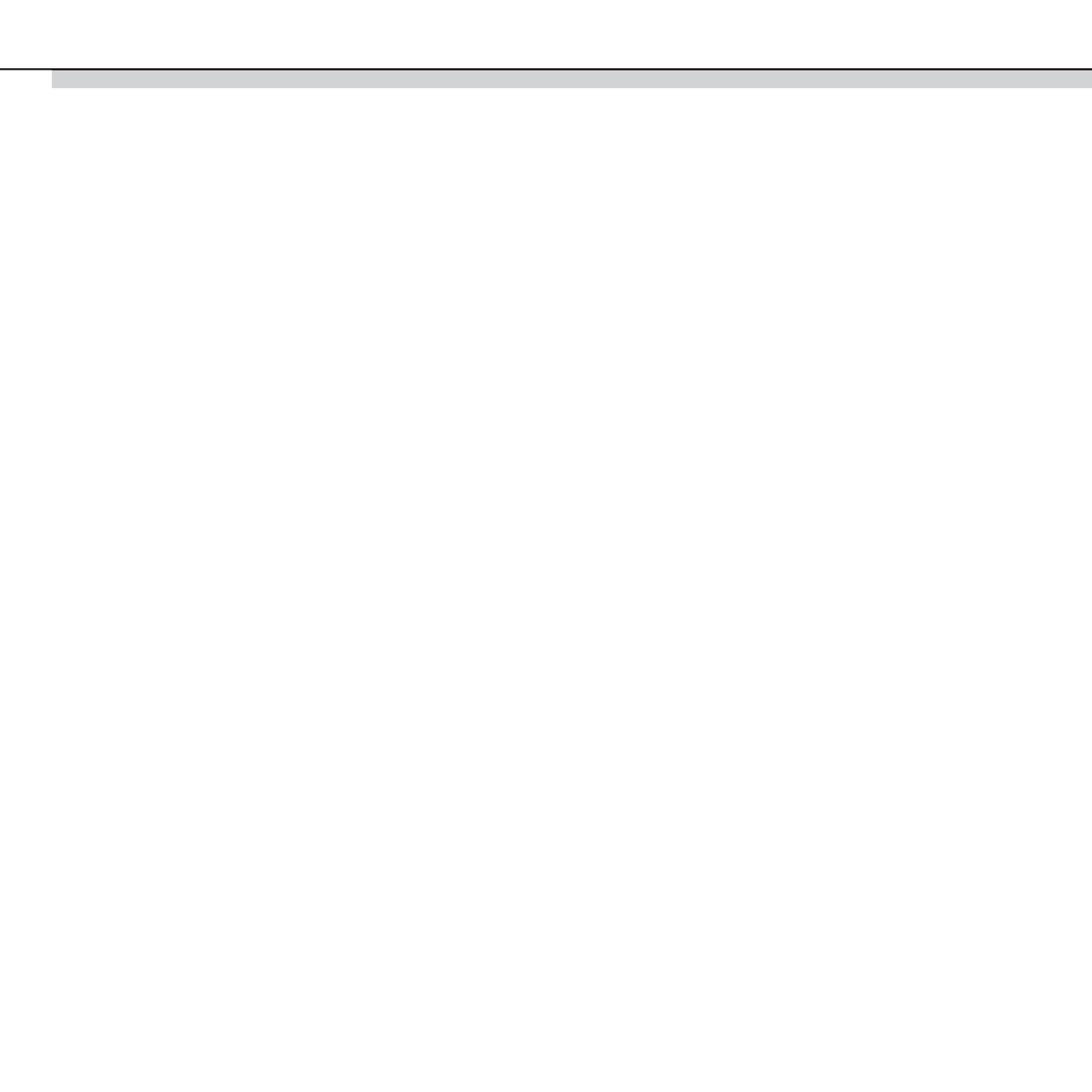
Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of Master of Architecture.

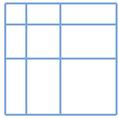
Marcia Feuerstein, Committee Chair

William Galloway

Michael O'Brien

July 15, 2004
Blacksburg, VA





ABSTRACT

A house in the mid-west located on the prairie.

A “get-away” from the busy city of Chicago, a place of quiet repose.

View of the horizontal is intensified by various planes of crops and the plinth.

Fields of crops descend in height to allow the house to rise up and breathe.

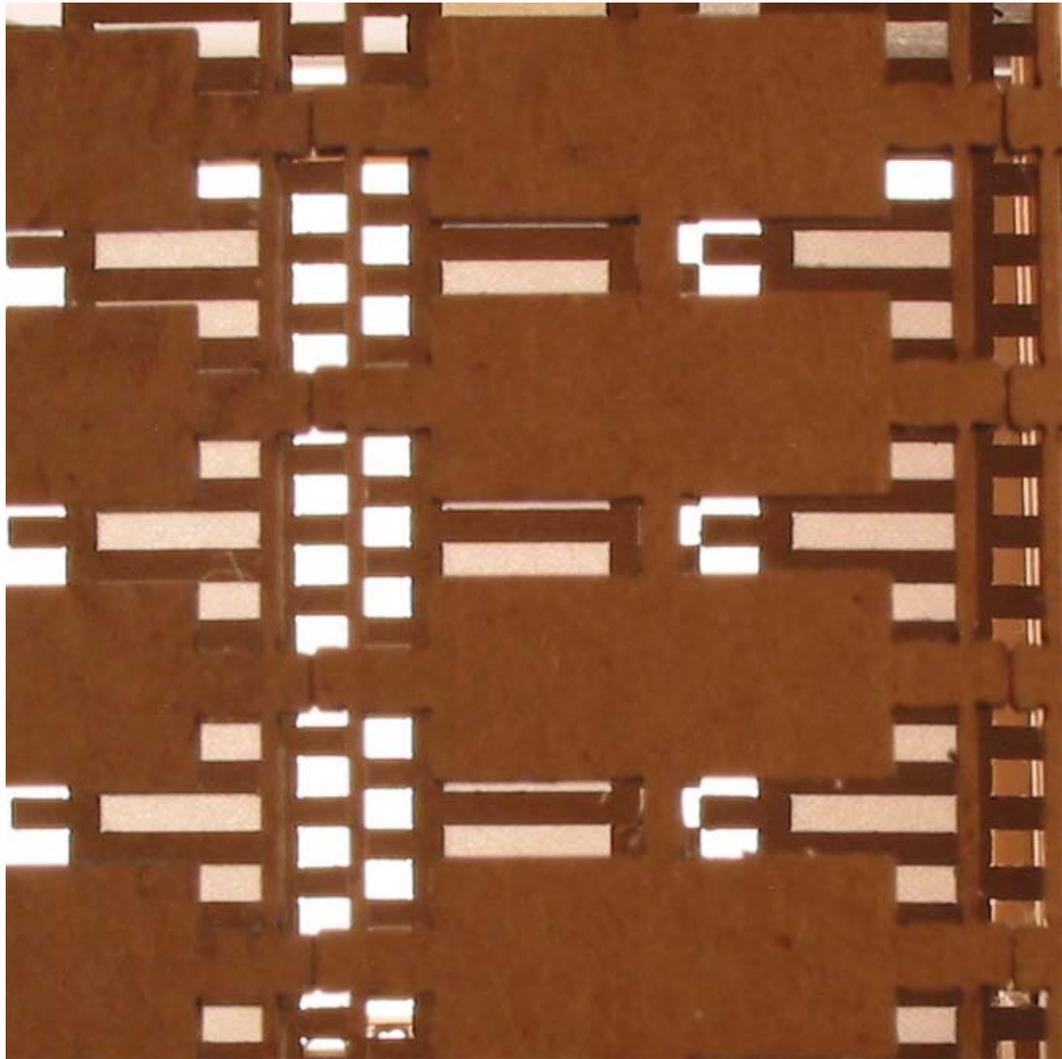
A simple grid provides inspiration and gives structure.

A house full of screens provides changing spaces and adjustable levels of privacy and protection.

Views of one screen layered with another provide changing patterns.

But he said to me, “My grace is sufficient for
you, for my power is made perfect in weakness.”

2 Corinthians 12:9



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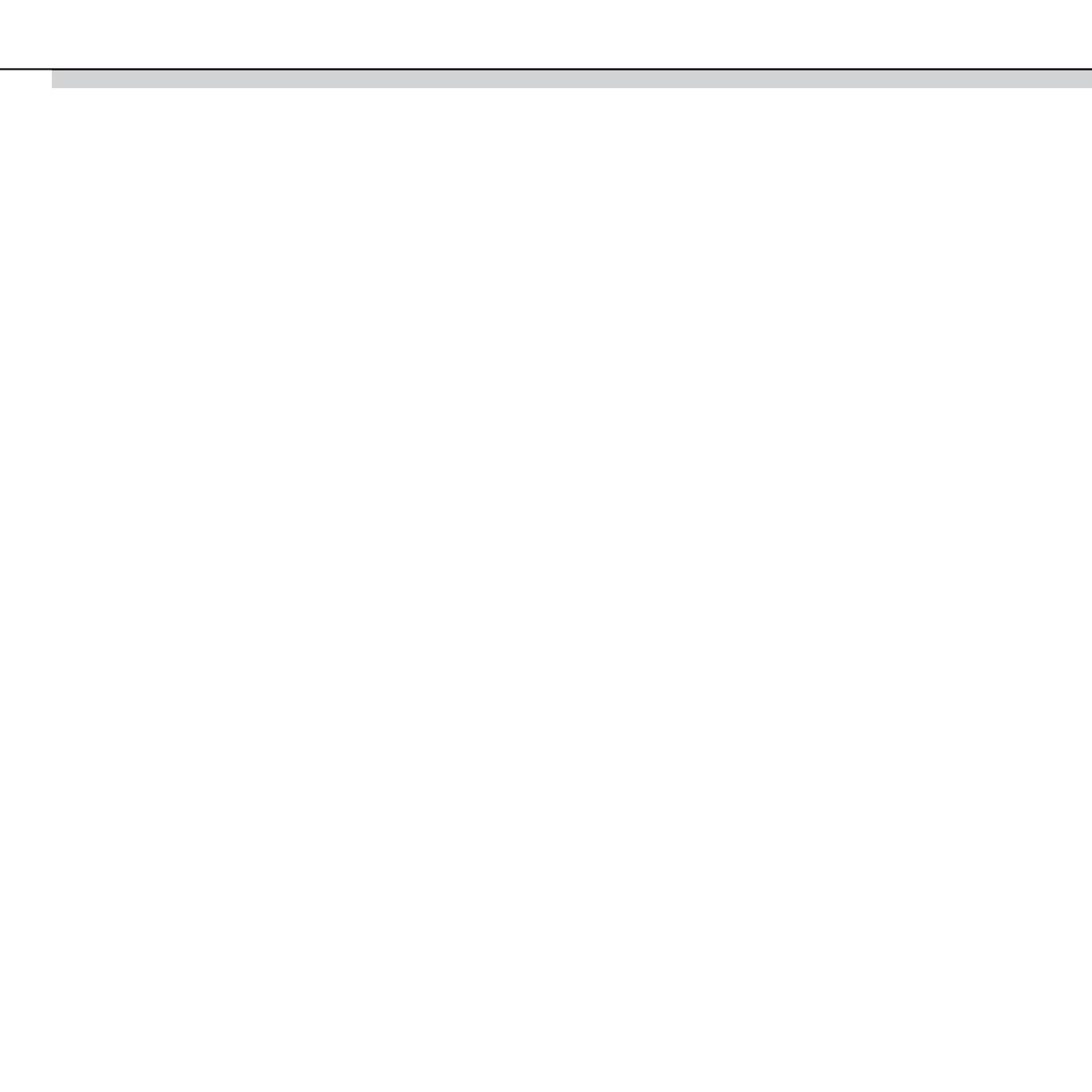
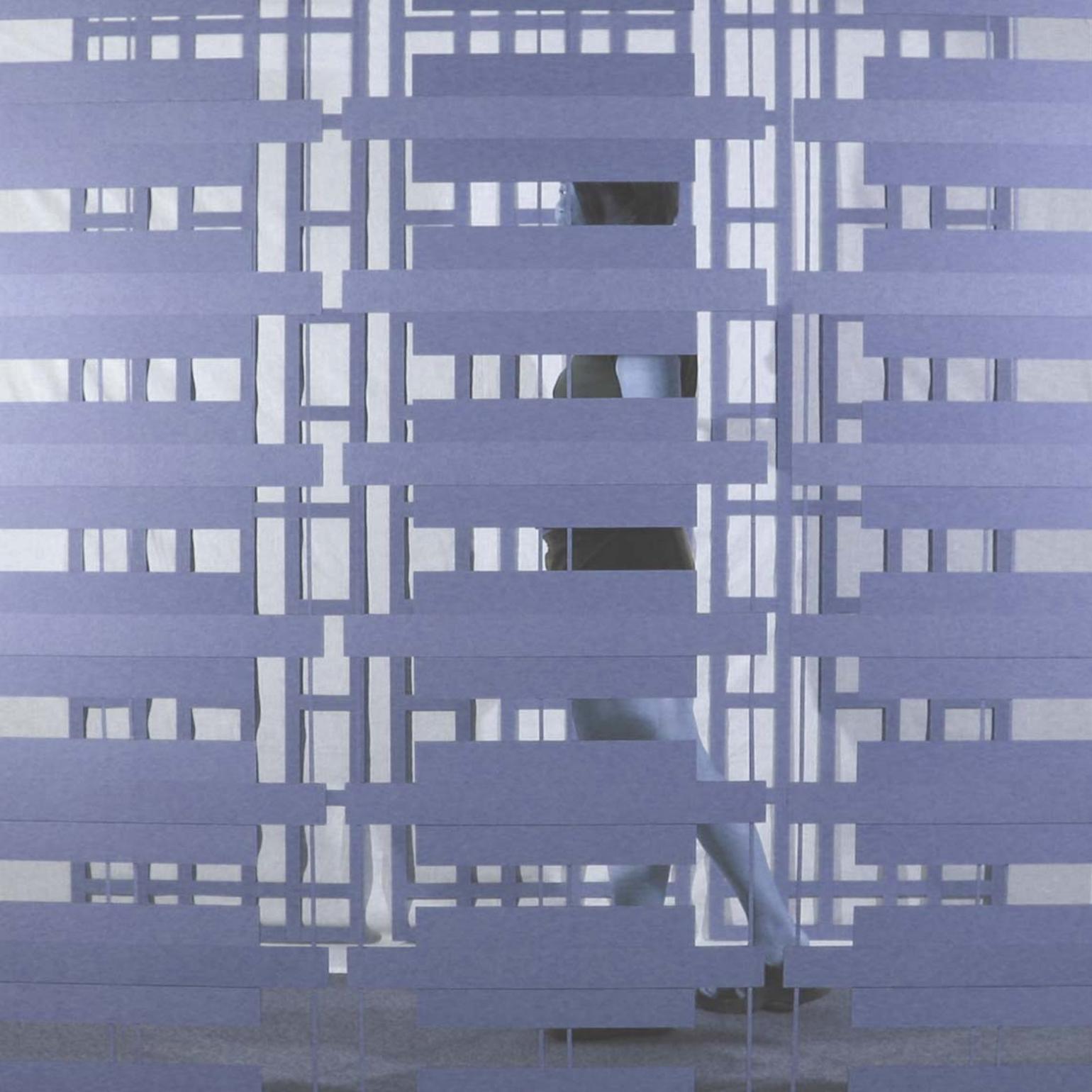
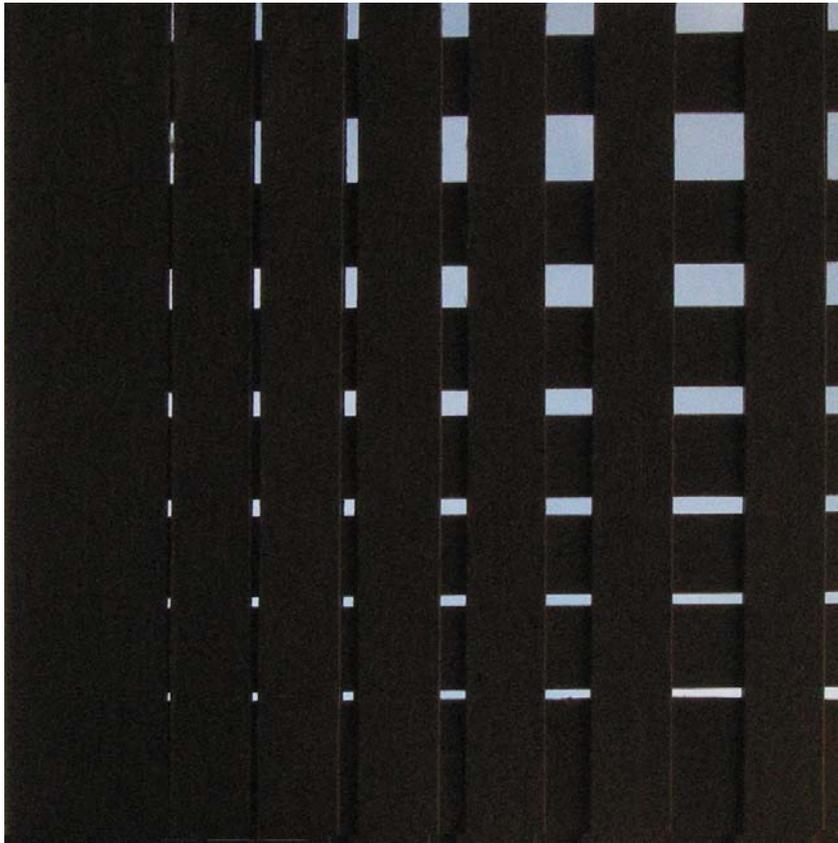


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“We should be taught not to wait for inspiration to start a thing. Action always generates inspiration. Inspiration seldom generates action.”

-Frank Tibolt

My thesis started out as a study of ornament. The original intent of the project was to design a small vacation home in which ideas about ornament could be explored and expressed. Although it began as a study of ornament, I perceived that the focus of my study evolved into something different. Various aspects of my study on ornament influenced and melded the project into its current form.

Those Proportions will be the most beautiful which it will be most difficult for the eye to detect.

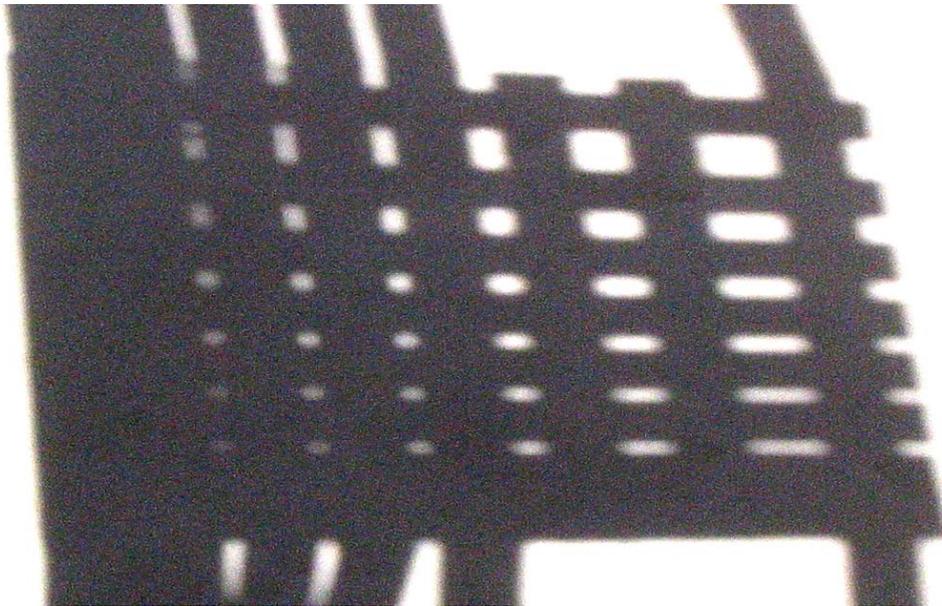
Thus the proportion of a double square, or 4 to 8, will be less beautiful than the more subtle ratio or 5 to 8; 3 to 6, than 3 to 7; 3 to 9, than 3 to 8; 3 to 4, than 3 to 5.

-Owen Jones
The Grammar of Ornament

The first influence that carried over from my thinking of ornament was the use of geometry. I noticed most ornament that I was studying used geometry for structure. Take for example, Louis Sullivan's ornament from his 1893 Chicago Stock Exchange building shown at the right. The use of geometry is undeniable. I thought that if I wanted to create ornament then I should choose a set of rules or geometries to base my design upon. I looked at the Fibonacci series of numbers. These became the geometrical base that informed my design decisions. The Fibonacci numbers are derived from the golden proportion of 1 to 1.618. This proportion is viewed by most to be the most pleasing proportion. The Fibonacci series of numbers starts with the numbers 1, 2, 3, 5, and 8. Each additional number in the series is found by adding the two numbers preceding it.



detail from entry arch of the
1893 Chicago Stock Exchange



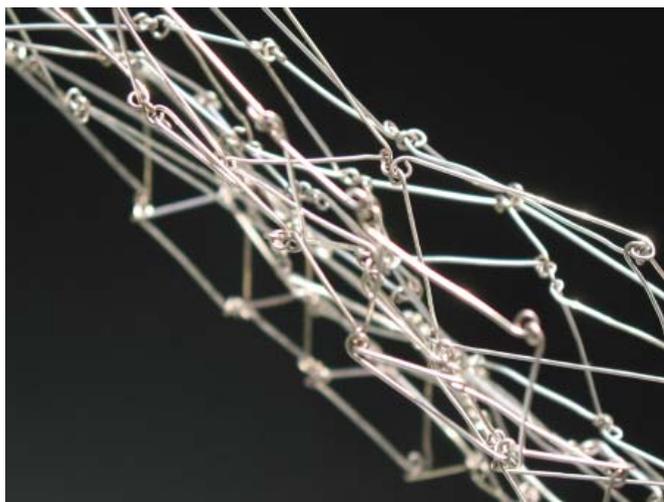
first grid pattern created by using the Fibonacci series

From the Fibonacci numbers I created two grids. These grids served as a great influence for the project as it currently stands. The first grid was made out of lines placed at increasing amounts of space based on the Fibonacci sequence. This provided a grid that had great potential for intriguing patterns of light and shadow.

The second grid was based solely on the Fibonacci numbers 3, 5, and 8. I used this grid to order the structure and plan of the house. Beyond just providing an ordering system, I gained much more from this grid when I created a flexible, metal wire representation of it. The wire representation was one of the key influences that furthered my project into the next stage. Every evening hues of yellow and orange light would stream through the window by my desk. The metal grid lying on my desk captured and reflected this light.

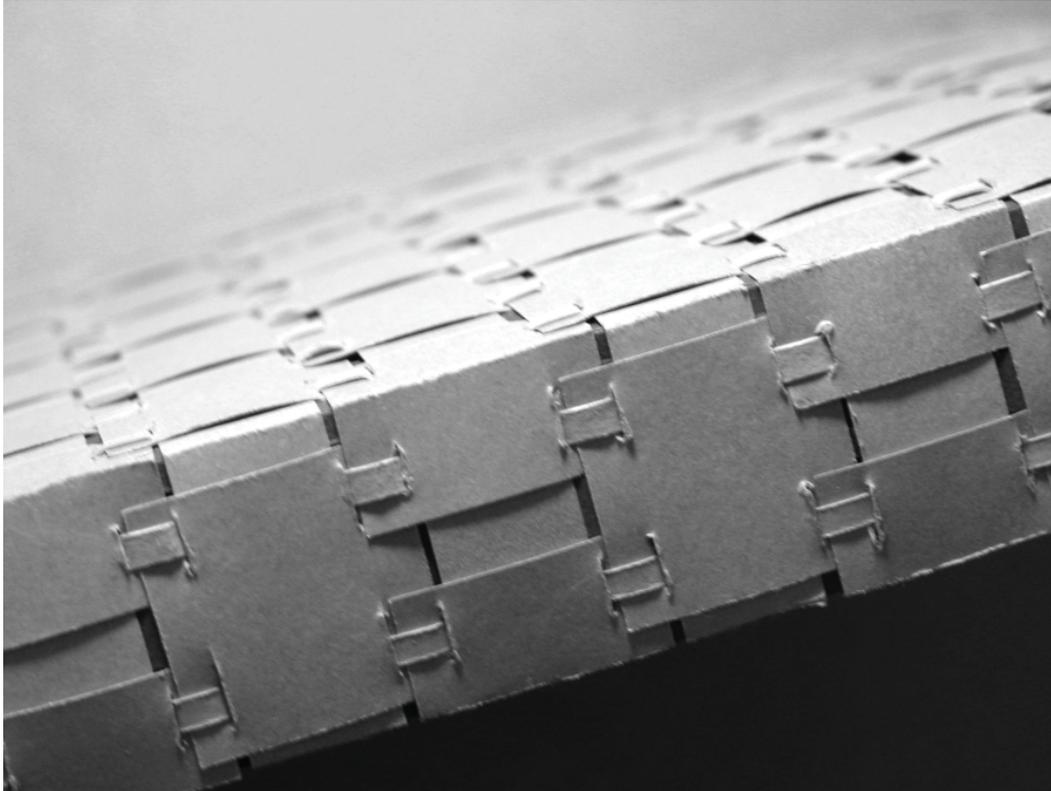


second grid pattern created by using the numbers 3, 5, & 8



flexible metal wire grid

The light and shadow created from the two grids allowed me to think about light as ornament and the idea of capturing the light and shadow with a screen, perhaps something similar to the flexible, metal wire grid.



Hanging carpets remained the true walls, the visible boundaries of space.

-Gottfried Semper
The Four Elements of Architecture

Gottfried Semper and his concept of the textile wall was another source of inspiration. He believed that architecture should represent the original ways of making. These fundamental ways of making included the skills of ceramics, carpentry, weaving, and masonry. Each of these skills was used in elements of the first dwellings. The elements created from these original skills included the hearth, the roof, then enclosure, and the mound. For Semper, the original walls or the element of enclosure was textiles or rugs hung from a structure. Since screens essentially are a form of a textile wall, I tied this concept of textile walls to the idea of capturing light and shadow with screens.



sliding screens in a samurai residence ¹

Perhaps the greatest inspiration from the project came from an image in a book titled “The Japanese House” by Alexandra Black. The image is of two screens, one in front of the other, creating a pattern that neither one could produce on its own. This image remained with me. In the weeks that followed, I began to create a “platform” for the screens. I wanted to create a structure where several screens could be viewed at once, to be able to see the patterns that they create. This platform had to be a cohesive whole. It had to suggest that the screens are the most important part.



The site is located approximately 60 miles or about an hour south of Chicago. The project is a vacation retreat to get away from the busy city. Despite its close proximity to Chicago, the site seems to be in the middle of nowhere. Farmland goes on for miles.





aerial view-site in red



beginning of tree line from across road



tree line adjacent to site



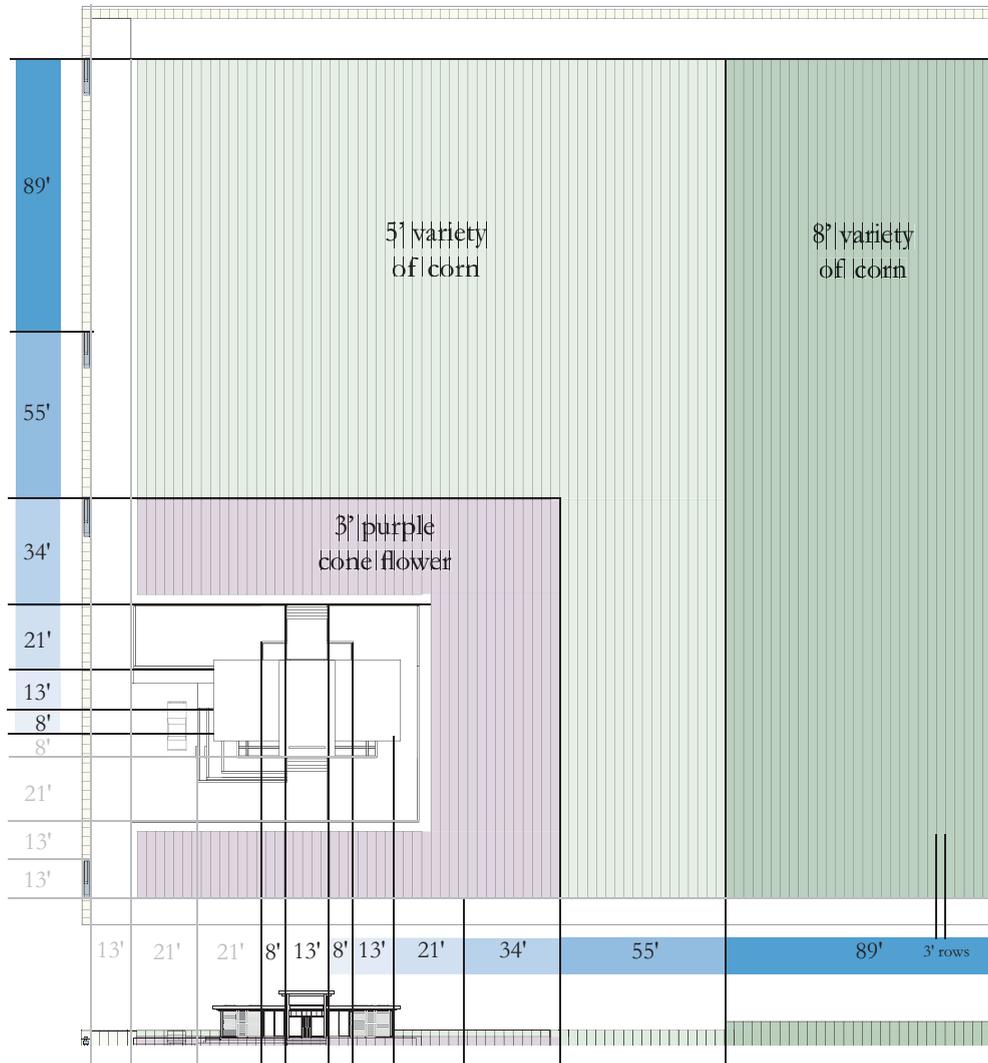
tree line from across road

The site surrounding the house is the first platform for the screens. It has the first obligation to prepare an individual to view the screens. The current site conditions include a very flat site, in which the horizontal is very prominent. The surrounding area consists of very little other than farmland and two lines of trees to indicate the borders of neighboring land. I wanted to continue these tree lines in some way onto my site. These lines set up a boundary, a beginning for the platform, of which I can exert direct control. One of these tree lines is across the road, while the other is adjacent to the site. I decided to continue the tree line from across the road by placing a “sculptural fence,” along the western border of the site. Along the northern border, the line of trees continues with plantings which will be discussed later.



western border of site

The screens, like the rest of the house, are based on the Fibonacci numbers. The site is no different. The site is organized based on those numbers in plan and in section.



site organized with Fibonacci series



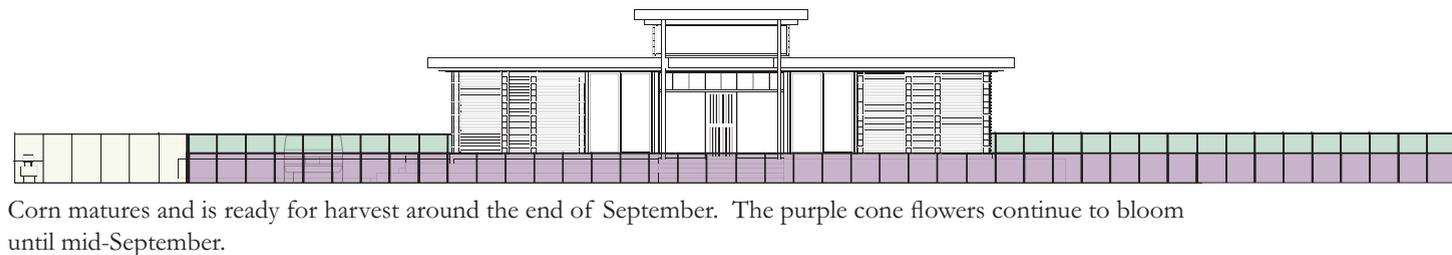
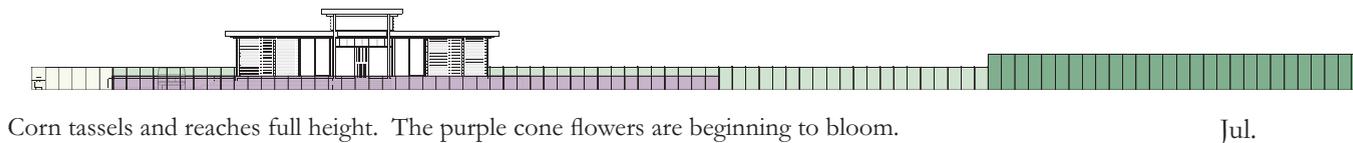
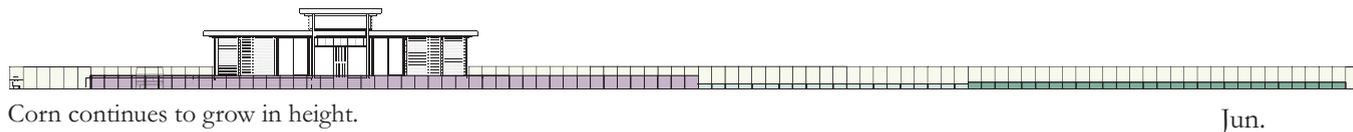
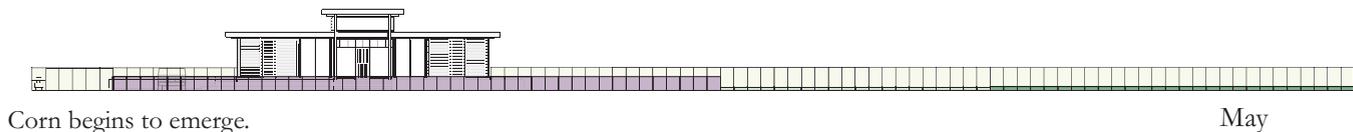
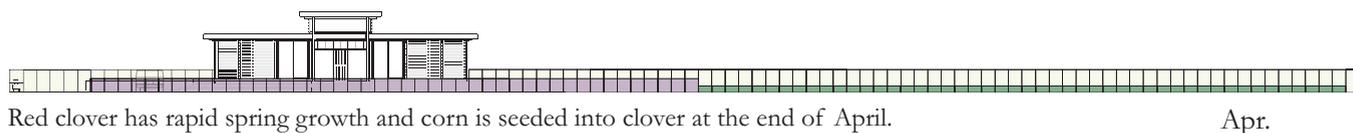
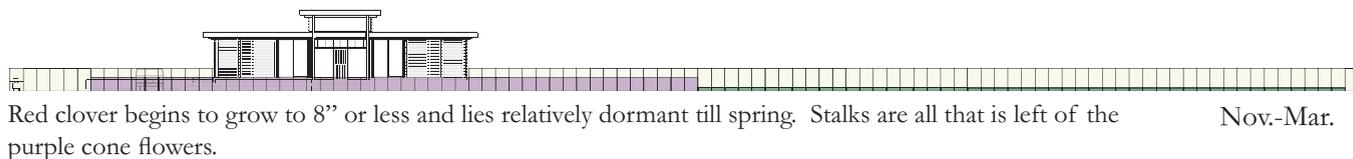
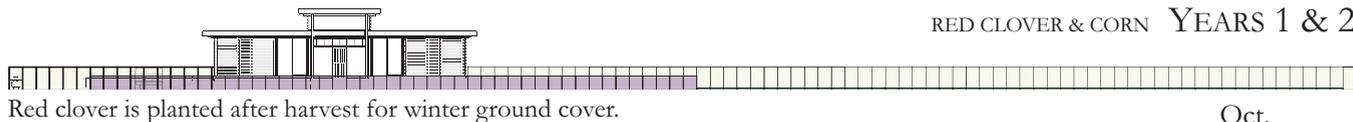
view from plinth looking towards crops

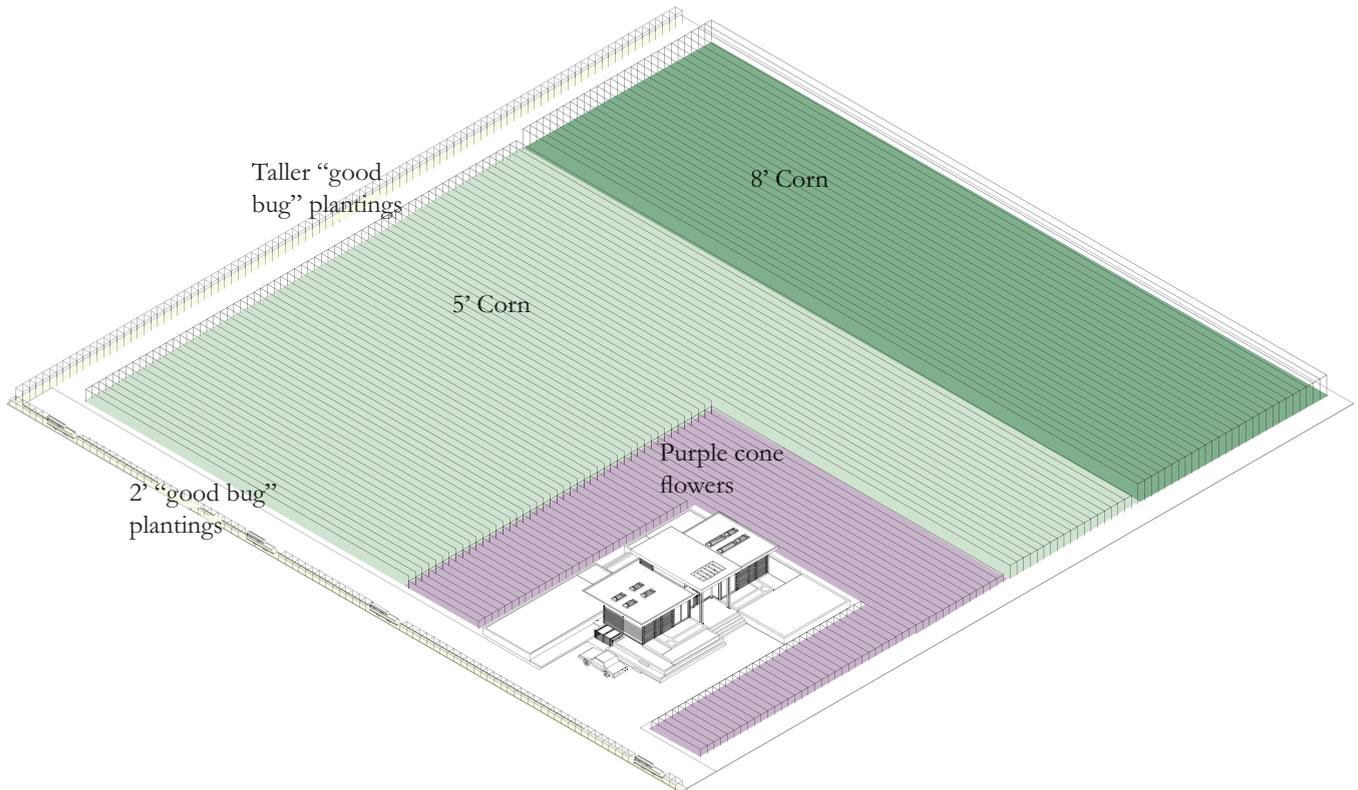
The months of July through September, during the seasons that corn is planted, is the best time to view the house. This is the time when the crops are closest to the ideal height and the flowers are in bloom. There are two varieties of corn used. One is 8' tall and the other is 5' tall. Echinacea, better known as purple cone flower, is planted in the area surrounding the house. Purple cone flowers grow to be about 3' tall. The combination of these plantings provides a stepping away from the house. It is as if the field is giving way and making room for the house.



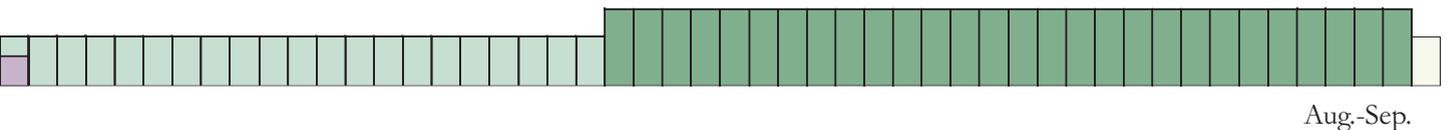
view from road in front of house

RED CLOVER & CORN YEARS 1 & 2

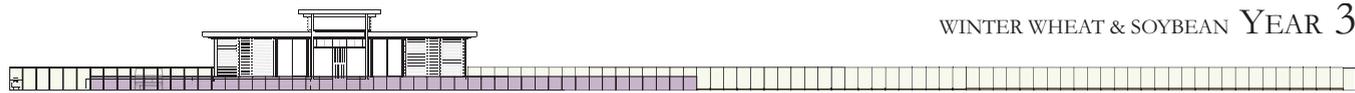




The plantings vary by time of year and crop rotations. The rotations include two varieties of corn, soybeans, red clover and winter wheat. The first and second year of the rotation begins after either a soybean or corn harvest. Red clover is planted in the fall. It is useful for several reasons. Red clover helps to fix nitrogen in the soil. It is a good ground cover during the winter to prevent erosion. During the spring it prevents weed growth. The planting of corn follows the red clover in the spring. Corn is seeded into the red clover. As plants develop it acts as a living mulch and continues preventing weed growth. The red clover eventually dies out as the corn develops in height because of too much shade. The site reaches optimum viewing time during the months of July through September. This is when the corn has reached its peak height and if conditions are right, the heights will coincide with the Fibonacci numbers.

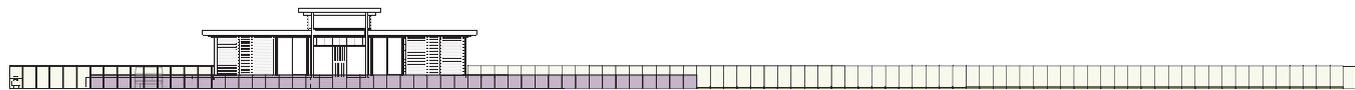


Aug.-Sep.



Winter wheat is planted after the last corn is harvested for winter ground cover.

Oct.



Winter wheat grows till mid-Nov and then lies dormant until spring. Only the stalks are left of the purple cone flowers.

Nov.-Mar.



Winter wheat begins to grow again.

Apr.



Winter wheat grows to about 3' before it is removed for the planting of soybeans.

May



Soybeans are planted at the beginning of June.

Jun.

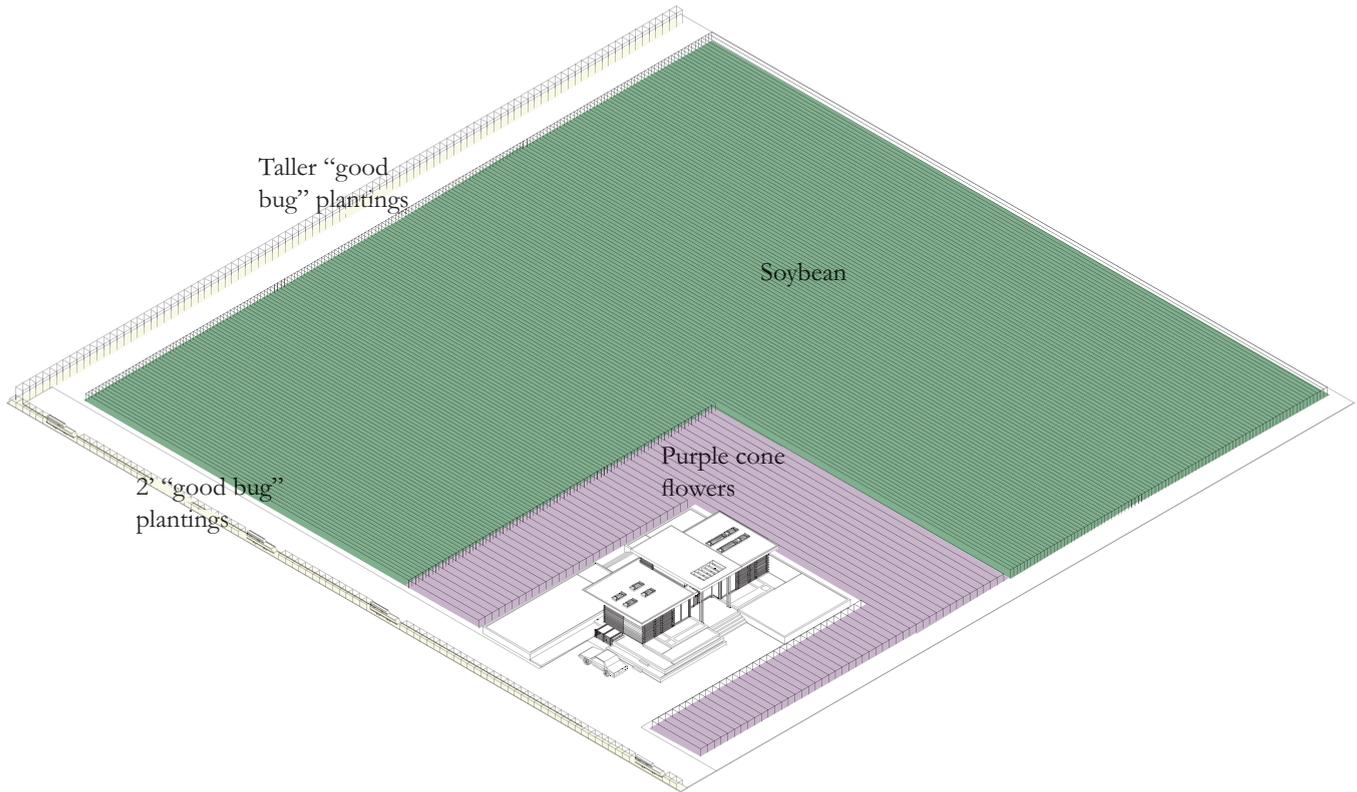


Soybeans are growing rapidly and blooms during the last part of July. The purple cone flowers are beginning to bloom.

Jul.

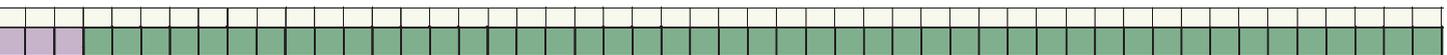


Soybeans begin to mature during August and are ready to harvest by the end of September. The purple cone flowers continue to bloom until mid-September.



After the second corn harvest, winter wheat is planted for winter ground cover. This crop is grown because it is good to have some variety in crops to cut down on diseases. This is also a good choice because nitrogen is not needed for the succeeding crop which is soybean. Soybean is grown during the third year because this crop is excellent in replacing nitrogen needed for corn production.

The ground in the vicinity of the house is covered with purple cone flowers. Unlike the rest of the field, this planting is not rotated. This is because the plant is a perennial and does not thrive until the second or third year of its life.

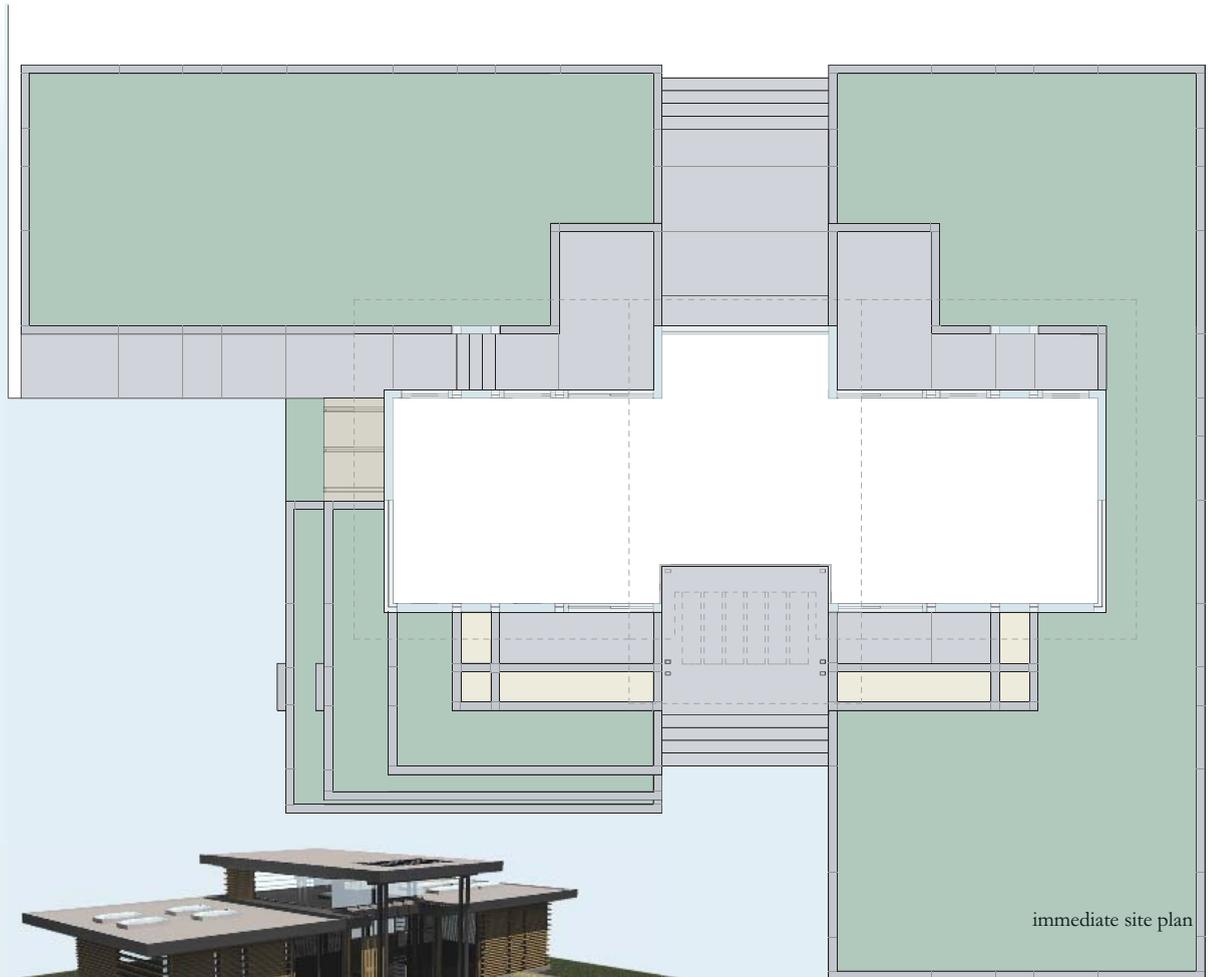


Because the use of pesticides and chemicals on crops can become a nuisance to the inhabitants of the house, a more natural approach will be used. Several of these strategies have already been mentioned, such as crop rotations and living mulch. Other strategies include genetically heartier plants and the use of plantings to attract predatory insects. These insects will kill the pests that feed upon the crops. The plants that attract these bugs typically include alfalfa, alyssum, caraway, carrot, celery, chervil, coriander, clovers, dill, daikay, fennel, parsley, radish, and yarrow. These plantings will be planted along the borders of the site to continue the two tree lines mentioned earlier.



example of "good bug" blend³

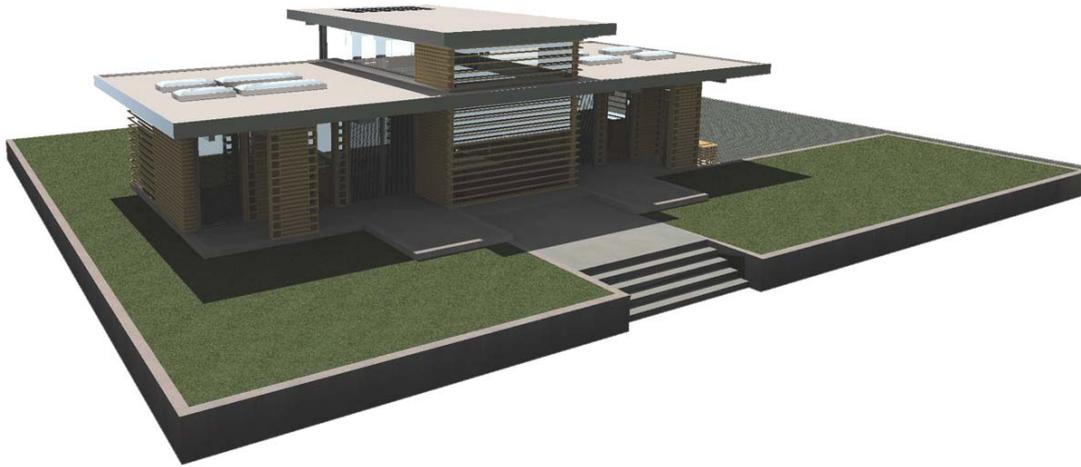




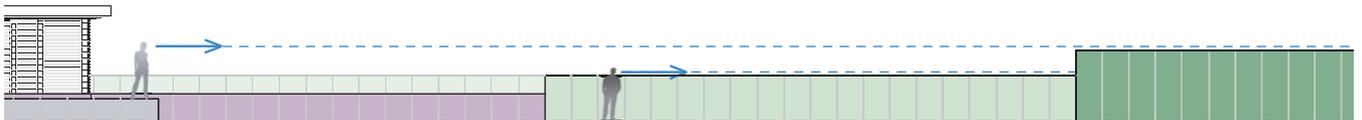
immediate site plan



The site immediately surrounding the house is the next platform for the screens. This is where the grid that the house is based on is first employed. The house is on a plinth that emerges out of the field.



The plinth allows an individual's view to emerge up out of the field. At ground level, a person's view of the horizon is very limited. He or she can see up over the tops of the five foot corn, but not over the eight foot corn. Once on the plinth of the house, one is able to see just over the tops of the eight foot corn and can see the extent of the horizon.



views extending into site



view of south façade

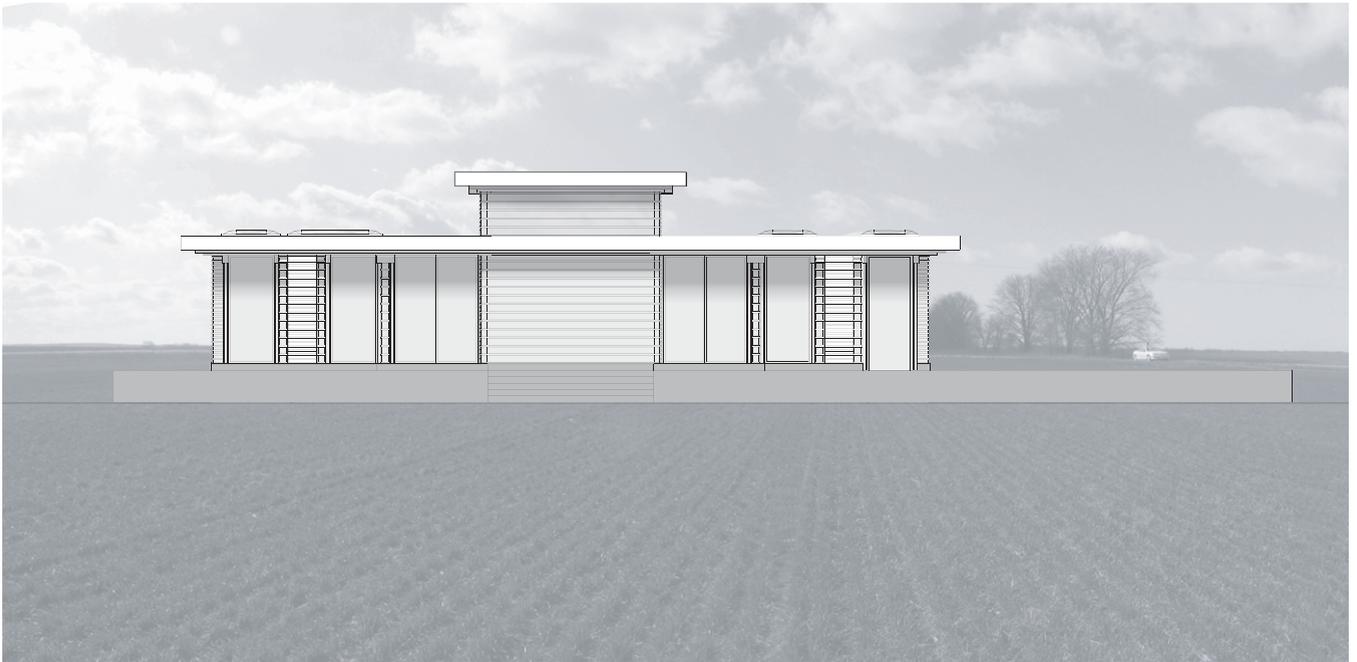
The exterior of the house is the next platform of the screens. The screen-like exterior foreshadows the screens held within. Its construction is similar to board and batten. Every other slat is carried across in front of the windows to form a screen. Like the interior screens, the exterior forms were created using the numbers 3, 5, & 8.



front elevation



view of north-west corner of the house



rear elevation



view of west side of the house



west elevation



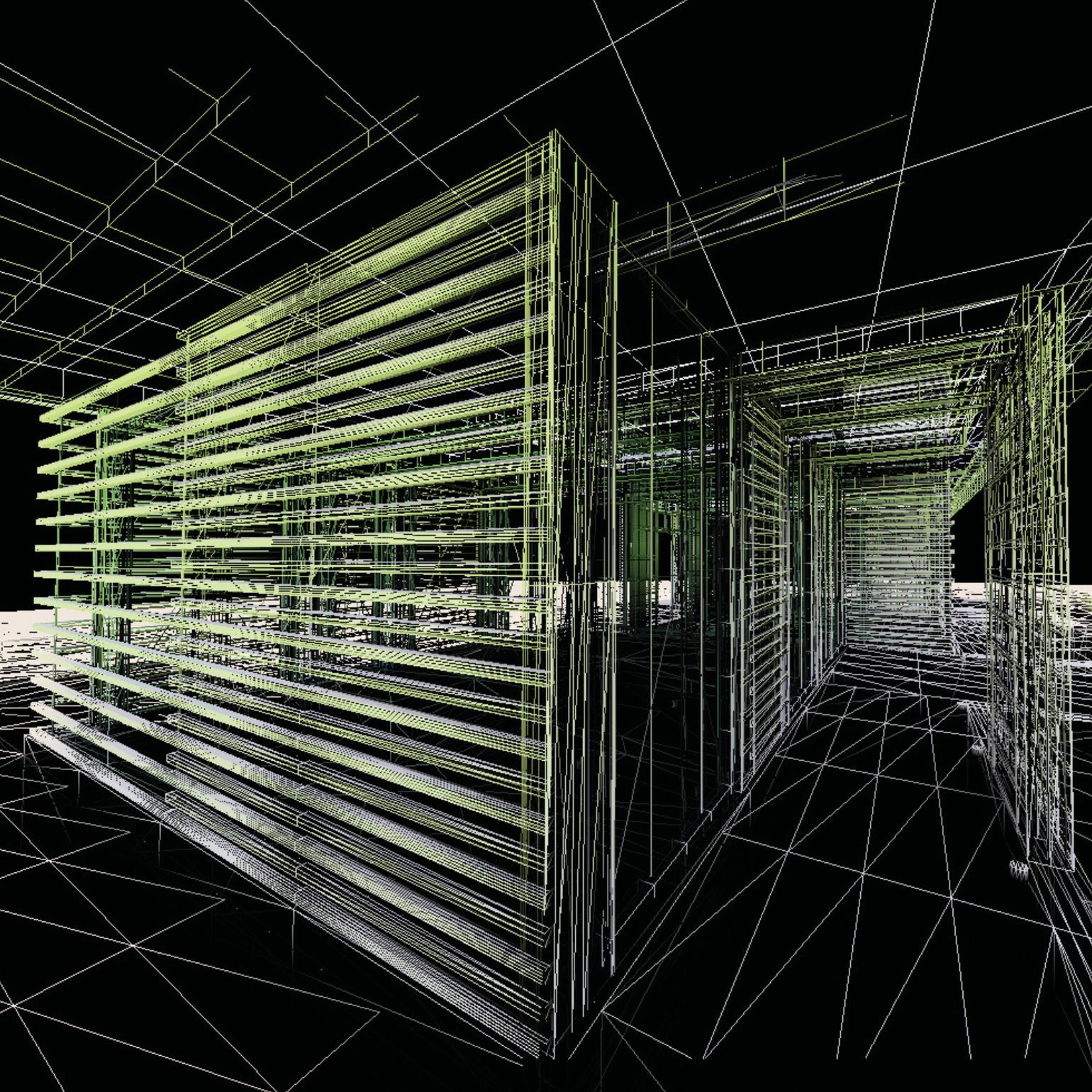
view of east side of the house

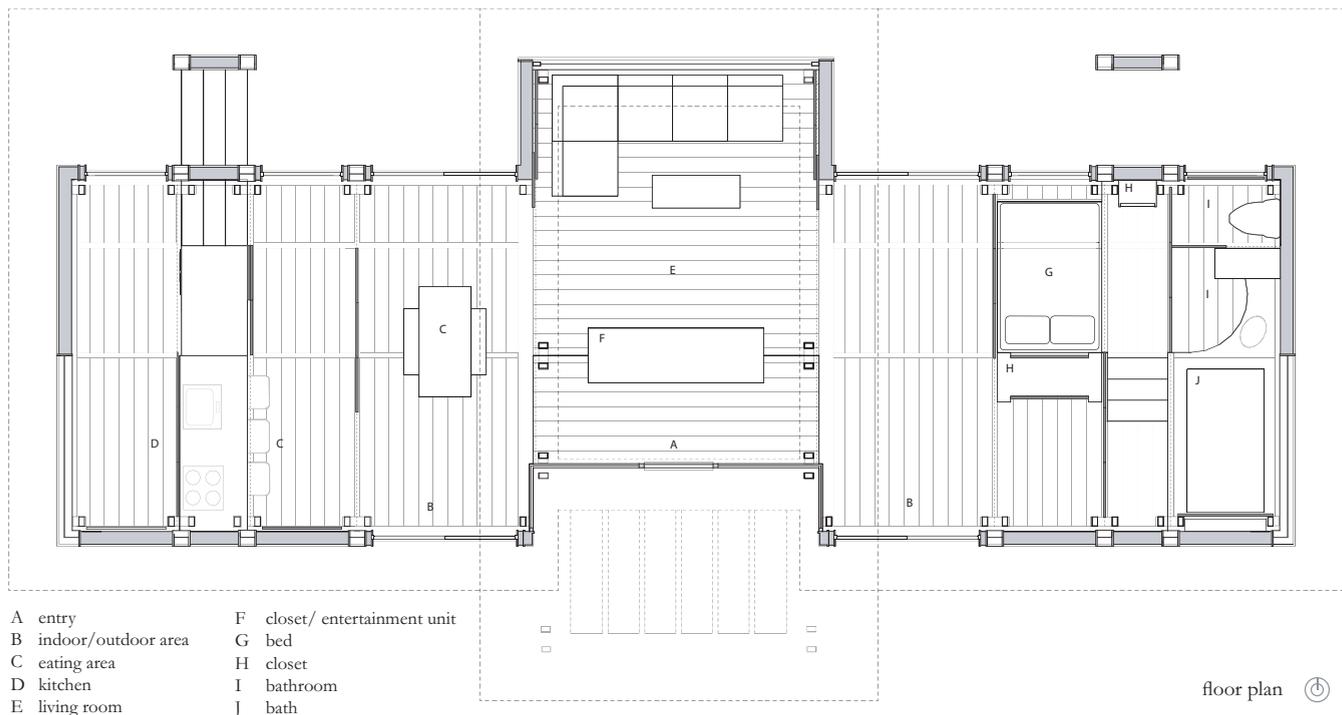


east elevation

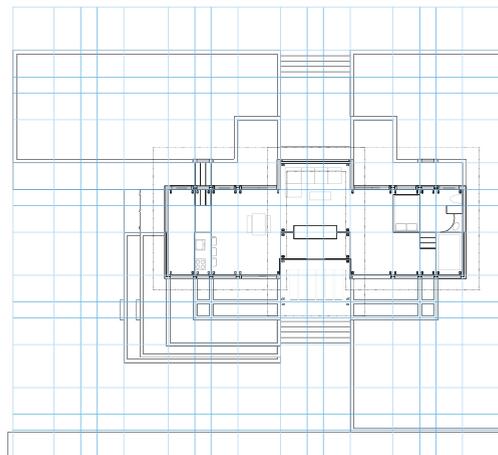
As one approaches the front door and peers into the front windows to the left and right of the door, one can get his or her first glimpse of the screens within. Depending on the position of the screens, one can even be able to look through a couple of screens at the same time to see the patterns they create.

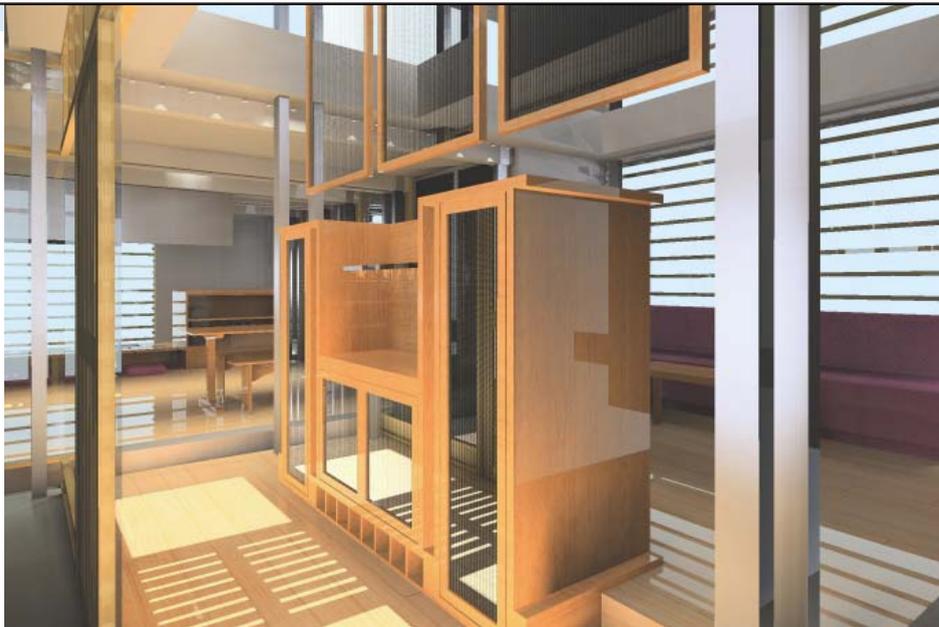




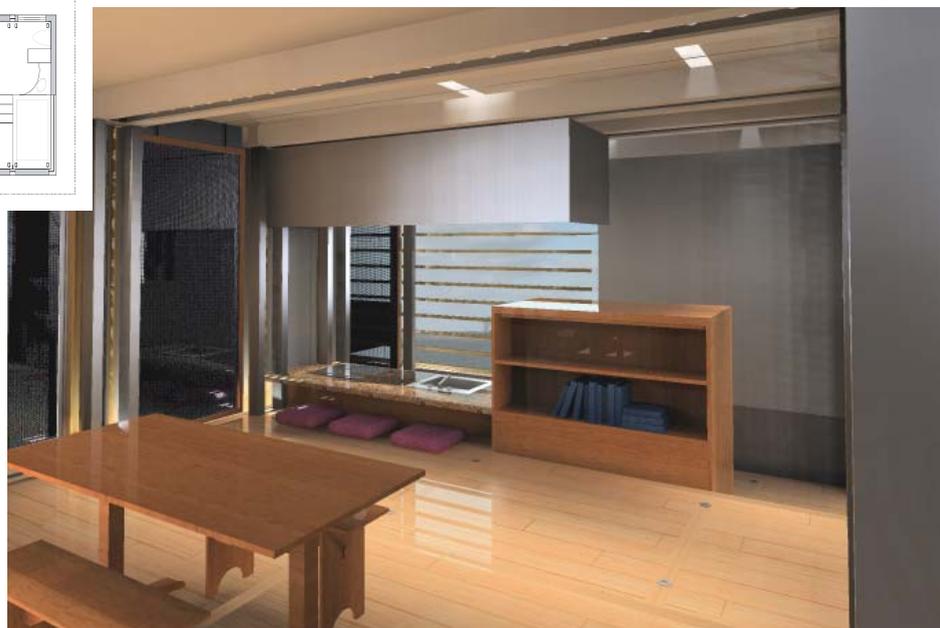
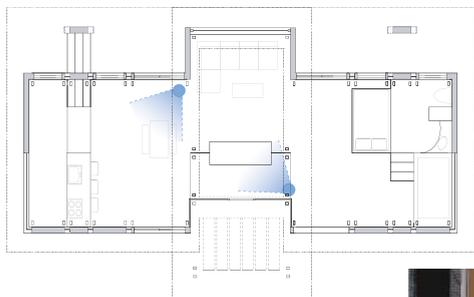


The floor plan is the most crucial platform for the screens. It is the primary force in controlling the placement of the screens. The floor plan was organized in such a way as to allow several different combinations of screens to be viewed. The combinations of screens, when looked through, provide different possibilities of patterns. This floor plan, that provides order for the screens, uses the grid that was created by the numbers 3, 5, and 8.





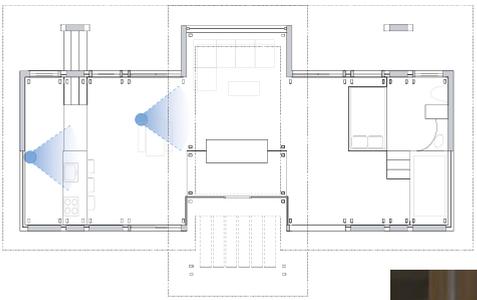
A. entry



C. eating area



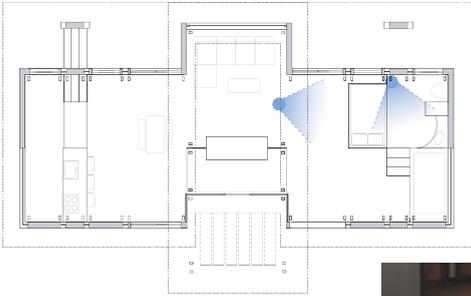
D. kitchen



E. living room

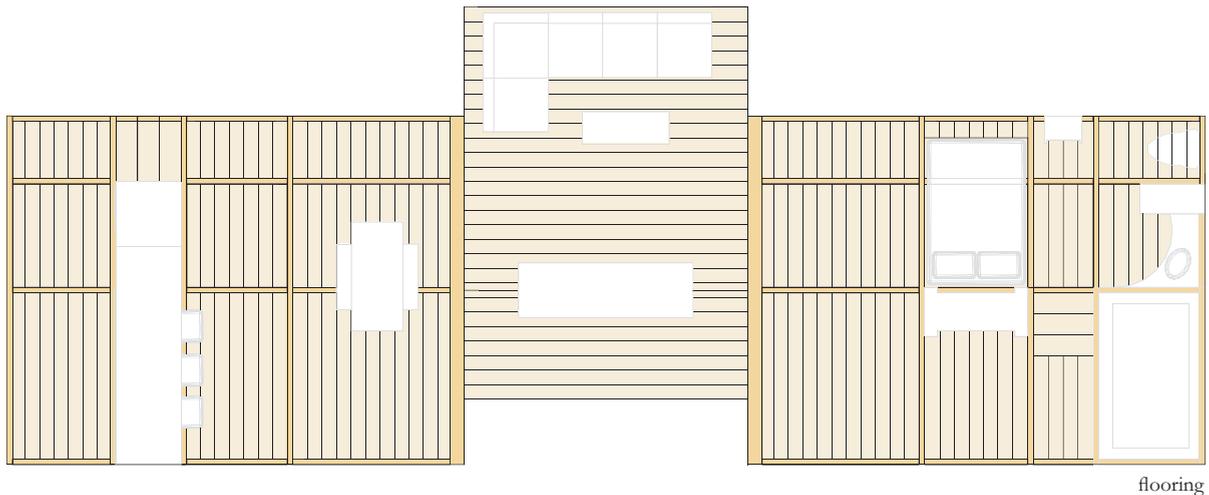


G. bed

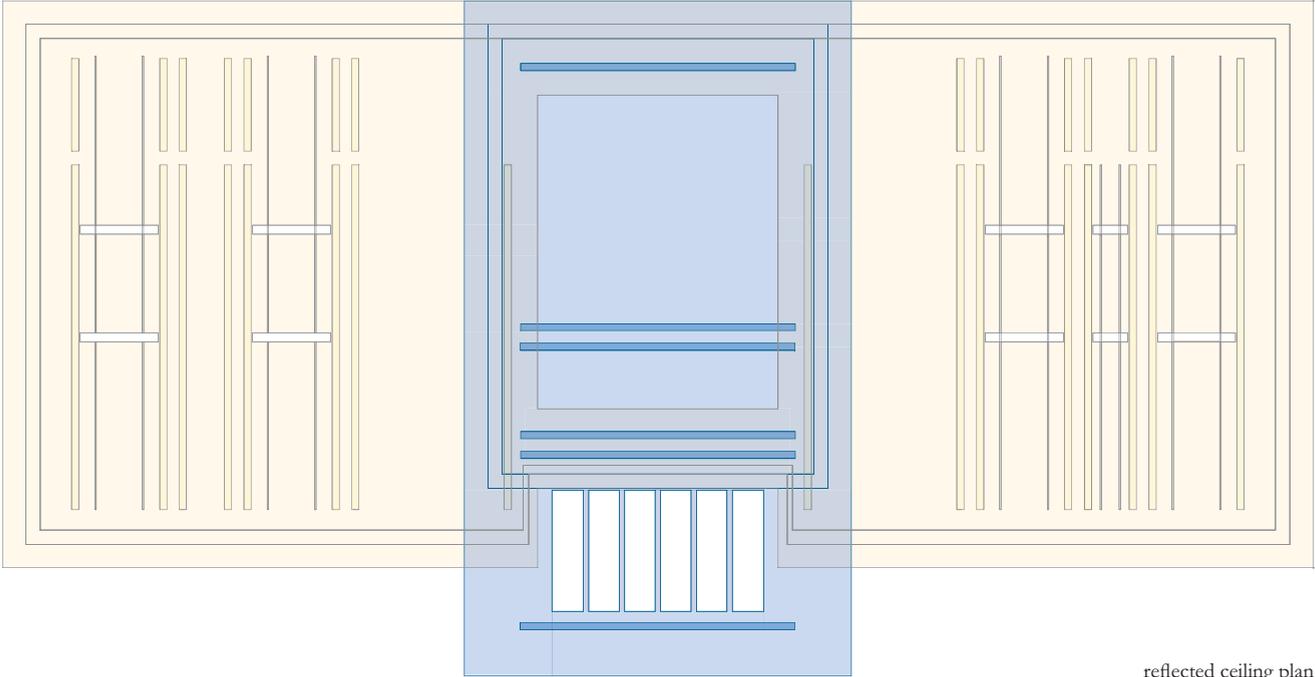


I. bathroom

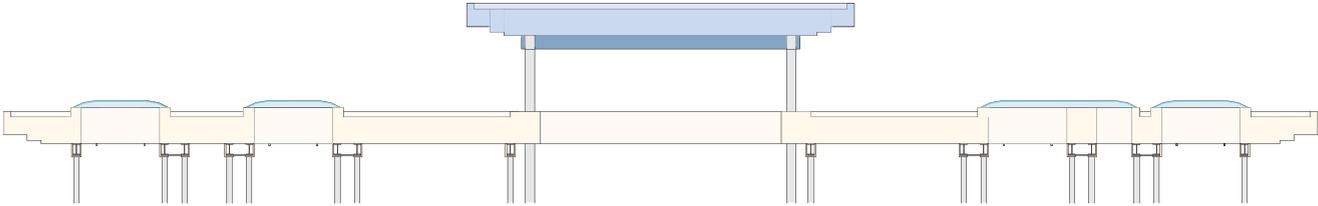
The flooring is yet another platform for the screens. The flooring is generally eight-inch wide strips of wood. However, the size of the strips changes to indicate where the screens move or rest. For the screens that are perpendicular to the facade, there are three-inch strips of wood to designate where the screens slide. For the screens that are parallel to the facade, there are three-inch strips to designate where the screens ideally rest.



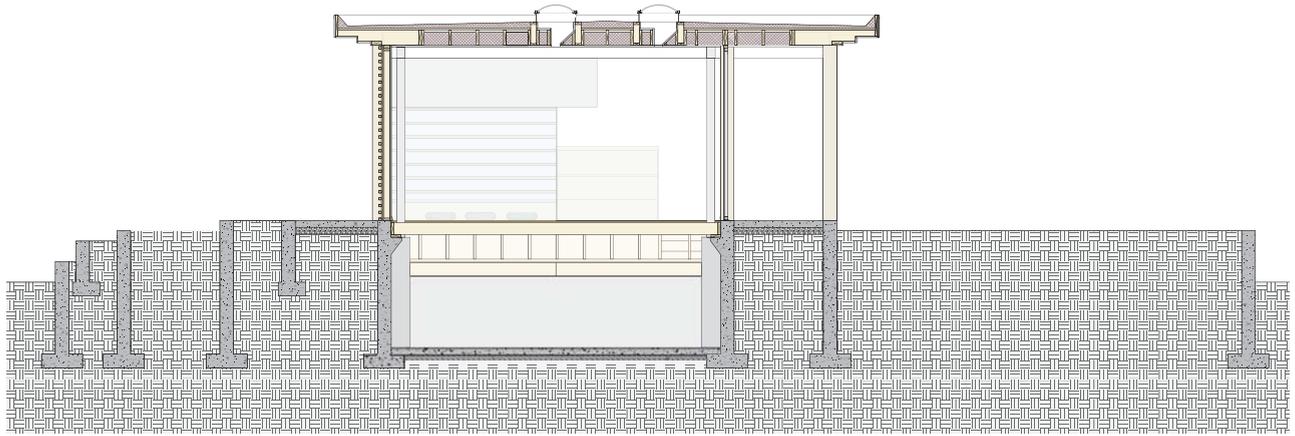
The ceiling indicates the moving and resting positions of the screens in a similar way to the flooring. Skylights in the ceiling suggest where the screens that are parallel to the facade should rest. For the other screens, the beams in the ceiling frame the screens by providing a gap for them to move. Also, the major source of artificial lighting for this house comes from between these beams, highlighting the screens beneath.



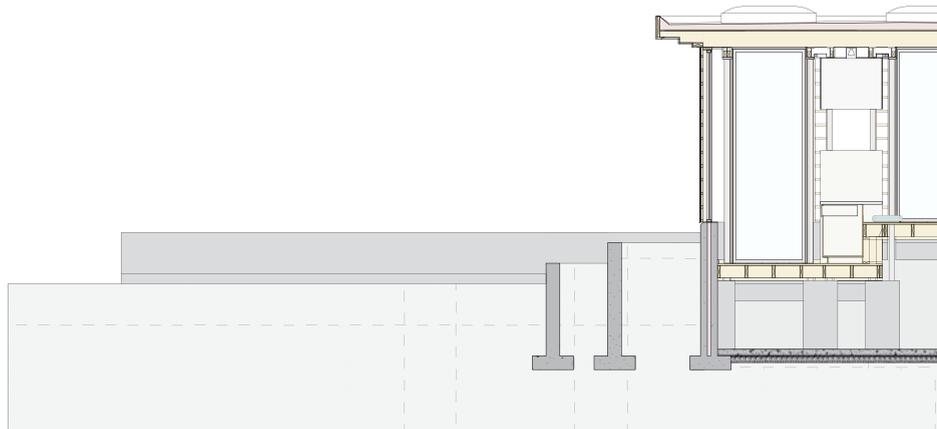
reflected ceiling plan

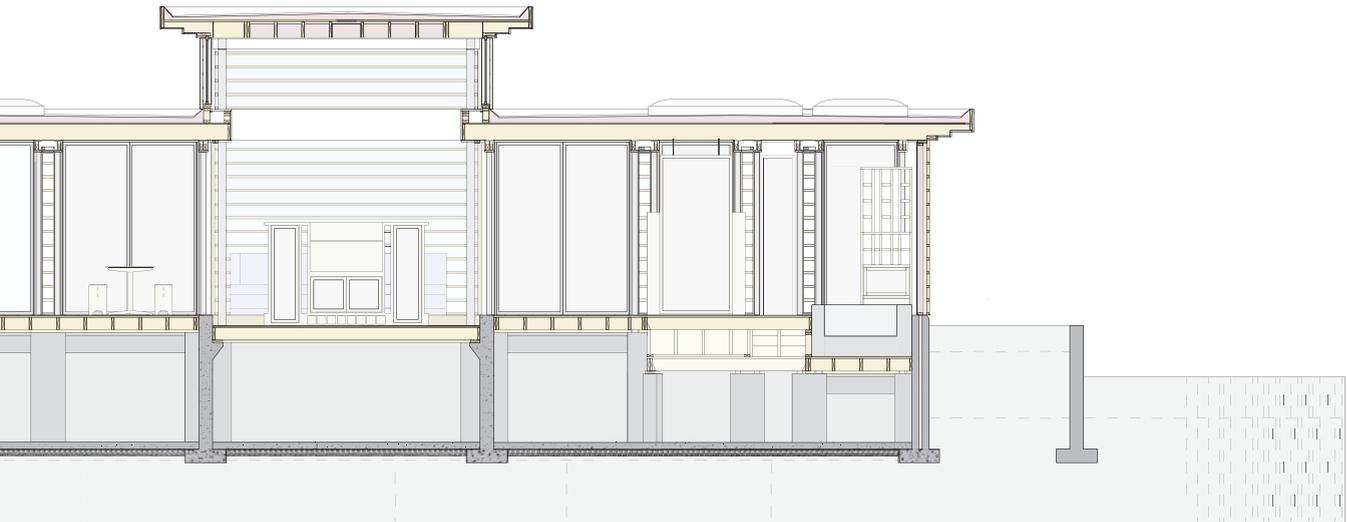
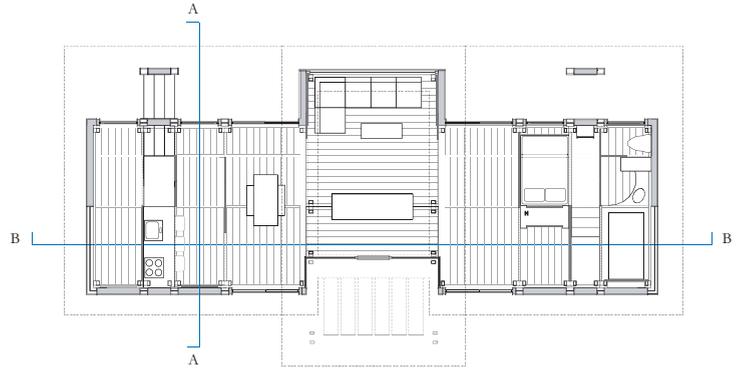


ceiling section

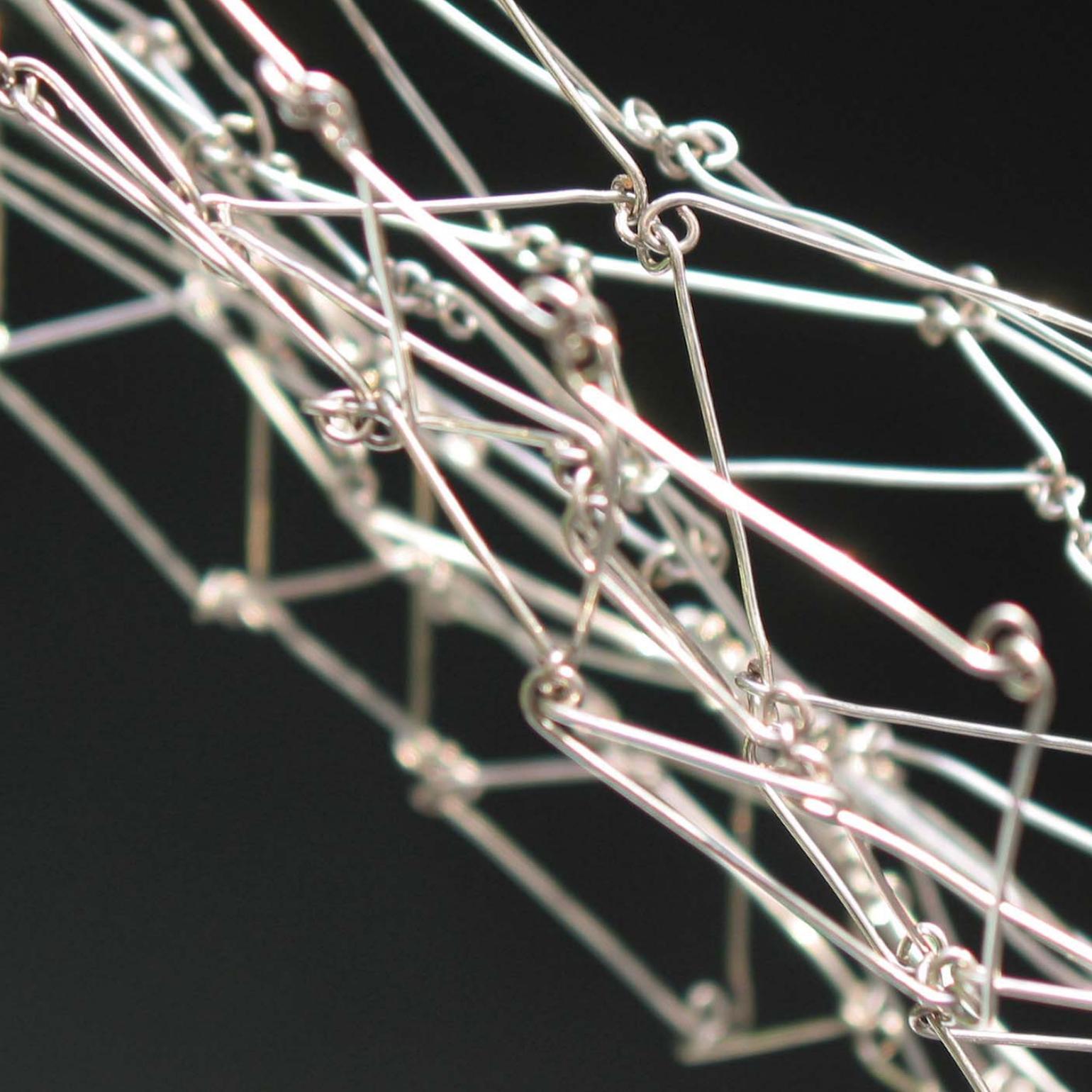


section A

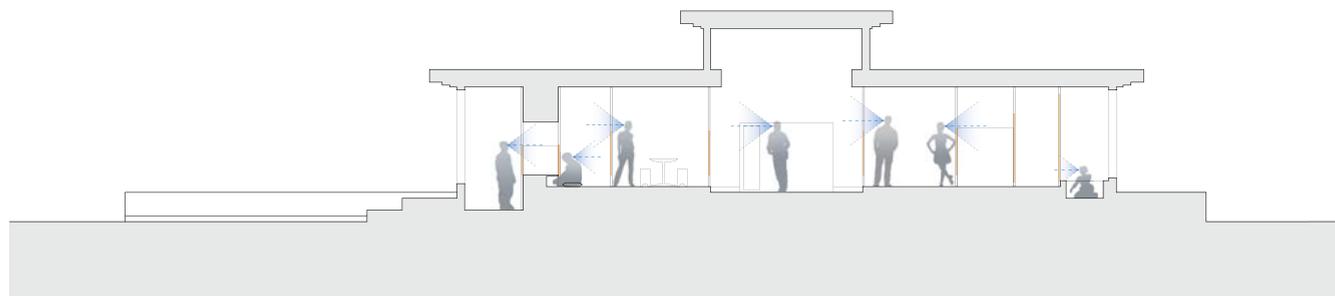




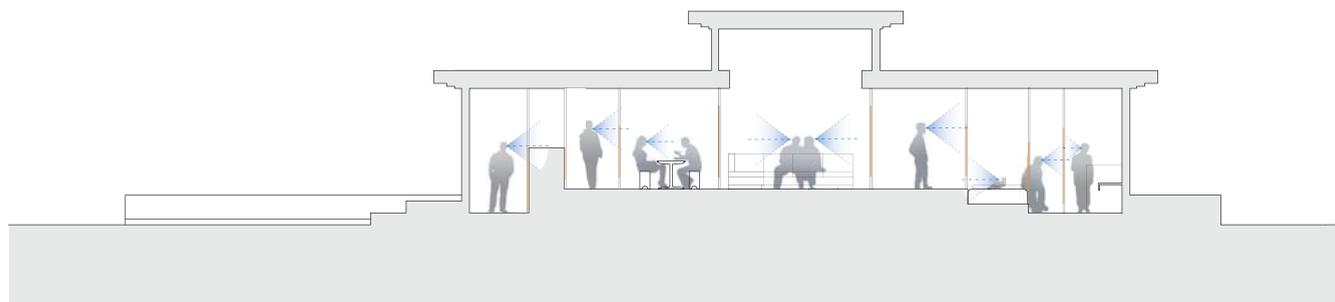
section B



The main criterion in the design of the platform was to design a space for the screens. This does not mean that the screens had no criteria for their design. The screens were designed with several factors in mind. These criteria were the use of the numbers 3, 5, & 8, creating patterns with multiple screens, and providing the privacy or sense of protection needed by the inhabitant.



section through front
portion of house



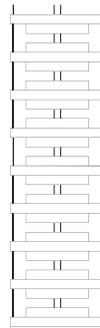
section through rear
portion of house

The two sections above help assess privacy and protection issues by showing the different activities that might take place and the lines of sight of the people. Different activities that are to happen within the space require different levels of privacy or protection. People have different senses of what privacy is and what levels of it are okay. In some instances a sense of protection or enclosure can be felt even when a view out is not totally blocked or a space is not totally enclosed. In other situations, if a view is not totally blocked, one can feel vulnerable depending on the activity, usually in the most private of places.



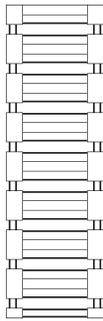
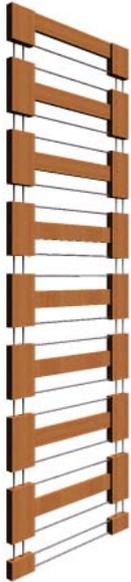
earlier version of screens

Creating pattern was another design criterion. In the design of the screens repetition of shape had to be used. In earlier versions of the screens the use of repetition was not employed. The result was that the patterns weren't very strong or cohesive. Simplicity was something else the screens needed. I noticed the simplicity of the mere horizontal and vertical patterns of traditional Japanese screens. These simple patterns formed the most pleasing screens.



LOCATION - between indoor/
outdoor areas and living room.

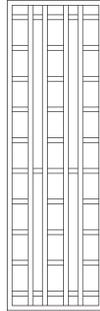
PURPOSE - provides separation
and a sense of enclosure for those
enjoying a movie in the living
room



LOCATION - between eating areas

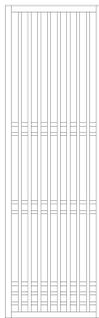
PURPOSE - provides a more intimate and formal dining setting for those at the table because it obscures the view of the surroundings. This is similar to Frank Lloyd Wright's use of tall backed chairs. For those sitting at the counter top eating area, it provides security. It is often unpleasant to be sitting on the floor seeing the underside of furniture or to have standing people that seem to tower above. This screen acts as a protection wall.

With traditional Japanese screens, the wood portion is what creates the pattern and rice paper serves as a background. This same approach was employed in the design of the screens.



LOCATION - between kitchen counter and eating areas

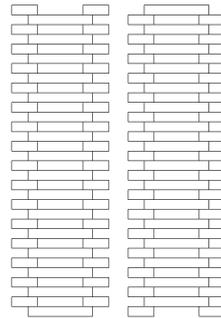
PURPOSE - shelters view of a potentially messy kitchen



LOCATION - between bed and indoor/ outdoor area

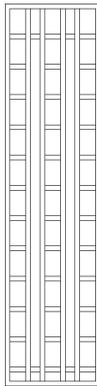
PURPOSE - provides privacy for those sleeping or for those changing clothes. The openings at the bottom of the screen allow for those in the bed to see out, while those standing or sitting on the other side of the screen can't see in.

The materials used in the screens are wood, glass, and metal. The wood used for the screens is a traditional wood used in the creation of Japanese screens. Port Orford cedar or Japanese cypress, two very similar types of wood, is traditionally used in shoji screen construction. These woods are traditionally used because they are lightweight, straight grained, and easy to work with. Where traditionally rice paper would be used for screens, these screens are composed of a translucent, frosted glass. The third material, used on just two of the screens, is aluminum rods.



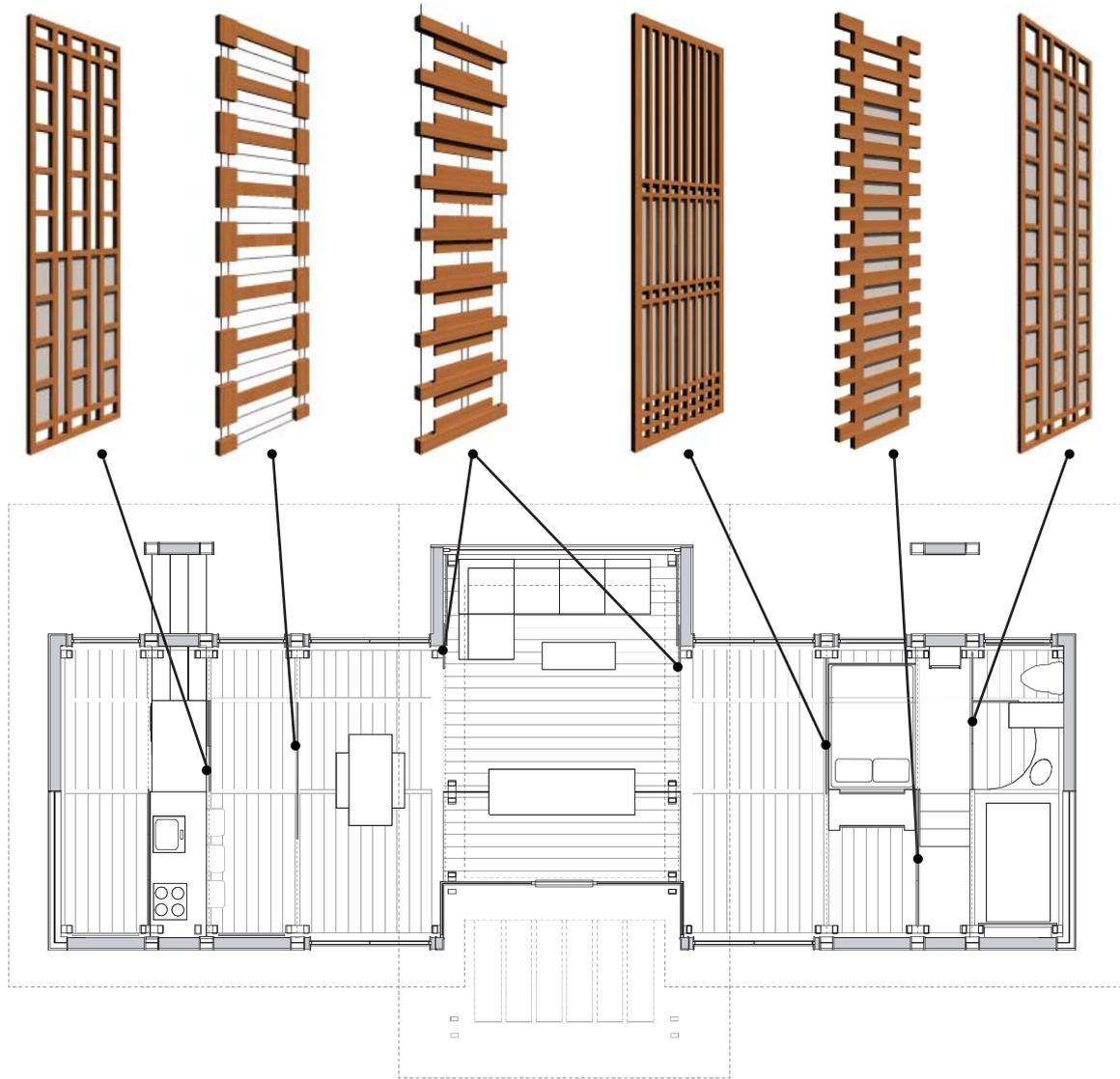
LOCATION - between bath and changing area

PURPOSE - provides privacy for those taking a bath or using the bathroom.

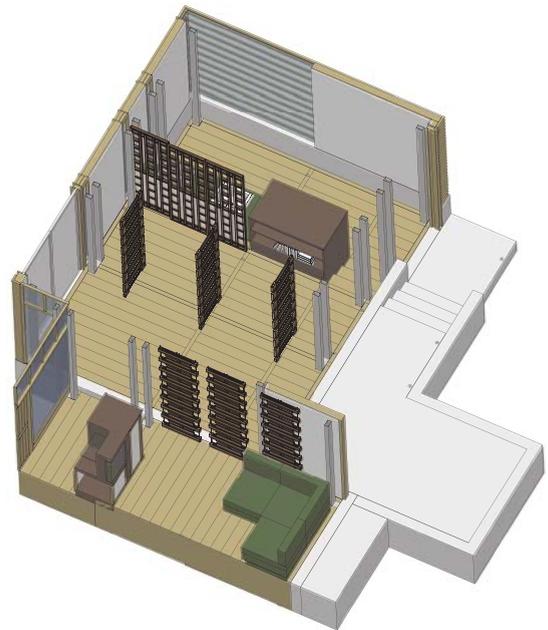
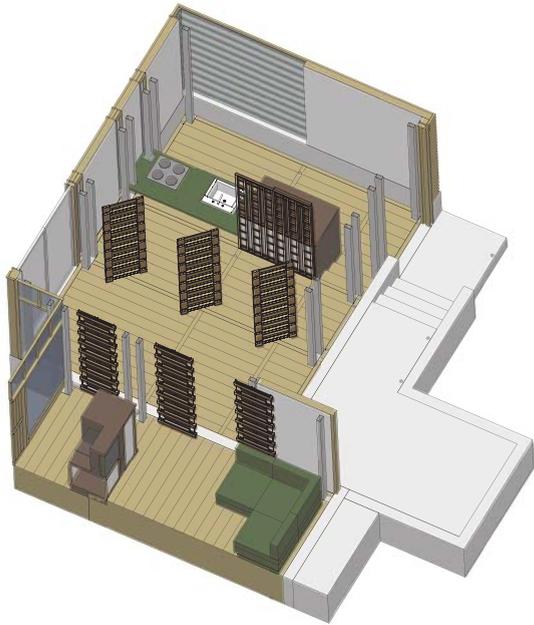


LOCATION - between bathroom and sleeping area

PURPOSE - provides most privacy for the bathroom



SCREEN LOCATIONS





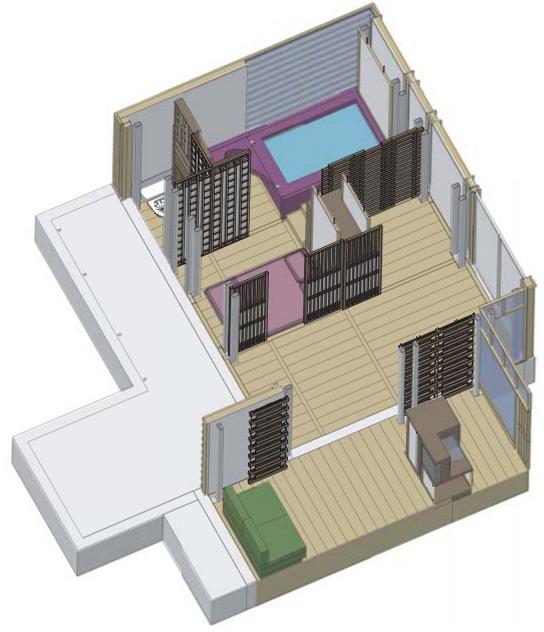
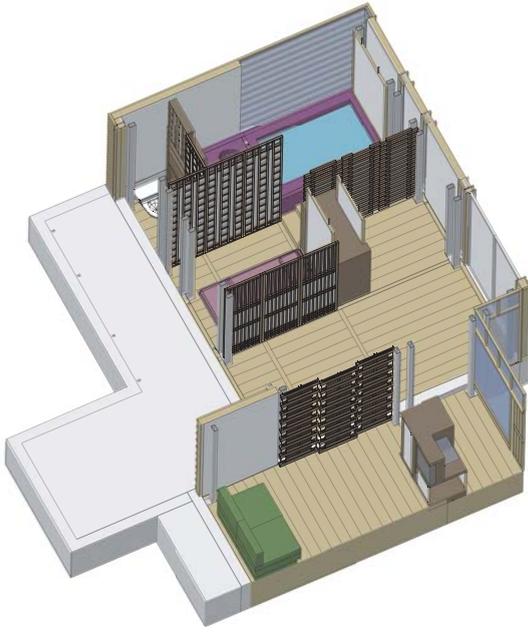
“I don’t like to see space nailed down. If you could move it and change it everyday, fine.”

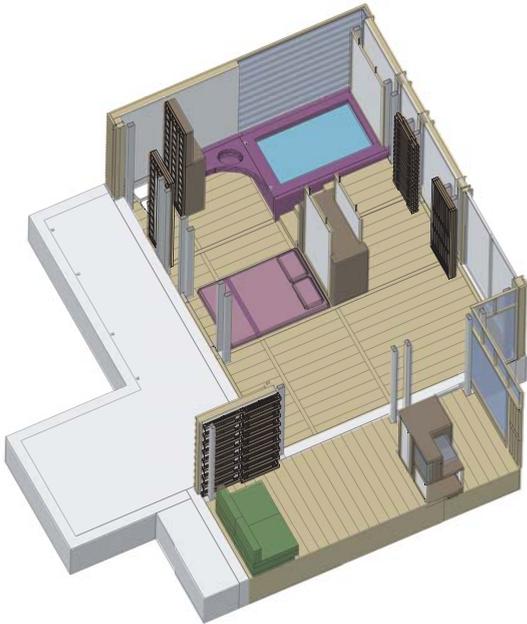
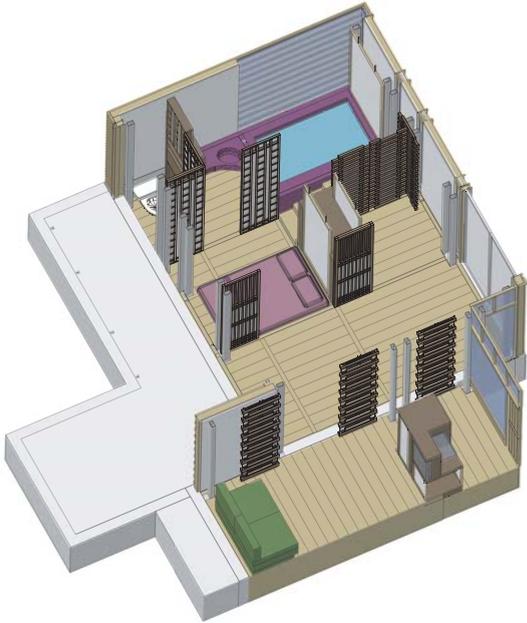
- Louis Kahn, Light is the theme

The movement of the screens provides flexibility and the possibility for change in the space. The user can reconfigure the space to whatever he or she likes, depending on the mood or the needs of the person. There are many possibilities. This page and the following page show just a few of these combinations.

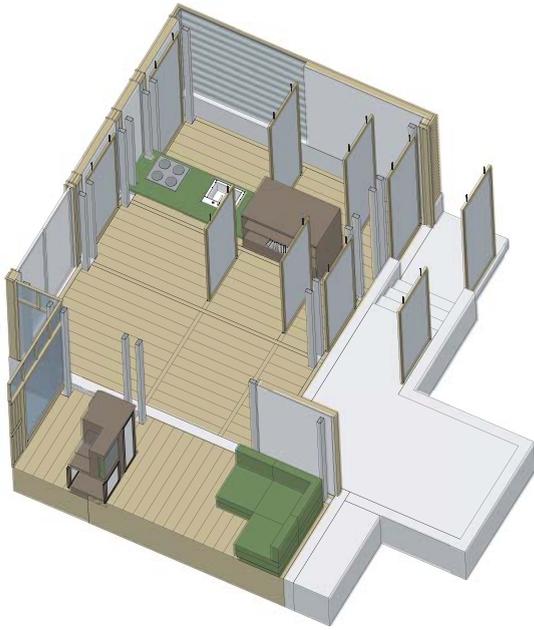


DIFFERENT SCREEN POSITIONS ON
WEST SIDE





DIFFERENT SCREEN POSITIONS ON EAST SIDE



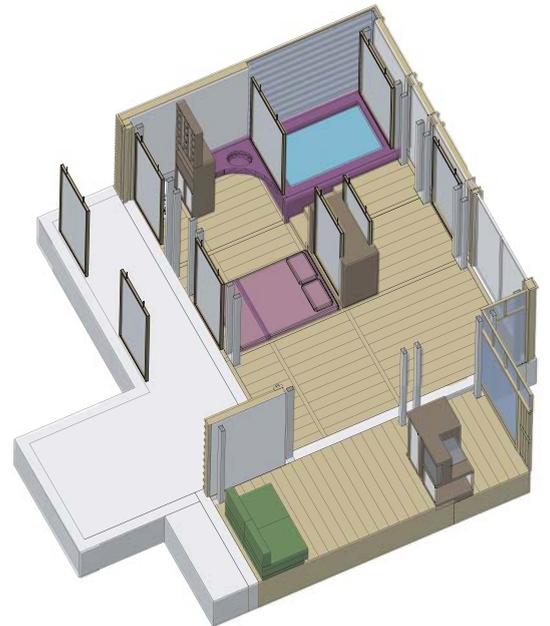
Screens that move parallel to the front facade are different from the screens already mentioned in the way they move and their appearance. These screens have a wooden frame and a metal fabric. They move on two tracks placed in the ceiling. They can slide from the interior to the exterior. Sliding the screens to the exterior creates a blur between the distinction of inside and outside.



metal fabric panels blur the distinction of inside and outside



metal fabric ³





Cloth fabric panels act as the third type of screens within the house. In the kitchen a loose weave fabric will be used. The purpose of the fabric is to obscure the view of a messy counter top from the kitchen side. Second, it provides a more neutral background for the screens to be displayed, rather than having another set of patterned screens.



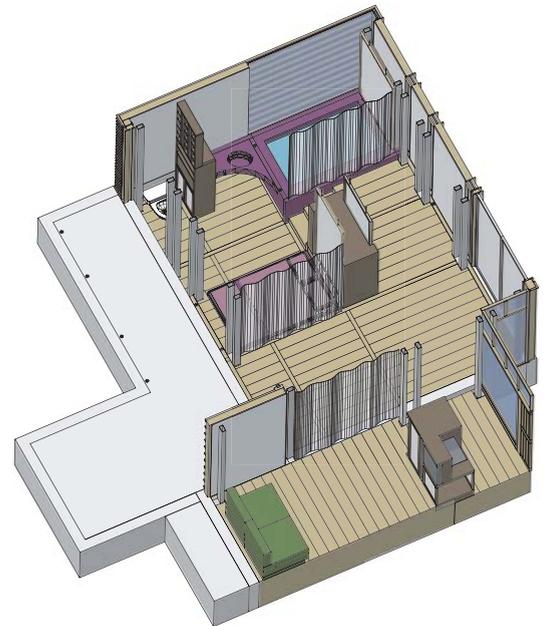
indigo-dyed linen screens ⁴



translucent fabric ⁵

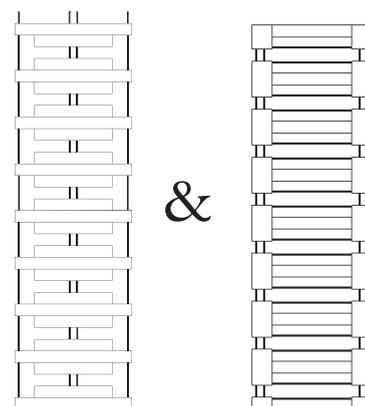
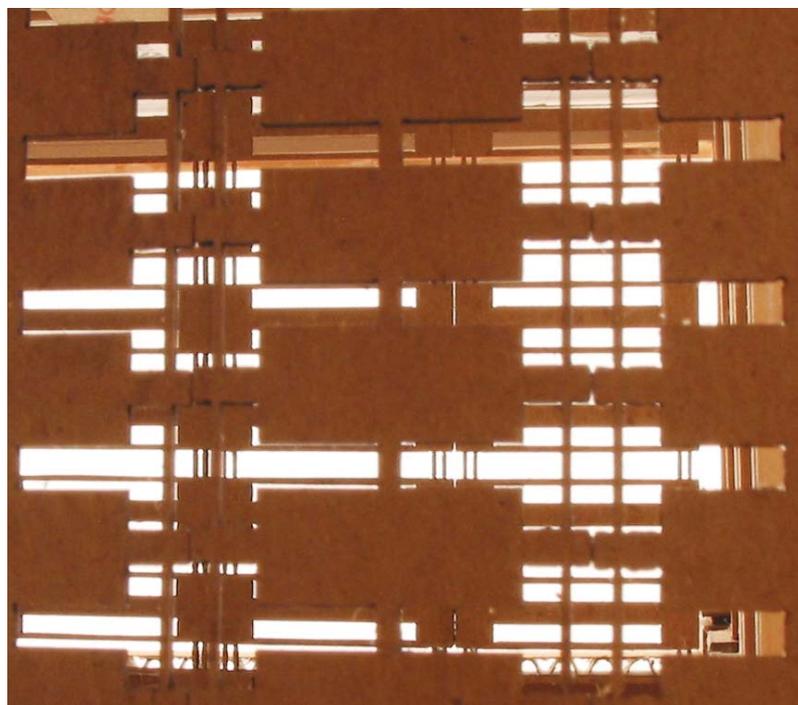
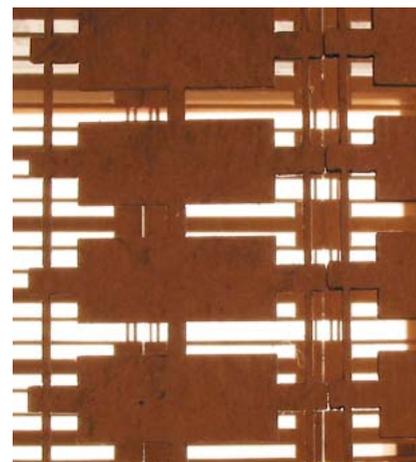
In the living room and bedroom, translucent but not transparent fabric panels are used. This adds additional privacy. The fabric panels in the living room allow it to double as extra sleeping space.

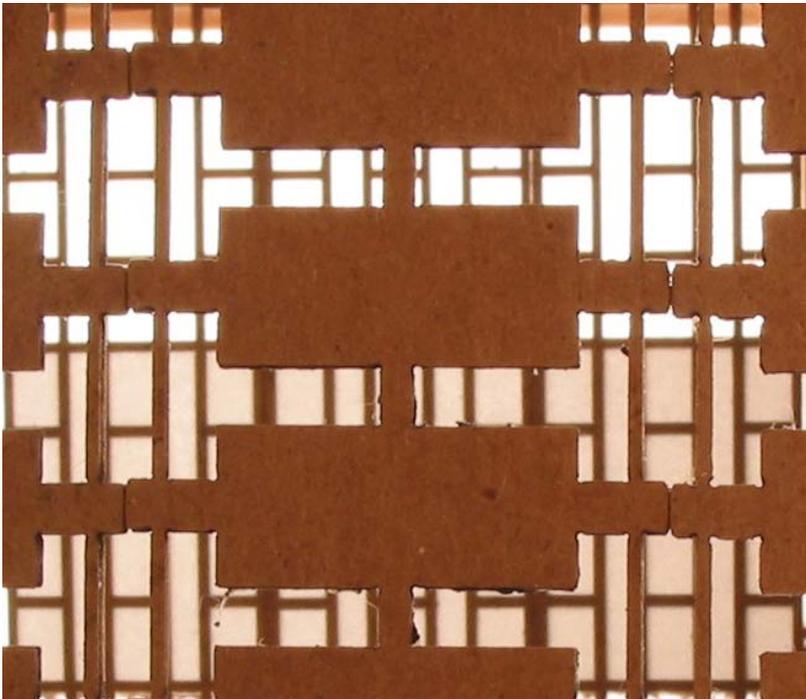
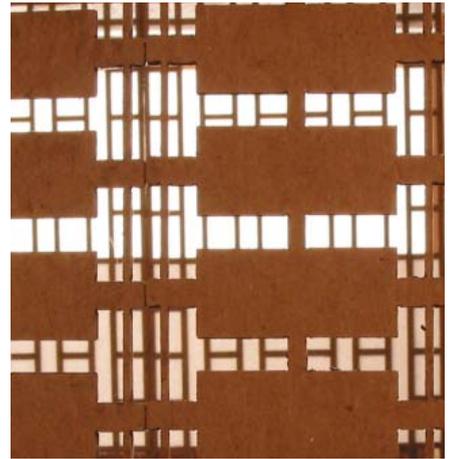
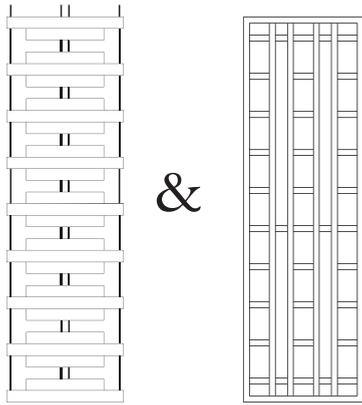
The final fabric panel is by the bath. It provides privacy and encloses the tub.

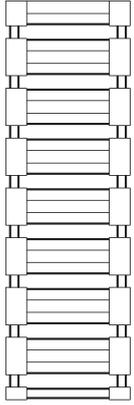




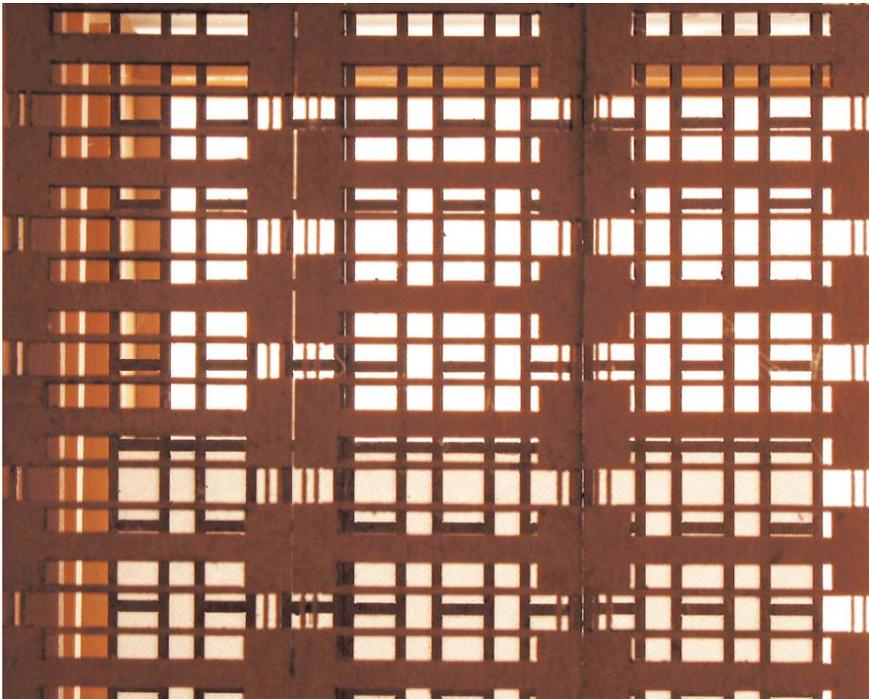
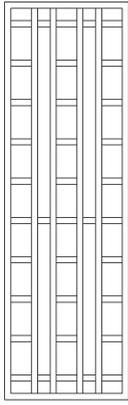
In changing and moving the screens not only can different types of spaces be created, but several patterns can be created as well. On the following pages are some of those patterns.

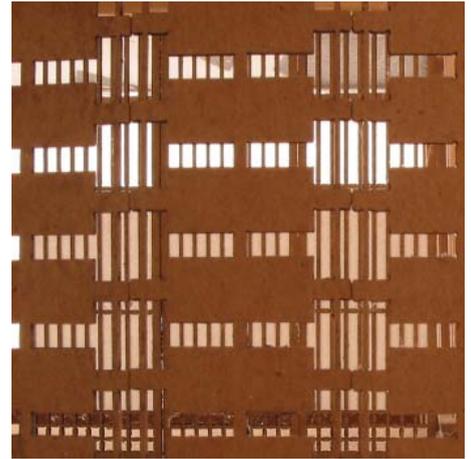
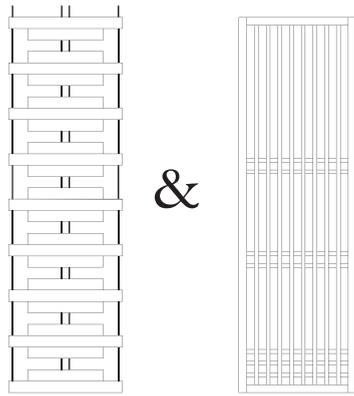


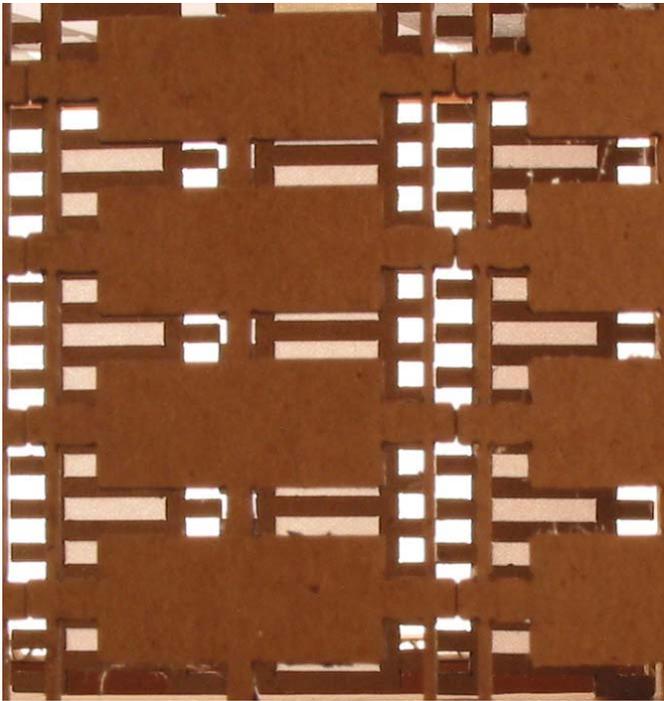
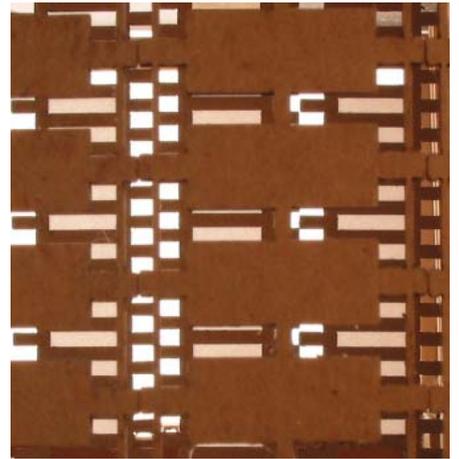
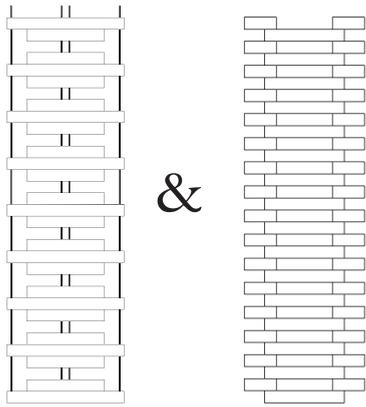


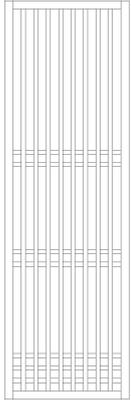


&

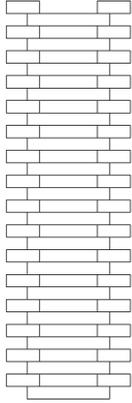


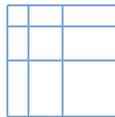






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In the end, the project was about ornament. The beginnings of the word *ornament* are wrapped up in the Greek word *κόσμος*, meaning order. Throughout the project everything was well ordered by the geometrical base of the Fibonacci numbers and the grid created by those numbers. The structure of the house itself created order. The house contained distinct places where the screens could be placed.

The screens themselves are a form of ornament. The screens have repetition which is seen so often in ornament. Similar to Sullivan's ornament, the patterns formed by the screens have different layers or depths. Perhaps the best thing about the screens is that they are a changing, moving form of ornament, allowing the inhabitant to everyday choose his own patterns.

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IMAGE CREDITS

Unless otherwise noted, all images are the work of the author.

1. Sliding screens in a samurai residence- Black, Alexandra, *The Japanese House*. Tuttle Publishing. Boston, Massachusetts. 2000. pg 116. (photography by Noboru Murata).
2. “Good-bug blend”- <http://www.groworganic.com>
3. Metal fabric used in a gazebo- <http://www.archi-visions.com>
4. Indigo-dyed linen screens- Black, Alexandra, *The Japanese House*. Tuttle Publishing. Boston, Massachusetts. 2000. pg 128. (photography by Noboru Murata).
5. Translucent fabric- <http://www.ferrousland.com>

VITA

JENNIFER C. STARKEY

Education

Master of Architecture
Virginia Polytechnic Institute and State University
2004

B.S. in Housing and Environmental Design
Olivet Nazarene University
2001

B.S. in Business Administration
Olivet Nazarene University
2001

