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## Active Design: Creating a Blue Zones model for interior environments

Alexis Holcombe  
*Virginia Commonwealth University*

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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*  
form  
*give meaning and order to materials*  
love  
*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

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# THESIS PREFACE

“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 Korpelainen. They had agreed to meet 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 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. In doing so 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.

— Alexis Holcombe

(right) *I Was Told*, by Alexis Holcombe. Mixed media on fifteen cards, front and back. The author’s artist statement addresses the journey a designer makes in the long process of achieving artistic maturity. This project’s emphasis on flaws and imperfection in materials as seen through *wabi-sabi* principles is used to emphasize the acceptance of change and fate as natural and necessary aspects of life.



# THESIS ABSTRACT

How might interior environments play a role in promoting life long 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; Oligastro 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

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 produces 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 in-

## how can interior design help us live longer, healthier lives?

creases 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 life long 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.



Centenarians living in the five original Blue Zones have created environments where they naturally live longer, more vital lives.

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RESEARCH

# THE BLUE ZONES

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 inclined to be 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 wise 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 some 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 downshift and shed stress by meditating, napping or praying

## the BLUE ZONES POWER NINE

(right) The Power Nine are principles common to all five Blue Zones. These same principles are also being applied in the Blue Zones Project, a program that gives 31 U.S. communities a blueprint for making wide-ranging changes that bring measurable results. (Buettner, pp. 7-9).

01   
**move naturally**  
 People in Blue Zones live in environments that build movement into their daily routines.

04   
**80% rule**  
 In Japan's Okinawa region people remind themselves to stop eating when they are 80% full with the concept of *hara hachi bu*.

07   
**right tribe**  
 Social circles support healthy behaviors. Okinawans create moais - five friends who support each other for life.

02   
**purpose**  
 Have something to live for when waking up each day. Having a sense of purpose adds seven years of extra life expectancy.

05   
**plant slant**  
 Beans are the backbone of Blue Zones diets, while meat is eaten in limited quantities.

08   
**community**  
 Attending faith-based services adds four to fourteen years of life expectancy regardless of the denomination or practice.

03   
**down shift**  
 Make a daily habit of taking time to meditate, pray or nap.

06   
**wine @ five**  
 All Blue Zones centenarians drink alcohol moderately and regularly - one to two glasses a day.

09   
**family first**  
 Children who are cherished care for aging parents, while having a life partner can add three years' life expectancy.

# ACTIVE DESIGN FOR WELL-BEING



01 **move naturally**  
People in Blue Zones live in environments that build movement into their daily routines.

Buildings and sites can have a measurable impact on occupants' health. Building site 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).W



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.



RECREATIONAL



INSTRUMENTAL



HYBRID

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.

## 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 non-exercise movement by using a smartphone app to track self-reports of happiness levels.

## Fidgeting

Humans spend a great deal of time sitting, most of it while sitting motionless. "Studies of movement patterns indicate that most of us spend between eight and 10 hours each day seated. During that time, our bodies and, in particular, our legs barely 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 shows that fidgeting could produce enough lower body muscle movement to significantly elevate blood flow to the legs.

## Buildings and stress

Five identifiable dimensions of the interior built environment could affect human health by impacting stress levels, which in turn has been shown to affect overall physical health by affecting our ability to cope with the stress.

**STIMULATION**  
loud noise, bright light, strong smells, bright colors, crowding  
  
shape, orientation, proximity to circulation paths  
  
mystery, the promise of further information, partially occluded spaces and views

**CONTROL**  
inflexible resources and arrangements prevent effective interaction with interiors  
  
spatial hierarchy for solitude, small groups, and public contact

**AFFORDANCES**  
using building features and technologies  
  
corners, entries, stairs, barriers

**COHERENCE**  
identity, meaning and location of objects and spaces

**RESTORATIVE**  
retreat, fascination, exposure to nature

Concern for well-being and the environment can be encouraged by positive social trends: "A built environment (and associated policies and social marketing) may both improve individual health and help the community achieve environmental sustainability." *'Behavioral Choices and the Built Environment'*

## Design and stair use

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).



Signage is used at the Buckingham County Primary and Elementary Schools to encourage students to use stairs to increase physical activity. Source: Alan Karchmer or Tom Daly.

## Stair design features that promote stair use

### most important factors

#### convenience

how available is the stair to entrances and other building activities?  
how easy is it to move between the stair and other interior/exterior spaces?

#### legibility

are stairs visible and understandable from other interior spaces (isovist)?  
what are the visual clues from the stair's form and plan?  
what is the stair's function within the building's entire environment?

### other significant factors

travel distance from stair to nearest entrance and elevator  
occupant load of each stair  
accessibility of each stair  
area of stair isovist  
number of turns required for travel from stair to closest entrance  
most integrated path

### least important factors

appeal  
comfort  
safety

Signs placed near stairs and elevators to encourage stair use 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 designed for the targeted user population (*The Community Guide*).

## New York City addresses 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.

The Center for Architecture in New York City uses hold-open devices on the door of its main circulation 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.”



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.

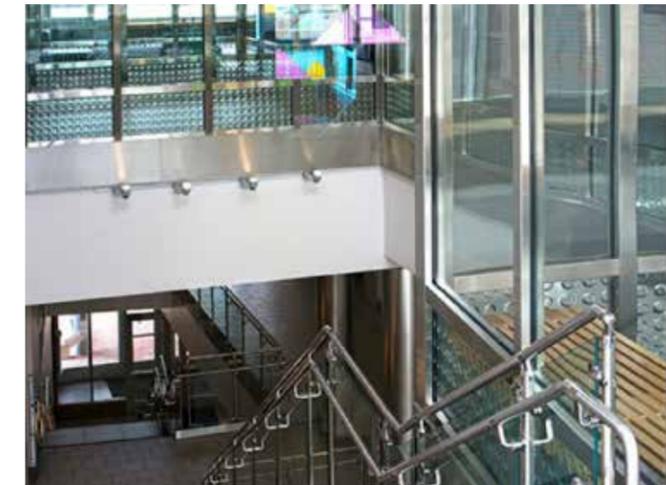
Products such as SuperLite II-XL can be used to form glazing assemblies for fire exit enclosures, such as this one at a St. Cloud University stairway in Minnesota. Source: SaftiFirst.

## Fire-rated safety glass and stair use

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.

According to the amended 2012 International Building Code (IBC), codes for fire exit doors require a maximum allowable glass vision panel of 100 square inches, whether or not the building is fully sprinklered. However, this requirement applies only to traditional “safety” wired glass and ceramic products. Recently developed special fire-rated glass assemblies can be used to limit temperature rise and to block radiant heat.

While fire windows are not permitted in 60- to 90-minute exit enclosures, fire resistive assemblies that limit radiant heat are permitted [NFPA 80 (2007)].



## Well-being research connects to practice

Several recent initiatives are addressing the connection between well being and interior environments. While each of these innovation centers varies somewhat in emphasis and scope, they share several overlapping criteria.

The Blue Zone principle of natural movement is evident in each of these programs. In most cases, the focus is on stair use, building programming for active movement, and integrated paths of travel that are visible and appealing.

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. General Services Administration (GSA) and the Centers for Disease Control and Prevention (CDC) in designing the [Fitwel](#) rating system for office buildings to take a holistic approach to well being in the built environment.

The Urban Land Institute has developed a similar matrix for designing healthy spaces. The [Building Healthy Places](#) Toolkit has been designed in cooperation with the Center for Active Design to promote the ULI's educational and research mission.

The [Well Building Standard](#) 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 Building Standard is a rating system that works with the LEED Green Building Rating System.

### CENTER FOR ACTIVE DESIGN BUILDING DESIGN CHECKLIST

#### 01 Designating stairs for everyday use

Make stairs the principle means of vertical travel and integrate stairs with the principle areas of travel within the building

#### 02 Stair location and visibility

Locate stairs near the building's entrance and consider fire-rated glass enclosure, use open stairs between floors with the same tenancies

#### 03 Stair dimensions

Make stairs wide enough to accommodate groups to travel in two directions

#### 04 Appealing stair environment

Use sculptural staircases with exciting stair construction and appealing finishes

#### 05 Stair prompts

Place stair signage at elevators to encourage stair use, making them visible and informational

#### 06 Elevators and escalators

Make elevators less prominent while providing elevator access for persons with disabilities

#### 07 Building programming

Locate building functions to encourage brief bouts of walking to commonly used amenities within a building; consider locating the principle lobby on the second floor

#### 08 Appealing and supportive walking routes

Provide visually appealing environments along paths of travel

#### 09 Building facilities that support exercise

Include physical activity spaces in commercial workplaces and residential buildings

#### 10 Building exteriors and massing

Maximize variety and detail on the lower exterior floors of a building and provide multiple entrances and maximum transparency from the street

### FITWELL SEVEN HEALTH IMPACT CATEGORIES

01 Impacts community health

02 Reduces morbidity and absenteeism

03 Instills feelings of well being

04 Social equality for vulnerable populations

05 Provides healthy food options

06 Promotes occupant safety

07 Increases physical activity

### URBAN LAND INSTITUTE HEALTHY PLACES STRATEGIES PHYSICAL ACTIVITY

01 Incorporate a mix of land uses

02 Design well-connected street networks at the human scale

03 Provide sidewalks and enticing, pedestrian-oriented streetscapes

04 Provide infrastructure to support biking

05 Design visible, enticing stairs to encourage everyday use

06 Install stair prompts and signage

07 Provide high-quality spaces for multigenerational play and recreation

08 Build play spaces for children

### HEALTHY FOOD AND DRINKING WATER

01 Accommodate a grocery store

02 Host a farmer's market

03 Promote healthy food retail

04 Support on-site gardening and farming

05 Enhance access to drinking water

### HEALTHY ENVIRONMENT AND SOCIAL WELL-BEING

01 Ban smoking

02 Use materials and products that support healthy indoor air quality

03 Facilitate proper ventilation and airflow

04 Maximize indoor lighting quality

05 Minimize noise pollution

06 Increase access to nature

07 Facilitate social engagement

08 Adopt pet-friendly policies

### WELL BUILDING STANDARD NEW AND EXISTING BUILDINGS SELECTED CRITERIA FOR FITNESS COMPONENT

01 AIR

02 WATER

03 NOURISHMENT

04 LIGHT

05 FITNESS

64 Interior fitness circulation to promote stair use and accessibility

65 Activity incentive programs to encourage bicycle commuting and mass transit use

66 Structured fitness opportunities for onsite fitness and training programs

67 Exterior active design of pedestrian amenities such as benches and plazas, in neighborhoods with Walk Scores of 70 or greater

68 Physical activity spaces, both inside and outside, of dedicated exercise space

69 Active transportation support such as bicycle storage and shower/changing facilities

70 Fitness equipment such as cardiorespiratory and strengthening equipment

71 Active furnishings such as adjustable height and treadmill desks

06 COMFORT

07 MIND

### COMMON FACTORS

Focus on improving access to and design of stairs to promote increased physical activity

Support active transportation with facilities and storage for bicycles

Provide activity spaces, equipment and furnishings within and around buildings for all ages

# THE WELL LIVING LAB

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 quality, 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.

In an interview at the lab's Rochester facility, 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



The Well Living Lab's central location in the BioBusiness Building in Rochester, Minnesota gives its modern 7500 sq. ft. facility a visible presence on the Mayo Clinic campus.

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 started with standard healthcare models but their goal was to think about how to work outside traditional models. In 2008 Delos proposed the creation of a lab environment to test metrics for understanding indoor health. They launched the lab in May 2016.

Spurrier says that with the fundamentals in place the lab's scientists are starting to include "design thinking" strategies and have included 17 designers in a variety of disciplines on staff. They are also working on making 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 Information Technology Director, moving out of the lab and into greater Rochester, or even other U.S. or international locations requires "a system that can grow organically." Barbara Spurrier agrees, saying partnerships are key for scaling the lab's results to the real world.

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 Insti-



The Well Living Lab's state of the art facility carefully controls simulated real-world living and working environments by measuring human subjects' responses to various stimuli (Illustration source: *Nature*).

tute released the WELL Building Standard v.1 in 2015.

Developed in conjunction 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.



The Microsoft Band biometric technology worn by the lab's test subjects measures step counts, sleep quality, heart rate and other physical data while the lab's scientists remotely control various "scenes" in typical office and living environments (Source: microsoft.com).

# TAI CHI CHUAN



**01 move naturally**  
People in Blue Zones live in environments that build movement into their daily routines.



**02 purpose**  
Have something to live for when waking up each day. Having a sense of purpose adds seven years of extra life expectancy.



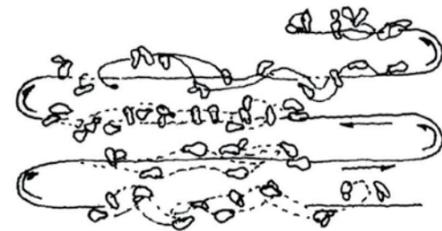
**03 down shift**  
Make a daily habit of taking time to meditate, pray or nap.



**07 right tribe**  
Social circles support healthy behaviors. Okinawans create moais - five friends who support each other for life.

Tai Chi Chuan, or Tai Chi, is a form of martial arts 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 influence the nervous system's 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 sociocultural, meditative component that is believed to contribute to overall well-being” (Yau, 2008). These qualities make a Tai Chi studio an effective programming choice for a Blue Zone.



The fluid foot motions of Yang-style Tai Chi forms a flowing 24-step pattern (Based on an image from travel2health.blogspot.com).

## 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 to 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.

(right) Tai Chi can be practiced nearly anywhere without any special equipment. People of all ages and fitness levels can benefit from regular Tai Chi practice (Source: dreamstime).



# TEAISM

03 **down shift**  
Make a daily habit of taking time to meditate, pray or nap.

04 **80% rule**  
In Japan's Okinawa region people remind themselves to stop eating when they are 80% full with the concept of *Hara hachi bu*.

05 **plant slant**  
Beans are the backbone of Blue Zones diets, while meat is eaten in limited quantities.

Chadō, 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 “aesthetics, economics and etiquette” (pp. xxi-xxii).

## Tea and human health

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.

Active compounds called catechins were found to have protective 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. 89).

Ten 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 four cups of tea a day. Catechins in tea could reduce blood glucose or insulin level.

Studies in Japan and the US suggest mortality from cardiovascular disease was decreased when more than 6 cups of tea per day are consumed. Black and green tea “may reduce risk of both coronary heart disease and stroke by 10% - 20%” (Chen and Lin, p. 91).

Science 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).



Visitors' shoes sit next to visitors enjoying a tea lunch at Ching Ching Cha tea room in Washington, D.C.

## Zen culture and the Blue Zones

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 ensure healthy portion control and make the meal “a time to enjoy, relax and relieve stress” (Buettner, p. 48).

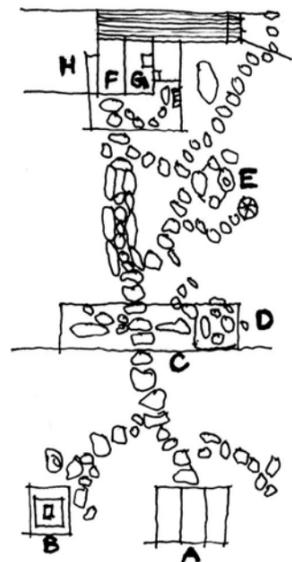
A tea room based on traditional practices of selecting, blending and serving tea addresses several core Blue Zone principles.

Making food and dining sacred is an important characteristic of people living in Blue Zones. “For them, growing, preparing, serving, and eating are all sacred practices with power to bring their families, their homes, their communities, their beliefs, and the natural world together in daily rhythms and harmonies” (Buettner, p. 77).

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. Ikarians drink brews of rosemary, wild sage, and dandelion – all herbs known to have anti-inflammatory properties.” (Buettner, p. 77)

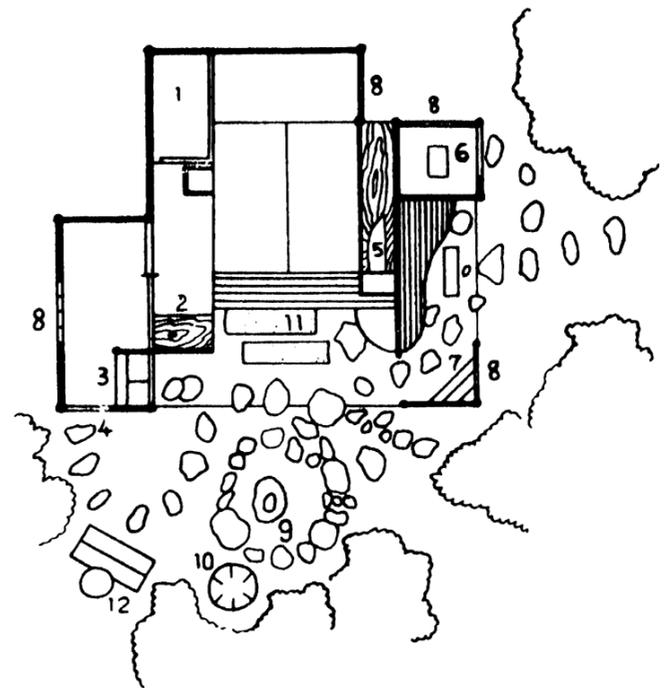


A tea service at Ching Ching Cha tea room, with the “slop cup” at top to pour off the first water to wash the tea leaves.



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



RIGHT  
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, “[a]nd since Teism was the art of making a house as well as living 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, architect, 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.

(right) Visitors enjoy a bowl of warm green tea in winter while viewing the 700-year-old pine in the garden at Hosen-In Temple in Ohara, Japan.  
Photo credit: Ben Simmons from *Kyoto Gardens: Masterworks of the Japanese gardener's art*.



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

## LA MAISON DE VERRE



01 **move naturally**  
People in Blue Zones live in environments that build movement into their daily routines.

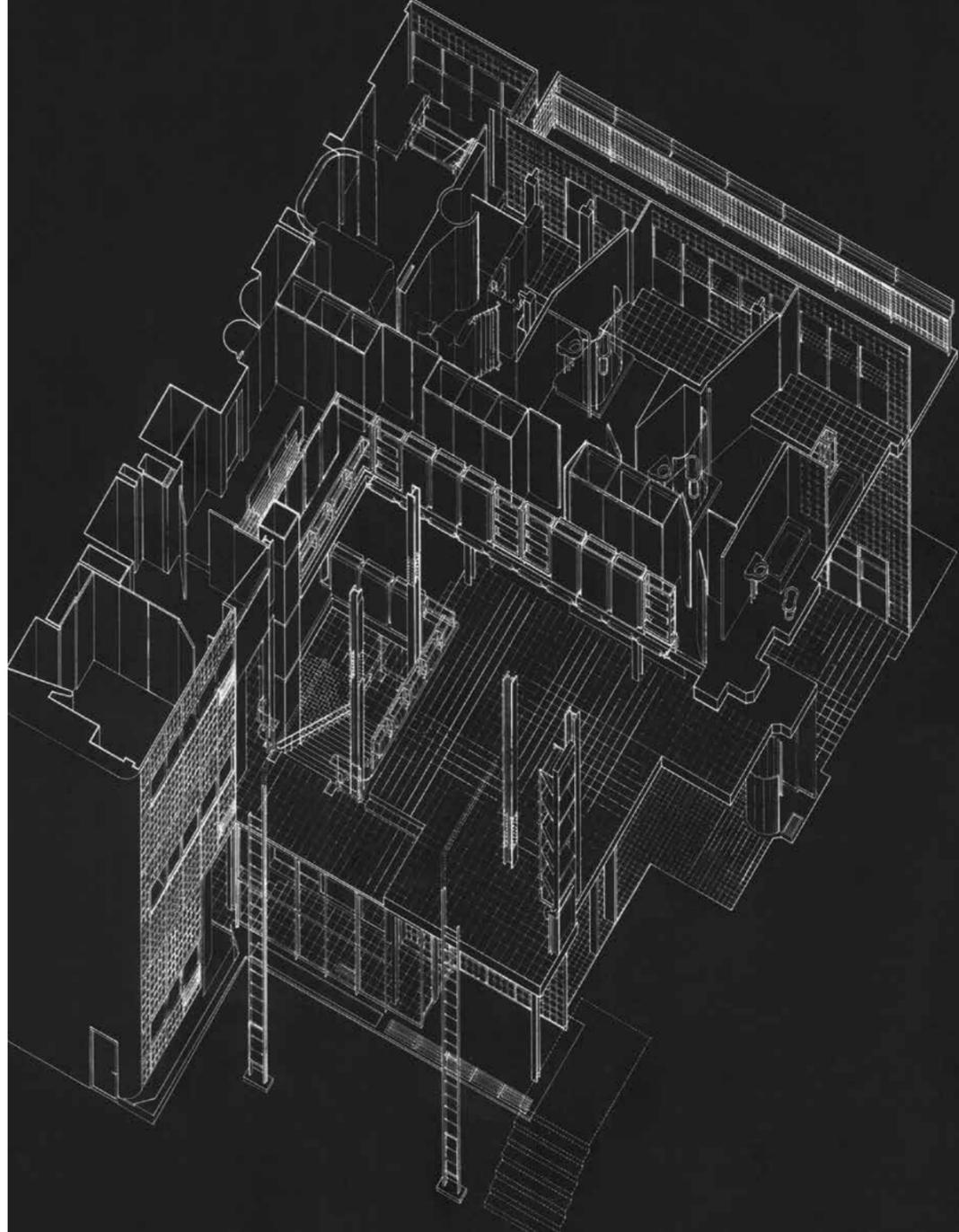
Created in close consultation with metalworker Louis Dalbet, and the clients, Dr. and Mme. Dalsace, La Maison de Verre is so richly detailed that its interior is equally if not more significant than its architecture. In fact, in his 1969 essay, architecture critic Kenneth Frampton wondered whether it would be more accurate to call La Maison “a grossly 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 through the house, Chareau’s house is an excellent model for organization of this thesis site.

*Pierre Chareau and Bernard Bijvoët, 1928–1932  
Paris, France*

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.

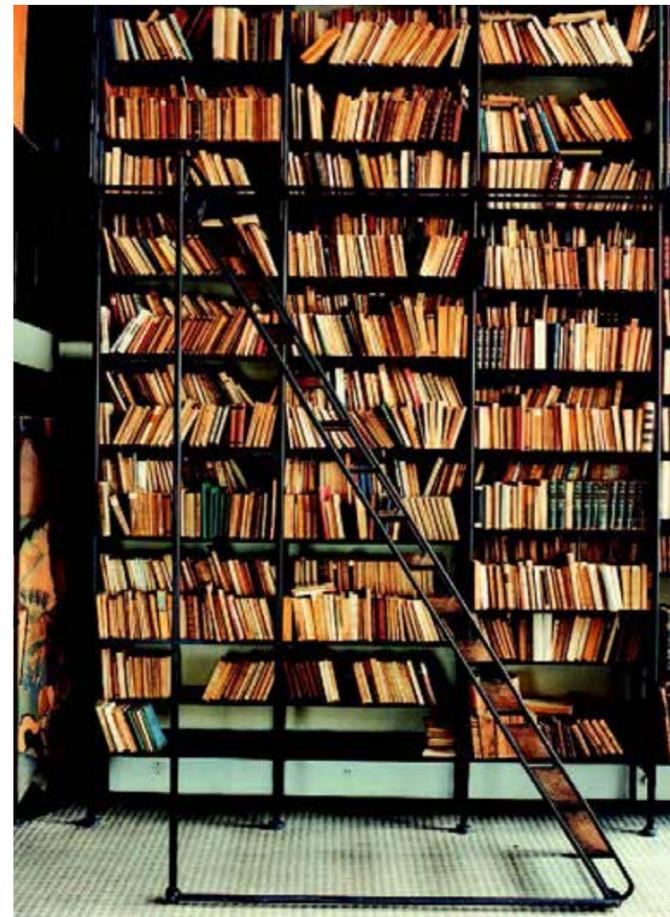


The glass block facade of La Maison de Verre, as seen from the forecourt, allows in light while maintaining privacy. At the time, the use of glass block “lenses” on such a scale for residential architecture was relatively unknown. The material was originally developed in Japan and indeed contributes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





A view of the main salon, with furniture designed by Pierre Chareau. The second floor storage unit is visible above, with gallery access. (Photo source: Francois Halard via Edwards and Gjertson.)



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: Subrealistsandu/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.)



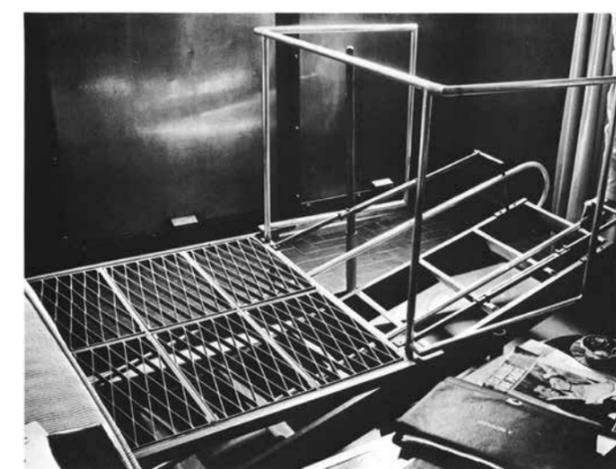
01



02

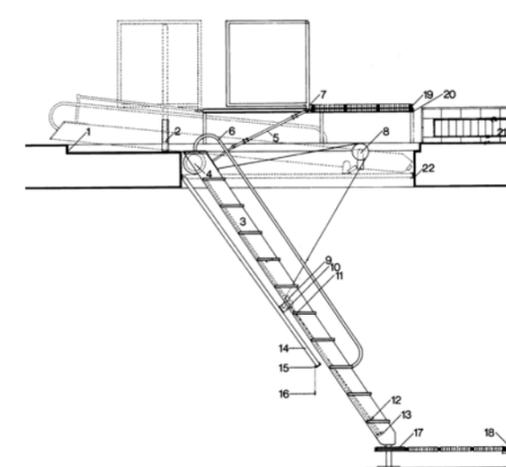
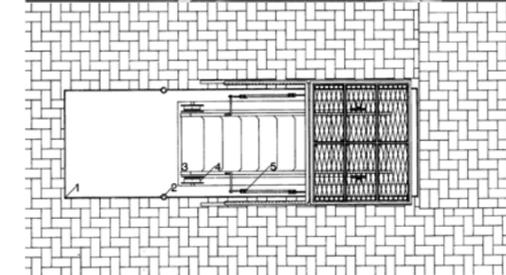


03



04

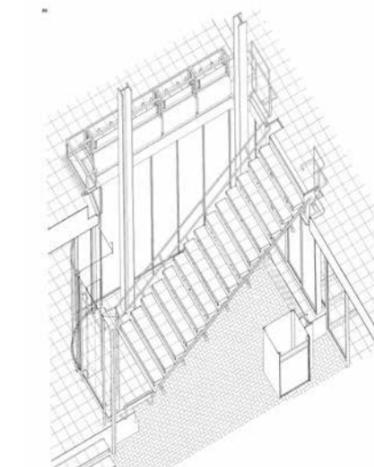
Four different stair solutions in the house include (01) an auxiliary stair for the doctor to access his study and the main salon, (02) the main stair with its steel string beams, (03) Access stair to the second floor faced in wooden tiles to match dining room floor, and (04) a retractable ship's stair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



(top) Retractable stair from Madame Dalsace's day room. (bottom) Plan and section of the retractable master bedroom stair. (Both images: Michael Carapetian via Perspecta.)

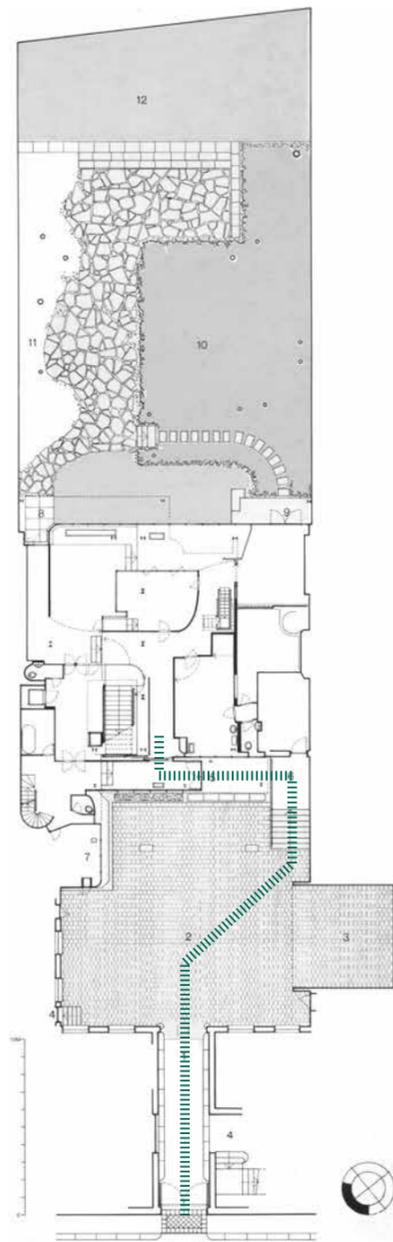


The pivoting door leading from the medical suite to the private quarters with perforated metal sub-screens. (Photo source: Francois Halard via Edwards and Gjertson.)



Axon of the main stair. (Image source: Michael Carapetian via Perspecta.)

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 ivy
11. grass and shrubs
12. gravel play court

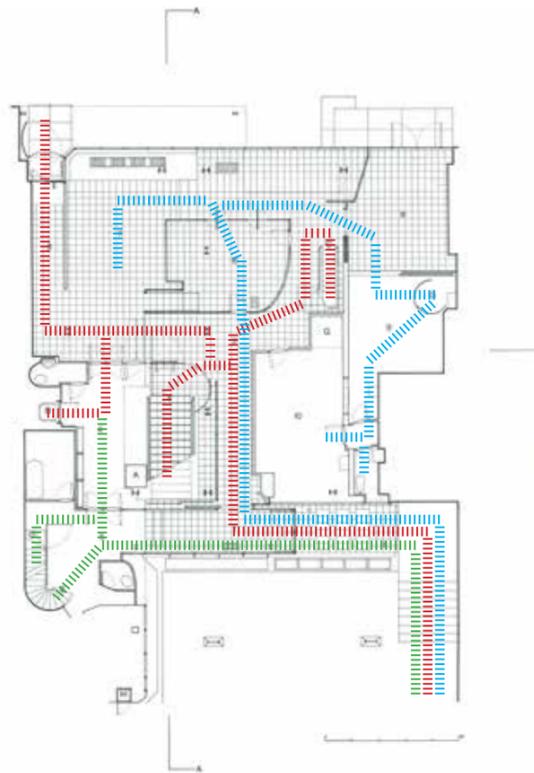


1. entrance lobby
2. central corridor
3. garden corridor
4. service foyer
5. servants' entrance
6. receptionist
7. waiting room
8. consulting room
9. examination room
10. attendance room

- A. dumb waiter  
 B. passenger elevator  
 C. auxiliary stair to study  
 D. stair to basement  
 E. stair to kitchen  
 F. main stair to salon  
 G. changing cubicle  
 H. refuse

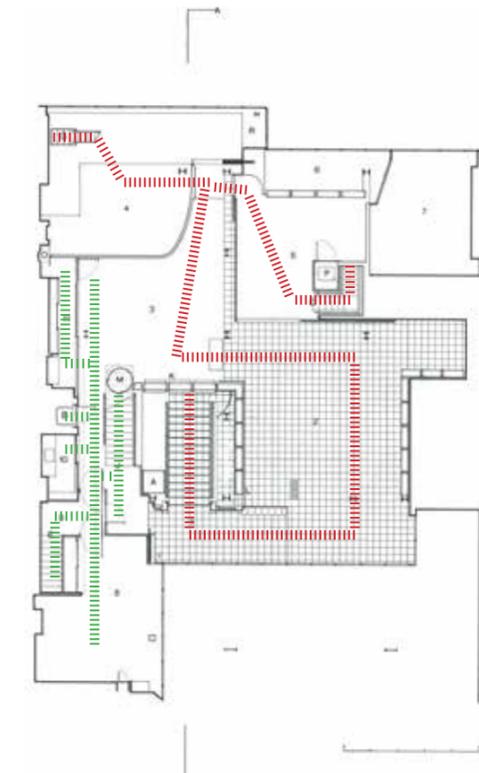
(left) Site plan showing the arrival path family, staff and patients take from the street through the forecourt and to the main entrance. (above) Ground floor plan showing paths of travel for the family, staff and patients. (Source both images: Perspecta magazine.)

- PATH OF TRAVEL FOR SERVANTS  
 ■■■■■■■■■■ PATH OF TRAVEL FOR FAMILY  
 ■■■■■■■■■■ PATH OF TRAVEL FOR PATIENTS  
 ■■■■■■■■■■ PATH OF TRAVEL FOR GUESTS



1. main landing
2. main salon
3. dining area
4. day room
5. study
6. void over foyer
7. void over consulting room
8. kitchen
9. kitchen entrance
10. wash up
11. storage wall

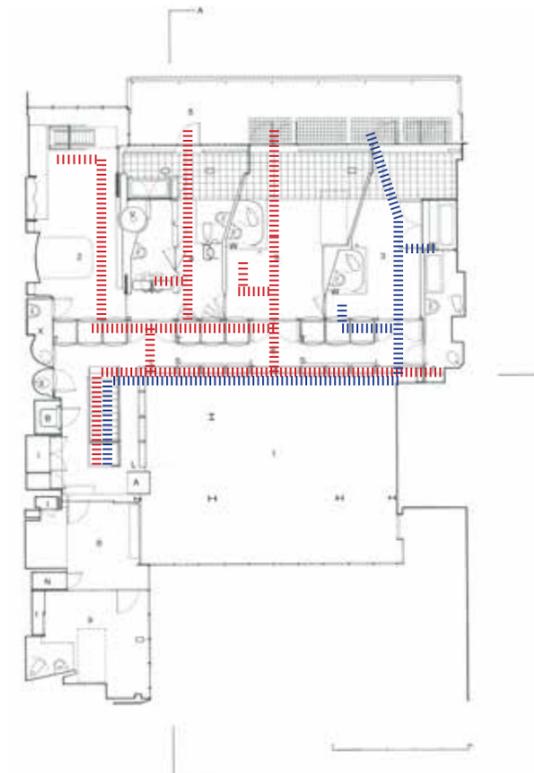
- A. dumb waiter  
 B. passenger elevator  
 C. auxiliary stair to study  
 E. stair to kitchen  
 H. waste disposal  
 J. storage unit  
 K. storage unit  
 L. book rack  
 M. rotary cleaning cupboard  
 O. pass through  
 P. telephone kiosk  
 Q. retractable stair to master bedroom  
 R. plant conservatory



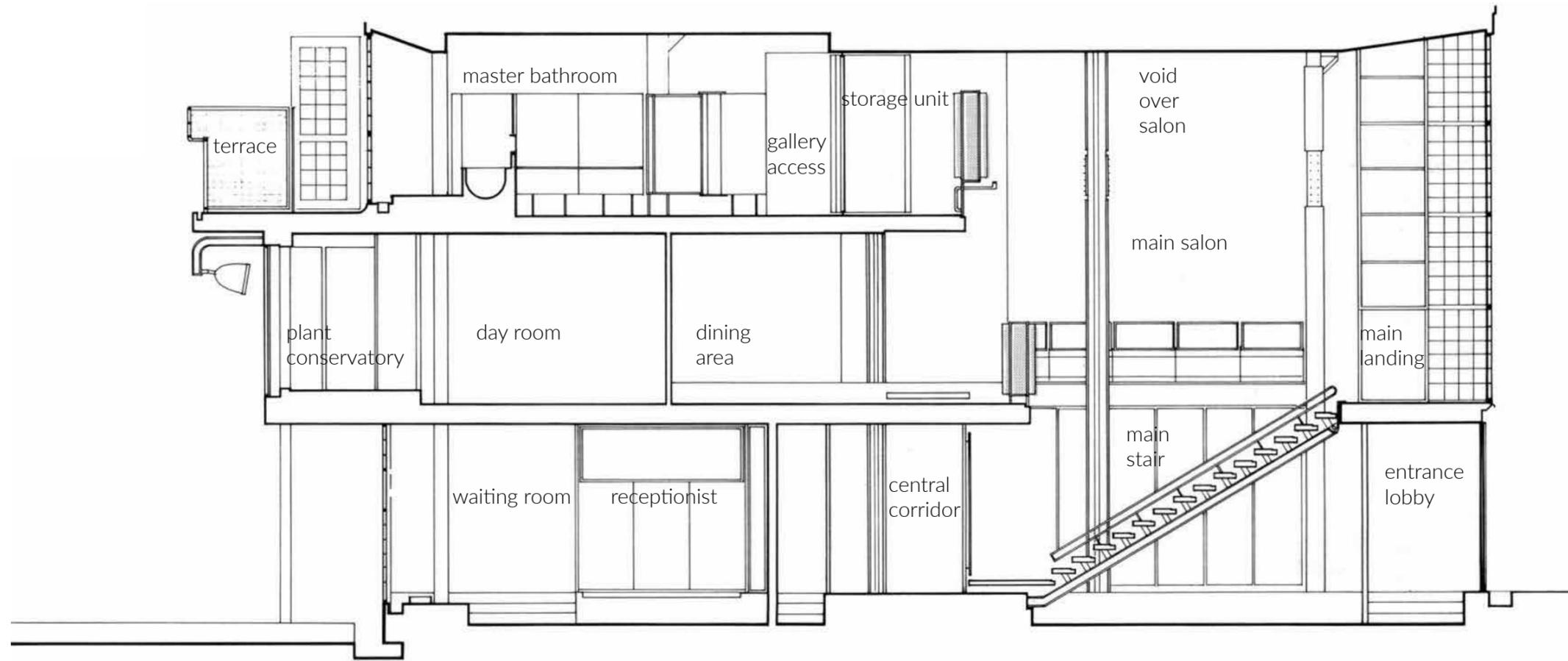
First floor plan of public and semi-public spaces features the two-story main salon. The service wing with kitchen and maids' quarters is located in the lower left. (Source: Perspecta magazine.)

1. void over salon
2. master bedroom
3. bedroom
4. master bathroom
5. terrace
6. gallery access
7. guest bathroom
8. workroom
9. maid's bedroom

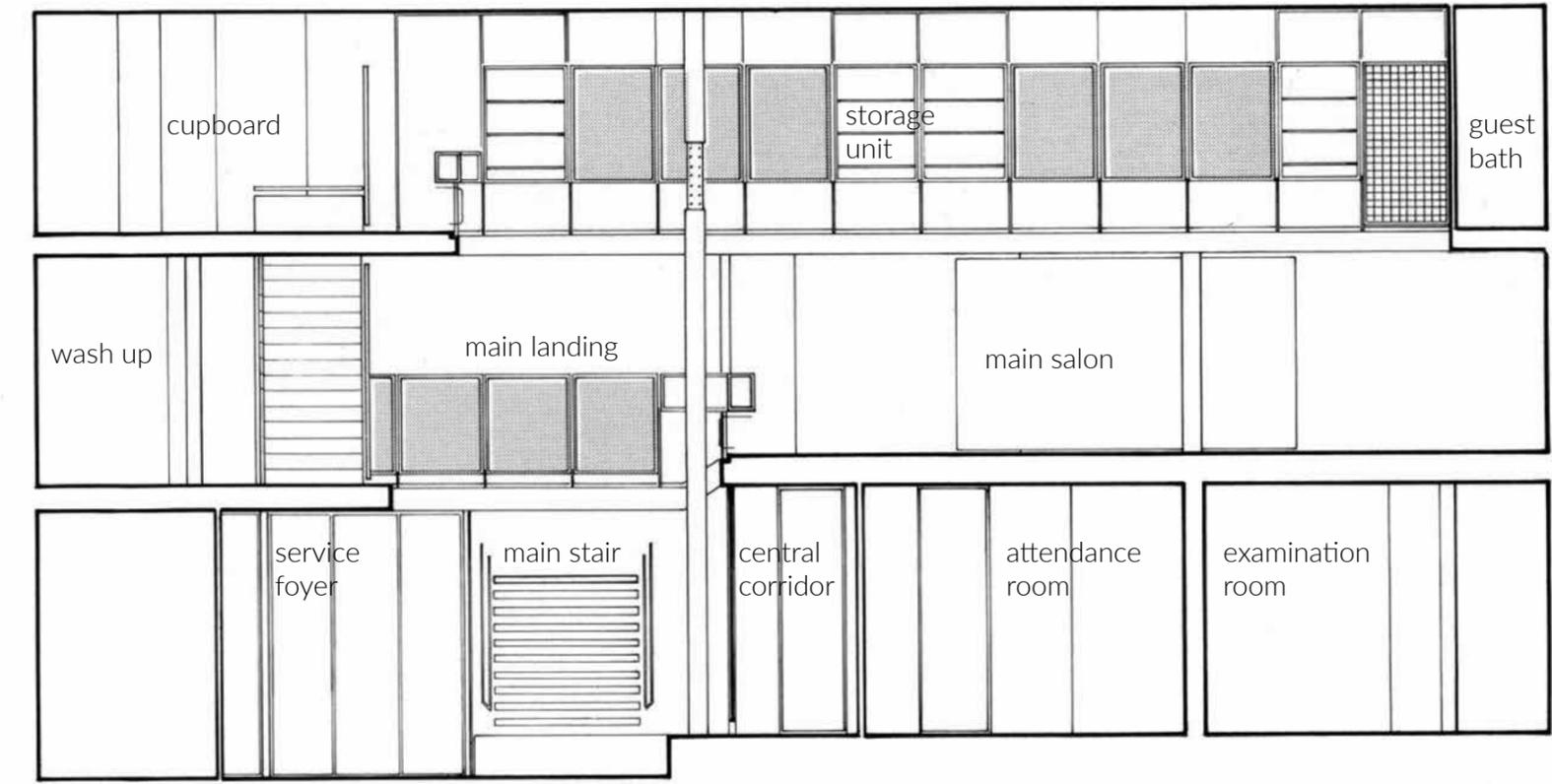
- A. dumb waiter  
 B. passenger elevator  
 I. cupboard  
 L. book rack  
 N. cleaning cupboard  
 S. storage unit  
 T. wardrobe unit  
 V. shower  
 W. toilet unit  
 X. w.c.



(above, left) 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 left. (right) 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.

# L'UNITÉ D'HABITATION À MARSEILLE

01 **move naturally**  
 People in Blue Zones live in environments that build movement into their daily routines.

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 Radiant City 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).

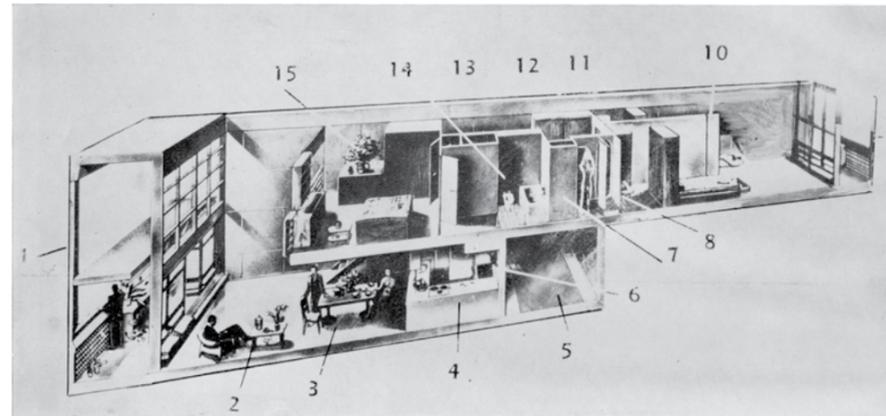
Le Corbusier's unique plan allowed the apartment units to be inserted into a concrete skeleton, which he likened to wine bottles in a rack. The units wrapped up and over, or down and under, a common interior "street," making a highly efficient use of space that gave all units windows on either end and 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.

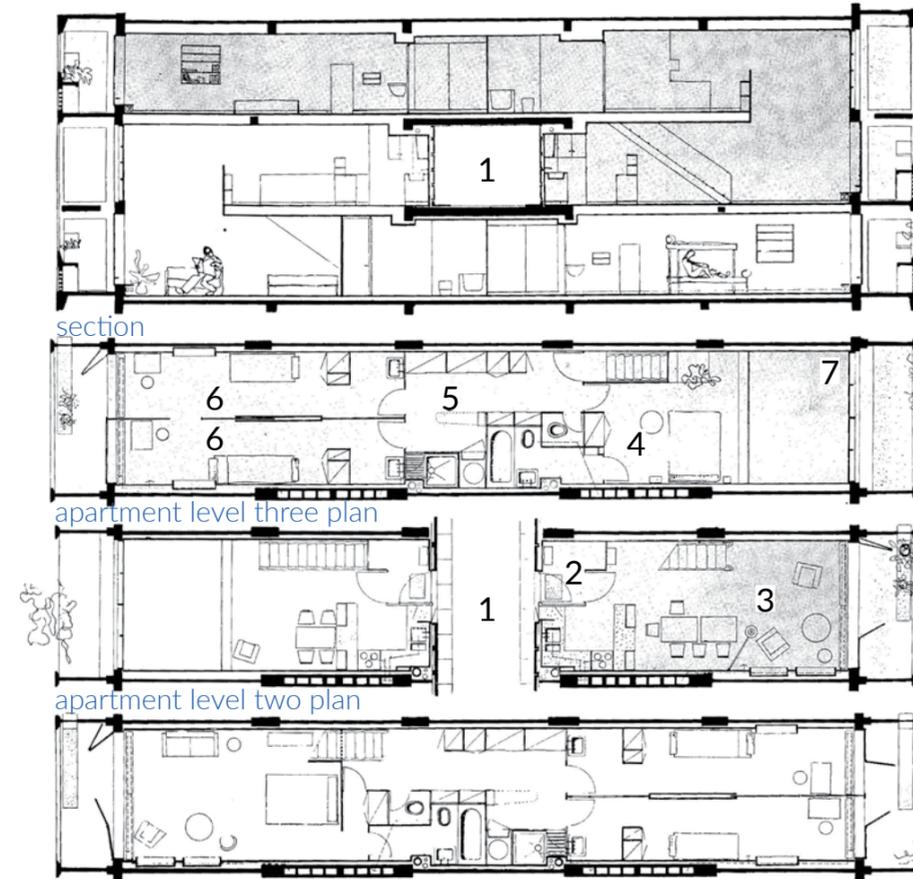
*Le Corbusier, 1946 - 1952  
 Marseille, France*



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



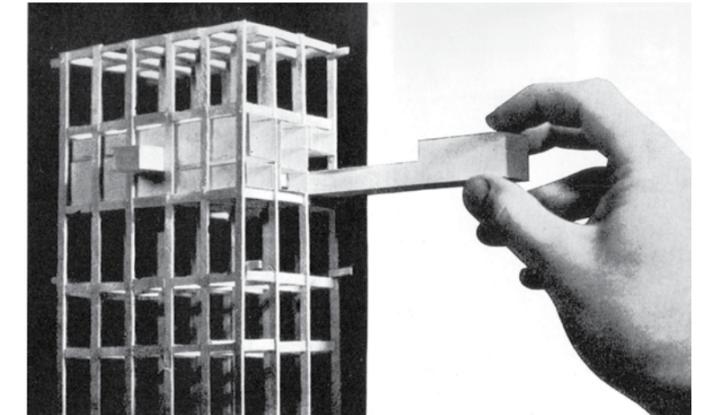
section perspective showing the access to natural light, vertical transitions and generous volume in a narrow space (Source: Choay and Herve, 1961).



- typical section and plan of apartment
- 1 interior corridor
  - 2 entry
  - 3 living room with kitchen
  - 4 parents' room with bath
  - 5 lockers, wardrobe, cupboards, ironing board, children's bath
  - 6 children's room
  - 7 void over common room



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).

# TEA HOUSE



02 **purpose**  
Have something to live for when waking up each day. Having a sense of purpose adds seven years of extra life expectancy.

Architect David Jameson's tea house, located in a leafy backyard of a suburban Maryland residence, appears suspended, like a lamp, in its woodland setting.

While it appears to hang from a steel structure, cantilevered over the garden's edge, the tea house is in fact fully anchored to the ground. The structure's frame holds the building on slender columns while lighting accents the apparent suspension.

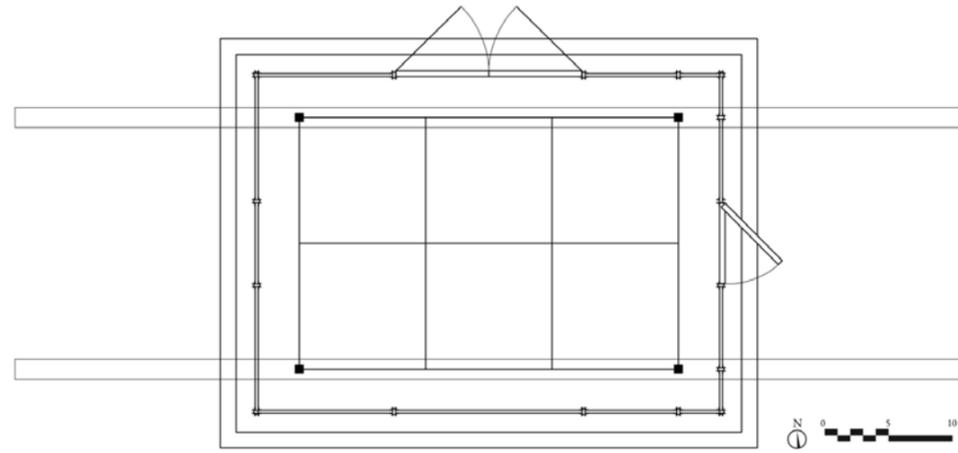
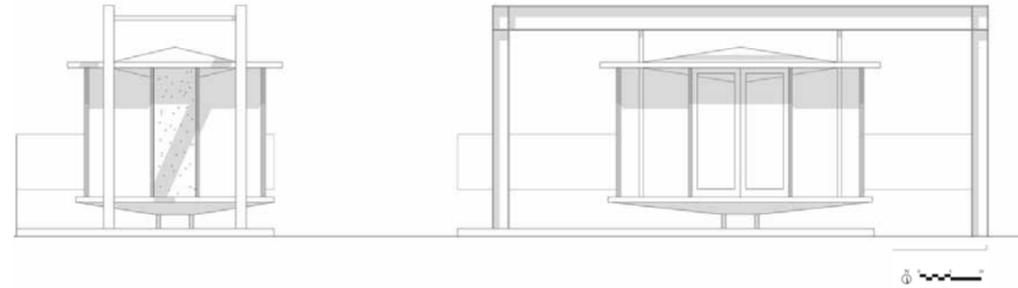
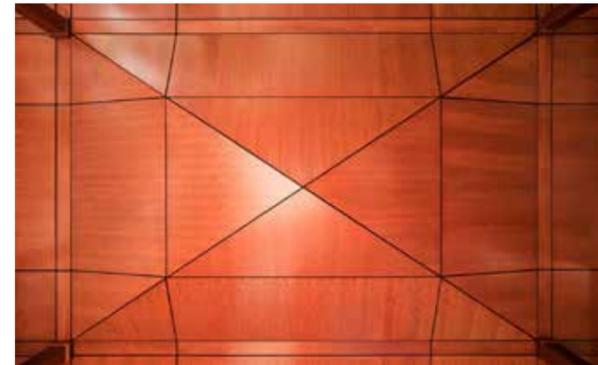


03 **down shift**  
Make a daily habit of taking time to meditate, pray or nap.

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

*Tea House*  
180.0 sqm  
David Jameson, 2009  
Bethesda, Maryland



(above) elevations and plan of the Tea House with its supporting framework (Source: ArchDaily).

(left) the folded cherry ceiling (Source: Paul Warchol for ArchDaily).

(right) the Tea House is intended to be a metaphor for mindfulness (Source: Paul Warchol for Residential Architect).



RICHMOND AND THE  
FAN DISTRICT  
42

SITE STUDY  
46

BUILDING AND SITE

# RICHMOND AND THE FAN DISTRICT



## POPULATION

City of Richmond population (2015) 217,938, projected population (2020) 229,383  
 Richmond metropolitan area population 1.25 million  
 The Richmond metropolitan statistical area is the 44th largest metro in the US  
 56% of the population is in the prime working ages of 25-64, higher than the national average of 53%  
 48% male, 52% female  
 62% white, 30% black, 3% asian, 1.6% other  
 Median household income (214) of \$59,677, above the U.S average of \$53,657  
 High school graduate 87.8%, some college or associates degree 28.4%, bachelor's degree or higher 32.5%

## COSTS AND SERVICES

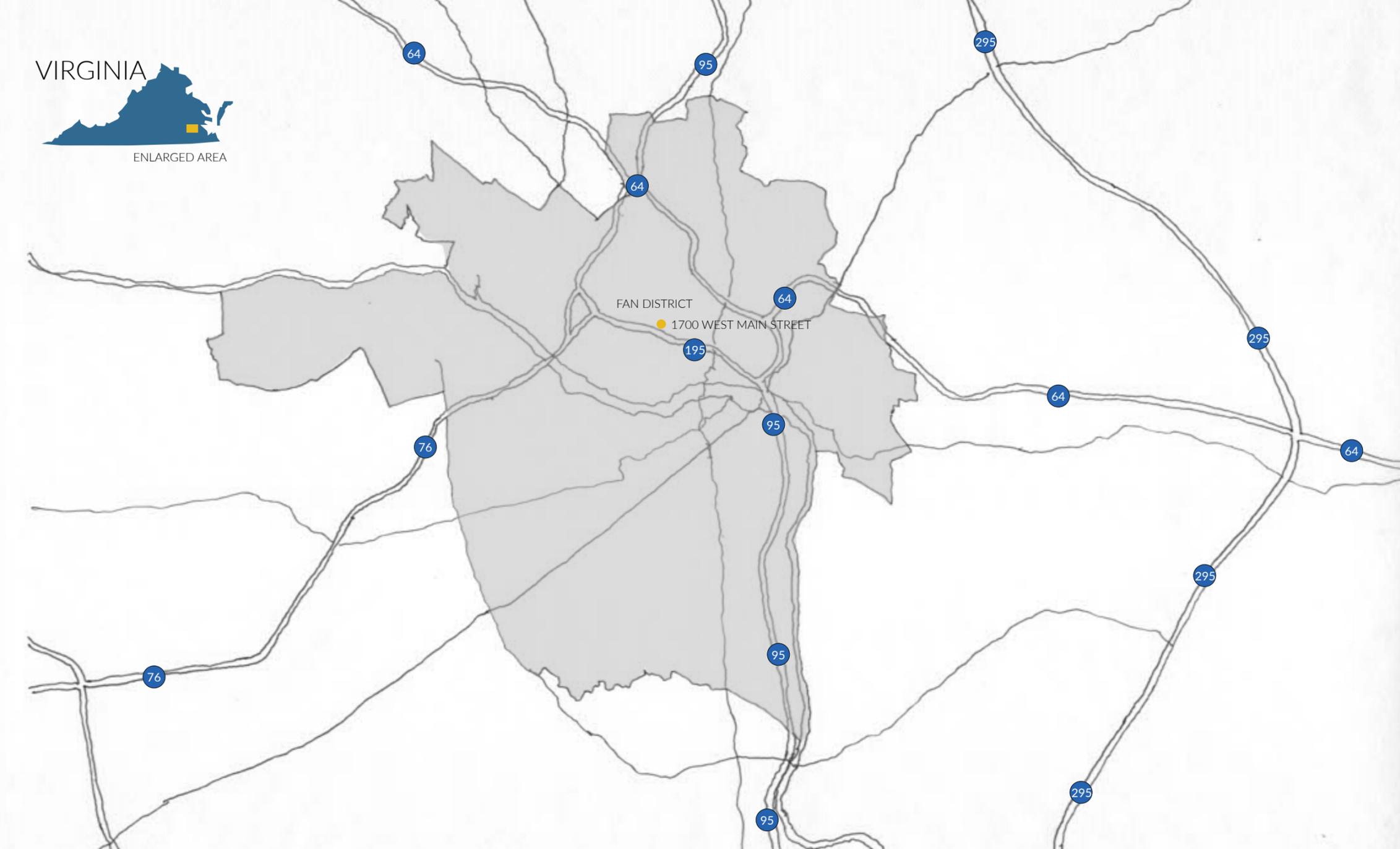
Richmond's cost of living is more than 5% below the national average  
 Housing, groceries, transportation are also lower than the national average  
 Health care and utilities costs are higher than the national average  
 The average monthly apartment rental is \$867 for a 950-square-foot two bed-room unit with 1 1/2-2 baths, excluding all utilities but water  
 The region has more than 4,100 physicians and 19 acute care and specialty hospitals  
 VCU's Medical College of Virginia is the most comprehensive teaching hospital in Virginia

## LOCATION

Located at the midpoint of the East Coast/mid-Atlantic region of the United States.  
 Lies on the I-95 corridor, the major north-south highway on the East Coast.  
 Also bisected by I-64, a major Virginia artery connecting Richmond with Norfolk, Newport News and Virginia Beach to the east and Charlottesville and the I-81 corridor to the west.  
 Served by Richmond International Airport (RIC) and Chesterfield Airport.  
 Amtrak passenger rail stops in Staples Mill and the Main Street Station in historic Shockoe Bottom.

## ACCOLADES

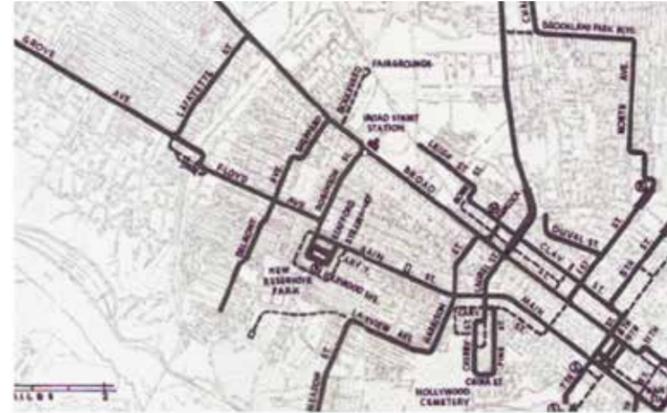
One of America's 50 Best Running Cities by *Runner's World* (August 2016)  
 Top City for Creatives by *Thrillist* (July 2016)  
 Top Destination for Food Travel by *National Geographic* (January 2016)  
 No. 3 on international list of Best Places to Travel in 20016 by *Travel + Leisure* (November 2015)  
 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)



Development of the Historic Fan District grew from a late 19th century trolley transit line. Subdivided 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 Robinson and Strawberry Streets continue to serve residents.

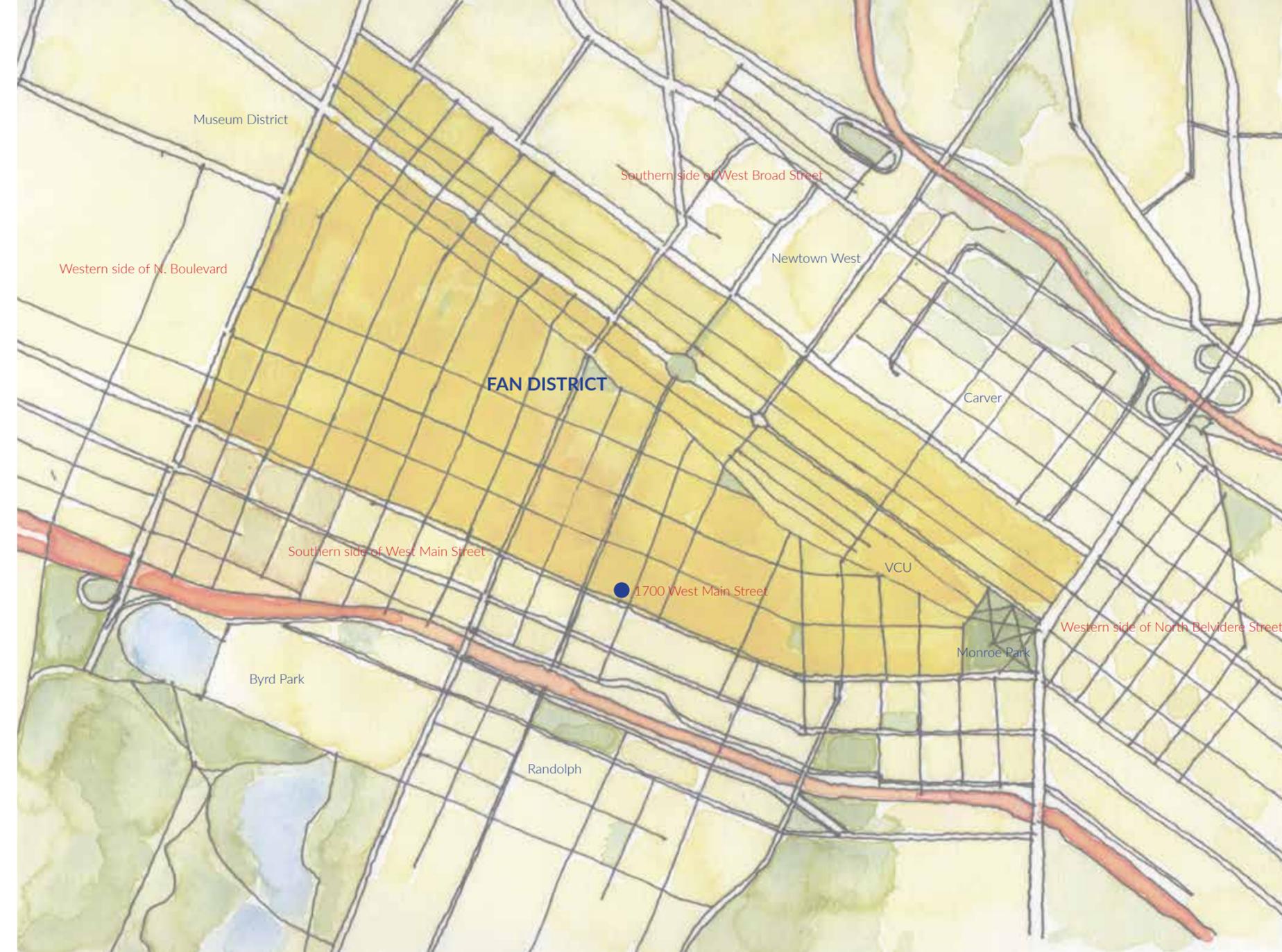
The streetscape is very walkable, with sidewalks edging all streets and set backs that keep residential and commercial buildings



Richmond Trolley map, 1930. Source: Fan of the Fan.

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](http://fanofthefan.com)). This arrangement also creates several triangular 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.”



# SITE STUDY

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.



- restaurants/cafes
- school
- art galleries
- food markets
- houses of worship
- gas station
- barbershops/hairstylists

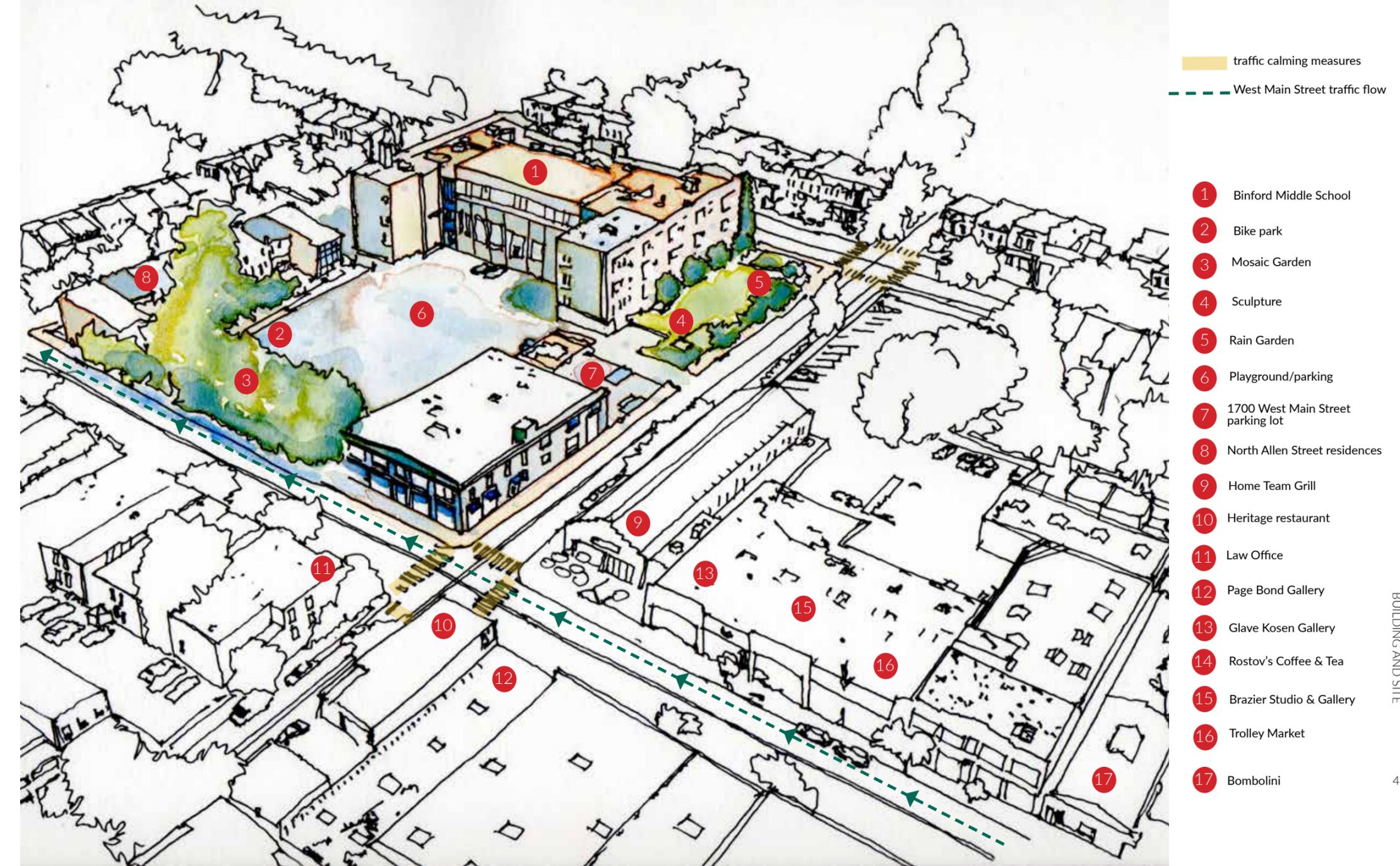


Binford Middle School at 1701 Floyd Avenue was designed in 1914 by Richmond architect Charles M. Robinson. The school and its site are the most dominant feature of the block. Built in the Tudor Gothic Revival style, it features “castellated parapets, a Tudor-arched stone entrance with decorative carving, and an oriel 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/school playground occupies the center of the block. The building at 1700 West Main is a hub that defines the northwest 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.





1 Binford Middle School



2 Bike park



3 Mosaic Garden



4 Sculpture



5 Rain Garden



6 Playground/parking



7 1700 West Main Street parking lot



8 North Allen Street residences



9 Home Team Grill



10 Heritage restaurant



11 Law Office



traffic calming measures





(left) 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.

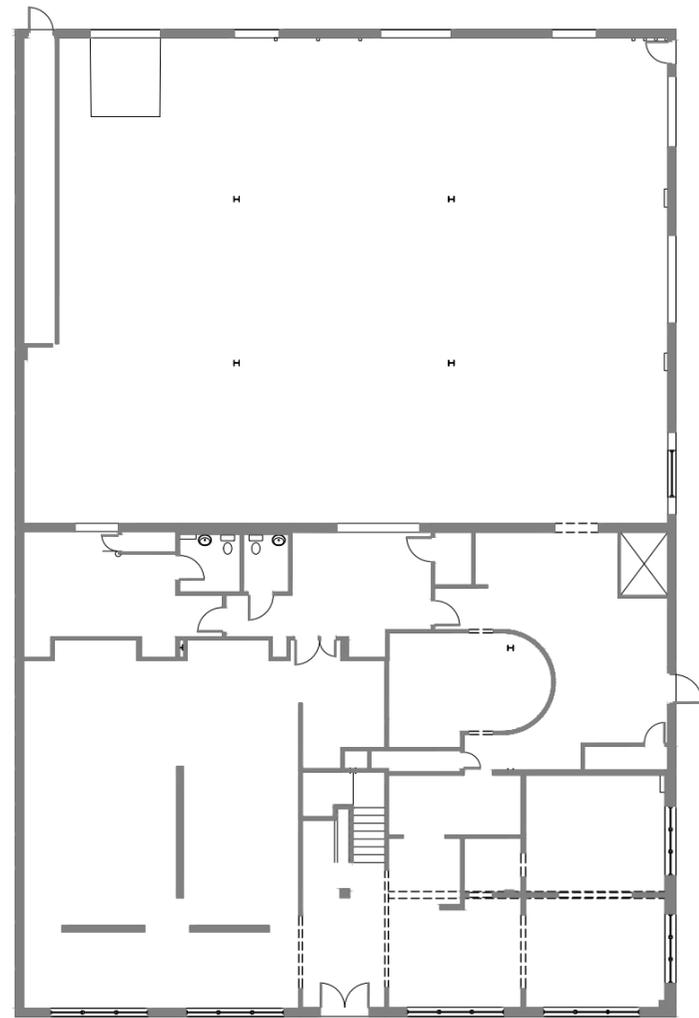
The property at 1700 West Main Street is a two story, fully detached 19,800 gross sft. rectangular block with five bays, a flat parapet roof and a central pediment that caps the middle three bays.

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 some time 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.

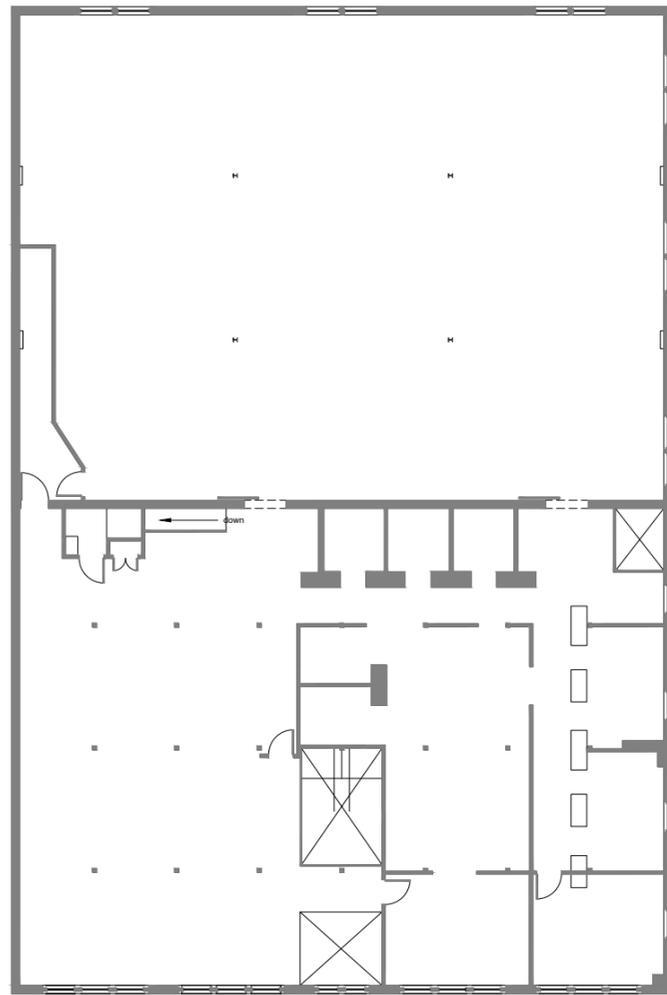
(right) An east elevation entry door features a fan pediment and classical Doric pilasters.





FIRST FLOOR PLAN

0 20' 40'



SECOND FLOOR PLAN

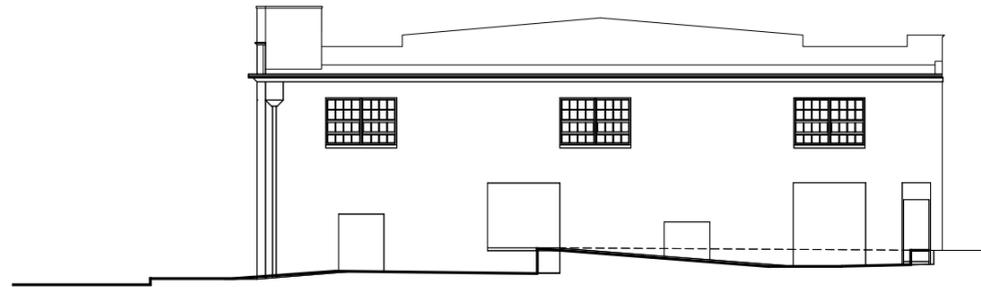
(Source: Johannes Design Group).



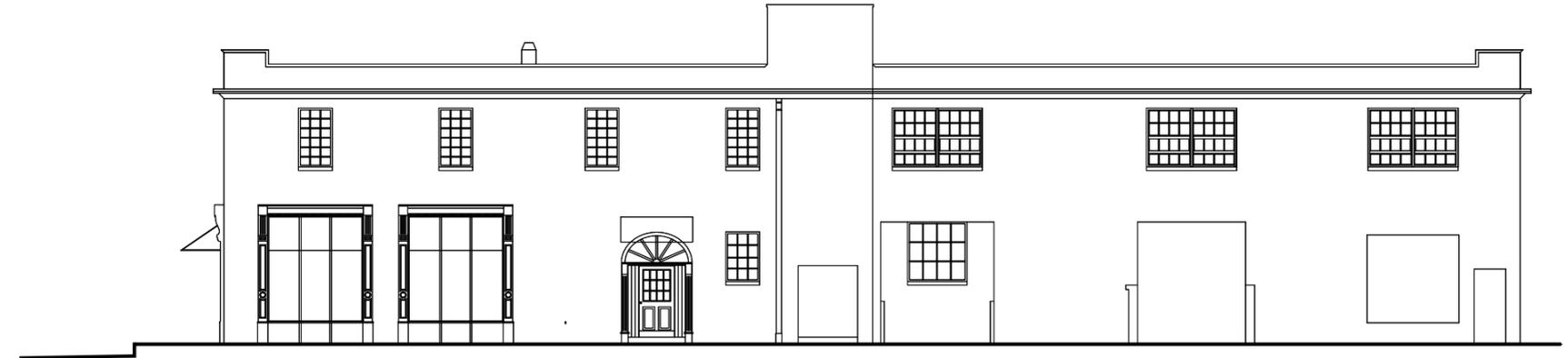
(previous page) A 1924 photo from Sketches of Richmond shows 1700 West Main Street four years after it was built by the James Robertson Mfg. Co., a plumbing supply firm based in Baltimore.



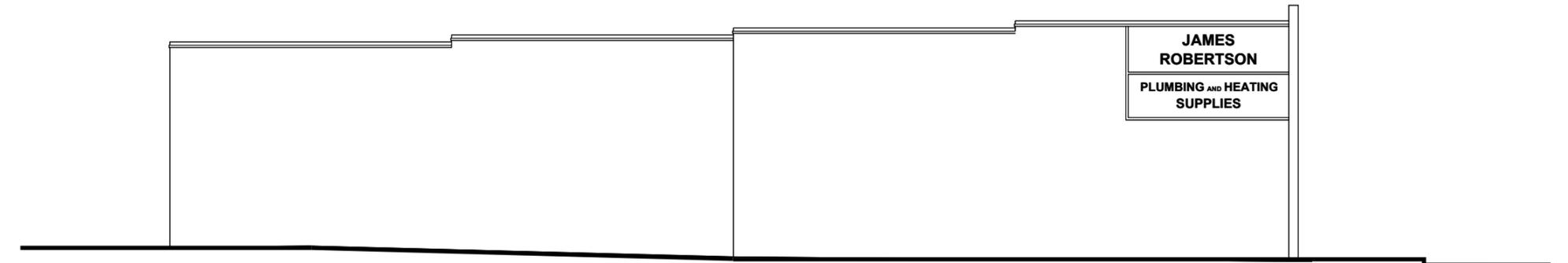
SOUTH ELEVATION



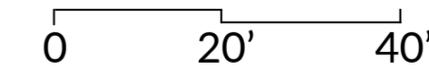
NORTH ELEVATION



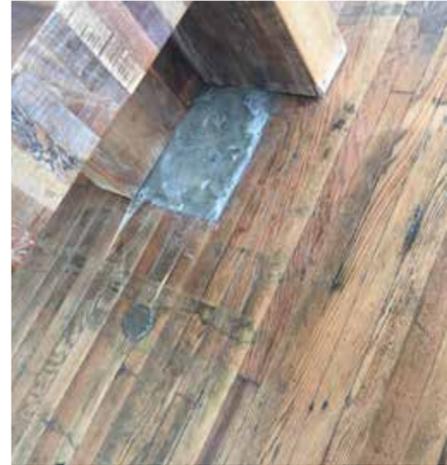
EAST ELEVATION



WEST ELEVATION



(Source: Johannes Design Group).



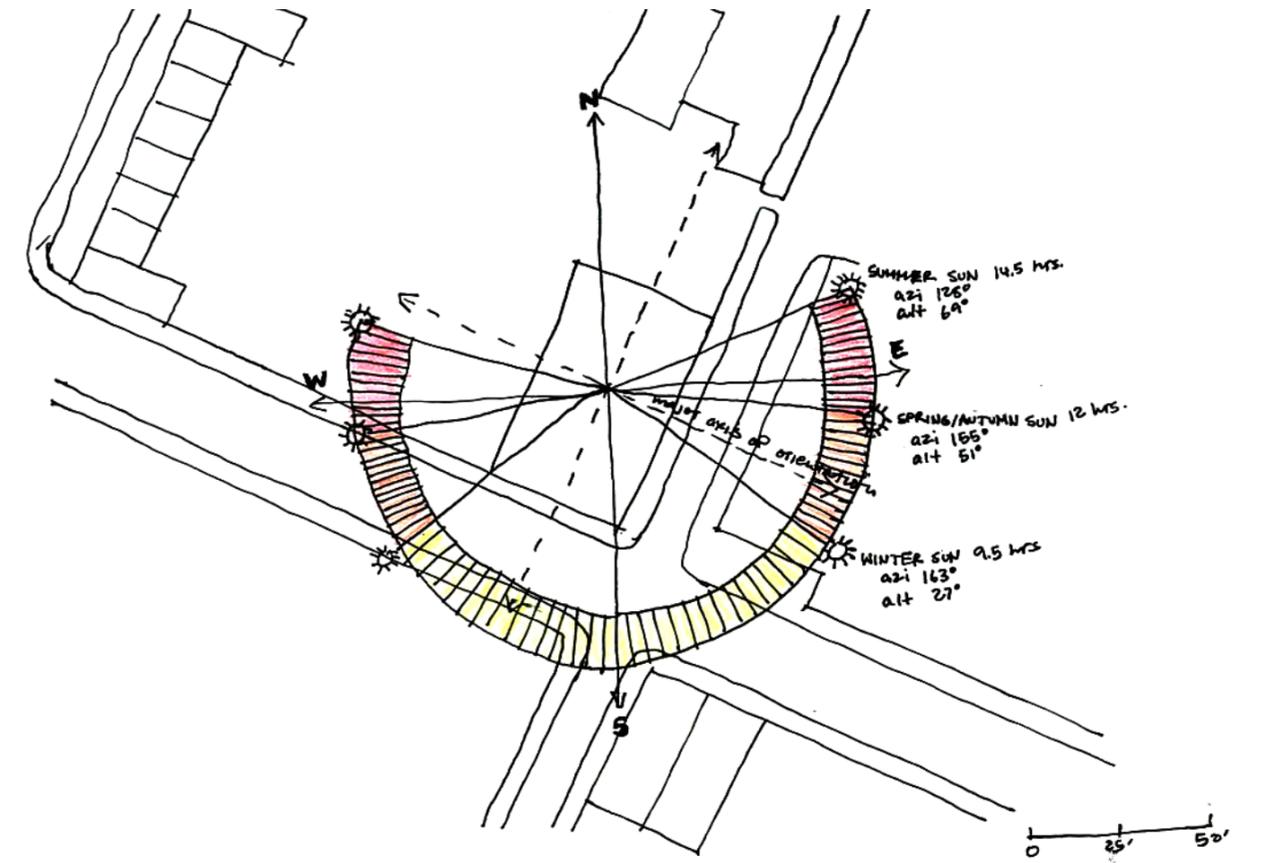
(above, left and right) Aged concrete penetrates the worn antique floor boards in the Capital Mac showroom on the first floor southeast corner of the building. (below, left and right) Awnings and blinds shade the Capital Mac showroom from the intense mid-day sun.



(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.

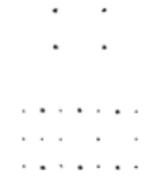


(above) The setting sun completely shades the north elevation the 16-car parking lot on the rear of the building. (below) At dusk, streetlights illuminate the busy south side of the building after the Capital Mac shop has closed for the day.

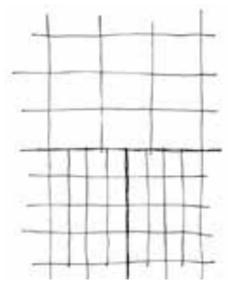


(above) Without any adjacent structures to overlook the building at 1700 West Main Street, the south and east elevations receive intense sun while the north side facing the parking lot receives filtered sun, mainly in the winter. While the most recent

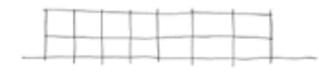
renovation added several balcony niches to the west elevation, the original solid brick west elevation had no windows or doors.



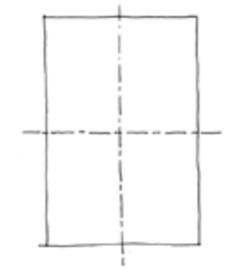
STRUCTURE



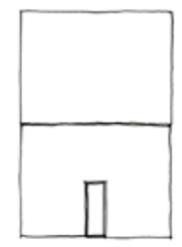
GEOMETRY



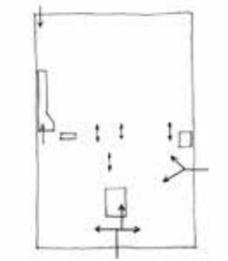
GEOMETRY



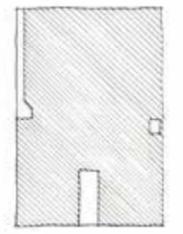
SYMMETRY AND BALANCE



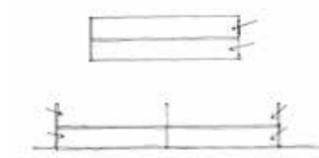
HIERARCHY



CIRCULATION TO USE



ADDITIVE AND SUBSTRACTIVE



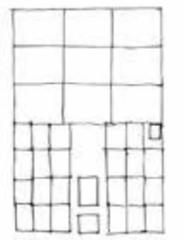
NATURAL LIGHT



MASSING



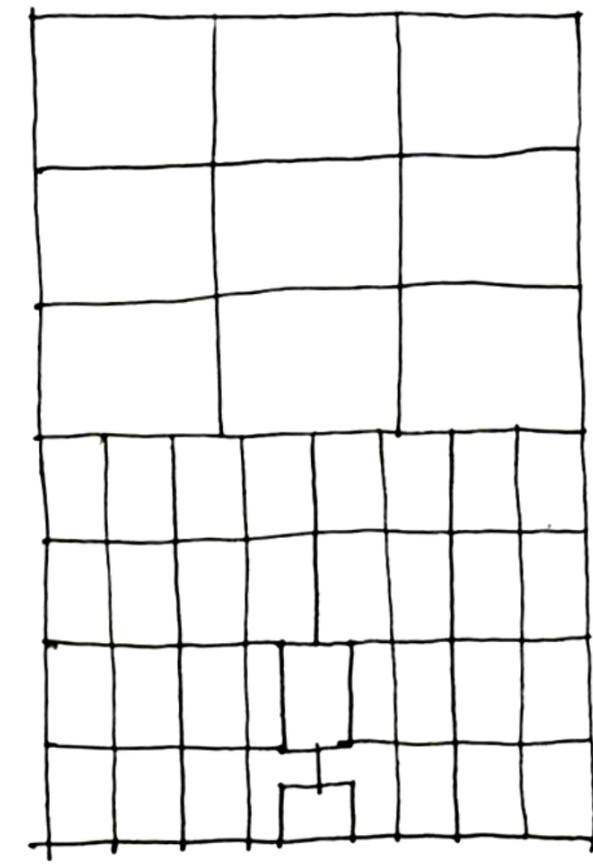
MASSING



REPETITIVE TO UNIQUE



UNIT TO WHOLE



PARTI

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.

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CONCEPT AND PROGRAM

# PROGRAM AND CODE

**what** 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.

**who** 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.

**why** 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.

**when** 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.

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 gross sft for tea room  
14,400 sft for residential apartments

2,400 sft X .60 = 1,440 net sft for T'ai Chi Studio  
2,400 sft X .60 = 1,440 net sft for tea room  
14,400 sft X .60 = 8,640 sft for residential apartments

T'ai Chi Studio A-3 occupancy type, standing (5 net/sft)  
tea room A-2 occupancy type, unconcentrated (15 net/sft)  
residential apartments R-2 occupancy type (200 gross/sft)

T'ai Chi 1,440 net sft/5 = 288 occupants  
tea room 1,440 net sft/15 = 96 occupants  
residential apartments 14,400 gross sft/200 = 72

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

456/2 = 228 men, 228 women

Summary

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

EXIT REQUIREMENTS

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)

1/3 rule for sprinklered building  
144 ft diagonal measurement per floor  
144 ft/3 = 48 ft minimum distance between exits

PLUMBING 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

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

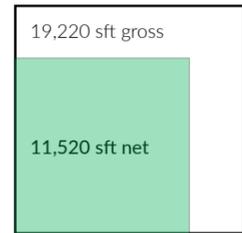
No. of lavatories required per gender  
T'ai Chi Studio (A-3, 40 person occ) 1/200 male, 1/200 female  
Tea Room (A-2, 96 occ) 1/75 male, 1/75 female  
Residential (R-2, 72 person occ) 1/10 male, 1/10 female

1 lavatory:males, 1 lavatory:females  
2 lavatories:males, 2 lavatories:females  
Minimum 1 lavatory per residential unit

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 fountain  
1 water fountain

# GRAPHIC PROGRAM AND ADJACENCIES



Total for entire building



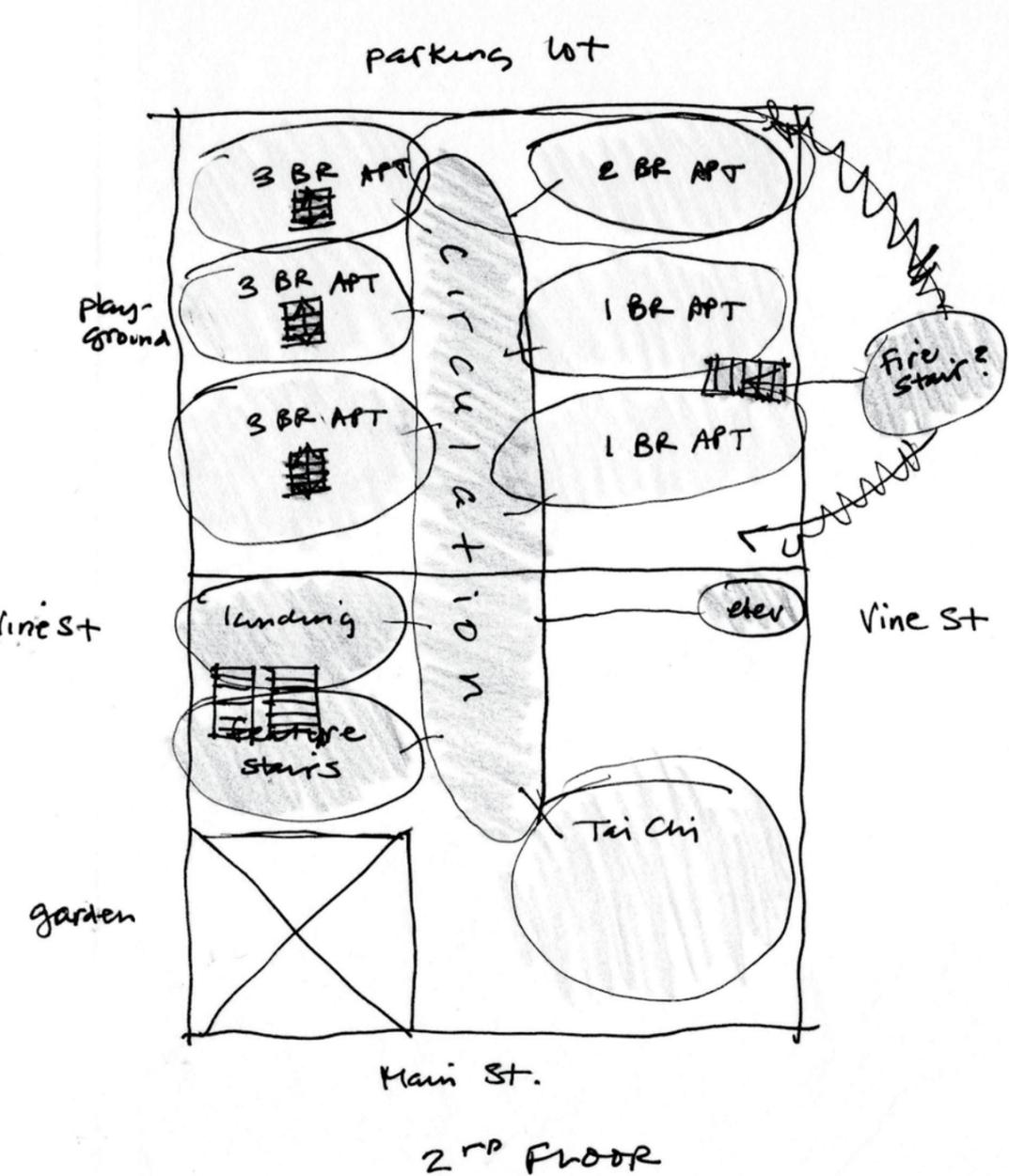
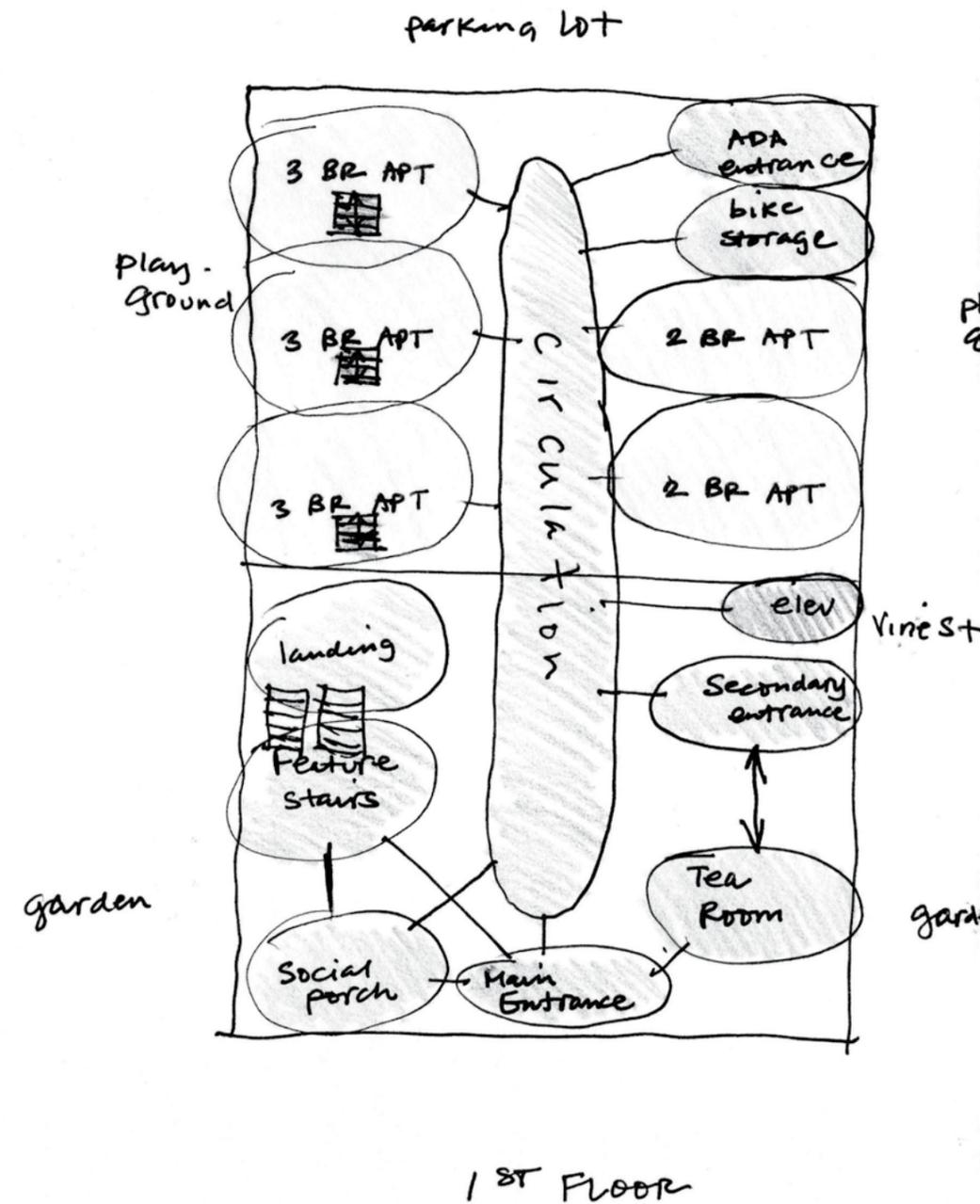
Total residential 8,640 sft net



Tea Room



Tai Chi Studio



# CONCEPT DEVELOPMENT

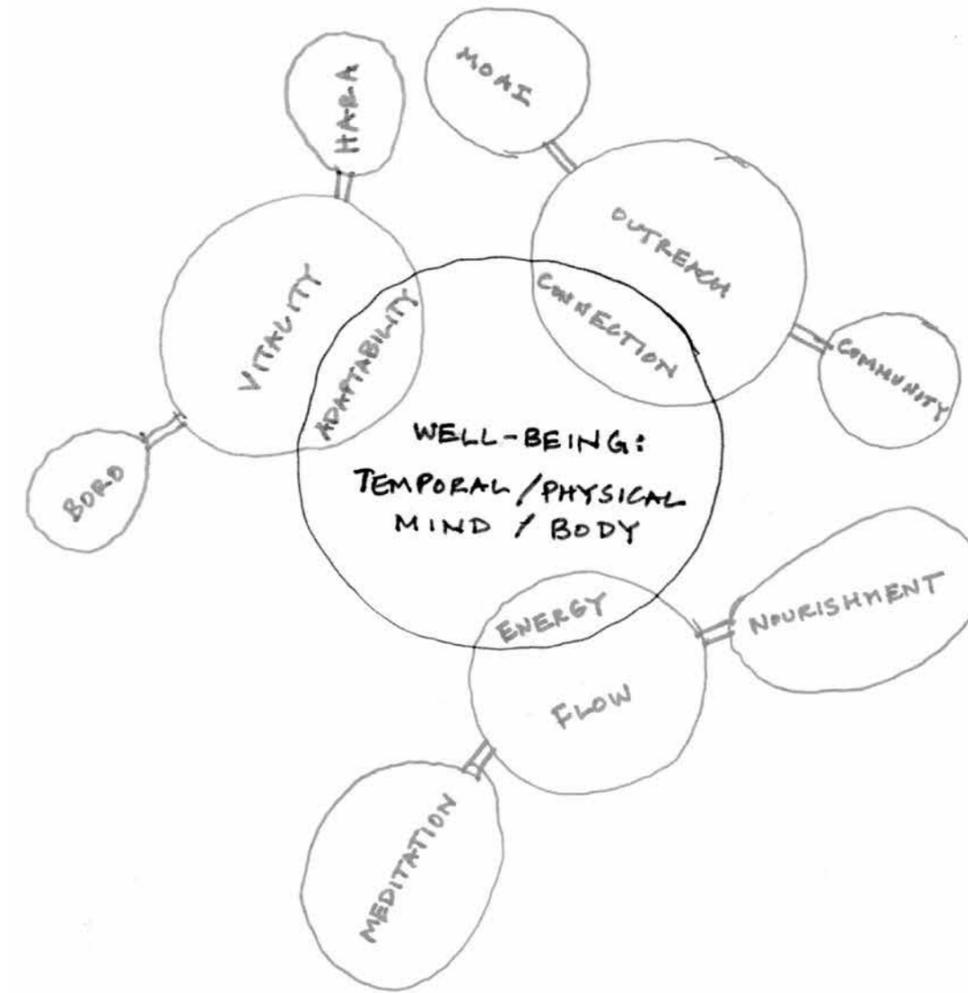
THIS PROJECT CELEBRATES  
 THE RHYTHM OF DAILY LIFE  
 AS A PROGRESSIVE JOURNEY  
 THE SLOW AND STEADY JOURNEY  
 UP AND DOWN THE HILL  
 STRENGTHENS THE MIND AND BODY

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, meditate 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 centenarians live in the real world, not in utopia. That is why the research into how and why they live as long and as well as they have is so meaningful. For those communities, families or individuals who seek a long-lasting framework for life long well-being, it is best 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 Zone" 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.



## CONCEPTUAL DRIVERS

a fully lived life  
 mountains/valleys  
 well-being through incremental movement  
 active design

perseverance  
 tenacity  
 determination  
 structure  
 durability  
 strength  
 purpose  
 drive  
 continuance  
 endurance

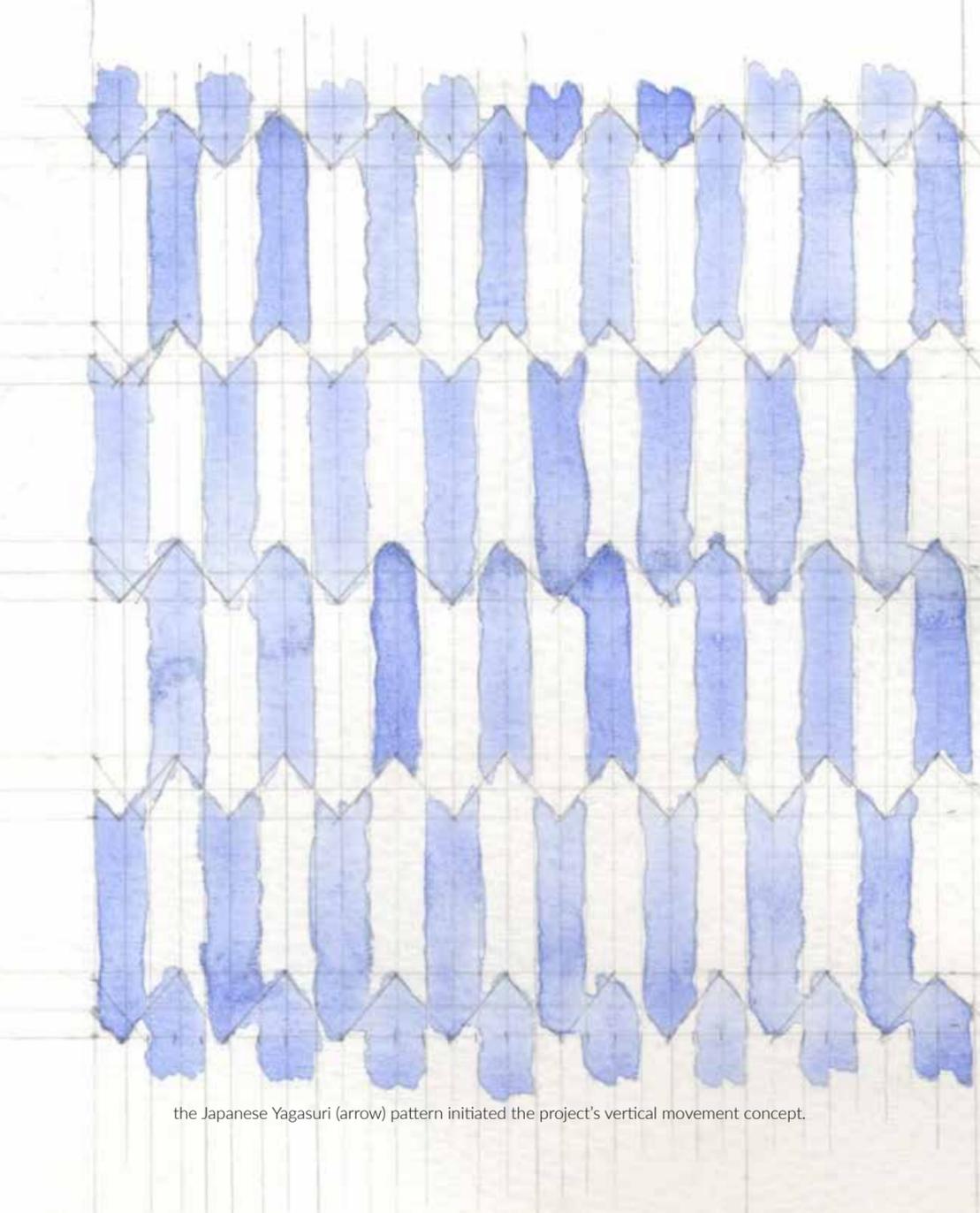
hara  
 vitality  
 life  
 force  
 energy

repair  
 mend  
 patch  
 wabi-sabi  
 boro  
 patina  
 imperfect  
 impermanent  
 incomplete

rest  
 repose  
 relax  
 support

connection  
 bond  
 union  
 link  
 attach  
 cement  
 bind  
 seam  
 truss

nourish  
 nurture  
 sustain  
 feed  
 maintain



the Japanese Yagasuri (arrow) pattern initiated the project's vertical movement concept.



(above) an old pair of the author's jeans illustrates the patch and repair philosophy that Blue Zones residents use to mend and make do.



(left) folded paper concept models continue to explore verticality and (right) a wall of concept displayed at VCU's department of interior design

Well-being is most durable when a mind-body balance is supported within a naturally active micro- and ambient environment. Strong social and family connections supported by a healthy diet and purposeful meditation practices provide the energy needed to adapt to the disruptive challenges that we all face.

# WABI-SABI AND MATERIALITY

The Japanese philosophy of wabi-sabi embraces the **flawed and imperfect**. The Japanese highly value marks of wear and use in objects and this ideal forms the basis 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. Boro textiles, from **boroboro**, celebrate the ingenuity and thriftiness of the Japanese peasantry. Generations of families 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 strengthen the mind and body. **Building materials** such as soapstone, copper, brick and charred wood will 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].



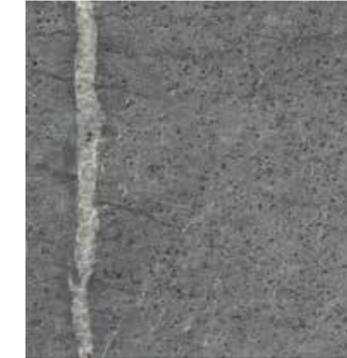
The kintsugi technique uses gold to fill cracks in pottery [apartmenttherapy.com]



a watercolor study explored a potential color palette for the project



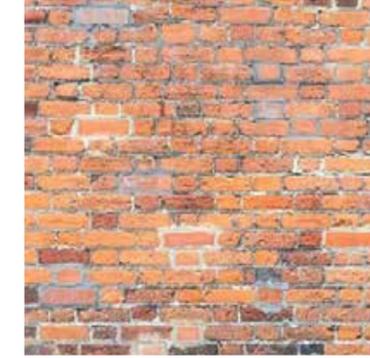
Japanese raku *chawan*, or tea bowls [SINGHATO, etsy.com].



Alberene soapstone floor and stair treads



patinated copper stair railing



existing brick walls



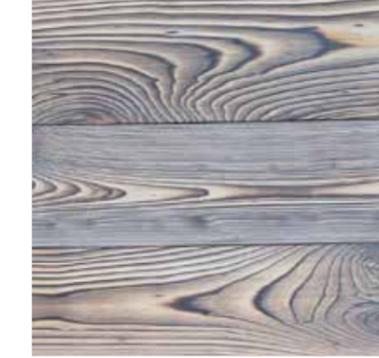
steel L-beam



patchwork ceramic tile bar



charred white oak flooring both levels



charred cypress paneling rotating bar cabinet



lilac frosted glass tile

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DESIGN PROGRESSION

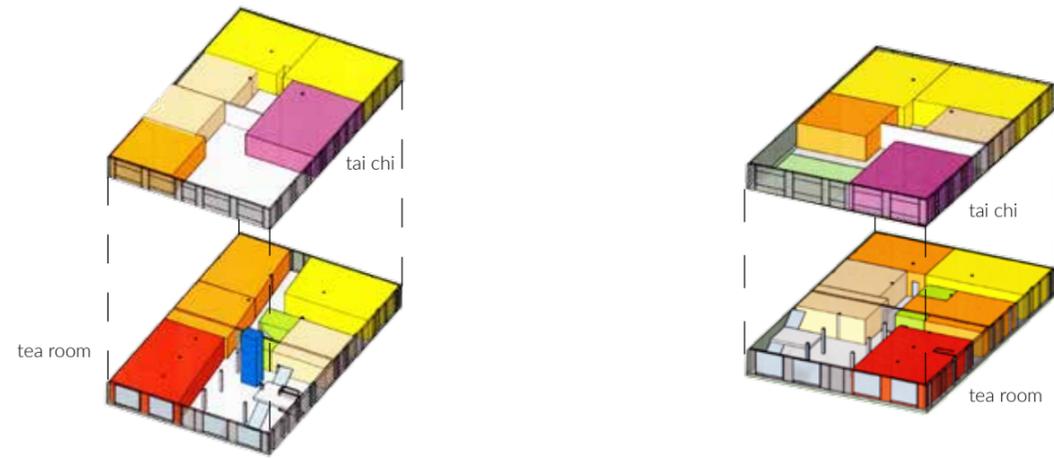
# DESIGN PROGRESSION

## SCHEMATIC DESIGN

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 station 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 additional considerations for residents. Similar issues were considered for Tai chi students, who could use privacy and quiet to help focus during classes. On the other hand, tea room patrons could welcome varied exposure to audio and visual stimulation from the street.

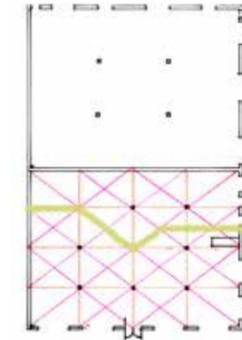


01 schematic design 01 placed the tea room on the street level along West Main Street and the tai chi studio on the second level along Vine Street

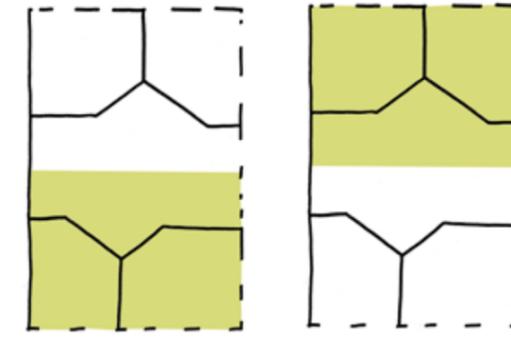
02 schematic design 02 placed the tea room and tai chi studio at the corner of West Main and Vine Streets on the first and second levels.



03 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.



04 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.



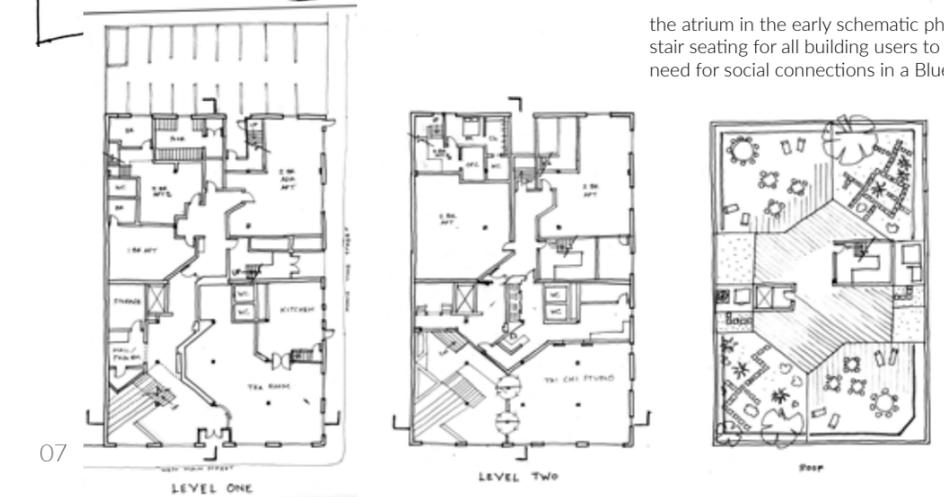
this discovery led to identifying an organization of oblique lines in the plan of the front half of the building that could then be inverted and used in the back half of the building. in this way, the overall plan for the building could be resolved in spite of two very different column grids for the front and back.



06 using the parti organization to address programming requirements with greater circulation to maximize natural movement throughout the building.

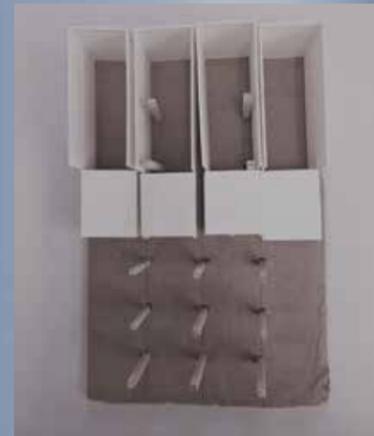


the atrium in the early schematic phase created stair seating for all building users to address the need for social connections in a Blue Zone



07

## DESIGN DEVELOPMENT



Design development progressed from schematic design by 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. And further research on Japanese architecture provided a map for organizing the commercial portion of the project in the front while

The linear arrangement of architect Le Corbusier's plan for L'Unite d'Habitation a 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 of the garden and tea house informed the development of the tai chi studio, tea room, and overall circulation of the project.

The meandering path of the Japanese garden was 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.

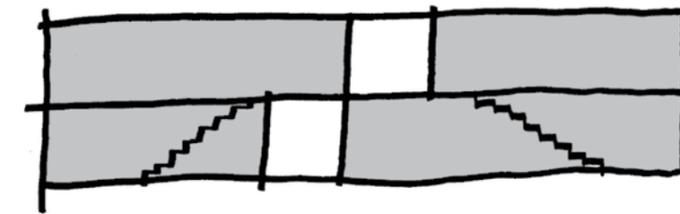
Finally, the foot movements of Yang style tai chi suggested a flowing pattern that organizes the first level of the studio.

Vertical movement by means of different staircases through La Maison de Verre formed a model for addressing stairs

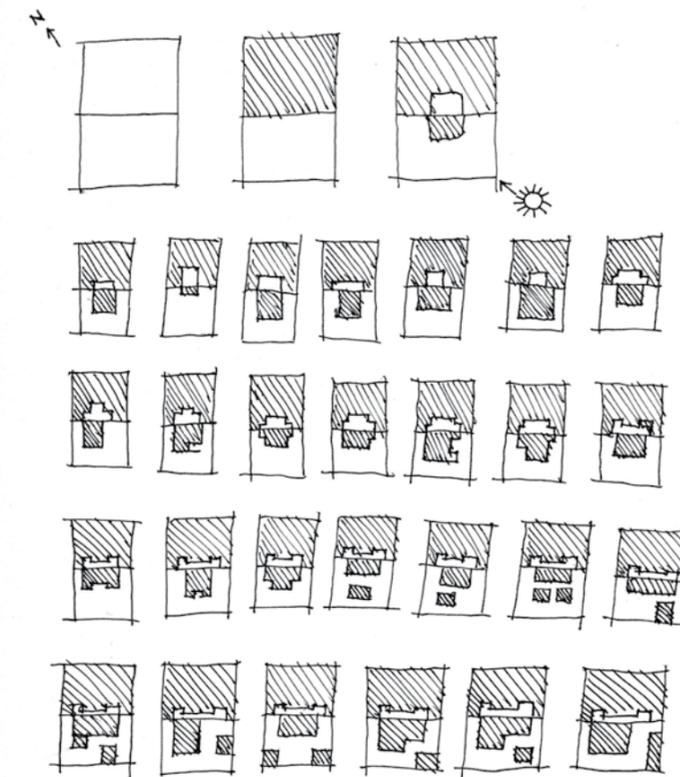
in this project. La Maison also has many built-in elements that are moveable and these inspired the addition of some moveable features in the apartments.

Finally, the Tea House and placemaking examples, both located in Bethesda, Maryland inspired 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 circulation with the entire program.

So the initial schematic design studies that focused on connecting the column grid with oblique lines was abandoned. Instead, a new plan treated each half of the building as separate entities joined by a large circulation space.

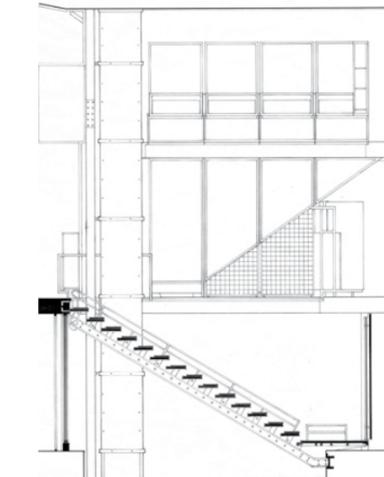


(above and below) studying solid and void relationships in the building to create a plan that organizes private and public activity and the circulation needed to connect them.

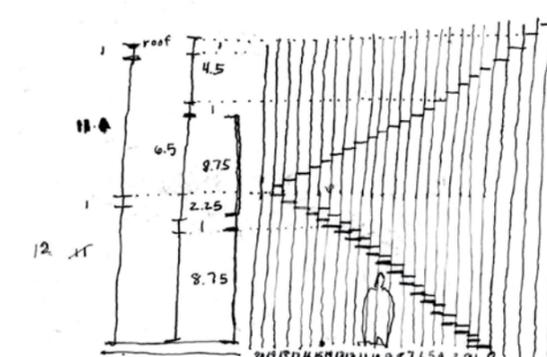
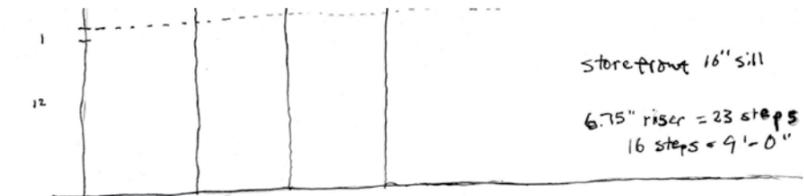


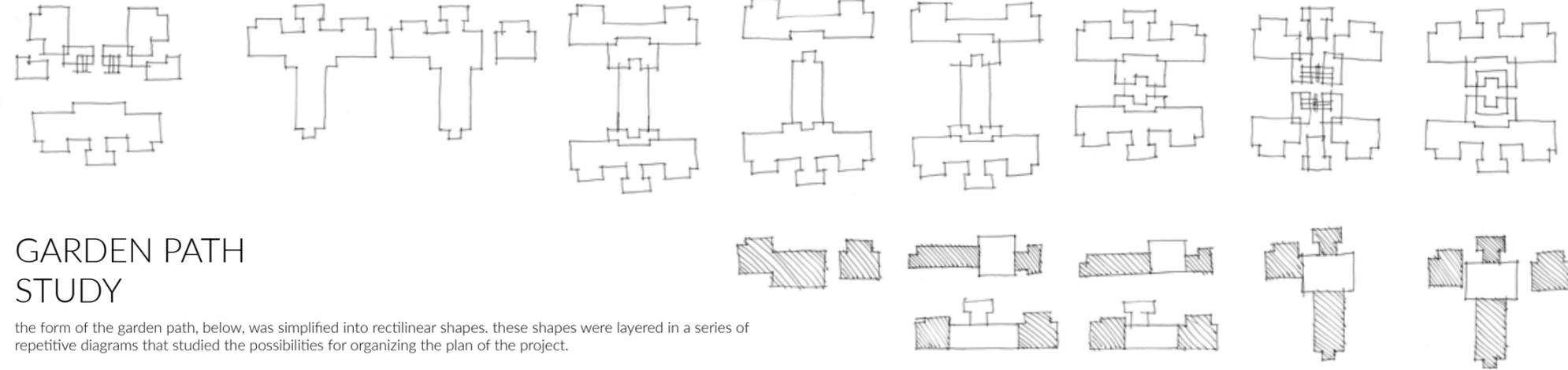
## VERTICAL ORGANIZATION

Elevations and openings in the building's exterior walls were analyzed to determine stair riser heights. Stair counts (shown below) were then made to determine the number of risers necessary to clear adequate ceiling height for mezzanines and landings. The stairs of La Maison de Verre (shown right) provided a useful guide for this study.



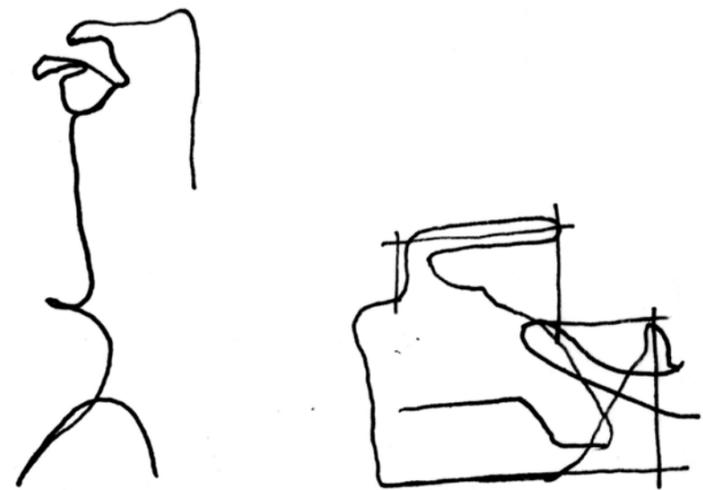
Section through main staircase at La Maison de Verre (Source: XX)



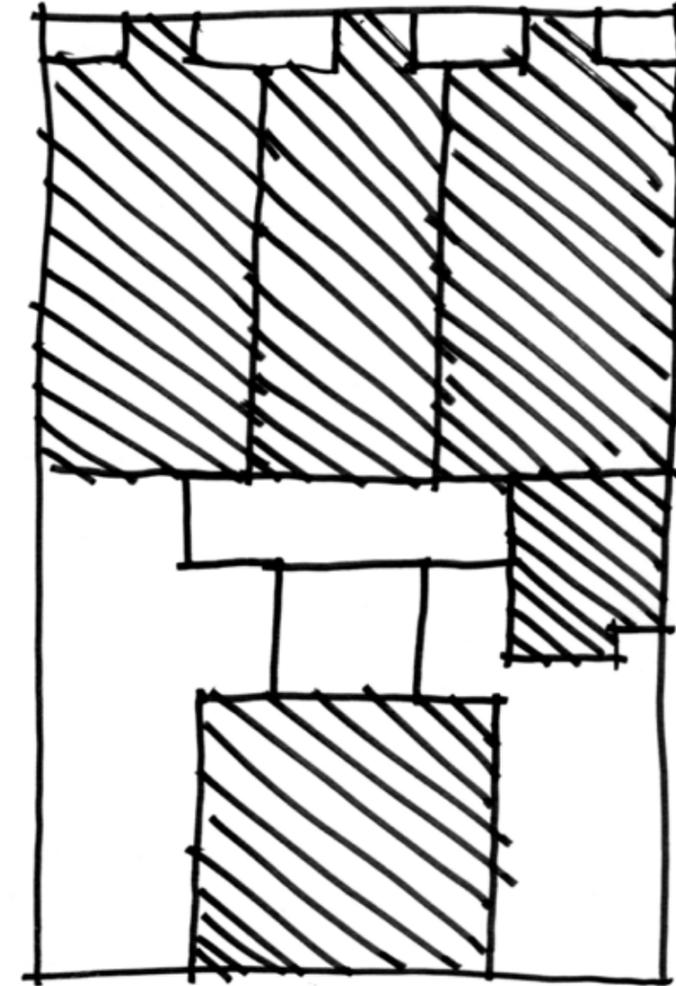


## GARDEN PATH STUDY

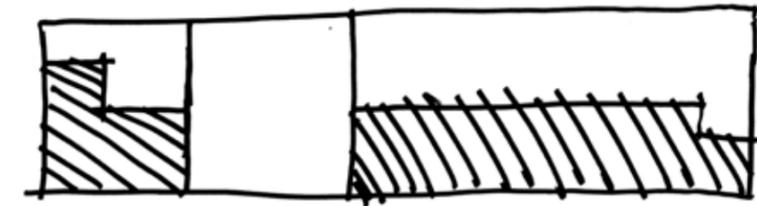
the form of the garden path, below, was simplified into rectilinear shapes. these shapes were layered in a series of repetitive diagrams that studied the possibilities for organizing the plan of the project.



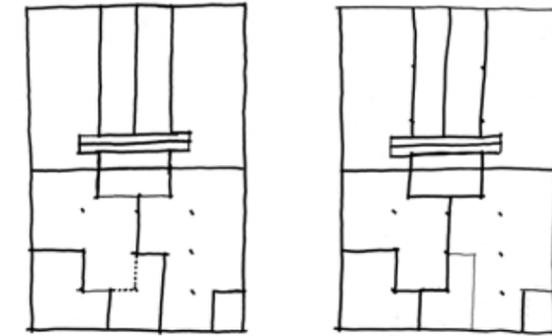
tracing a path through a Japanese garden, such as the example on the left, formed a framework for a pattern study, shown above.



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

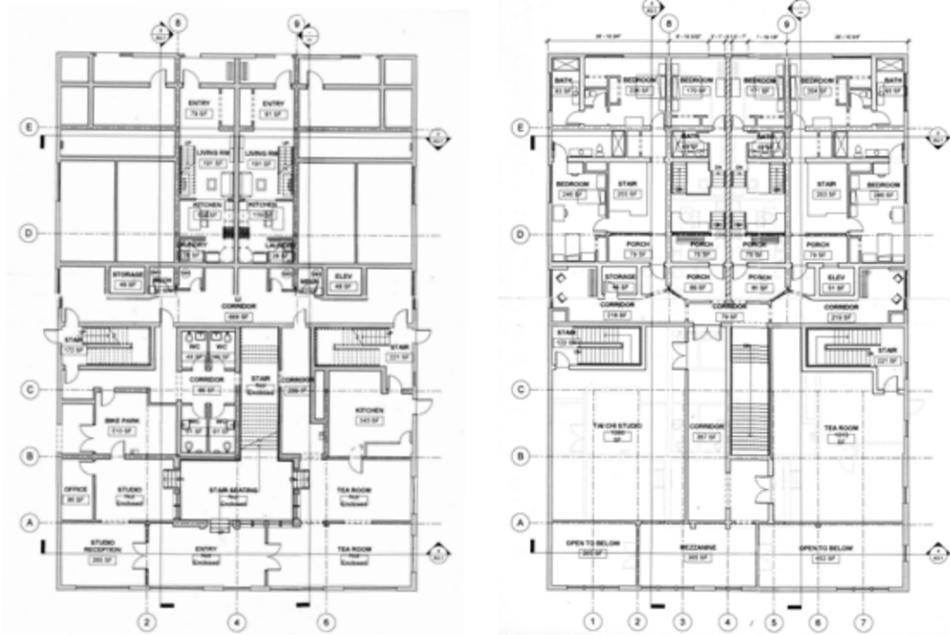


solid/void relationships in the new design show how the atrium and general circulation connect the residential and commercial halves of the building.

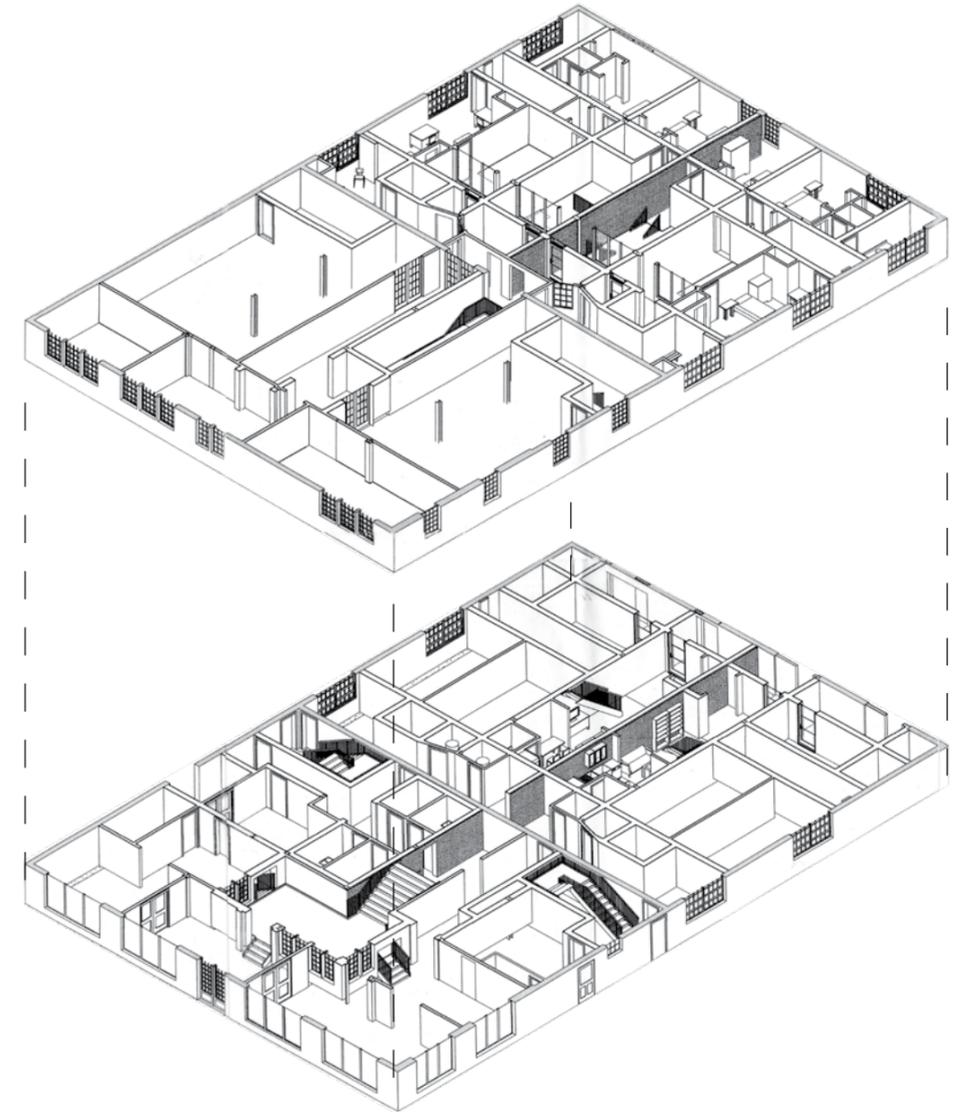
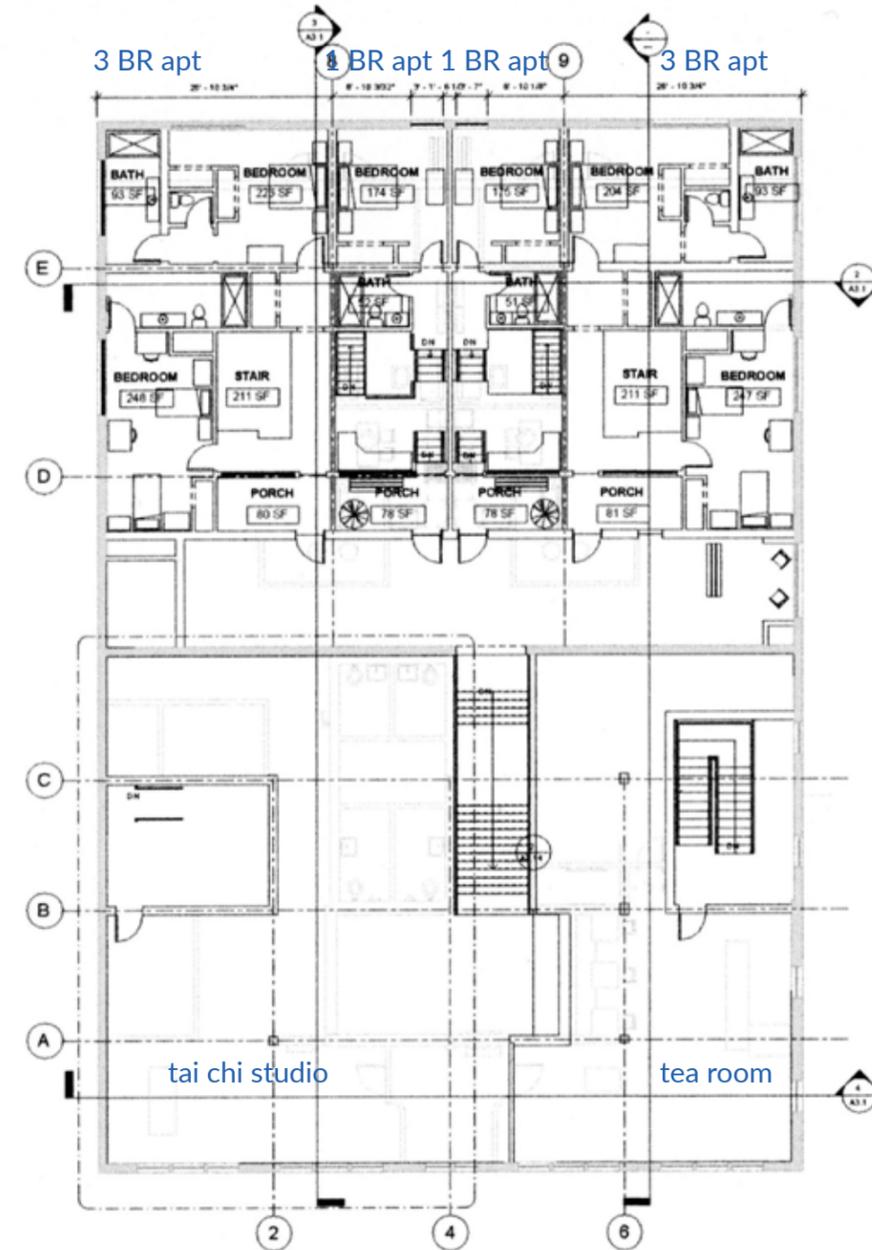
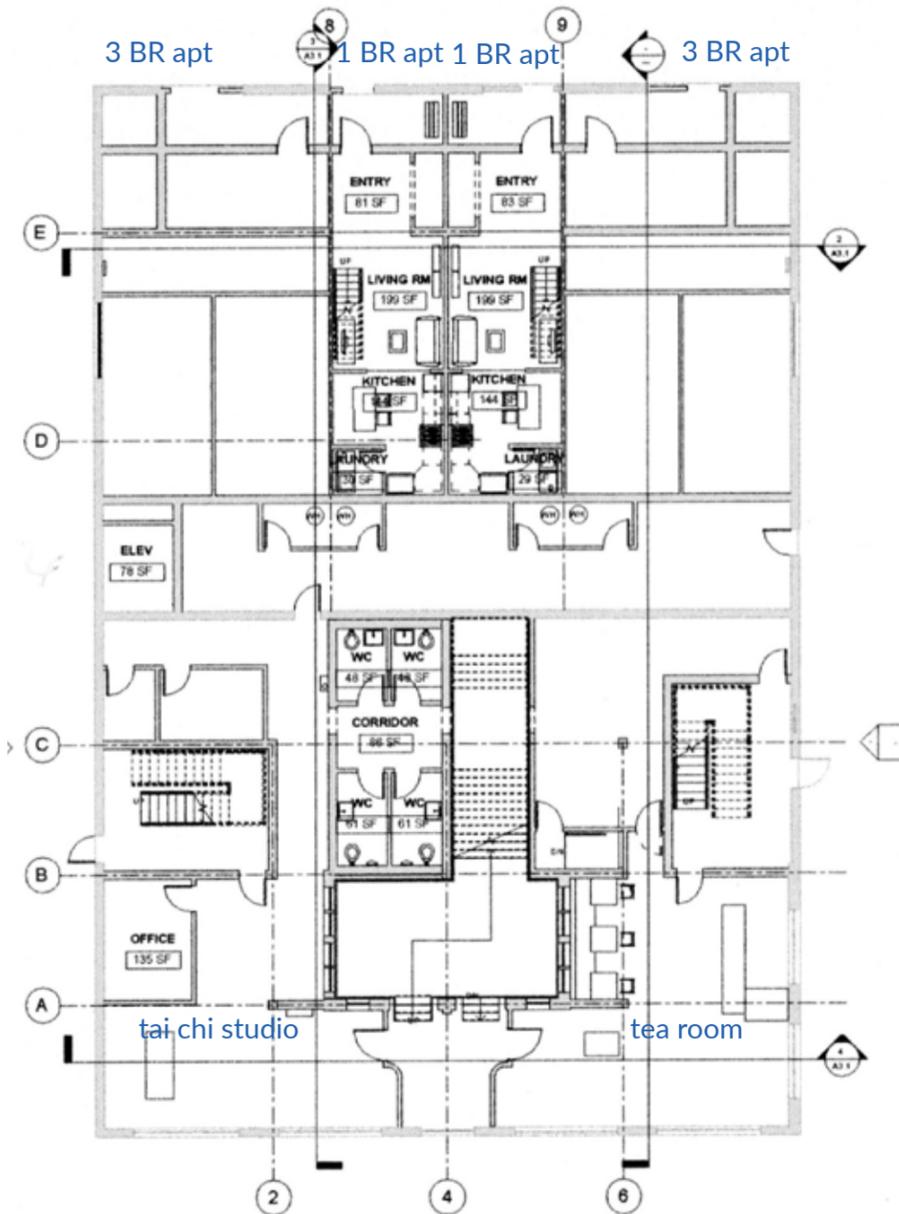


## UNIFYING THE PROGRAM

Before the atrium is developed, the relationship among the three program elements is strengthened around the entry gate and main staircase.



fresh 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.

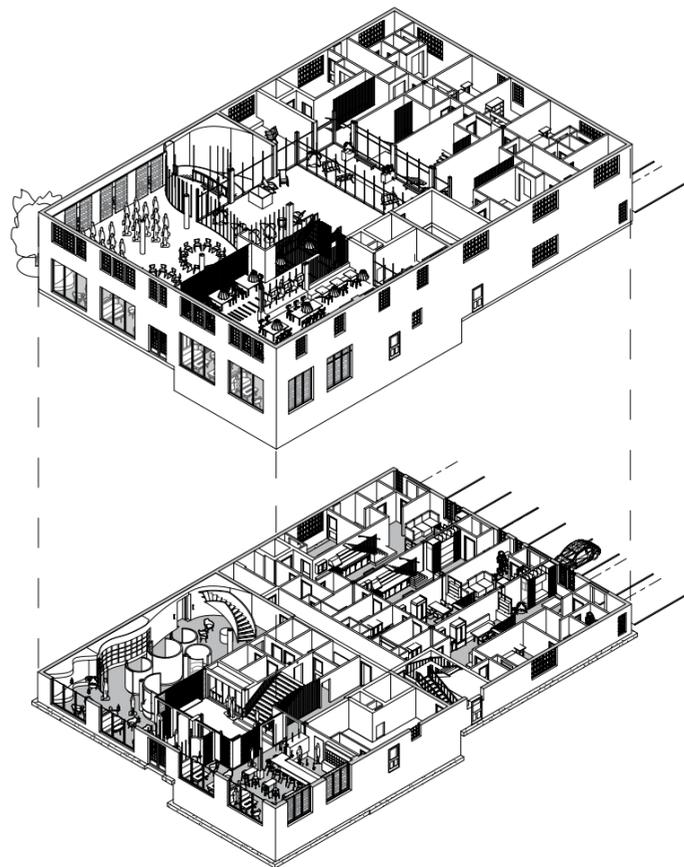


the entry gate begins to take shape, while connections to the tai chi studio and tea room develop

# DESIGN REALIZATION



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



SECTION VIEW  
FIRST AND SECOND LEVELS

## APARTMENTS

- 1 entry
- 2 bike storage/closet
- 3 bike storage
- 4 living
- 5 dining
- 6 kitchen
- 7 bedroom
- 8 ADA bathroom
- 9 guest bathroom
- 10 utility/storage
- 11 to 2nd floor
- 12 to mezzanine
- 13 residential elevator

## TAI CHI STUDIO

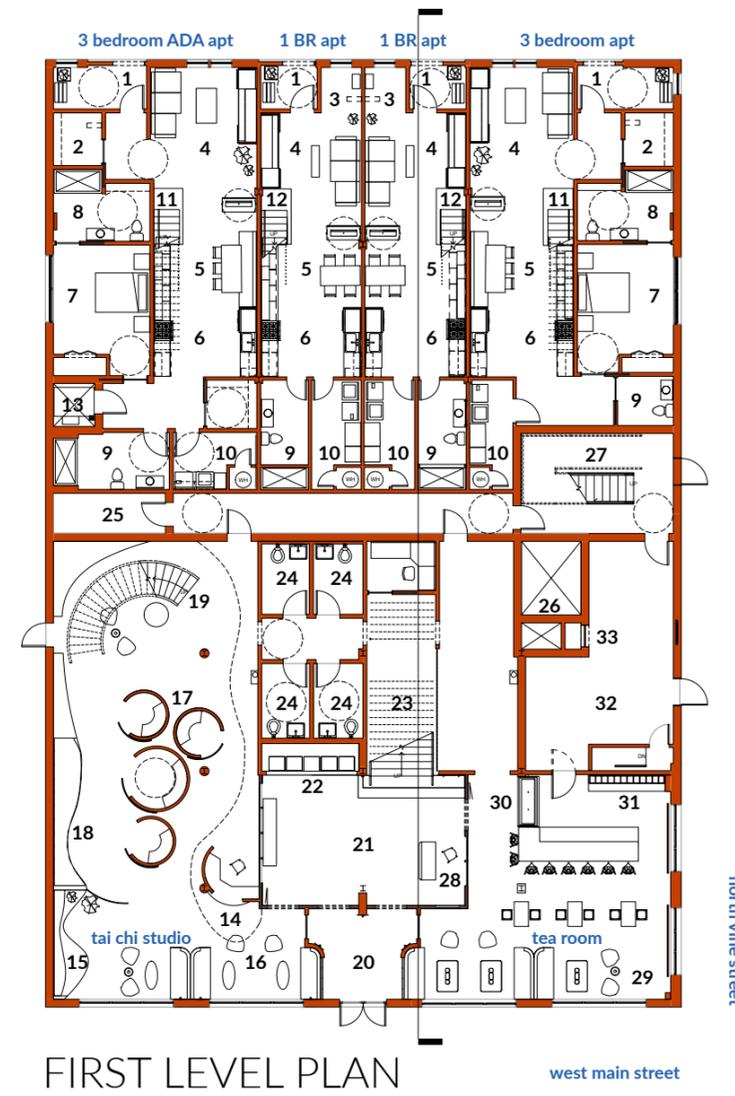
- 14 reception
- 15 retail display
- 16 lounge
- 17 changing carrels
- 18 storage lockers
- 19 to studio floor

## ENTRY AND GENERAL CIRCULATION

- 20 main entrance
- 21 entry gate
- 22 tokonoma display/mail drop
- 23 main staircase
- 24 wc
- 25 mechanical
- 26 elevator
- 27 emergency stairs

## TEA ROOM

- 28 host stand
- 29 lounge
- 30 retail display
- 31 tea cabinet
- 32 tea room kitchen
- 33 dumbwaiter



FIRST LEVEL PLAN

## APARTMENTS

- 1 bathroom
- 2 wc
- 3 bedroom
- 4 master bedroom
- 5 closet
- 6 floor seating
- 7 to 1st floor
- 8 residential elevator
- 9 ladder
- 10 mezzanine

## TAI CHI STUDIO

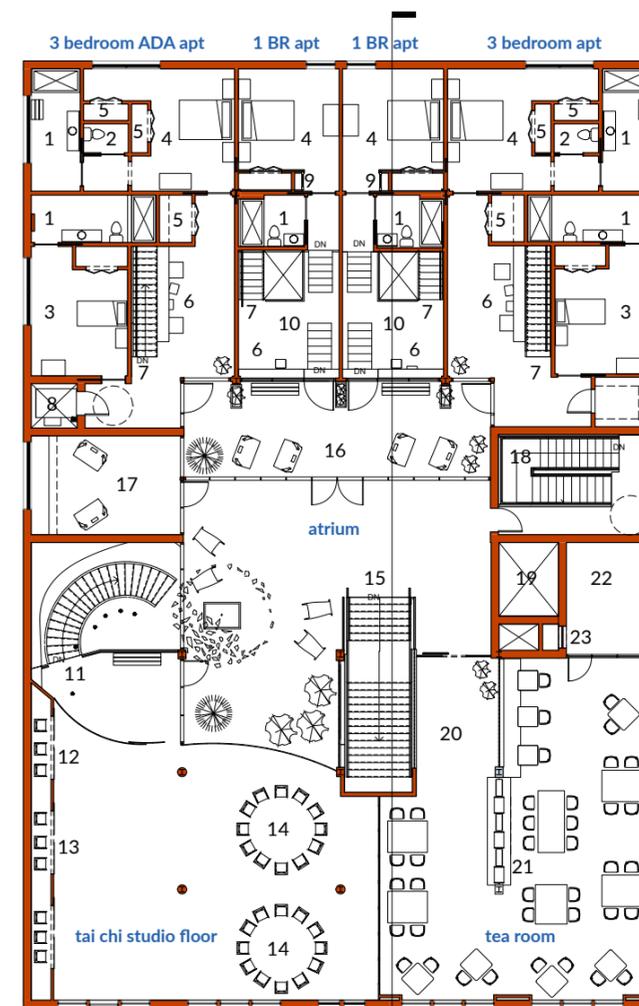
- 11 to reception/lounge
- 12 chair storage
- 13 mirrored doors
- 14 group breathing assembly

## GENERAL CIRCULATION

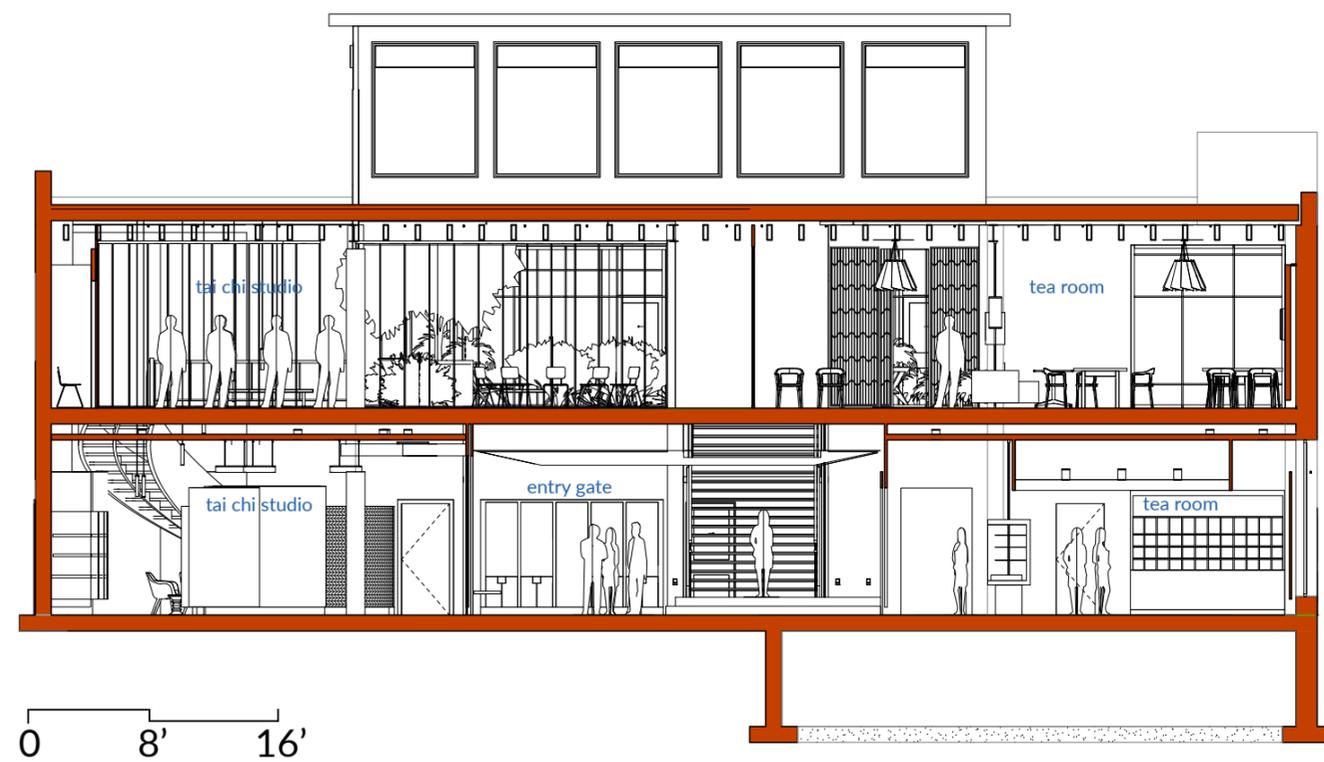
- 15 to entry gate
- 16 social porch
- 17 view to garden
- 18 emergency stairs
- 19 elevator

## TEA ROOM

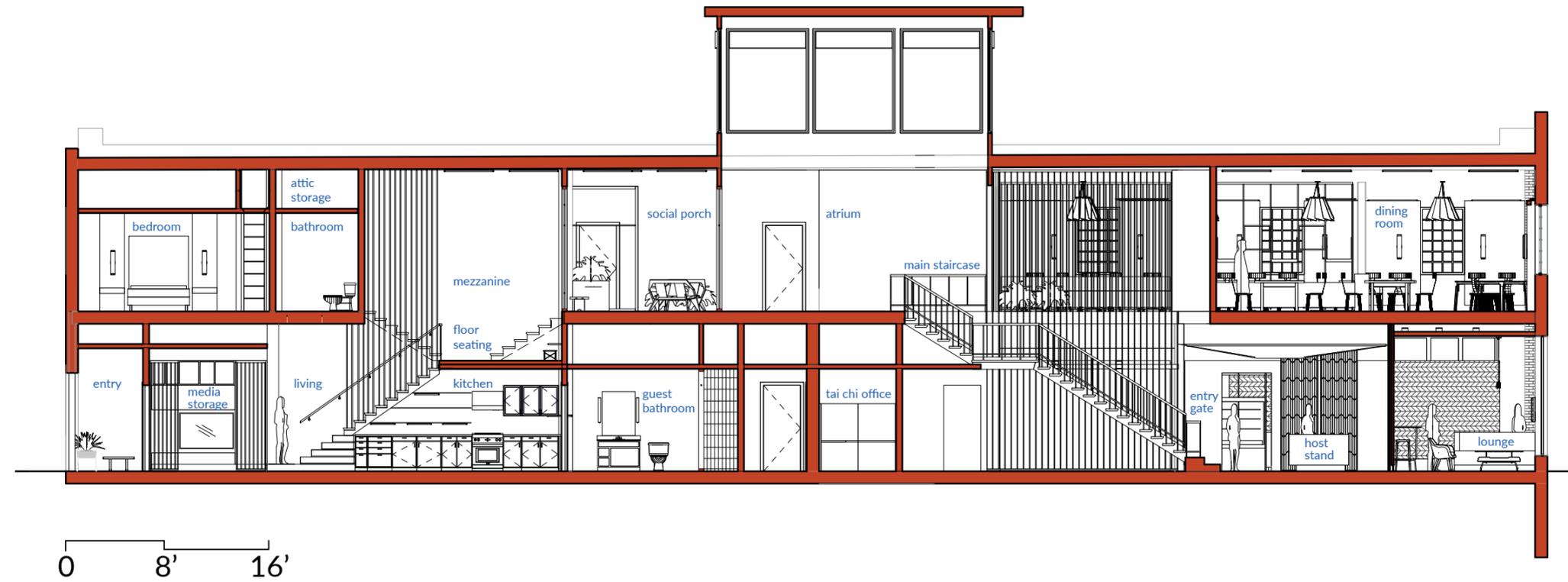
- 20 recessed floor lighting
- 21 display casework
- 22 auxiliary kitchen
- 23 dumbwaiter



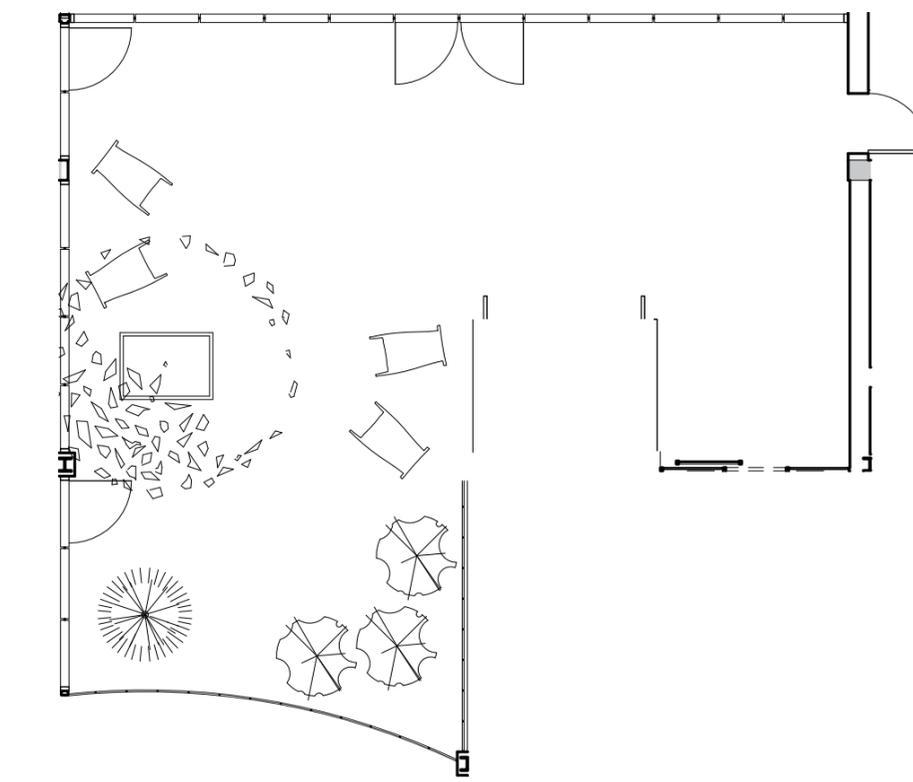
SECOND LEVEL PLAN



SECTION THROUGH TAI CHI STUDIO, ENTRY GATE AND TEA ROOM



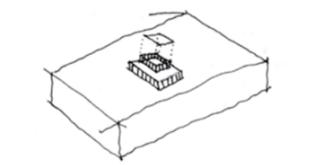
SECTION THROUGH 1 BR APARTMENT, SOCIAL PORCH, ATRIUM, ENTRY GATE AND TEA ROOM



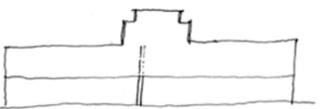
ATRIUM PLAN



(above) sketch showing progress on developing the atrium roof monitor.



(above and below) diagrams developing the atrium's roof monitor to bring light and air to the back of the apartments and unite the three program elements of the project.



# ATRIUM

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 *tanden* breath control technique used by tai chi students.



Baltic birch paneling ceiling and walls



Alberene soapstone floor and stair treads



patinated copper stair railing

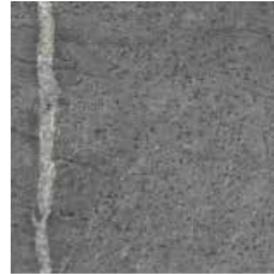


steel L-beam

DESIGN PROGRESSION

# 1 BEDROOM APARTMENT

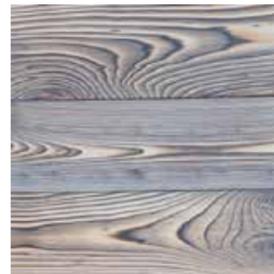
Two one-bedroom apartments feature an open staircase that leads to a mezzanine. A bar cabinet rotates to serve dining and living areas while the media cabinet's sliding screen hides the TV when not in use.



Alberene soapstone floor and stair treads



charred white oak flooring both levels



DESIGN PROGRESSION

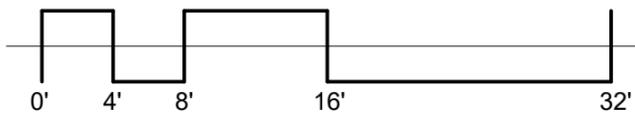
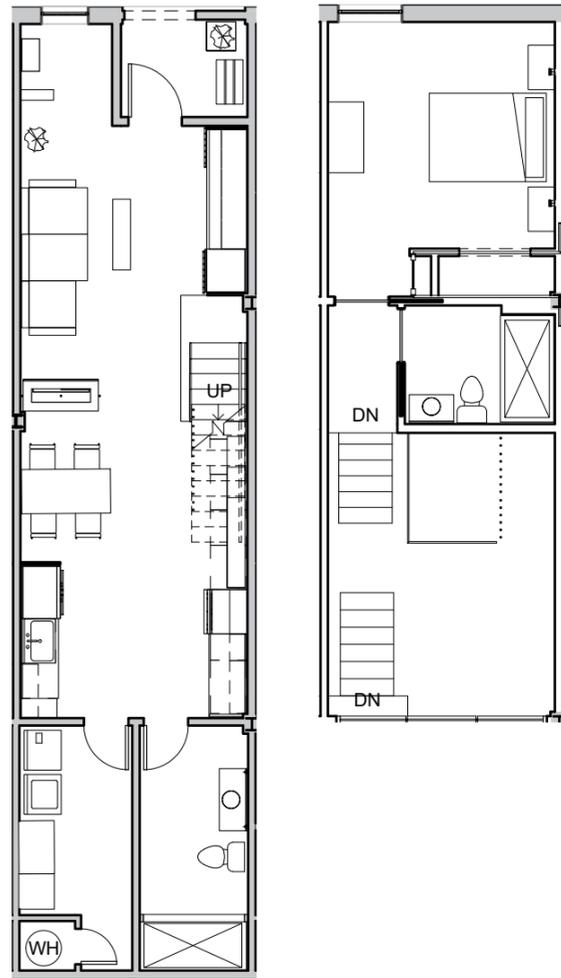
90 charred cypress paneling rotating bar cabinet



Baltic birch paneling ceiling and walls

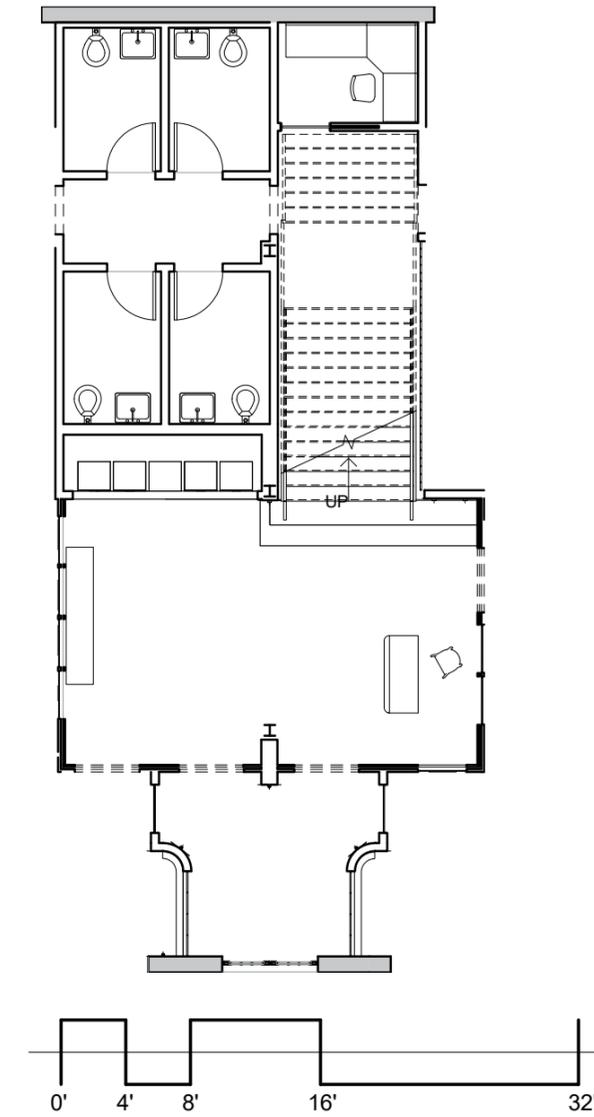


(above) sketch showing progress on developing the space under the apartment stairs leading to the mezzanine. Initial plans called for floor seating under the staircase. Later the floor seating was moved up to the mezzanine.



1 BR APARTMENT PLAN





ENTRY AND STAIRCASE



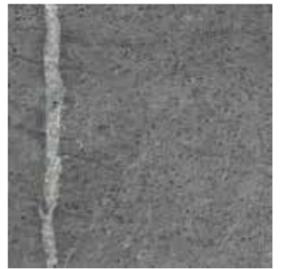
(above) sketch showing progress on developing the tokonoma display niche in the entry gate. the niche also serves as a mail and parcel drop for the building's residents.

# ENTRY GATE MAIN STAIRCASE

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 pick up for building residents.



charred cypress paneling walls and host stand



Alberene soapstone floor and stair treads



Baltic birch paneling ceiling and casework



patinated copper stair railing

DESIGN PROGRESSION

# TEA ROOM LEVEL 1

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.



patchwork ceramic tile bar



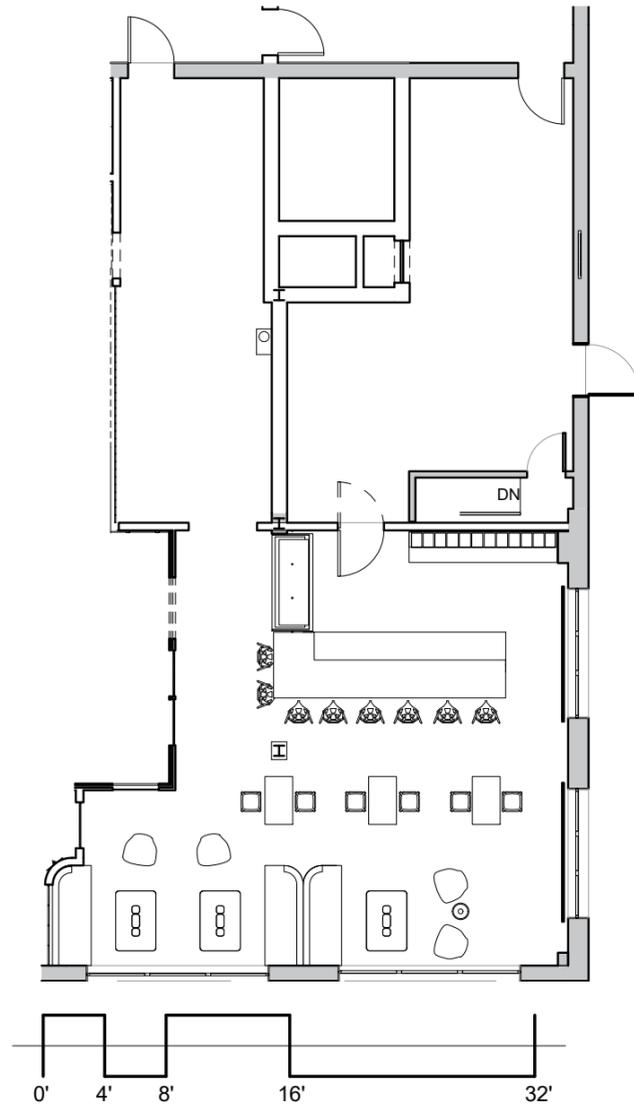
patinated copper bar soffit



View TEA Room

10/21/17

(above) sketch showing progress on developing the ceiling and the screens covering the windows facing North Vine Street.



TEA ROOM LEVEL 1

DESIGN PROGRESSION

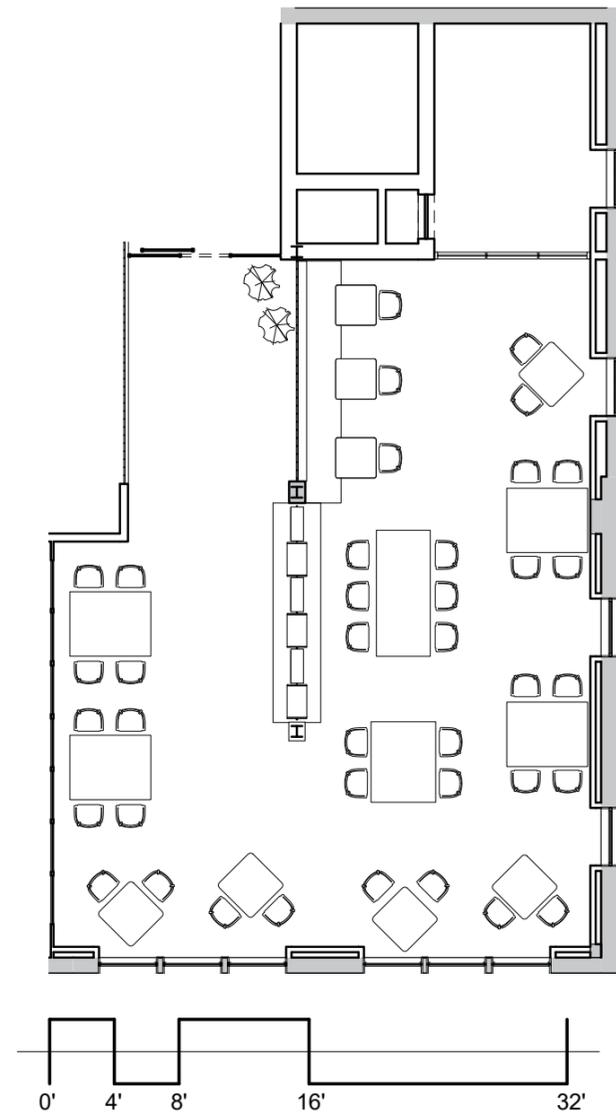


Magis Stool\_One

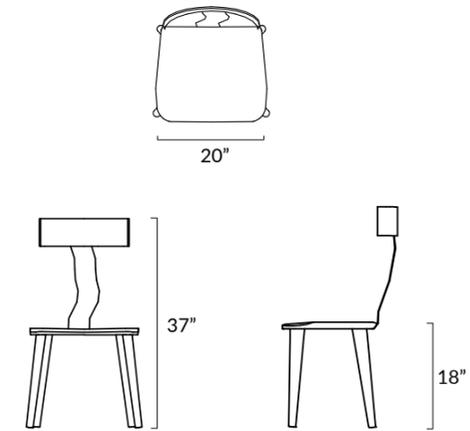


Moving Blanket Brooklyn Navy on custom sofa





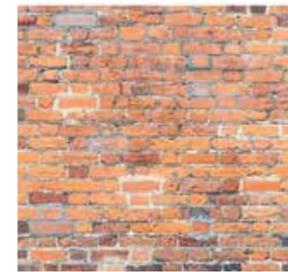
TEA ROOM LEVEL 2



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.

## TEA ROOM LEVEL 2

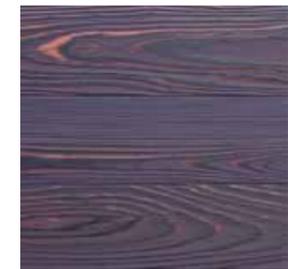
The bar and lounge on the lower level serve casual dining and tea service while the upper level caters to lunch and dinner patrons.



existing brick wall



charred white oak flooring both levels



charred cypress paneling feature wall first level display cabinets both levels



Mute acoustic felt pendant

# TAI CHI STUDIO LEVEL 1

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.



Saiba side chair with copper leather

Uki Tri ceramic pendant

DESIGN PROGRESSION

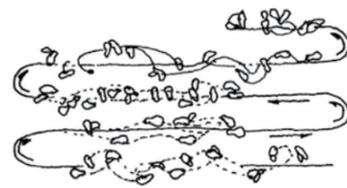


98 Coalesce Ginger maple coffee table

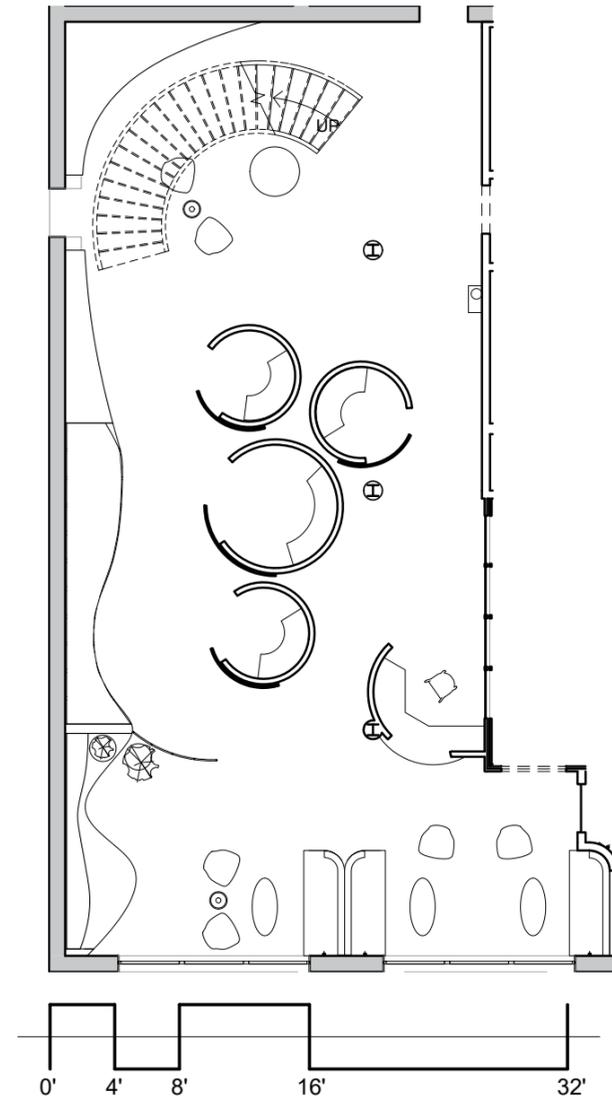
lilac frosted glass tile



(above) sketch showing progress on developing the flowing forms of the tai chi studio.

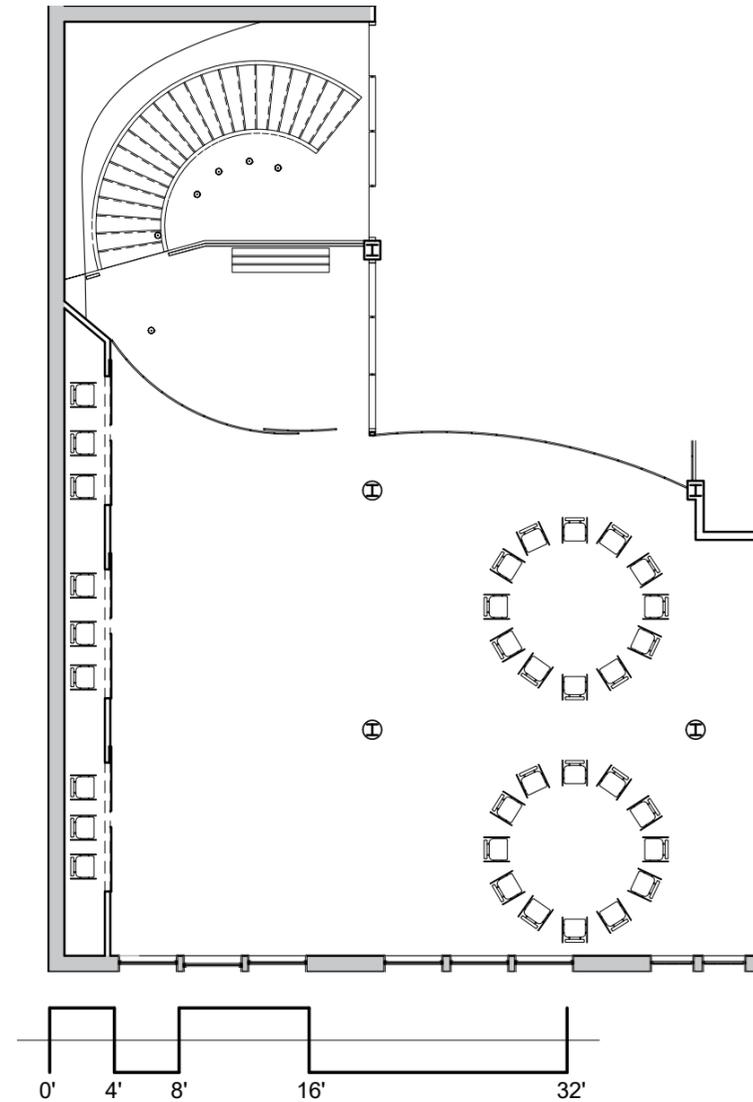


(above) sketch showing the foot patterns of 24 form Yang style tai chi

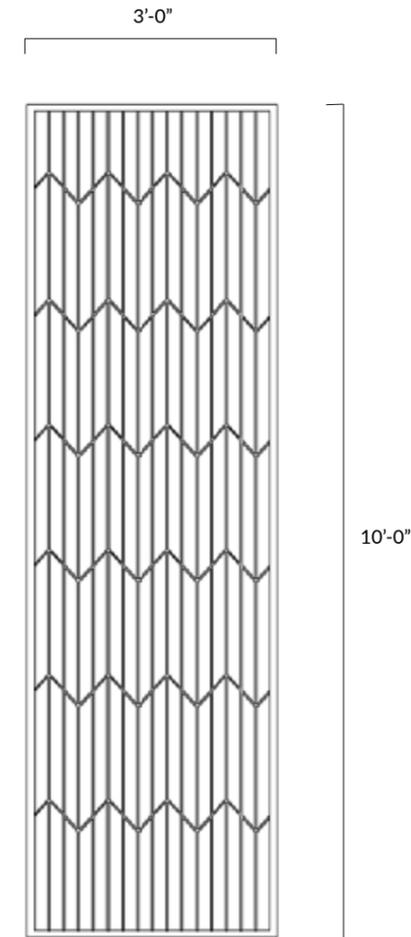


TAI CHI STUDIO LEVEL 1



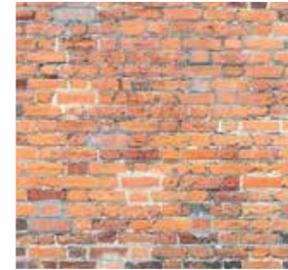


TAI CHI STUDIO LEVEL 2



(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.

# TAI CHI STUDIO LEVEL 2



existing brick walls

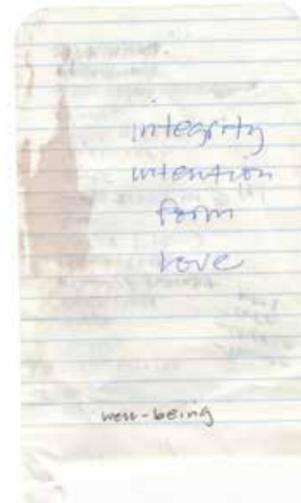


Baltic birch paneling ceiling panels and casework



charred white oak flooring both levels

# REFLECTION



my designer's manifesto, always present during the formation of this project's concept and execution.



exhibition visitors and students study the models, concept work and posters and relax during the MFA 2017 IDES thesis show on April 28, 2017 at the Anderson Gallery on VCU's Monroe Park campus.

Long term projects demand stamina 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. The days and nights have been long and certainly there were times where it seemed the process would never end. Yet here we are, at the end of one 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 mind-body 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



"reach": the theme for the 2017 IDES MFA thesis show.



studio colleagues celebrate at the opening night of the MFA thesis exhibition at the Anderson Gallery on VCU's Monroe Park campus. (left to right) An Liu, Mingming Zhao, Alexis Holcombe, Lauren Prisco, Heather Overby, Lucy Dabney and M.J. Rhodes.



M.J. Rhodes, Heather Overby, Lauren Prisco and Lucy Dabney "reach" for success as MFA candidates while preparing the Anderson Gallery space for exhibiting.



presenting my thesis work before a panel of IDES faculty. (left to right) Camden Whitehead, Sara Reed, Emily Smith, Roberto Ventura, Jennifer Fell and Robert Smith. not seen: Christiana Lafazani (photo: An Liu).

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(above) A tea pot and stand for sale at Ching Ching Cha tea room in Washington, D.C.

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enjoying the tea ceremony while seated on floor cushions at Ching Ching Cha in Washington, D.C. (left to right) Allie Reese, Peter Mueller, Andy Moskal and Claire Moskal.