Active Design: Creating a Blue Zones model for interior environments

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ACTIVE DESIGN

creating a Blue Zones model for interior environments

alexis c. holcombe
ides 699 spring 2017
virginia commonwealth university
Integrity
approach work honestly and openly
Intention
define concept and plan clearly and articulately
Integrity
give meaning and order to materials
Integrity
respect and care for people and the earth

I am committed to making design that serves many and is universal, because that is economical, sustainable and ethical. But I honor design that celebrates the individual, because that is personal, poetic and joyful.

Design is power.
Designers have a responsibility to help people experience and manage their time and place on earth.

— Alexis Holcombe
“It is a question of environment.”

That was the assessment of Dr. Pekka Puska, a cardiologist and public health professor with Finland’s National Institute for Health and Welfare (THL). I was sitting at a cozy kitchen conference table with Dr. Puska and his associate, Vesa Korpe- laine. They had agreed to meet with me at their office in Joensuu, Finland, a seven-hour journey by train from Helsinki, through endless miles of thick Baltic birch forest.

I visited Joensuu and Helsinki to discuss the connection between interior environments and public health. Dr. Puska had reservations that he could provide any useful insights to a researcher looking for clues to well-being and indoor health. Yet as our conversation continued, it was clear that both men noticed the same growing awareness that I had intuitively grasped after reading The Blue Zones Solution by Dan Buettner. The environment is critical to healthy living, both indoors and out.

The germ of an idea that grew into this book started in the summer of 2015. I had just finished reading The Blue Zones Solution before entering the master’s program at Virginia Commonwealth University’s department of interior design. After a six-week immersion in the department’s summer intensive workshop that prepares master’s students for the rigors of a two-year design program, I started to wonder whether interior design could help people live longer, healthier lives.

I learned about Dr. Puska’s effort to address a public health crisis in Joensuu from reading Buettner’s work on the Blue Zones. Although it was one thing to define areas of the world where people already were living long, healthy lives, Buettner’s challenge was to discover a way one could create a Blue Zone from a community where people led comparatively unhealthy lives.

Dr. Puska explained how, as an idealistic young doctor in the 1970s, he proceeded to help bring Joensuu back from the brink of a serious public health crisis. North Karelia, the eastern province where Joensuu is located, had the highest mortality rate for men under the age of 35 in Finland. Through trial and error, Puska and his associates learned that they couldn’t make a lasting difference by treating people individually. Instead, they discovered that a community approach based on lifestyle changes was the most effective, long-term solution to addressing the problem. And so, they took an ecological approach and worked with grocers, restaurant owners, teachers, parents, doctors, students—anyone from the community who wanted to participate.

Using this example, I conceived of a mixed-use building project in Richmond, Virginia, where one could live, eat healthfully, and participate in a mind-body strengthening program. I hope to provide a blueprint for a micro-Blue Zone for healthy living within the context of modern-day urban Richmond.

I am grateful to Dr. Puska, Mr. Korpelainen and their associate, Dr. Tiina Laatikainen, for initiating this research and design process.

Alanna Holcomb
How might interior environments play a role in promoting lifelong well-being? According to Passarino, et al., genetic variety only accounts for about 25% of the variation of human longevity. A combination of diet, environment and exercise comprise the greatest factors.

The amount of time Americans spend indoors presents a challenge to increasing physical activity: the Environmental Protection Agency (EPA) states that Americans spend 93% of their lives indoors (Roberts, 2016). Therefore, if physical activity is crucial to living longer, the design of interior environments could logically be a critical factor in promoting natural movement and sustaining lifelong well-being.

National Geographic fellow Dan Buettner identified five “Blue Zones” throughout the world where people naturally live longer: Ikaria, Greece; Okinawa, Japan; Oligastra Region, Sardinia; Loma Linda, California; and Nicoya Peninsula, Costa Rica. These regions have unusually high concentrations of centenarians who had grown old without noticeable signs of heart disease, obesity, cancer or diabetes (Buettner, 2015).

Buettner identified nine common principles that universally characterize well-being in the Blue Zones. The first, and most crucial to design in the built environment, is to “move naturally.” Healthy centenarians, Buettner says, “live in environments that constantly nudge them into moving” (Buettner, 2015).

This research will seek to translate Blue Zone principles aimed at promoting continued well-being through natural movement into interior environments that can inform principles for the creation of interior environments.

**RESEARCH METHODOLOGIES**

Further analysis of Blue Zones principles will address specific conditions and behaviors that encourage natural movement. A literature review and case studies will be presented that show a correlation between natural movement within the built environment and measurable increases in healthy outcomes. The example projects include La Maison de Verre, Paris, France; L’Unité d’Habitation à Marseille, France; and Tea House, Bethesda, Maryland.

Interior design that encourages regular natural movement occurs primarily in the design of a building’s major circulation systems and its program (Center for Active Design, 2010). Corridors, elevators and lobbies that connect other spaces in the program encourage walking. Elements like stairs, bicycle storage and furniture that produce micro-movement promote activity when they are visible, safe and attractive. Programmed spaces that encourage physical activity like dance/movement studios and those that promote healthy diets also lead to increases in healthy behaviors, which ultimately lead to increased longevity.

Using these guides, a building in Richmond, Virginia will be redesigned as a micro-Blue Zone that could be used as a model for promoting increased lifelong well-being. This two-level adaptive reuse, mixed-use commercial project will address vertical transitions, social spaces and outdoor relationships that encourage residents and visitors to move throughout the day.

**THESIS ABSTRACT**

How can interior design help us live longer, healthier lives?
There are many factors that work against creating healthy life habits for most Americans. Cheap, high caloric food with little nutritional value adds pounds and degrades our bodies’ ability to fight disease. Technological advances make life easier but also make us more sedentary. Previous generations moved more because they had to and ate simpler diets. Scarcity and hardship created an environment where people’s bodies worked harder to maintain health. As researcher Dan Buettner notes in *The Blue Zones Solution* (2015), most Blue Zones residents, such as those in Sardinia and Ikaria, for example, live in communities that are physically isolated from many modern conveniences. These individuals live largely in the same way they did a century earlier. Their simpler lifestyles hold the key to understanding their long and healthy lives.

Buettner’s research on the Blue Zones shows that it is possible to create modern day environments that mirror the experiences of Blue Zones centenarians. The results from these Blue Zones community “makeover” projects has produced noticeable results in 31 communities across the U.S., with an impact on more than 2,000,000 lives.

The Blue Zone principle of moving naturally means people can add more exercise to their daily routine without going to the gym. Making your food choices, more social connections and having a purposeful outlook round out the Blue Zones blueprint.

This project’s proposed mixed use, adaptive reuse addresses three major program areas: nine residential apartments, a tai chi studio, and a modern day Japanese tea room.

**HOW TO BLUE ZONE THE HOME**

A. deconvenience the home to maximize movement
B. create an efficient kitchen layout
C. have plenty of cleared kitchen counter space and good lighting
D. make the bedroom a sanctuary for a good night’s sleep
E. own only one TV
F. have indoor plants for better air quality
G. create a quiet destination space for relaxing and meditating
H. place seating on the floor
I. ride a bike and walk a dog to get moving outdoors

**HOW TO BLUE ZONE THE ENVIRONMENT**

J. move naturally throughout the day
K. have a sense of purpose and live for something beyond work
L. make food and dining sacred by eating a plant-focused diet with friends and family
M. bring together a group of mutually committed friends
N. downhill and shed stress by meditating, napping or praying

**THE POWER NINE**

01. move naturally
02. downshift
03. plant slate
04. 80% rule
05. purpose
06. right tribe
07. family first
08. night rule
09. community

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Buildings and sites can have a measurable impact on occupants' health. Buildings and the form of buildings, as well as amenities, programming, and circulation have all been shown to affect physical activity (Zimring, Nicoll, and Tsepas, p. 188-90). Likewise, building elements can promote or deter physical activity. Stairs are the building element that have the greatest potential for affecting human health positively. Studies have shown measurable impacts on weight reduction and risk of stroke or death when occupants use stairs rather than elevators or escalators.

Yet while behavioral choices are governed by the built environment, cultural norms, economics and social trends also play a crucial role in defining the ways in which we use buildings. The social behavioral model of individual behavior change is governed by societal, community, organizational, interpersonal and individual factors.

Adults with low self-efficacy only increase their participation in physical activity if they have increased access to sports facilities. Adults with high self-efficacy, on the other hand, find a way to maintain a consistent program of physical fitness regardless of their access to sports facilities. High self-efficacy is also linked to better knowledge about nutrition and social support for eating fruits and vegetables (Zimring, Nicoll and Tsepas, pp. 265-66).

The feature staircase at the Buckingham County Primary and Elementary School is located near the building’s entrance. Colorful handrailings are placed at kids’ heights, while the stair connects important shared common spaces and acts as a social hub. Source: Tom Daly.

Blue Zones residents incorporate instrumental and hybrid activity in their daily lives naturally. For modern societies that rely on convenience, such activity must be more deliberately considered.

**ACTIVE DESIGN FOR WELL-BEING**

**CONVERGENCE**
- Identity (branding and marketing)
- Sustainability (environmental and social)
- Economy (cost)

**AFFORDANCES**
- Using building features and technologies
- Corners, entries, stairs, barriers

**COORDINATION**
- Aligning social and environmental trends
- Spatial familiarity for community, health, and public contact

Concern for well-being and the environment can encourage social trends.

**RESTORATIVE ENHANCEMENTS**
- Sensory, tactile, and visual experiences
- Human and nature contact

**STIMULATION**
- Loud noise, bright light, strong smells, bright colors, crowding

### Movement and happiness

Equally as important as hybrid physical activity are the smaller and more subtle forms of movement that we engage in every day. A new study tracking 10,000 smartphone users shows that “inactivity, which has been linked to poor physical health, is also linked to poor psychological health” (Lathia, Sandstrom, et al., p. 1). Research on self-reported levels of “happiness” and physical well-being has mostly focused on exercise. This new research shows a link between happiness and even exercise movement by using a smartphone app to track self-reports of happiness.

Fidgeting

Humans spend a great deal of time sitting, most of it while sitting sedentary. “Leaders of movement promotion activities say that most of us spend between eight and 10 hours each day seated. During that time, we do not break and, in particular, our legs hardly move” (Reynolds). This causes a clear decline in the flow of blood to our legs, and lower blood flow results in hardening of the arteries. Standing can improve this by causing leg muscles to contract and blood to flow.

But it’s not always acceptable to stand in some situations, such as a long meeting or during a long trip. A study in The American Journal of Physiology Heart and Circulatory Physiology testing a small number of healthy young people showed that fidgeting could produce enough lower body muscle movement to significantly elevate blood flow to the legs.

### Buildings and stress

Four identifiable dimensions of the interior built environment could affect human health by impacting stress levels, which in turn has shown to affect overall physical health by altering one’s ability to cope with the stress.

- **Rationale**: Inflexible resources and arrangements prevent effective interaction with interiors.
  - **Control of the environment**
  - **Integration of elements**

- **Transcendence**: Sensory, tactile, and visual experiences
  - **Human contact with nature**
  - **Social interaction**

- **Harmony**: Identity (branding and marketing)
  - **Sensory, tactile, and visual experiences**
  - **Human contact with nature**

- **Orderliness**: Sensory, tactile, and visual experiences
  - **Human contact with nature**
  - **Social interaction**

- **Consistency**: Sensory, tactile, and visual experiences
  - **Human contact with nature**
  - **Social interaction**

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**CONVERGENCE**
- Identity (branding and marketing)
- Sustainability (environmental and social)
- Economy (cost)
Building developers and designers have only recently recognized the importance of encouraging stair use to benefit human health. Interestingly, visual appeal is not a significant indicator of whether stairs will be used regularly. A recent study suggested that spatial characteristics of stairs are much more important than attractiveness or a pleasing view in determining stair use, suggesting “a well-placed stair has more impact on stair use than a well-dressed stair” (Nicoll, p. 351).

The study concludes that convenience and legibility are the most important features of determining stair use, and that “building managers may design interventions to remediate spatial deficiencies such as the lack of stair visibility or intelligibility” (Nicoll, p. 352).

### Design and stair use

#### Stair design features that promote stair use

<table>
<thead>
<tr>
<th>Most important factors</th>
<th>Other significant factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convenience</td>
<td>Visual appeal</td>
</tr>
<tr>
<td>Legibility</td>
<td>Comfort</td>
</tr>
<tr>
<td>Safety</td>
<td>Signage</td>
</tr>
<tr>
<td>How available is the stair to entrances and other building activities?</td>
<td></td>
</tr>
<tr>
<td>How easy is it to move between the stair and other interior/exterior spaces?</td>
<td></td>
</tr>
<tr>
<td>Are stairs visible and understandable from other interior spaces (isovist)?</td>
<td></td>
</tr>
<tr>
<td>What are the visual clues from the stair’s form and plan?</td>
<td></td>
</tr>
<tr>
<td>What is the stair’s function within the building’s entire environment?</td>
<td></td>
</tr>
</tbody>
</table>

### Signs placed near stairs and elevators to encourage stair use

- The New York City Council recently passed a bill that increases stair visibility by allowing some stair doors to be held open by magnetic devices that will close automatically in case of an emergency. These devices make code-compliant fire stairs more visible and therefore more likely to be used.
- Before this, special permission needed to be granted by the city to install magnetic hold-opens on stairway doors.

At the Center for Architecture in New York City, hold-open devices allows visitors to see fire exit stairs more easily. Source: Emily Young /the Center for Active Design.

### Stairs as a strategy for health

- Using fire-rated glass assemblies can make stairs more visible, even in existing buildings. In addition to making stairs more appealing for everyday use, stairwells that are enclosed by fire-rated glass can be better lit, more accessible and wider.

### Signage

- Signs placed near stairs can encourage building occupants to consider health benefits of using stairs.
- A review of sign use has shown that 10 of 11 studies of such “point-of-decision prompts showed more people used stairs when signage was used as long as signs are discrete, legible, and relevant to the targeted user population (The Community Guild).”

- Signs placed near stairs and elevators to encourage stair use can encourage building occupants to consider health benefits of using stairs.

### New York City addresses stair use

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- Before this, special permission needed to be granted by the city to install magnetic hold-opens on stairway doors.
- The Center for Architecture in New York City uses hold-open doors on the stair of its museum-resolution stair. Rick Bell, Executive Director of the New York City chapter of the American Institute of Architects, says “The Center welcomes 5,000 visitors a month, and of those visitors, ninety five percent take the stairs to reach our gallery spaces and lecture halls” (Center for Active Design).

- A pending NYC bill ensures that all new construction provides building occupants with stair access to all floors. The bill also will allow the use of fire-rated glass and point-of-decision stair prompts “in at least one stairway in each building.”

- New York City addresses stair use Fire-rated safety glass and stair use

- Products such as SuperLite II-XL can be used to form glazing assemblies for fire exit enclosures, such as this one at a St. Cloud University stairway in Minnesota. Source: SaftiFirst.
Well-being research connects to practice.

Several recent initiatives are addressing the connections between well-being and green building. While each of these initiatives centers around landscape and open space, they share several overlapping criteria.

The Blue Zones concept of natural environment in residence to enhance greater well-being. The Urban Land Institute, for example, has created a similar matrix for promoting the ULI’s educational and research mission. The Center for Active Design in New York City is a non-profit organization that uses research to promote healthy and engaged communities. The center’s building design checklist focuses on a building’s circulation. The Center also assisted the U.S. Department of Housing and Urban Development in designing the Fitwel program for other federal agencies to work in a holistic approach toward well-being in the built environment.

The Urban Land Institute has developed a similar matrix for designing healthy spaces. The Building Healthy Places Tool has been designed in cooperation with the Center for Active Design to promote the ULI’s educational and research mission. The Well Living Lab, founded and the affiliated Well Living Lab, are supported by the International Well Building Institute. The Well Living Lab is a joint venture between the Mayo Clinic and Delos Living, LLC, a wellness real estate concern. It is the world’s first lab devoted to studying human health in the built environment. The Well Living Lab is a ratings system that works with the LEED Green Building Rating System.

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The Well Living Lab in Rochester, Minnesota simulates real life indoor living and working environments. Created as a joint venture between Rochester’s Mayo Clinic and Delos Living, LLC, a wellness real estate concern, the lab studies indoor environments to identify factors that make interiors healthier places to live in.

While the evidence-based methodology used by the Well Living Lab does not specifically address the Blue Zones principles identified by Dan Buettner, the lab’s mission taps into the same critical environmental factors and quantifies them.

The lab uses advanced biometric and wearable sensor technology that allows study participants to move about naturally. Sensors monitor and record the body’s response to stimuli such as sound, motion, air flow, light, and sleep. The lab uses advanced architectural design features like reconfigurable mechanical and structural systems designed by Steelcase to simulate a wide range of living situations and other features such as sound and noise simulators, residential modules and open office environments (welllivinglab.com, 2017).

The research methodology uses large and small groups of subjects with varying demographic and health measurements. Outcomes such as sleep, performance, stress, fitness and nutrition are studied in a variety of environmental configurations. Jolene Bernau, Innovation Coordinator for the lab, says the first study tested the lab’s capabilities in addition to collecting performance data. She stresses that this is a simulation of a real world environment, not a recreation of one. Bernau notes that the best way to measure productivity in the simulated office environment is to measure cognitive function. Preliminary data already show that stress and fatigue lead to lower levels of productivity. Results like this can give employers, designers and contractors a sense of where the best return on investment lies for installing upgraded lighting systems, for example.

The project began when Delos Ventures approached the Mayo Clinic’s Center for Innovation (CFI). Barbara Spurrier, the lab’s Administrative Director, said in an interview that the CFI’s work with standard indoor environments made Delos feel prepared to do something new. They did not think about how to work outside traditional models. In 2008 Delos proposed the creation of a lab to measure the outcomes for understanding indoor health. They launched the lab in May 2016.

Spurrier says that while the fundamentals put in place the lab’s current focus is to include "design thinking" strategies and have included 17 designers in a variety of disciplines on the lab’s staff. They are now working on seeking remote connections with other Mayo entities such as a senior center and a fitness center to extend the work of the lab.

"Scalability" is therefore one of the lab’s highest priorities. According to Alfred Anderson, the lab’s Technology Director, "scalability means that the lab can move out of the lab and into greater Rochester, or even other U.S. or international locations."

The field of wellness research in interior environments is just beginning. As part of its effort to establish accountability in healthy building design, the International Well Building Institute announced the WELL Building Standard’s (v1) 2017. Developed in cooperation with the U.S. Green Building Council, the standard is modeled on the Leadership in Energy & Environmental Design (LEED) credentialing program. Candidates can become WELL Accredited Professionals (WELL AP) by successfully passing the WELL AP exam and buildings can receive WELL AP certification.
Tai Chi Chuan, or Tai Chi, is a form of martial art using singular movements that are combined into a series of continuous movements (Hong, 2008). Increased muscle strength, flexibility, balance control, and prevention of falls are the main physical benefits (Hong, Mao, Li, 2008). Additional benefits include the serene state of mind-body connection using breath control, eye-hand coordination and the calming state of mind that results.

Research shows that Tai Chi offers both a physical component as well as a cognitive-behavioral component that is believed to contribute to overall well-being (Yau, 2008). These qualities enable a Tai Chi studio to meet the Blue Zone criteria.

How does a Tai Chi studio meet Blue Zones criteria?

1. Move Naturally.
   - The lower body support and direction of movement are more effective than daily walking for simulating the body’s natural positions that are required for daily activities (Hong, Mao, Li, 2008). The slow movements and sustained poses increase the lower body workout. The moderate workout intensity is appropriate for all ages and can be adjusted for participants of various fitness levels (Lan, Chen, Lai, 2008). Finally, Tai Chi can be practiced virtually any time and any place without special equipment.

2. Purpose.
   - Tai Chi has been shown to improve quality of life. Meaningful and productive activities such as Tai Chi enhance quality of life by providing meaning and a pattern for living daily life (Yau, 2008).

3. Downshift.
   - Tai Chi effectively reduces stress and anxiety while it promotes tranquility and relaxation.

4. Right Tribe.
   - The positive atmosphere in the group setting promotes a strong social support component beyond the actual time spent in Tai Chi practice.

For more information on Blue Zones, visit the website: www.bluezonesproject.com

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Chado, the Way of Tea, also known as Teaism, was introduced in China thousands of years ago by Zen Buddhist monks to prevent sleep. After water, tea is the most frequently consumed beverage in the world.

Yet while the tools and processing of tea originated in China and India, Teaism is a full expression of Japanese character. Also known as Cha-no-yu, literally “Hot Water for Tea,” the ceremony of drinking tea in Japan embodies the simplicity and restraint of Buddhist philosophy.

As A.L. Sadler notes, the devotion to a calm and simple life in Japanese society was enforced on Japan out of postwar necessity. The rejection of the ego and public display of vulgarity was an effective way to moderate “the disruptive forces of society” and emphasize “esthetics, economics and etiquette” (pp. xxi-xxii).

As early as 4,000-5,000 years ago, the Chinese understood that tea could promote health and prevent some human diseases (Chen and Lin, p. 87).

In the 1980s a more modern approach was begun to assess the medicinal benefits of tea, with over 800 academic papers published between 2012 and 2015 on this subject. (p. 87). A survey of these studies points to several important benefits of drinking tea.

Tea and human health
Active compounds called catechins were found to have preventive effects on health, including prevention of some types of cancer. Six studies show there is a likely reduction of breast cancer risk with regular consumption of green tea (Chen and Lin, p. 88).

Tea studies indicate that green tea could reduce body weight and body fat. The risk of type 2 diabetes could also be lowered by drinking three to five cups of tea a day. Catechins in tea could reduce blood glucose or insulin levels.

Studies in Japan and the U.S. suggest mortality from cardiovascular disease was decreased where more than five cups of green tea per day are consumed. Black and green teas “were found to be of both coronary heart disease and stroke by 20-45%.” (Chen and Lin, p. 64).

Scientists also found a connection to the prevention of neurodegenerative disease. Tea drinking could reduce the risk of Alzheimer’s and Parkinson’s disease by thirty to fifty percent and cognitive ability was shown to be significantly higher in a group drinking black tea (Chen and Lin, pp. 92-93).

The Japanese practice of taking a moment to utter “Hara hachi bu” before each meal is an ancient Confucian practice that reminds centenarians in the Okinawan Blue Zone to stop eating when their stomachs are eighty percent full.

By waiting 20 minutes for the sensation of fullness during a meal, Okinawans carefully control healthy portion control and under the word “a time to enjoy, relax and relieve stress” (Buettner, p. 48).

Tea and Blue Zones
Researcher Buettner notes that people in all the Blue Zones drink tea. “Okinawans nurse green tea all day. Green tea has been shown to lower the risk of heart disease and several cancers. Barbanians drink brews of rosemary, wild sage, and dandelion – all herbs known to have anti-inflammatory properties.” (Buettner, p. 75)
Plan of a typical Japanese roji, or garden, and elements of a traditional tea house:

- A space for changing clothes
- B bathroom
- C middle gate and seat
- D bathroom
- E water basin
- F tea room entrance
- G tea room
- H tokonoma display niche

RESEARCH

Plan of a four-mat tea room called Kansui-an to have been given by the third Shogun Iemitsu to Okudaira, lord of Nakatsu in Kyushu.

(1) tokonoma
(2) board floor
(3) mizuya
(4) nijiri-agari
(5) shelf
(6) setsuin
(7) waiting arbor
(8) windows
(9) crouching basin
(10) lantern
(11) nobleman’s entrance
(12) garden gate

Illustrations, The Japanese Tea Ceremony

The Japanese home and garden

Buddhist monks and craftsmen designed temples and mansions. “Took since Shosoin was the art of making a house as well as being in it, the Tea Master was the architect in many cases” (Sadler, p. xxi). A professional Tea Master could also be known as an artist, architector, decorator and connoisseur.

Using the ken, a measurement of 3 feet by 6 feet, or the dimensions of a Japanese tatami mat, the plan of the house is designed to fit around the plan of the garden, with all ornamentation and construction clearly in view.

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Using the ken, a measurement of 3 feet by 6 feet, or the dimensions of a Japanese tatami mat, the plan of the house is designed to fit around the plan of the garden, with all ornamentation and construction clearly in view.

When viewing life from a different angle leads to a greater sense of place in the universe.

Viewing life from a different angle leads to a greater sense of place in the universe.
Created in close consultation with architect Louis Dalbet, and the clients, Dr. and Mme. Dalsace, La Maison de Verre is so richly detailed that its interior is equally if not more significant than its architecture. In fact, in his 1969 essay, architectural critic Kenneth Frampton wondered whether it would be more accurate to call La Maison “a greatly enlarged piece of furniture” (Frampton, p. 77), noting that architect Pierre Chareau was largely interested in interiors.

While adhering to principles of modern design proposed by Le Corbusier, La Maison shows a greater sense of liveability and suitability for its occupants. Serving as a medical office for the owner, Dr. Dalsace, and a family home, the building features moving parts such as screens and staircases. The complex path of travel shifts from floor to floor, providing constant movement. Simple forms and materials support the flow.

This project has been selected because of its unique circulation and arrangement of many moveable elements. By displacing the major horizontal planes and organizing a complex but orderly path throughout the house, Chareau’s house is an excellent model for organization of this thesis site.

Axonometric of the interior of La Maison de Verre, as seen from the forecourt. The recessed entrance is located on the lower right. Source: Perspecta magazine.

Pierre Chareau and Bernard Bijvoet, 1928–1932
Paris, France

CASE STUDY
LA MAISON DE VERRE

The glass block facade of La Maison de Verre, as seen from the forecourt, allows in light while maintaining privacy. At the time, the use of glass block “lenses” on such a scale for residential architecture was relatively unknown. The material was originally developed in Japan and indeed contributes to the Japanese character of the house. Photo source: Subrealistsandu/Arch Daily.

People in Blue Zones live in environments that build movement into their daily routines.
A mobile stepladder can be moved to access the double height bookcase in the main salon. Critic Kenneth Frampton notes the mobility evident in such elements are typical of the transformational quality of the house. (Photo source: Subrealistandsu/Arch Daily.)

The family dining area on the first floor facing the hallway to the butler’s pantry. The rotary cleaning cupboard is visible to the left, under stairs leading to the second floor. (Photo source: Francois Halard via Edwards and Gjertson.)

Four different stair solutions in the house include (01) an auxiliary stair for the doctor to access his study, and the main stair (02) with its steel string beams, (03) Access stair to the second floor that includes doors to reach dining room floor, and (04) a retractable ship’s stair to the master bedroom. (Photo sources: 01 02 03 04, Michael Carapetian.)

A view of the main salon with bookcase designed by Pierre Chareau. The second floor landing with built-in shelves and gallery access. (Photo source: Francois Halard via Edwards and Gjertson.)
### Tunnel Entrance
- Forecourt
- 2-car garage
- Existing 18th century building
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Entrance Lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Entrance to House
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Entrance to House Above
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Service Wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Garden Access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Consulting Room Terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Ground Ivy
- Grass and shrubs
- Gravel play court

### Lawn
- Grass and shrubs
- Gravel play court

### Gravel Play Court
- Grass and shrubs
- Gravel play court

### Building
- Entrance lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Path of Travel for Servants
- Entrance lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Path of Travel for Family
- Entrance lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Path of Travel for Patients
- Entrance lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

### Path of Travel for Guests
- Entrance lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

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**RESEARCH**

(path of travel for servants, path of travel for family, path of travel for patients, path of travel for guests)

1. Tunnel entrance
2. Forecourt
3. 2-car garage
4. Existing 18th century building
5. Entrance to house
6. Entrance to house above
7. Service wing
8. Garden access
9. Consulting room terrace
10. Ground key
11. Grass and shrubs
12. Gravel play court

**PATH OF TRAVEL FOR SERVANTS**
- Entrance lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

**PATH OF TRAVEL FOR FAMILY**
- Entrance lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

**PATH OF TRAVEL FOR PATIENTS**
- Entrance lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

**PATH OF TRAVEL FOR GUESTS**
- Entrance lobby
- Central corridor
- Garden corridor
- Service foyer
- Servants’ entrance
- Reception
- Entrance to house
- Entrance to house above
- Service wing
- Garden access
- Consulting room terrace
- Ground key
- Grass and shrubs
- Gravel play court

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First floor plan of public and semi-public spaces features the two-story main salon. The service wing with kitchen and maids’ quarters is located in the lower right. (Source: Perspecta magazine.)

Second floor plan showing the family’s private quarters. (Source: Perspecta magazine.)
Longitudinal section through two-story salon. Source: Perspecta magazine.

Transverse section through main stair. Source: Perspecta magazine.
Vertical living was one of Swiss modernist architect Le Corbusier’s signature achievements. The ideal of providing mass housing cheaply for as many inhabitants as possible was realized in 1952 with the Edificio Complex known popularly as the Marseille Block.

Building vertical housing made efficient use of scarce land resources, gave all dwellers the same basic advantages and allowed them to equally benefit from shared services in the building complex (Choay and Herve, 1961).

Le Corbusier’s unique plan allowed the apartment units to be inserted onto a central corridor, which he likened to wine bottles in a rack. The units wrapped up and over, or down and under, a common interior “street,” making a highly efficient use of space that gave all units windows on either side and two-level living (Boesiger, 1967). This project has been selected because of its vertical orientation and adaptability to a constrained volume. The long, narrow apartments maximize movement, both along length of each level and in transitioning between levels.

Le Corbusier, 1946 - 1952 Marseille, France

section perspective showing the access to natural light, vertical transitions and generous volume in a narrow space (Source: Choay and Herve, 1961).

view of the living area looking into the kitchen (Source: Choay and Herve, 1961).

exterior view from Boulevard Michelet (Source: Boesiger and Girsberger, 1961).

Le Corbusier likened the apartments to wine bottles inserted into a rack (Source: Boesiger and Girsberger, 1961).
Architect David Jameson’s tea house, located in a back yard of a suburban Maryland residence, appears suspended, like a lamp, on a steel armature. While it appears to hang from a steel armature, cantilevered over the garden’s edge, the tea house is in fact fully anchored to the ground. The street view frame holds the building in place while lighting accentuates the apparent suspension.

This space can be used for meditation or as a quiet space to entertain and serve tea, or simply to relax.

This project can be a model for the Japanese tea room in a model Blue Zone, addressing the principles of Downshift, Plant Slant, and Community.
Richmond and the Fan District

**Population**
- Richmond metropolitan area population: 1,154,578
- Richmond metropolitan area projected population: 1,209,611

**Location**
- Located on the eastern end of the Virginia Peninsula, at the confluence of the James and the Appomattox Rivers.
- Major north-south highways: I-95 and I-64
- Major east-west highways: US 1 and US 360
- Amtrak stops at Richmond Union Station and the Main Street Station in Shockoe Bottom.

**Costs and Services**
- Richmond's cost of living is more than 5% below the national average.
- Housing, groceries, transportation are all lower than the national average.
- Health care costs are higher than the national average.
- Utilities are lower than the national average.
- Median home price: $250,000
- Median household income: $59,677

**Accolades**
- Listed as one of America's 50 Best Running Cities by Runner's World (August 2016)
- Top City for Creatives by Thrillist (July 2016)
- Top Destination for Food Travel by National Geographic (January 2016)
- No. 3 on international list of Best Places to Travel in 2016 by Travel + Leisure (November 2015)
- Richmond ranked among 10 Most Walkable Mid-Sized Cities of 2015 by Redfin (August 2015)
- Richmond's Fan District among Top 10 Great Neighborhoods by the American Planning Association (October 2014)

**Accommodations**
- Richmond offers a variety of accommodations, from historic bed-and-breakfasts to modern hotels.
- VCU's Medical College of Virginia is the most comprehensive teaching hospital in Virginia.
Development of the Historic Fan District grew from a late-19th century trolley transit line. Emboldened in 1817, the district was a magnet for Richmond’s emerging middle class following the end of the Civil War. Building in the Fan was largely completed by 1920.

As Drew St. J. Carneal notes, a rich tapestry of late 19th C. architectural styles is represented. Because a relatively small number of architects designed the majority of Fan structures, the district has a sense of visual unity, in spite of the variety of styles. Although the district is largely residential, the commercial corridors of West Main, North Lombardy, North Richmond and Strawberry Streets continue to serve residents.

The streetscape is very walkable, with sidewalks edging all streets and set backs that keep commercial buildings within reach of pedestrians. The limitation of building height throughout the district creates a very human scale and sense of repose.

Geographically, many streets “fan” out radially from Monroe Park in the eastern region of the district, which creates the most dominant node for travel and for understanding the district’s geometry (fanofthefan.com). This arrangement also creates several triangle-shaped parks throughout the Fan. According to the nomination form for the district’s National Register of Historic Places Inventory, the grid of linear streets and square blocks is mediated by the small parks and many trees that line the streets, softening its edges. Visual scope is increased by the varied “rooflines, turrets, dormers, bay windows, cornices, projecting porches and recessed arched entrances.”
The proposed project site is located at the intersection of West Main and North Vine Streets in the Fan District. It is a 13-minute walk from the Fan’s landmark Monroe Park at the heart of Virginia Commonwealth University’s main campus. For dining and cultural events, the popular Carytown shopping district and the Virginia Museum of Fine Arts are each less than a 20-minute walk away. For hiking, rafting and kayaking, Brown’s Island and Belle Isle on the James River can be reached by bike in 15 minutes.

Several restaurants, cafes and bars are located within a four-block radius of the project site. Many galleries are also located along this part of West Main Street, with regular gallery openings and other special cultural events.

West Main Street bisects the cross streets into North and South street name designations. The immediate neighborhood is organized in a strong regular grid with rectangular blocks. Except for the Main Street commercial activity, the neighborhood, like the Fan as a whole, is mostly residential.

The dense development is well over 100 years old. Many old trees provide shade and frame the streetscape. While the site is located just three blocks from the busy I-195 Downtown Expressway corridor, the neighborhood’s density creates a barrier to highway noise and traffic.

1700 West Main Street has a high Walk Score rating of 94. This makes the building an ideal location as a model Blue Zone, one that encourages natural movement by walking and biking to nearby amenities. The location also serves residents of all ages. Young professionals can appreciate the social amenities while families will feel secure and supported by nearby schools and the residential character. Older residents can take advantage of many cultural opportunities within a safe and stimulating environment.
Binford Middle School at 1701 Floyd Avenue was designed in 1914 by Richmond architect Charles M. Robinson. The school and its site are the most dominant feature of the block. Built in the Tudor Gothic Revival style, it features “castellated parapets, a Tudor-arched stone entrance with decorative carving, and an ornate window-trimmed in stone” (National Register of Historic Places).

Eight attached rowhouses (Nos. 1, 3, 5, 7, 9, 11, 11 1/2, and 15) occupy North Allen Avenue from the northeast corner of West Main Street to Floyd Avenue. Vernacular and Colonial Revival in style and built c. 1910, all are brick 6-course American in construction. Two- to two-and-a-half stories, the first six have pedimented dormers, while several feature slate mansard roofs, Tuscan columns, and porches.

An asphalt parking-lot/shaded playground occupies the center of the block. The building at 1700 West Main is a church that defines the southwest corner and creates a boundary between the street and the school’s “backyard.” A tree line shades a school garden, establishing a boundary along West Main Street. It buffers the playground from street activity and creates a sense of security for the children.

West Main Street is a two-lane, one-way street that flows toward the west end of Richmond. There is no traffic light at the intersection of West Main and North Vine Streets, so the traffic passes by the project site at a very high rate. The city has placed crossing stripes at the intersection to assist pedestrians with crossing West Main Street. However, this measure has done little to make crossing safer and easier.
1700 West Main Street at the corner of North Vine Street in Richmond’s Historic Fan District. The building currently houses 18 1-, 2-, and 3-bedroom apartments and Capital Mac, a computer sales and service shop.

The property at 1700 West Main Street is a two-story, fully detached 19,800 gross sft. rectangular block with five bays, a flat parapet roof and a central pediment that caps the middle three bays.

Originally built as a warehouse for the James Robertson Mfg. Co., a plumbing supply firm based in Baltimore, it was constructed in 1920 of six course American brick by Davis Brothers Inc. The building was then expanded and doubled in size sometime between 1920 and 1924.

There is no architect of record so Davis Brothers was likely the designer as well as builder. The scale and detailing nod to the district’s late 19th century residential buildings in materiality and form.

[Image of the building and an east elevation entry door with a fan pediment and classical Doric pilasters.]

[Image of the building side view and an entry door with a fan pediment and classical Doric pilasters.]

[Image of the building front view with a detailed view of the entry door and fan pediment.]
A 1924 photo from Sketches of Richmond shows 1700 West Main Street four years after it was built by the James Robertson Mfg. Co., a plumbing supply firm based in Baltimore.
(above, left and right) Aged concrete penetrates the worn antique oak boards on the first floor southwest corner of the building. (below, left and right) Dummy wall to deter the Capital Mac showroom from the south and east sides.

(above, left and right) Sunny apartments at 1700 West Main Street celebrate the building’s warehouse structure and material palette. Mechanical systems are exposed, making use of the 12-foot ceiling height.

(below) Awnings and blinds shade the Capital Mac showroom from the intense mid-day sun.

(below) The setting sun completely shades the north elevation the 16-car parking lot on the rear of the building. While the south and east elevations face the bare north side of the building after the Capital Mac shop has closed for the day.

(below) Without any adjacent structures to overlook the building at 1700 West Main Street, the west and southeast elevations share a balcony with the west and east ends of the parking lot—sunlit in summer, shadowy in the winter. While the most recent renovation added several balcony niches to the west elevation, the original solid brick west elevation had no windows or doors.
One can see the strong relationship between the original rectangular block and its historic twin, built within four years of one another. The regular column grid, symmetry along both major axes and massing make it immediately recognizable as a warehouse structure. Yet the building’s two story building height and sympathetic material palette allows it to fit easily into the residential character of the Fan District.
This building in Richmond, Virginia will be redesigned as a micro-Blue Zone that could be used as a model for promoting well-being. The two-level adaptive reuse, mixed-use project addresses vertical transitions, social spaces and outdoor relationships. The Blue Zones principle of natural movement as defined by Active Design is the primary driver for the project’s design. Japanese design principles guide the use of form and materials for the project.

The apartments, exercise studio and restaurant each occupy two levels. The tai chi studio and tea room are open to the public and to residents. Visitors include patrons and employees of the tea room and studio. Building owners control the leasing of spaces, residential and commercial, so that all use is aligned with Blue Zones principles.

Interior design that encourages regular natural movement occurs primarily in the design of a building’s major circulation systems and its program (Center for Active Design, 2010). Corridors and lobbies that connect other spaces in the program encourage walking. Elements like stairs and bicycle storage and furniture that produces micro-movement all promote activity when they are visible, safe and attractive. Programmed spaces that encourage physical activity and those that promote healthy diets also lead to increases in healthy behaviors.

The tai chi studio is open from 6am to 9pm. Tai chi classes take place in the studio and the Binford Middle School garden. The tea room is open from 8am to 9pm for breakfast, lunch and dinner. Residents come and go throughout the day.

T’ai Chi Studio A-3 occupancy type, standing (5 net/sft)

Type III-A construction
9,600 gross sft/floor, two floors
9,600 sft + 9,600 sft = 19,200 total gross sft
Efficiency ratio = .60 (generous/excellent)
9,600 sft X .60 = 5,760 net sft/floor
5,760 sft + 5,760 sft = 11,520 total net area

Assume these estimated program areas

2,400 gross sft for T’ai Chi studio
2,400 sft X .60 = 1,440 net sft for T’ai Chi Studio

2,400 gross sft for tea room
2,400 sft X .60 = 1,440 net sft for tea room

14,400 sft for residential apartments
14,400 sft X .60 = 8,640 sft for residential apartments

T’ai Chi Studio
1,440 sft net
288 occupants allowed, 25 intended based upon research and observation of Richmond T’ai Chi studio class and Pure Barre, Alexandria

1,080 sft for studio/class floor and chair space
360 sft for all other functions
121 sft for reception
76 sft office
3 changing cubbies, 24 sft each, total 72 sft
2 single user restrooms, 45.5 sft each, total 91 sft

Tea Room
1,440 sft net
96 occupants allowed, 96 intended, based on research of Starbucks coffee shop

60% of space, 864 sft for Front of House functions (sales, bar, cafe)
40% of space, 576 sft for Back of House functions (workroom, 2 single restrooms/restroom vestibule)

Residential
14,400 sft gross, 8,640 sft net
72 occupants allowed, 72 intended

72 occupants in the building allowed = 288 + 96 + 72 = 456 occupants

228 men, 228 women

Phased design
456/2 = 228 men, 228 women

Pumbing Requirements

No. of water closets required per gender

T’ai Chi Studio (A-3, 40 person occ) 1/125 male, 1/65 female
Tea Room (A-2, 96 occ) 1/40 male, 1/40 female
Residential (R-2, 72 person occ) 1/10 male, 1/10 female

No. of lavatories required per gender

T’ai Chi Studio (A-3, 40 person occ) 1/200 male, 1/200 female
Tea Room (A-2, 96 occ) 1/75 male, 1/75 female
Residential (R-2, 72 person occ) 1/10 male, 1/10 female

No. of water fountains

T’ai Chi Studio (A-3, 40 person occ) 1/500 W
Tea Room (A-2, 96 occ) 1/500
Residential (R-2, 72 person occ) 1/100

1 water closet:males, 1 water closet:females
2 water closets:males, 2 water closets:females
Minimum 1 water closet per residential unit
1 lavatory:males, 1 lavatory:females
2 lavatories:males, 2 lavatories:females
Minimum 1 lavatory per residential unit
1 water fountain

1 water fountain

Exits

408 occupants allowed on First Floor (T’ai Chi + Tea Room + 1/3 of residential occupancy)
48 occupants on Second Floor (remaining residential occupancy)

Minimum No. of exits per story = 2 (less than 500 occupancy per floor, IBC Table 1005.2.1)

144 ft diagonal measurement per floor
144 ft/3 = 48 ft minimum distance between exits

Exits

408 occupants allowed on First Floor (T’ai Chi + Tea Room + 1/3 of residential occupancy)
48 occupants on Second Floor (remaining residential occupancy)

Minimum No. of exits per story = 2 (less than 500 occupancy per floor, IBC Table 1005.2.1)

144 ft diagonal measurement per floor
144 ft/3 = 48 ft minimum distance between exits

1 water closet:males, 1 water closet:females
2 water closets:males, 2 water closets:females
Minimum 1 water closet per residential unit
1 lavatory:males, 1 lavatory:females
2 lavatories:males, 2 lavatories:females
Minimum 1 lavatory per residential unit
1 water fountain

1 water fountain
CONCEPT AND PROGRAM

GRAPHIC PROGRAM
AND ADJACENCIES

19,220 sft gross
Total for entire building
Tea Room
1,440 sft for studio/class floor and chair space
976 sft for reception/lounge/waiting
200 sft for storage lockers/retail
48 sft for office
4 changing cubbies, total 121 sft
2 single user rest rooms, total 91 sft

Two 3 Bedroom Apartments 1,920 sft net each
Two 1 Bedroom Apartments 960 sft net each

3 Bedroom Apartment
Front of house functions 1,728 sft
Total 2,880 sft net
Back of house functions 1,061 sft
Total 2,880 sft net

1 Bedroom Apartment
Living/Office space 296 sft
Office space 72 sft
Bathing space, 1 bath, 35 sft

Sleeping space 144 sft
dining/Kitchen space 225 sft
Living space 446 sft

4 changing cubbies, total 121 sft
2 single user rest rooms, total 91 sft

Total residential 8,640 sft net

Vine St.

Garden

1st floor

Tai Chi Studio

2nd floor

Parking lot

Parking lot

1930 Vine St.

1932 Vine St.
Although they live in vastly different parts of the world, inhabitants of the original Blue Zones share many common traits. Their lives are nurtured in environments that encourage them to move, socialize, and get outside on a daily basis. They seek purpose in life, exercise regularly, eat simply but well and place a high value on family and friends. Moreover, they have found ways to adapt to life’s challenges.

But Blue Zones environments last in the real world, not in utopia. That is why the research into how and why they live as long as they do has been so meaningful. For those communities, families or individuals who seek a longitudinal framework for lifelong well-being, it is critical to examine the lives of those who have already lived well.

The concept of “a fully lived life” contains all of the traits that are present in the programming for creating a “micro-Blue Zones” project in Richmond. Study of active design, tai chi and Japanese tea traditions shows many intersecting characteristics that strengthen the mind-body connection that is so important for overall health.

While heredity plays a role in measuring relative health, lifestyle still plays the dominant role.
Well-being is most durable when a mind-body balance is supported within a naturally active micro- and ambient environment. Strong social and familial connections supported by a healthy diet and purposeful meditation practices provide the energy needed to adapt to the disruptive challenges that we all face.

The Japanese arrow pattern initiated the project’s vertical movement concept. An old pair of the author’s jeans illustrates the patch and repair philosophy that Blue Zones residents use to mend and make do. Folded paper concept models continue to explore verticality and a wall of concept displayed at VCU’s Department of Interior Design.
The Japanese philosophy of wabi-sabi embraces the flawed and imperfect. The Japanese highly value marks of wear and use in objects and have developed forms for the selection of materials for this model Blue Zones project.

Rather than throw away broken or torn objects, the Japanese have made an art form of their repair. The kintsugi technique highlights cracks in pottery as a chapter in the object’s life story. The Japanese treat torn textiles with the same reverence as other objects. Their textiles, from kimono cloths, celebrate the impermanence and touchstones of the Japanese peasants. Generations of family pass along these mended garments, narrating their shared history. The raku pottery technique likewise celebrates imperfect forms and surfaces.

Wabi-sabi reflects the acceptance of change and fate as natural and necessary aspects of human life. In the Blue Zones, such life experiences integrate the soul and body. Building materials such as soapstone, copper, brick and charred wood age and patina with use, embedding the character of the building’s occupants in their surface.

**Example of boroboro in the patchwork of a vintage Japanese farmer’s jacket [kimonoboy.com].**

The kintsugi technique uses gold to fill cracks in pottery [apartmenttherapy.com].

Japanese raku chawan, or tea bowls [SINGHATO, etsy.com].

A watercolor study explored a potential color palette for the project.

**And Materiality**

<table>
<thead>
<tr>
<th>Alberene soapstone</th>
<th>patinated copper</th>
<th>steel L-beam</th>
</tr>
</thead>
<tbody>
<tr>
<td>floor and stair treads</td>
<td>stair railing</td>
<td>existing brick walls</td>
</tr>
<tr>
<td>patchwork ceramic tile</td>
<td>bar</td>
<td>lilac frosted glass tile</td>
</tr>
</tbody>
</table>
| charred white oak | patchwork ceramic tile | bar |}

The broken teak step used to fill gaps in the paneling [sharonmichael.com].
The schematic design phase focused on understanding adjacencies for the three program areas of the project: apartments, a tai chi studio, and a tea room.

Additional considerations included a bicycle area for storage and repairs. This was seen as an important Blue Zone amenity for building occupants and a magnet for Binford Middle School's students who could benefit from a safe place to repair and park their bikes near school.

Privacy and acoustics from West Main Street traffic were important for all residents. Smaller spaces were also considered for residents who lived downtown, who could not privacy and efficiency while sharing classes. On the other hand, views from the second level would offer a sense of connection and social interaction from the street.

Schematic design 01 placed the tea room on the street level along West Main Street and the tai chi studio on the second level along Vine Street. Schematic design 02 placed the tea room and tai chi studio at the corner of West Main and Vine Streets on the first and second levels.

Schematic design 03 began to address the overall circulation in the building. A social porch was added to address social connections necessary for healthy Blue Zone living. The nine apartments originally planned for programming were eventually reduced to four.

Schematic design 04 then explored new relationships among the structural columns in the front half of the building and their relationship to the windows and doors.

Schematic design 05 used the plan information to organize a new schematic design. The atrium in the early schematic phase was used to address足口 space and circulation needs. The atrium was designed for the southwest corner of the building and an atrium was designed for the southwest corner of the building. The atrium was then inverted and used in the back half of the building. In this way, the overall plan for the building could be resolved in spite of two very different column grids for the front and back.
Design development progressed from schematic design to analyzing new case studies. The two unique halves of the building, front and back, could not successfully be joined while addressing the three program areas of the project. Therefore a new plan was developed that paired a new case study with the apartments in the rear of the building. Further research on Japanese architecture provided a map for organizing the commercial portion of the project.

The linear arrangement of architect Le Corbusier’s plan for L’Unité d’Habitation at Marseille provided a standardized framework. Each apartment unit becomes its own individual self within the unified whole of the building. Each of the four apartments (two have three bedrooms and two have one bedroom) is situated on both levels, thus allowing vertical transitions that satisfy the need for natural movement. The one bedroom apartments are narrow, at just twelve feet across, but their length and generous two level plan make them spacious enough for two.

Using principles of Japanese design and the flowing pattern of the tai chi studio, tea room, and overall circulation of the project.

The meandering path of the Japanese garden is a conceptual metaphor for Blue Zone living, as a means for living life as a progressive journey. This path also functions as a literal organizing plan from the main entry on West Main Street.

Finally, the foot movements of Yang style tai chi suggested a flowing pattern that organizes the first level of the studio.

Vertical movement by means of different staircases through La Maison de Verre formed a model for addressing stairs in this project. La Maison also has many built-in moveable elements that are moveable and thus required the addition of some moveable features in the project.

Finally, the Tea House and placemaking examples, both located in Bethesda, Maryland, provided a model for the project’s entry gate and atrium, at different scales. Using the form of the tea house created a placemaking opportunity that engages the building’s resolution with the easier program.

In the initial schematic design, research focused on connecting the central grid with oblique lines with limited success. Instead, a new plan treated each half of the building as separate sections joined by a large circulation space.

Elevations and openings in the building’s entrance walls were matched to determine entry and module heights. Some features (shown below) were moved to the main entry to determine the number of stairs necessary to clear adequate reading height for transcortical and landscaping. The entry of La Maison de Verre (shown right) provided a useful model for this study.
GARDEN PATH STUDY

The proposed garden path, below was simplified into rectangular shapes; these shapes were layered in a series of repetitive diagrams that studied the possibilities for organizing the plan of the project.

The final result of the new study shows the apartments in the back of the building and the new entry gate, main entrance atrium and social porch in the front half of the building.

Solid/void relationships in the new design show how the atrium and general circulation connect the residential and commercial halves of the building.

Tracing a path through a Japanese garden, such as the example on the left, inspired a framework for a garden study of our own.
Before the entries are developed, the relationship among the three program elements is strengthened around the entry gate and main staircase.

**UNIFYING THE PROGRAM**

The design development shows the four apartments in the rear of the building. The tai chi studio occupies two levels of the building in the southwest corner and the tea room is to the right.

Before the atrium is developed, the relationships among the three program elements is strengthened around the entry gate and main staircase.
SECTION VIEW
FIRST AND SECOND LEVELS

APARTMENTS
1 entry
2 living
3 bedroom
4 master bedroom
5 closet
6 floor seating
7 to 1st floor
8 residential elevator
9 guest bathroom
10 utility/storage
11 to 2nd floor
12 to mezzanine
13 residential elevator

TAI CHI STUDIO
1 entrance
2 retail display
3 group breathing assembly
4 changing carrels
5 storage lockers
6 to studio floor

ENTRY AND GENERAL CIRCULATION
21 main entrance
22 entry gate
23 tokonoma display/mail drop
24 social porch
25 view to garden
26 emergency stairs
27 elevator
28 host stand
29 lounge
30 retail display
31 tea cabinet
32 tea room kitchen
33 dumbwaiter

TEA ROOM
20 hot teapot
21 storage
22 tea room kitchen
23 dumbwaiter

FIRST LEVEL PLAN

SECOND LEVEL PLAN

exterior view of 1700 west main street shows the new roof monitor over the atrium

SECTION VIEW
FIRST AND SECOND LEVELS

APARTMENTS
1 entrance
2 living
3 bedroom
4 master bedroom
5 closet
6 floor seating
7 to 1st floor
8 ADA bathroom

TAI CHI STUDIO
1 entrance
2 retail display
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ENTRY AND GENERAL CIRCULATION
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TEA ROOM
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23 dumbwaiter

FIRST LEVEL PLAN

SECOND LEVEL PLAN

exterior view of 1700 west main street shows the new roof monitor over the atrium
SECTION THROUGH TAI CHI STUDIO, ENTRY GATE AND TEA ROOM

SECTION THROUGH 1 BR APARTMENT, SOCIAL PORCH, ATRIUM, ENTRY GATE AND TEA ROOM
The sunny atrium on the second level allows light into the back of the apartments and creates a breathing space for occupants, inspired by the random breath control technique used by tai chi students.
1 BEDROOM APARTMENT

Two one-bedroom apartments feature an open stair-case that leads to a mezzanine. A bar cabinet rotates to serve dining and living areas while the media cabinet’s sliding screen hides the TV when not in use.

- Charred white oak flooring both levels
- Charred cypress paneling
- Baltic birch paneling ceiling and walls
- Alberene soapstone floor and stair treads
- Rotating bar cabinet

Two one-bedroom apartments feature an open stair-case that leads to a mezzanine. A bar cabinet rotates to serve dining and living areas while the media cabinet’s sliding screen hides the TV when not in use.

- Charred white oak flooring both levels
- Charred cypress paneling
- Baltic birch paneling ceiling and walls
- Alberene soapstone floor and stair treads
- Rotating bar cabinet

Silent sketch showing progress on apartment floor plan. Initial plans called for floor seating under the staircase. Later plans called for floor seating under the mezzanine. Later the floor seating was moved to the mezzanine.
As in a Japanese garden, the Entry Gate acts as an entry point for all points in the building on both levels. The Tokonoma display niche features Japanese shibori textiles and serves as a mail and parcel drop for building residents.
The tea room’s menu celebrates the healthful qualities of tea and features a selection of mostly plant-based meals. The lower level retail display case holds several varieties of domestic and imported teas for sale.
The bar and lounge on the lower level serve casual dining and tea service while the upper level caters to lunch and dinner patrons.

The bar and lounge feature pendants, a charred cypress paneling feature wall, and display cabinets. The boro dining chair celebrates imperfection and flaws by skewing the lumbar seat support. The maple seat and back are supported by painted solid maple legs and an aluminum lumbar. Charred white oak flooring is found on both levels.

**TEA ROOM LEVEL 2**

- Mute acoustic felt pendant
- Charred white oak flooring
- Charred cypress paneling
- Charred brick wall
- Display cabinets both levels

**DESIGN PROGRESSION**

- TEA ROOM LEVEL 2
- The boro dining chair celebrates imperfection and flaws by skewing the lumbar seat support. The maple seat and back are supported by painted solid maple legs and an aluminum lumbar. Charred white oak flooring is found on both levels.
The tai chi studio is a calm space that is finished in gentle, smooth materials. The curves and cylinders in the space recall the flowing foot patterns of the Yang Style Tai Chi Chuan 24 forms, or movements.
TAI CHI STUDIO
LEVEL 2

Above the tea room screen appears in the entry gate, the tea room second floor entry and the partition between the tea room and tai chi studio on the second level.

Existing brick walls

Baltic birch paneling, ceiling panels and casework

Charred white oak, floating bamboo panels

LEVEL 2

TAI CHI STUDIO

LEVEL 2

DESIGN PROGRESSION

TAI CHI STUDIO

LEVEL 2

SECTION TITLE

SECTION TITLE

TAI CHI STUDIO

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REFLECTION

My designer's artwork, always present during the realization of this project, is a sort of meditation.

displayed below are student work 3D models, concept work and posters in the REACH exhibition at the Anderson Gallery on VCU's Monroe Park campus on April 28, 2017. (left to right) Heather Overby, Lauren Prisco, Lucy Dabney and M.J. Rhodes.

Long term projects demand dedication and a great sense of humor. Luckily, the graduating class of interior design MFA students at Virginia Commonwealth University for 2017 has both in great supply. From the first day we met in July 2015 until the present day, we have worked hard to support one another. These days and nights have been long and certainly there were times when it seemed the process would never end. You have to see it at the end of our road, getting ready to turn on to another one.

With an undergraduate degree in political science and a master's in journalism and public affairs, I've naturally gravitated to exploring issues that impact the public welfare. Studying the public health angle and mental health connection that is crucial for long-term health was a natural fit for me as an emerging interior designer. I hope to continue this passion for understanding the human dimension in interior design for many years to come. I thank my studio colleagues and the VCU interior design faculty for helping to focus my passion and pushing me to reach further than I thought possible.

— Alexis Holcombe, May 2017
WORKS CITED

THESIS PREFACE
Interviews with Pekka Puska and Vesa Korpelainen on May 30, 2016 in Joensuu, Finland.
Interviews with Tiina Laatikainen on June 1, 2016 in Helsinki, Finland.

THESIS ABSTRACT

THE BLUE ZONES

ACTIVE DESIGN FOR WELL-BEING

THE WELL LIVING LAB
Interviews with Barbara Spurrier, Administrative Director, Well Living Lab and Senior Vice President, Delos Ventures; Jolene Bernau, Innovation Coordinator, Well Living Lab; and Alfred Anderson, Information Technology Director, Well Living Lab on February 17, 2017.

THE WELL LIVING LAB
Interviews with Barbara Spurrier, Administrative Director, Well Living Lab and Senior Vice President, Delos Ventures; Jolene Bernau, Innovation Coordinator, Well Living Lab; and Alfred Anderson, Information Technology Director, Well Living Lab on February 17, 2017.


Interview with Floyd Herdich and Sondra Sealine of Richmond Tai Chi on November 1, 2016.

http://travel2health.blogspot.com/2015/05/yang-style-tai-chi-chuan-24-forms.html?m=1

TEASM


CASE STUDIES


RICHMOND AND THE FAN DISTRICT


SITE STUDY
SELECTED BIBLIOGRAPHY


The patient process of learning through discovery is rewarding and challenging. Thanks to my studio colleagues for making this journey so enjoyable: An Liu, Lauren Prisco, Mingming Zhao, Heather Overby, Lucy Dabney and M.J. Rhodes. Special thanks to An for assistance with laser cutting and graphic design guidance.

Dr. Pekka Puska and Dr. Tiina Laatikainen, National Institute for Health and Welfare (THL), Helsinki, Finland, and Vesa Korpelainen, North Karelia Center for Public Health, Joensuu, Finland welcomed me to their offices without reservation in May 2016 to discuss the relationship between interior environments and health. Their collective experience in Finland's public health sector helped to confirm my growing interest in well being and environments.

I would like to gratefully acknowledge the wisdom and experience of the faculty of the Department of Interior Design at VCU. Roberto Ventura, thesis mentor and all-around super teacher, has been with our cohort from the start. Camden Whitehead, Christiana Lafazani, Sara Reed, Jillian Chapin, Emily Smith, Jen Fell, Rob Smith and Hillary Fayle have also guided me in this thesis work. VCU alum Roy Abdun-Nur has been a generous advisor and friend. Andrea Alvarez and Lauren Ross assisted with curation and exhibition at Anderson Gallery.

Additionally, several people generously gave their expertise and time to assist with research on this project: Meg Hughes, curator at the Valentine Museum for historic documents; Anne Durkin, architect, Johannes Design Group for documentation of 1700 West Main Street; Floyd Herdich and Sondra Sealine of Tai Chi Richmond; and Patrick Bell, Nicole Killian, and David Shields for advice on graphic design. Carla Mae Corkendale of VCU’s Cabell Library assisted with research and Marnie Wolfford of CapitalMac gave me permission to visit and record their store at 1700 West Main Street.

Special thanks to VCU associate professor of fashion design Kristin Caskey, who helped me articulate the concept of this project with critical insight on wabi-sabi and materiality. Elizabeth Bolka of Worth Higgins & Associates in Richmond handled my printing requests swiftly and professionally.

The staff of the Well Living Lab in Rochester, Minnesota initiate an invite-only workshop to get a tee of their facility and promote their methodology: Jolene Bernauer, Barbara Spurrier, Brent Bauer, Nicholas Runko, Arora Brosius, Andrea Alvarez and Lauren Ross assisted with curation and exhibition at Anderson Gallery.

Finally, I could not have made it this far without the sane voice and gentle hand of Robert, who has poured many cups of coffee and tea for me, rubbed my sore shoulders and kept the fire going at home so I could lose myself in the world of design. You are the reason I care about design as much as I do.

This thesis is dedicated to my beautiful children, Claire and Peter. Being your mom is still the most creative and rewarding job I’ll ever have. You are the reason I care about design as much as I do.

The Well Living Lab workshop and exhibition with Carolina Campanella and Dr. Pekka Puska and Dr. Tiina Laatikainen (left to right).