



a garden in the sky

jenn russ



This book is dedicated to my father; Dr. Leo Russ, thank you for your support, patience, and love.



Design thesis submitted to the faculty of the college of
Architecture and Urban Studies, Virginia Polytechnic Institute
and State University in partial fulfillment of the requirements
for the degree of Masters of Landscape Architecture

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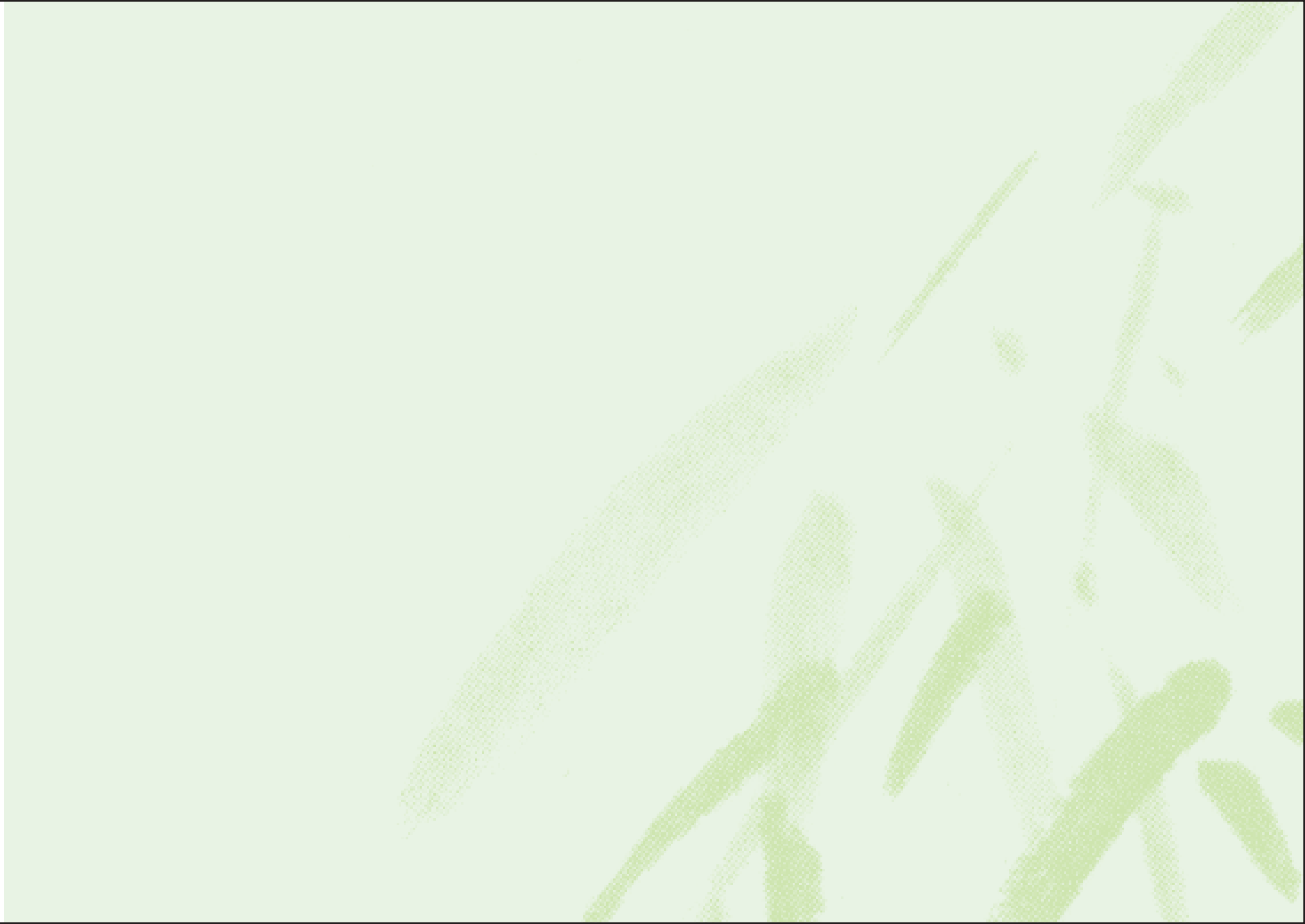


existing conditions model at 1605 7th street,nw

abstract

We live in an increasingly urbanized world as people migrate to cities for employment and cultural benefits. Growing and dense urban populations contribute heavily to water pollution and energy waste contributing to global biodiversity extinction. At the same time, contemporary urban areas deliver diminishing returns to residents as cities become cramped, unhealthy, and unattractive. The rooftops of urban buildings offer exciting opportunities for remedying these trends. New rooftop designs highlight the need for more plant life and green space in urban areas, improve energy efficiency, and offer urban residents gardens to enjoy and relax in.

Rooftops can enhance buildings in urban areas through landscape design, transforming neglected space into valuable real estate that provides ecological and economic services. Well designed rooftops can enhance property values, assist with primary on-site storm water management, help build energy efficiency, mitigate the urban heat island effect, and filter air and water. A good green roof exists in symbiosis with its neighbors and the city at large. Contemporary rooftop design strives for an ethical stewardship of the earth. I have chosen to design a green roof around the aesthetics and traditions of Japanese horticulture. Japanese landscape design evolved to maximize space and create intricate gardens in small areas and is deep in symbolism and ritual upkeep.





thesis question

what are the relative ecological advantages and design strategies of a green roof

tuskubai, Kita-Kamakurak, Japan

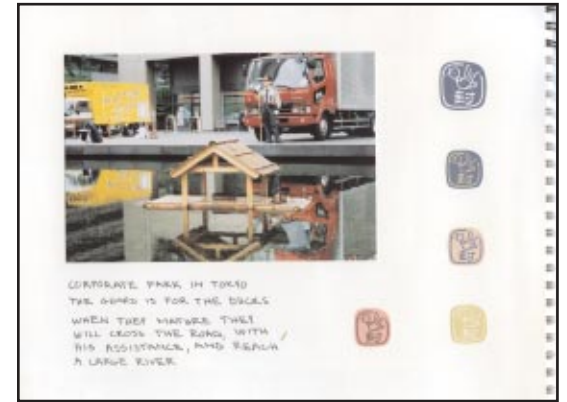
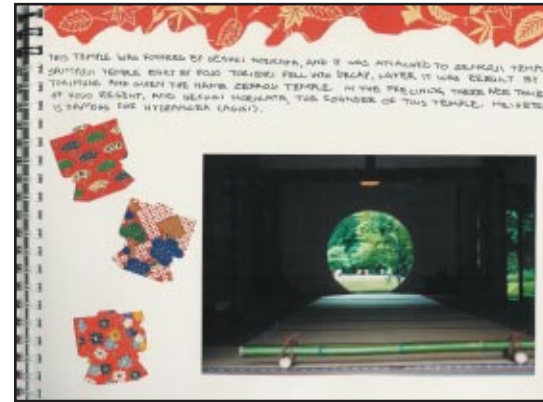
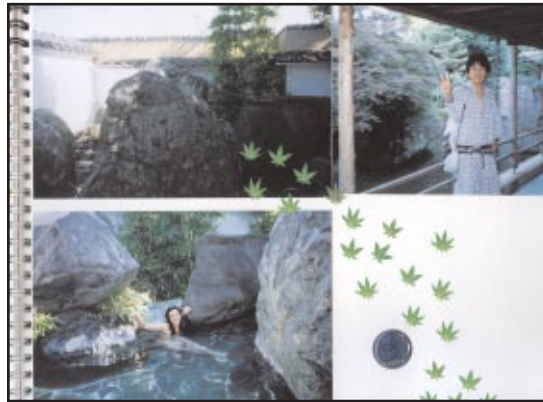
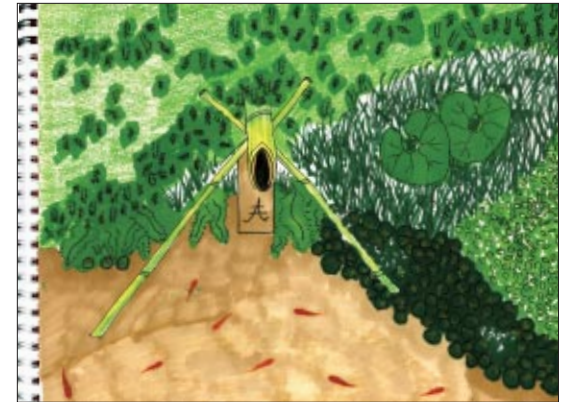
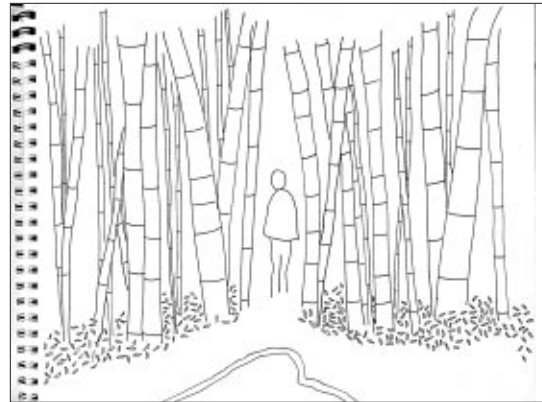


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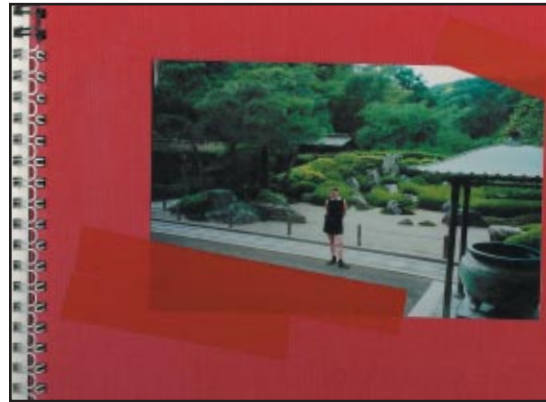
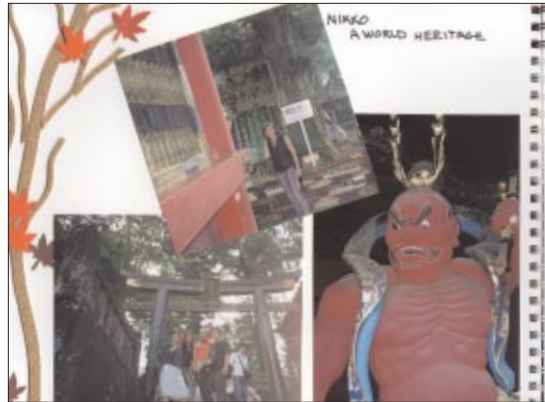
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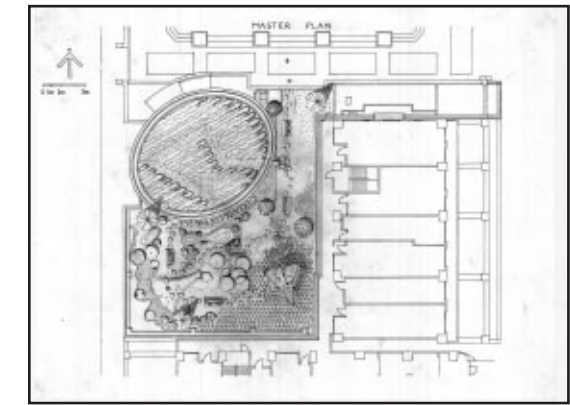
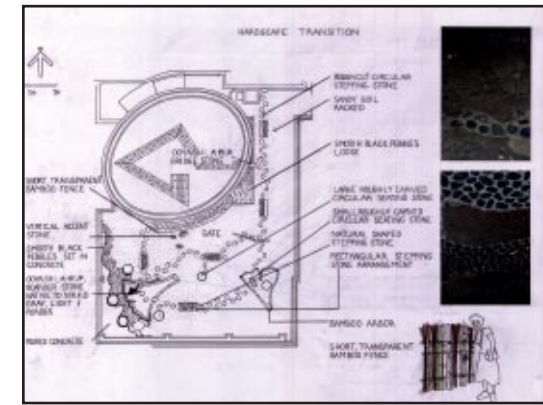
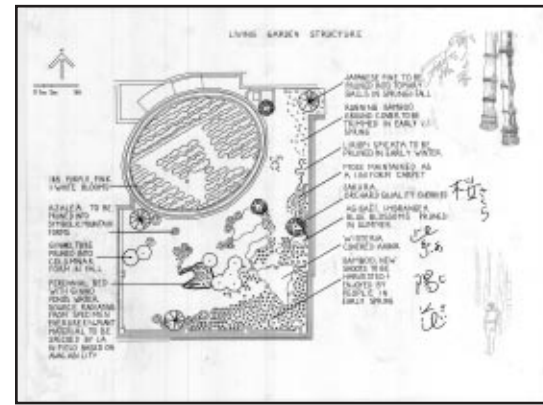
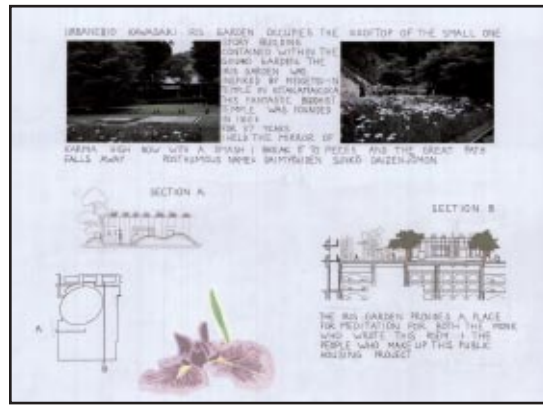
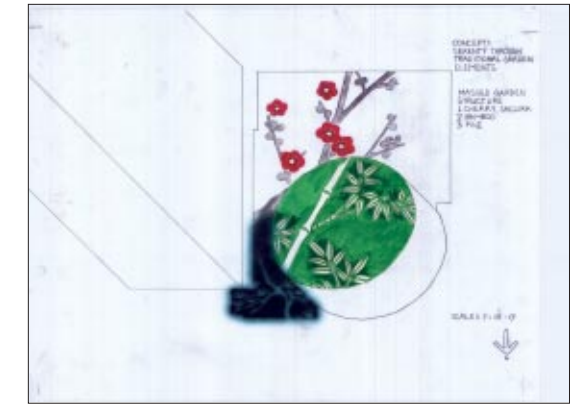
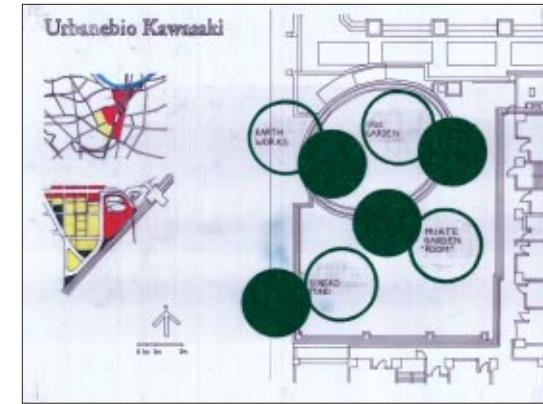
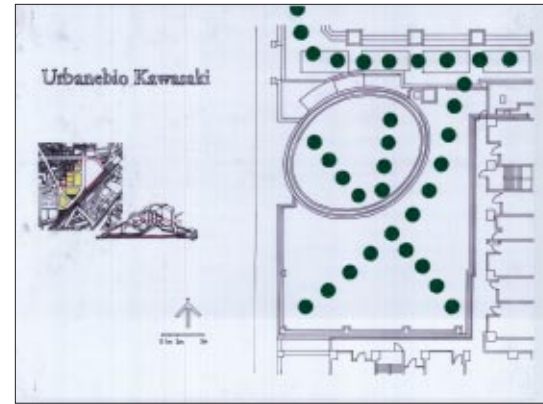




In April 2002, I arrived in Japan as a Yokohama National University graduate exchange student studying Japanese sculpture, architecture and traditional horticulture. Over the course of the next year I compiled eleven journals and two photographic studies of garden details in Kamakura, the birthplace of Zen philosophy and, prior to the 12th century, the ancient samurai capital.







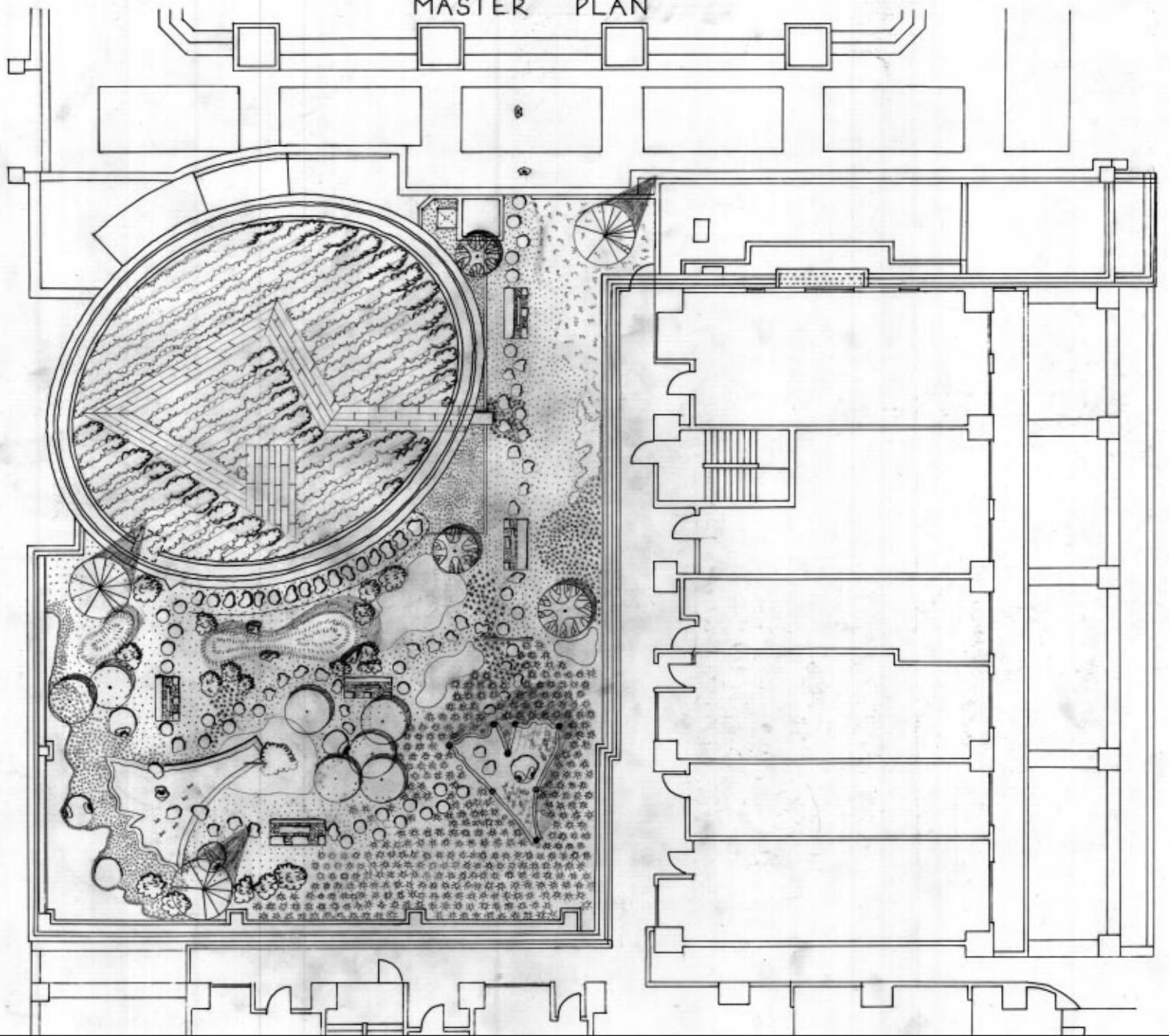
above and right: design-public housing project in Kawasaki

These diagrams represent a rooftop garden design for a public housing project in Kawasaki, Japan. Kawasaki is a densely populated city between Tokyo and Yokohama, where many residents live in public housing. These designs depict one such public housing building with an iris garden, a wisteria covered and ginkgo shaped arbor, a koi filled pond, earthworks, and secluded areas that provide a retreat from the city for residents.

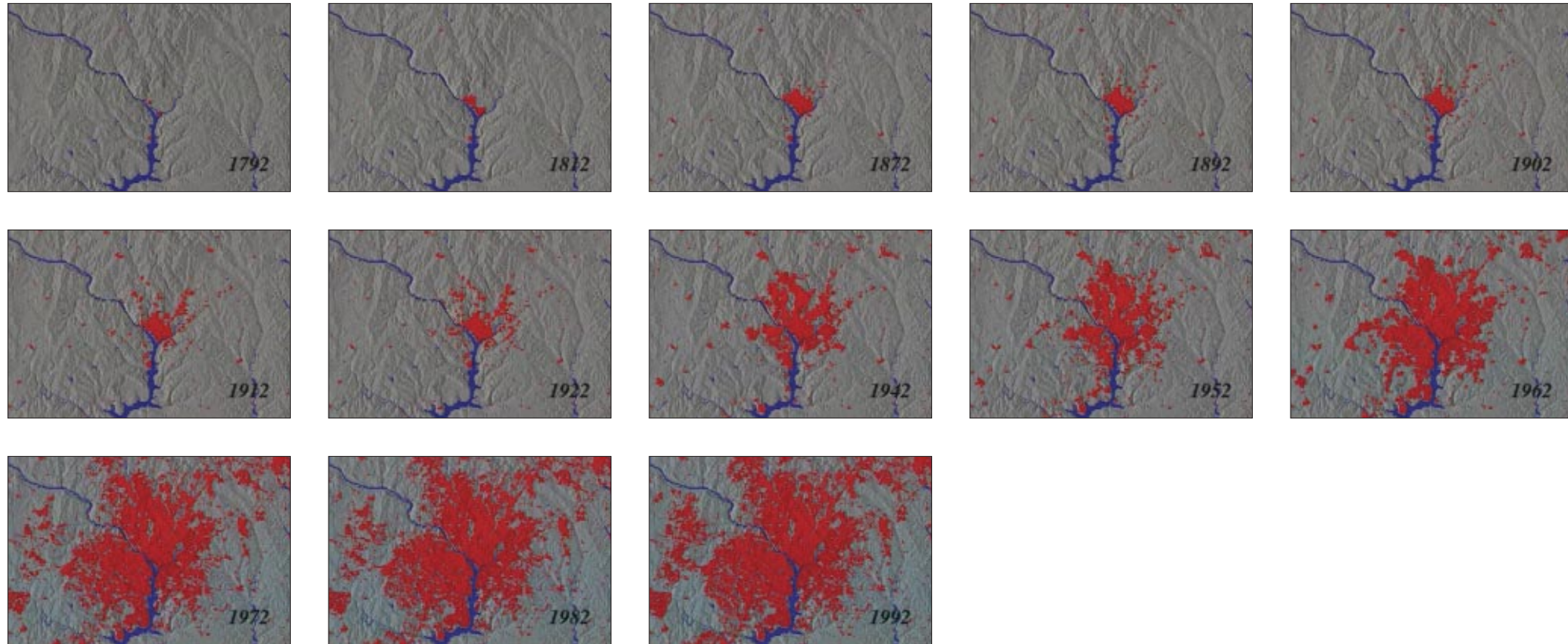
MASTER PLAN



0 1m 2m 5m



site selection



above: images showing change over time, based on land records and survey maps.

Scientists have developed animations of the growth of the Washington, DC area from satellite images, computer models, and land records to develop an eye-in-the-sky perspective of the extensive human impacts on the environment. These images depict cities and suburban areas expanding along the Potomac River. This exponential growth renders much of the surface area impervious. Impervious surfaces create excessive runoff and increased pollutant loads, while their color, location and quantity contribute to the urban heat island effect. Impervious surfaces contribute to flooding, water contamination, and broiling summers - factors that reduce the quality of life in Washington, DC.

Timothy Foresman (UMBC), Penny Masuoka (NASA/GSFC). NASA/Goddard Space Flight Center Scientific Visualization Studio. 1996.



The DC Citizen Atlas (Government of the District of Columbia, <http://citizenatlas.dc.gov/atlasapps/custommapsearch.aspx>).

Greenspace, such as parks and public gardens are diminishing in quantity. Accessible greenspace is most often found in upper class areas, such as the Dupont Circle area, and often it is the greenspace itself which creates value for neighborhoods.



The DC Citizen Atlas (Government of the District of Columbia, <http://citizenatlas.dc.gov/atlasapps/custommapsearch.aspx>).

In contrast to more affluent areas, the Shaw neighborhood of Washington, DC has relatively little in the way of parks and public gardens. 1605 7th Street, NW made an ideal site for a rooftop garden.

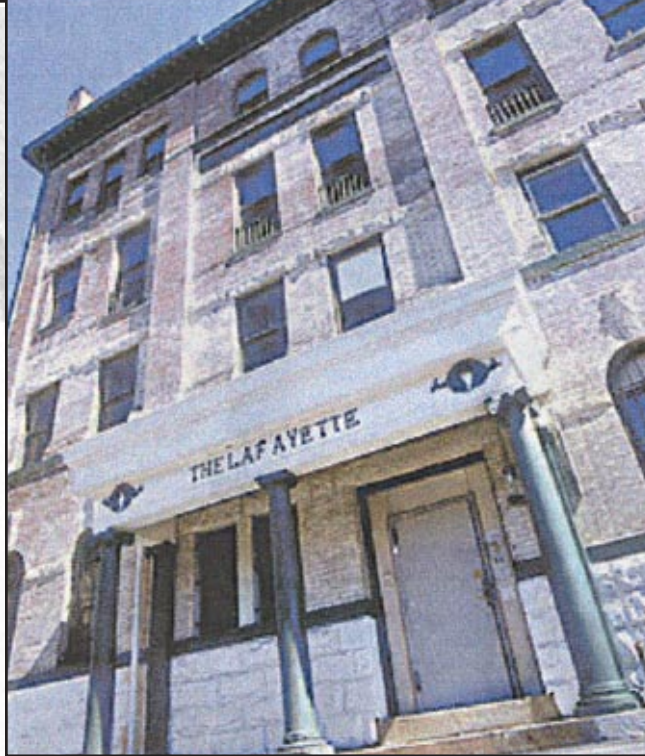
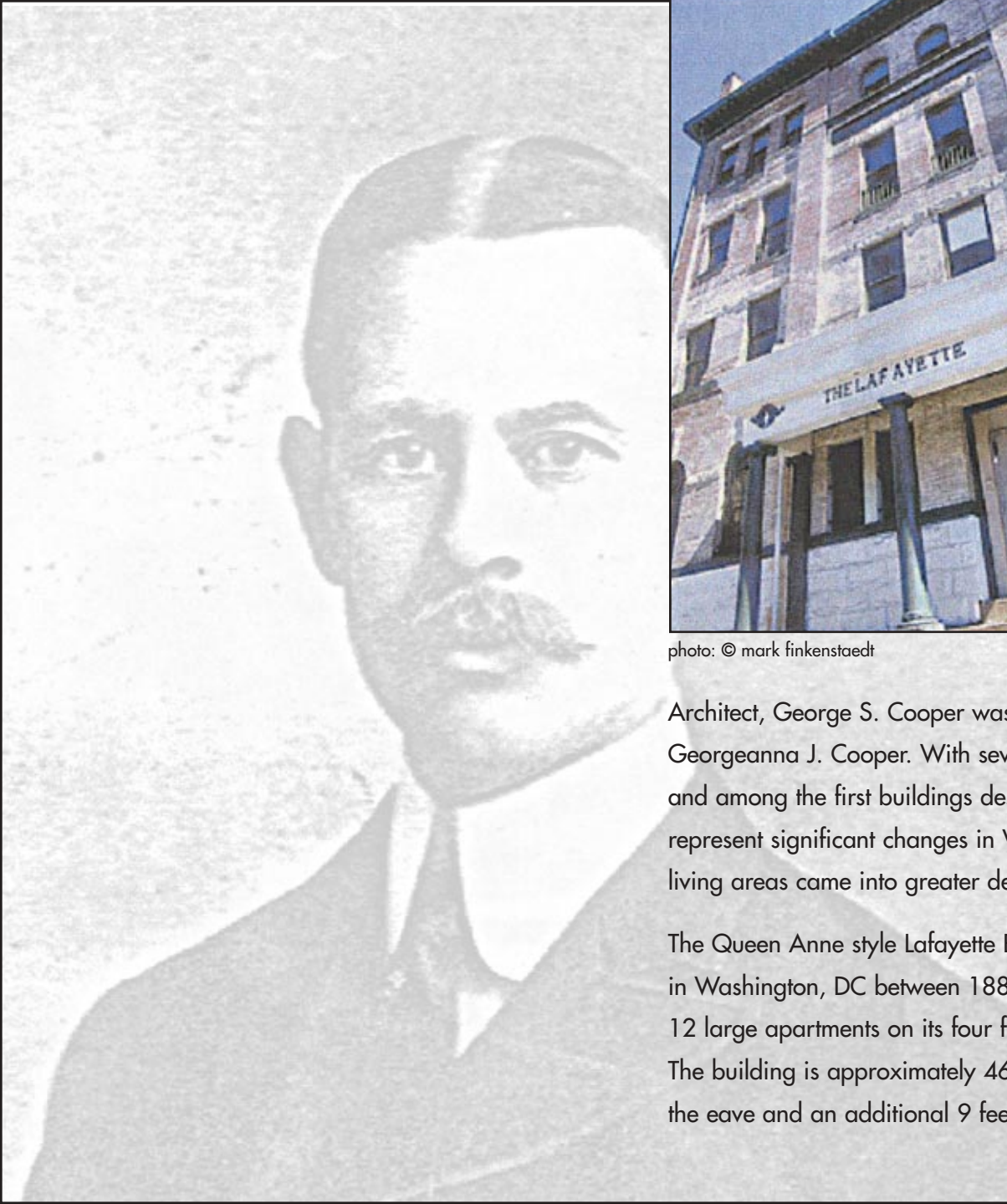


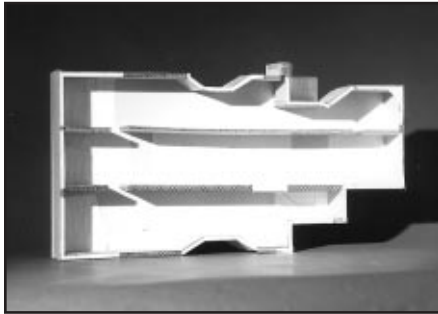
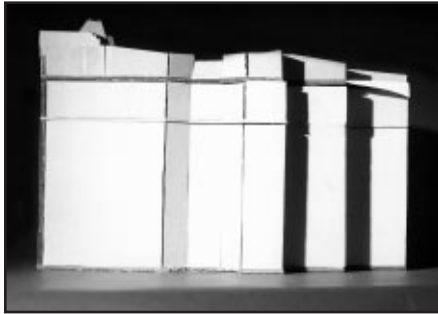
photo: © mark finkenstaedt

Geo S Cooper

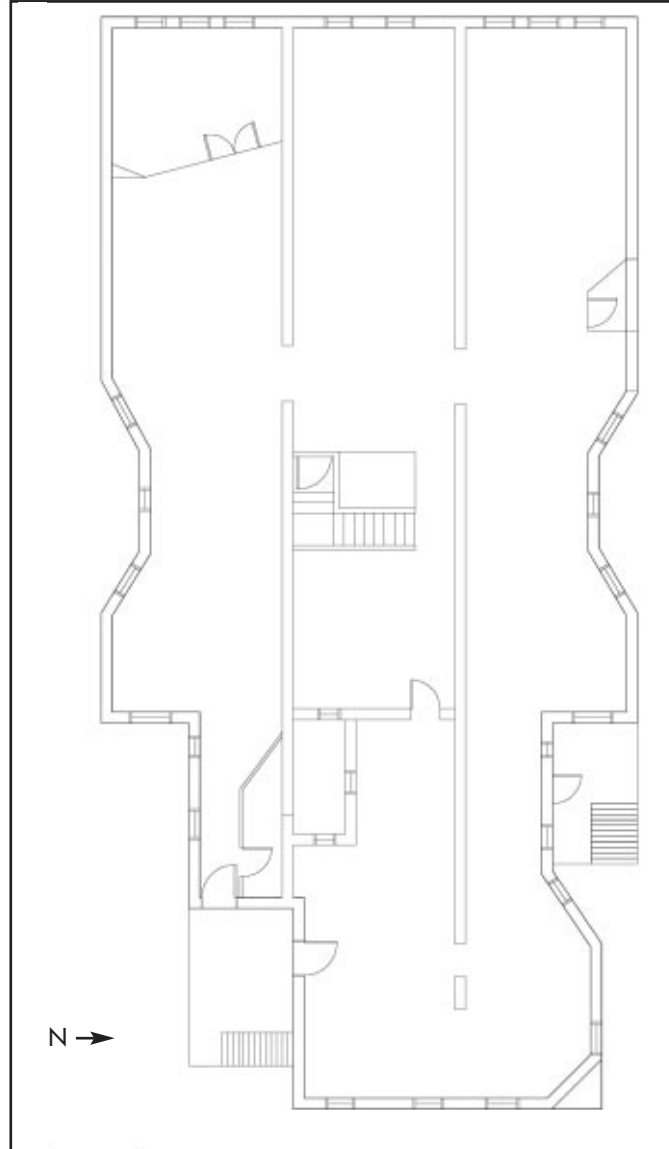
Architect, George S. Cooper was born in Washington, DC on December 14, 1864, the son of Henry Cooper and Georgeanna J. Cooper. With several notable exceptions his apartment buildings were primarily of moderate size and among the first buildings designed to attract Washington's growing middle class. Cooper's apartment buildings represent significant changes in Washington's pattern of residential preferences as land became scarce and downtown living areas came into greater demand as part of the development in post civil war Washington. .

The Queen Anne style Lafayette Building at 1605 7th street, NW was built in 1898. Of the 105 apartment buildings built in Washington, DC between 1880 and 1900, only 13 remain, including the Lafayette. The Lafayette originally housed 12 large apartments on its four floors, it is constructed of brick and hummelstone built on a Portland cement foundation. The building is approximately 46 feet wide and 91 feet deep. The four-story structure rises 50 feet from the sidewalk to the eave and an additional 9 feet to its roof line.

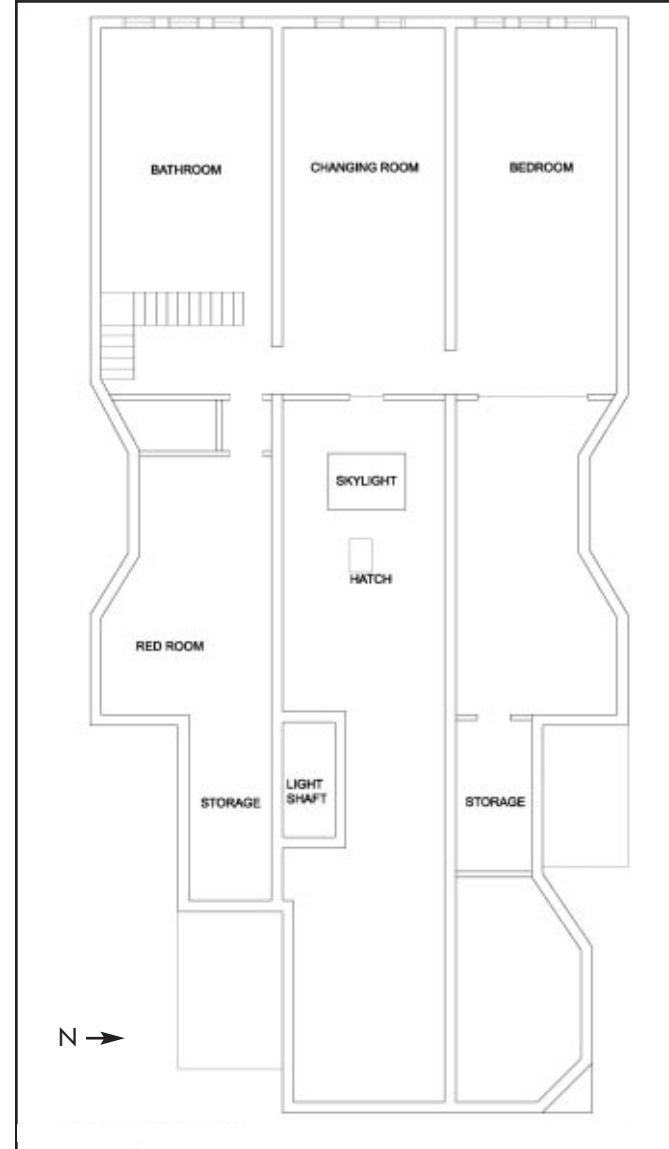




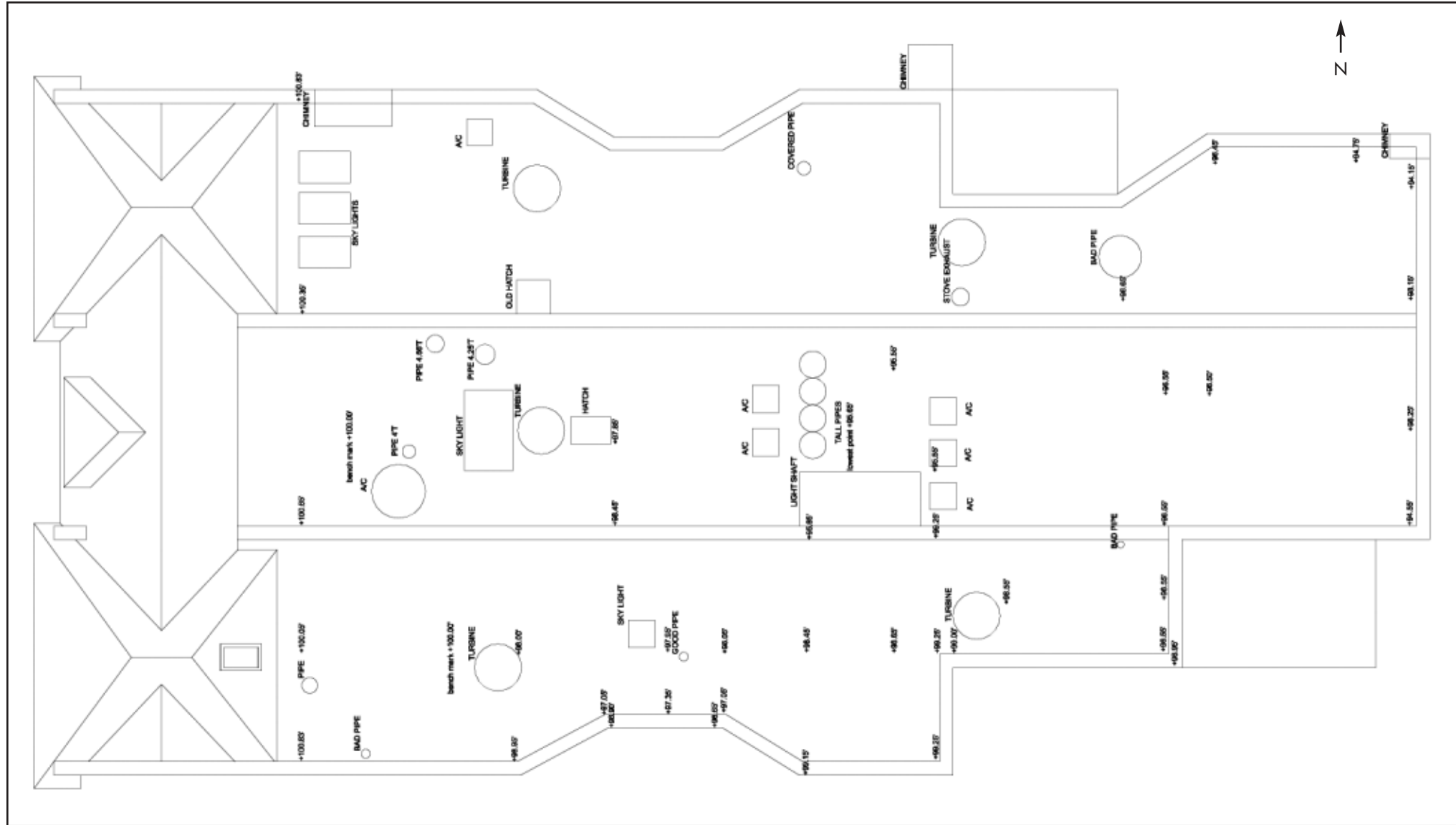
from top to bottom: 1. section cut through the center of building. 2. existing conditions model 3. 4th floor floor plan



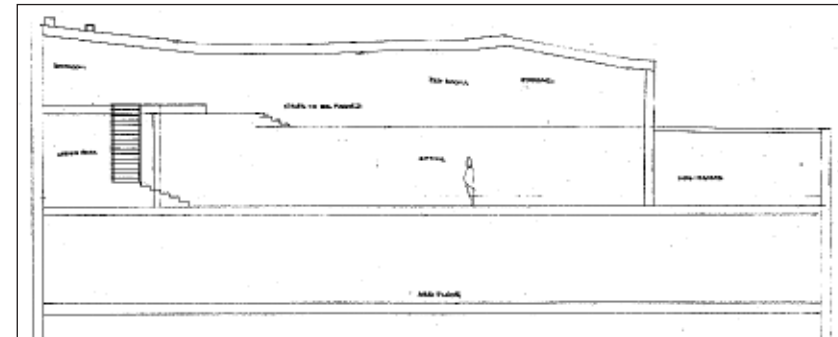
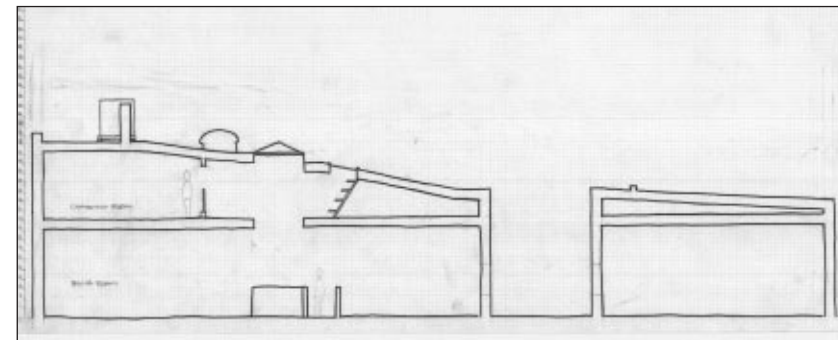
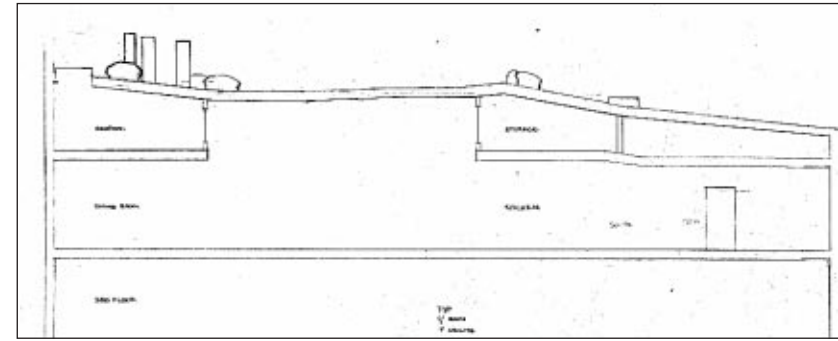
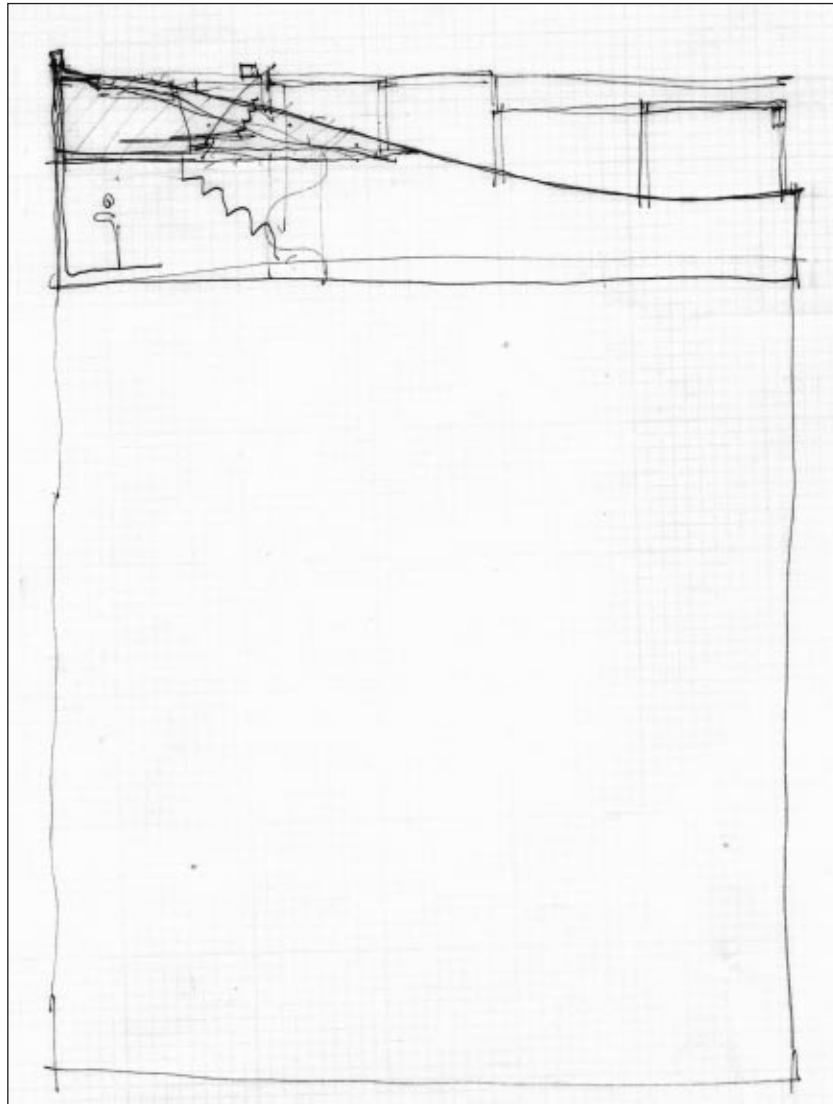
4th floor existing conditions



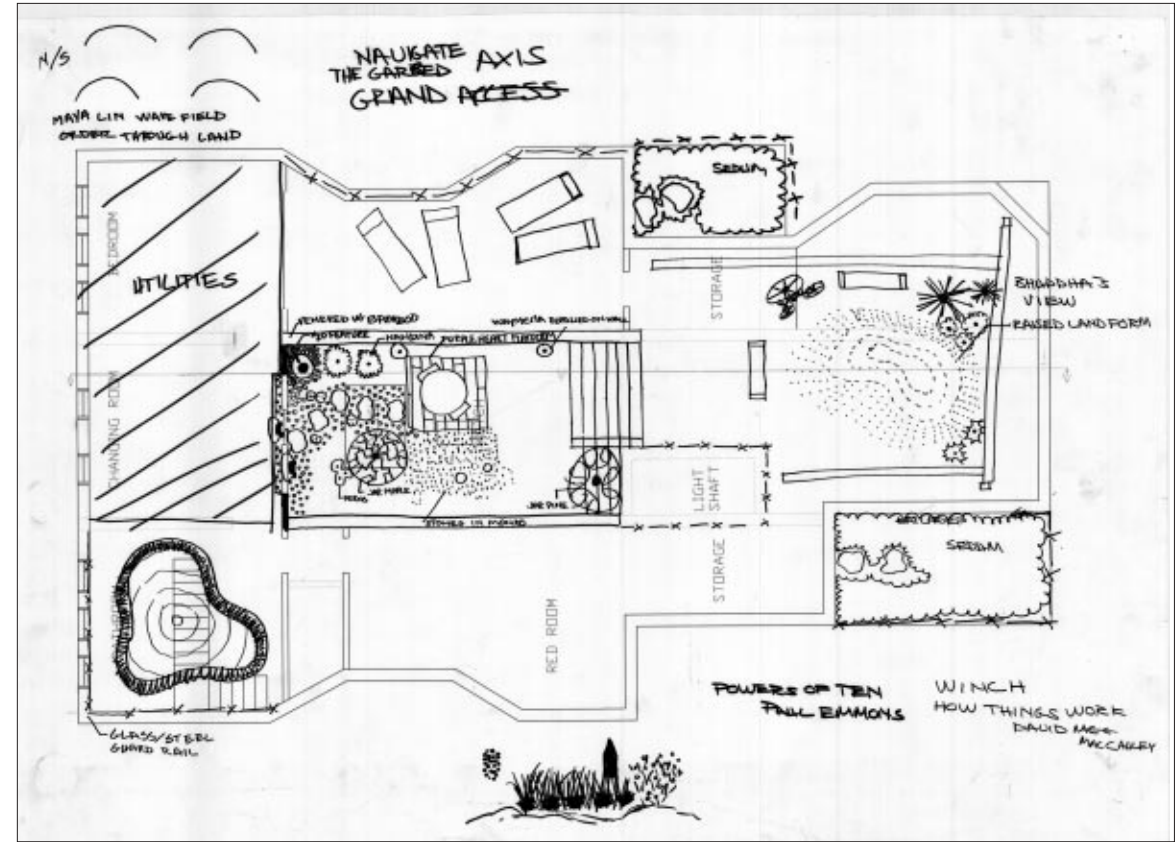
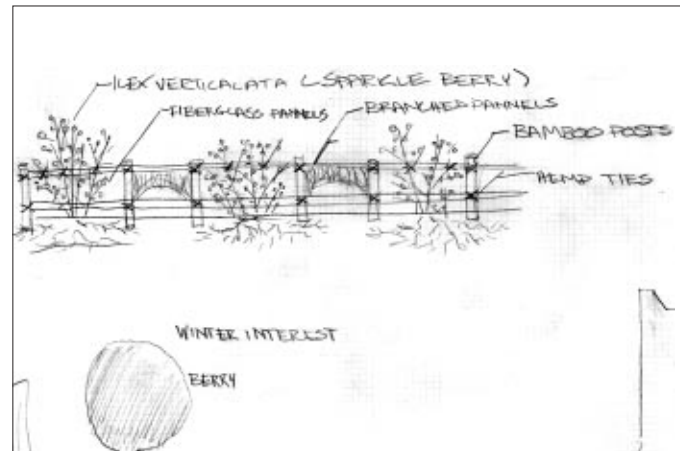
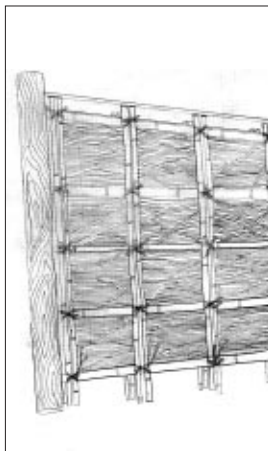
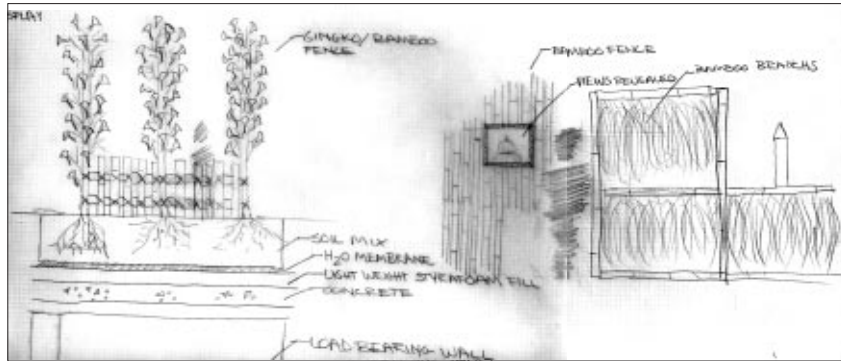
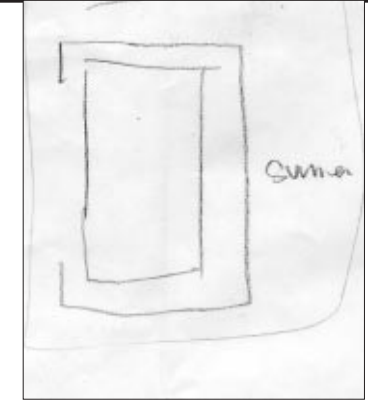
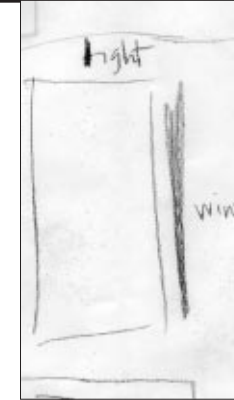
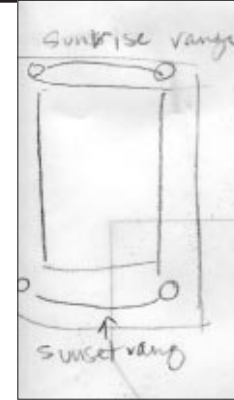
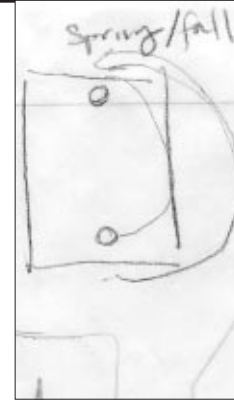
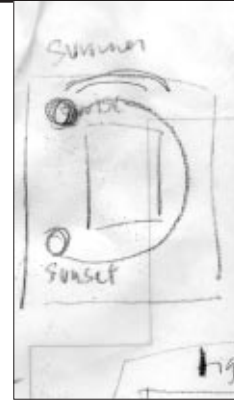
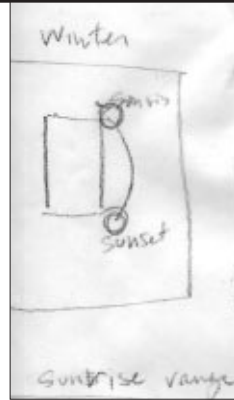
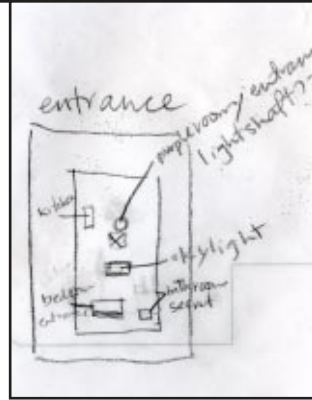
loft space existing conditions



rooftop spot elevations and utilities existing conditions

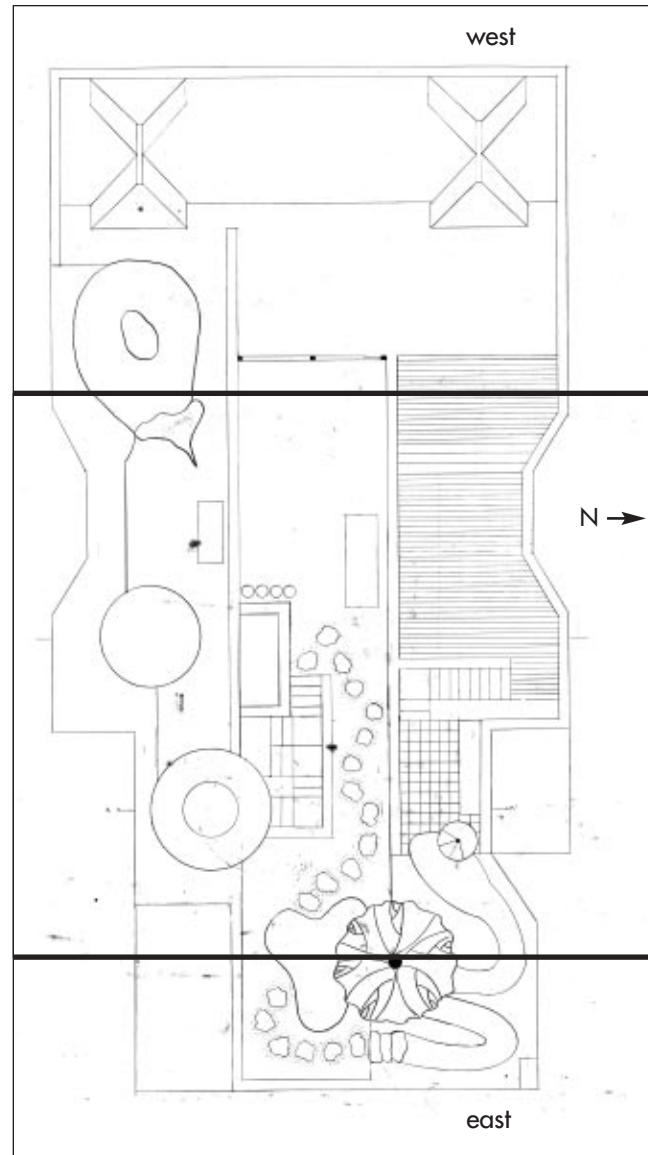


early sections of existing building conditions

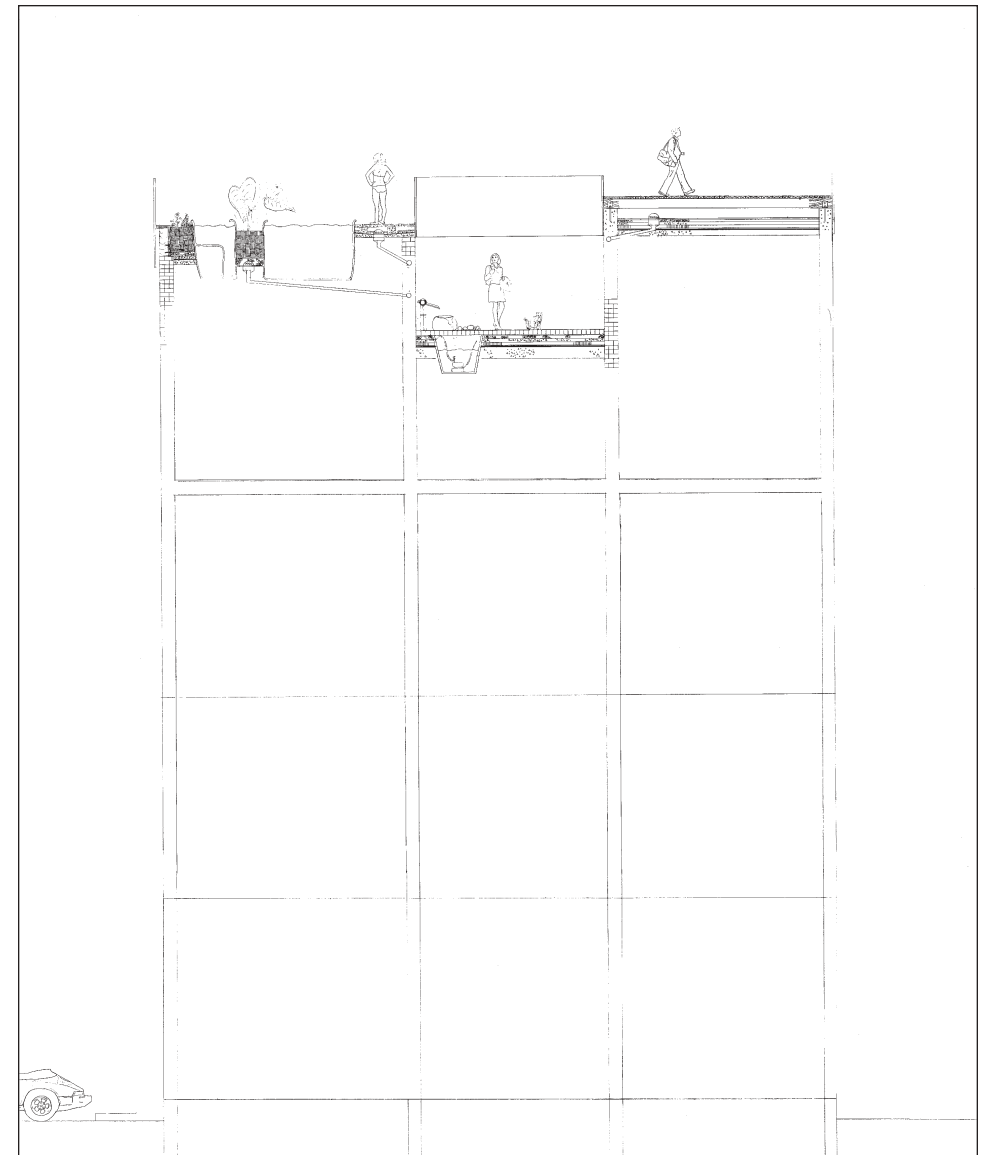




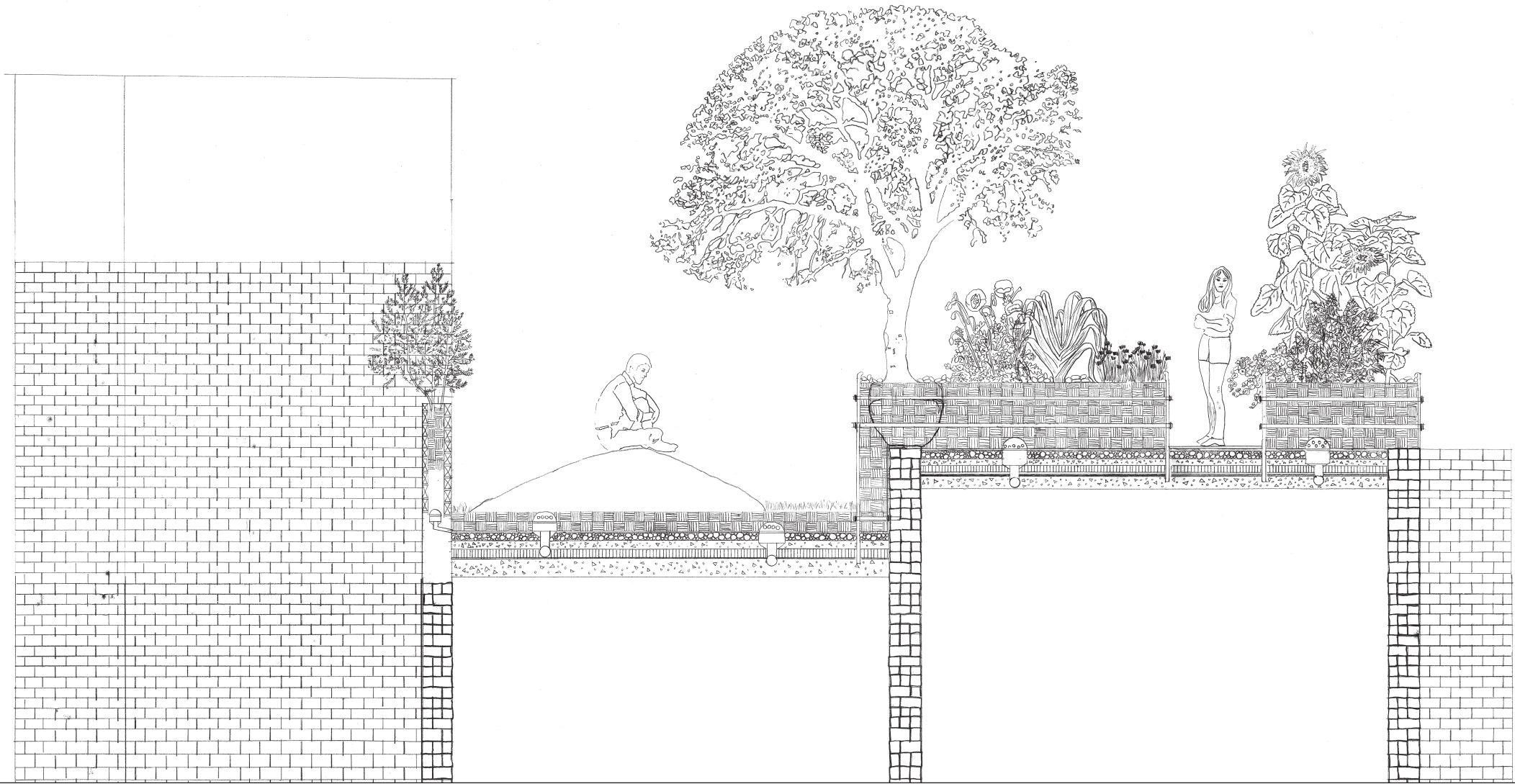
early concept model



early design



looking west, section through 3 gardens—onsen, zen and sustenance

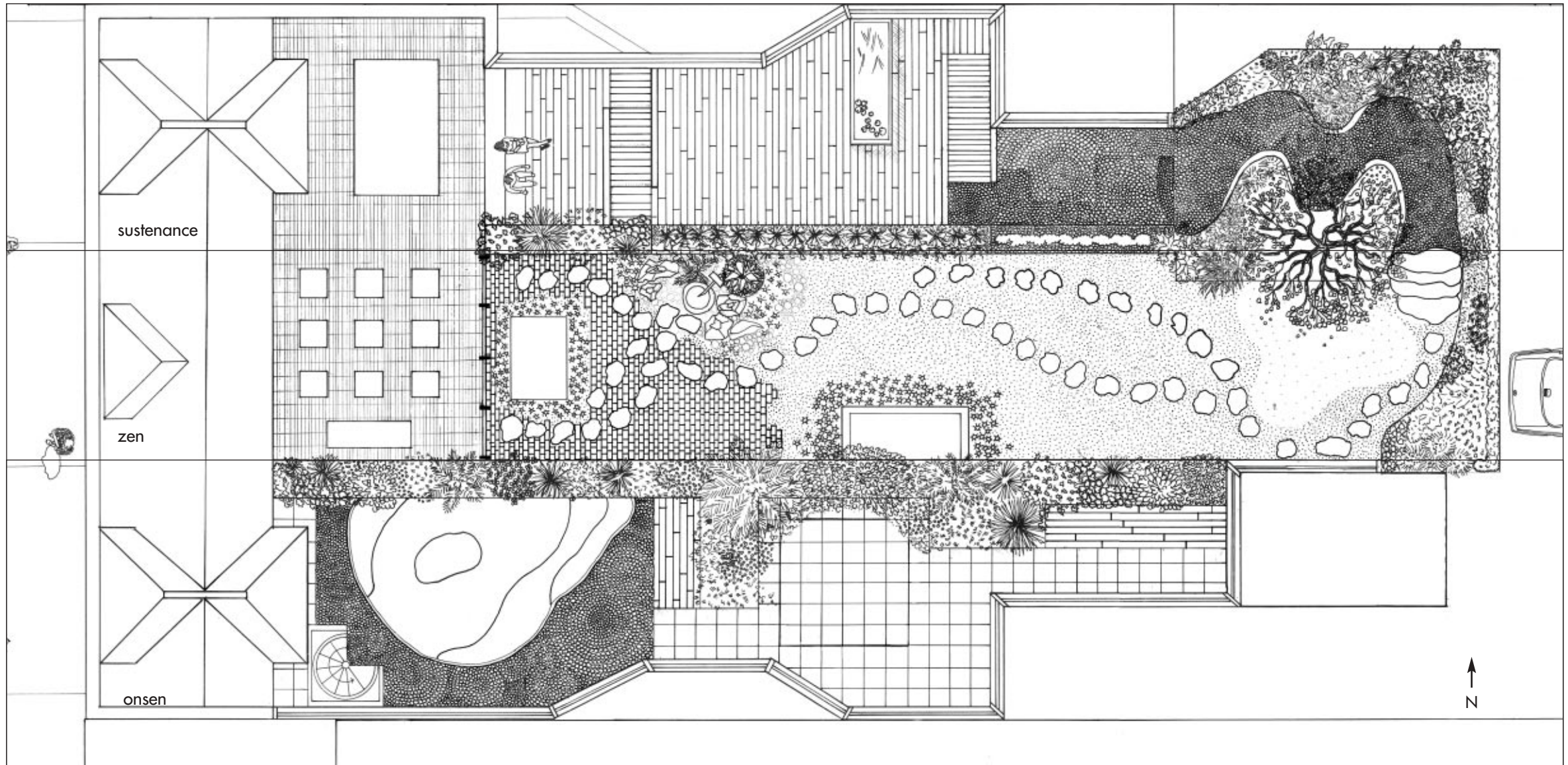


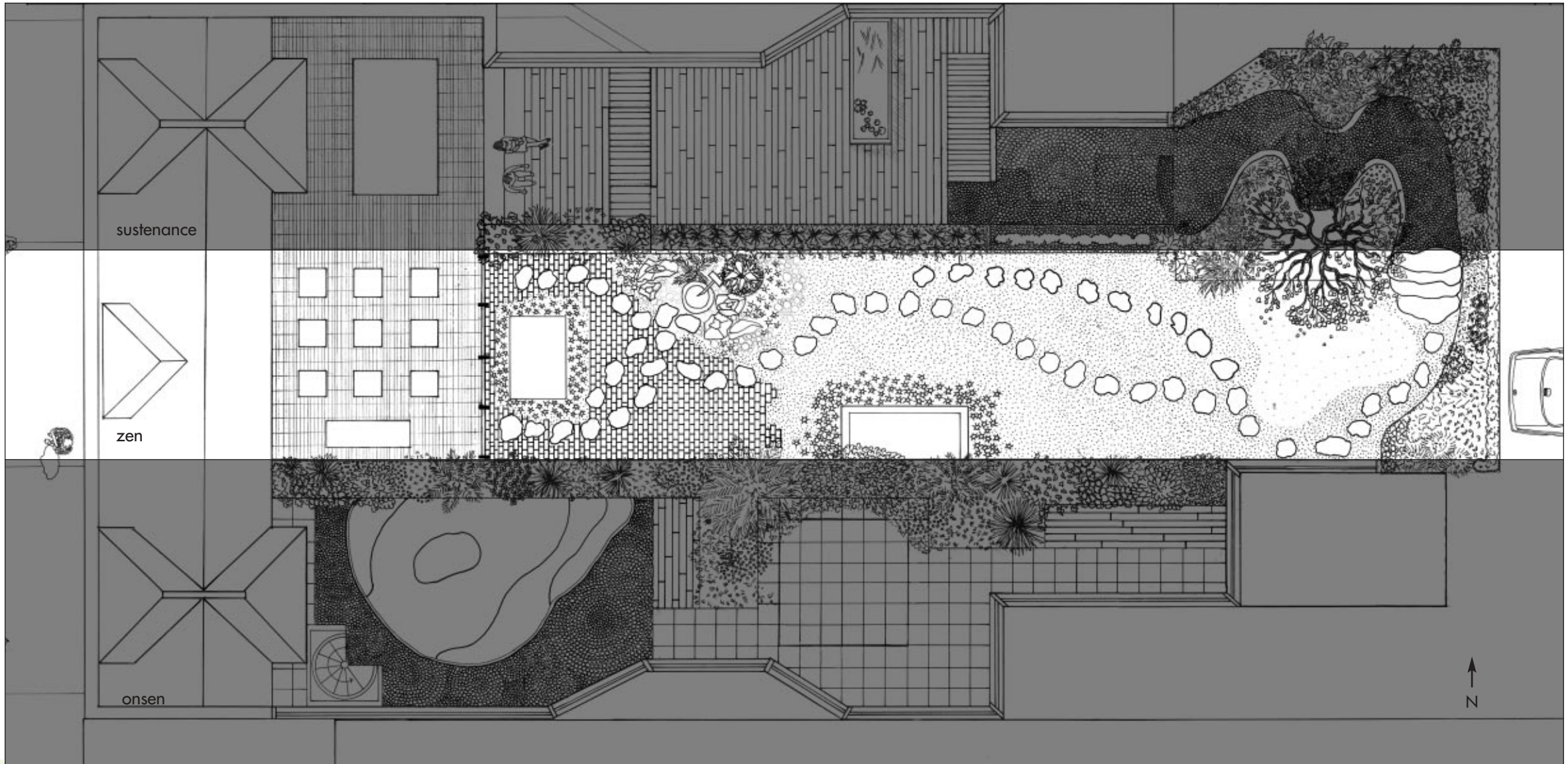
looking east, section through 3 gardens—zen, sustenance and onsen

温泉 泉



section looking west through three gardens-onsen, zen sustenance



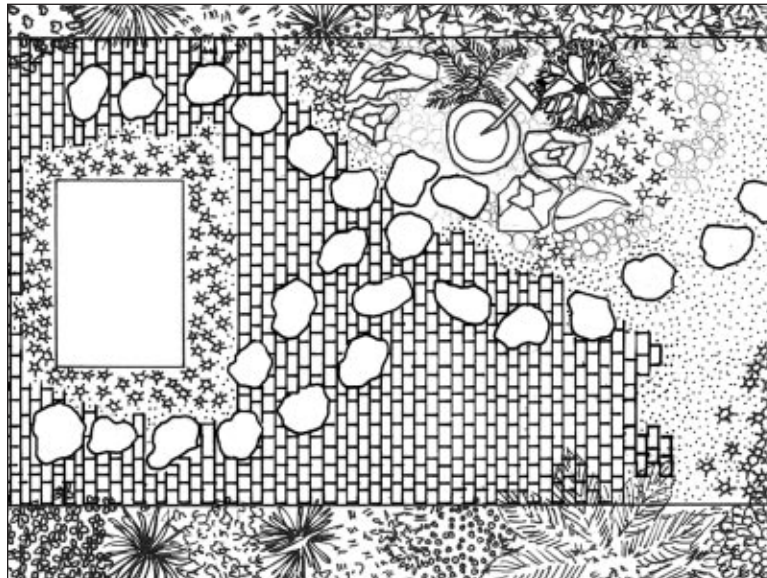


enter the zen garden from the master bedroom, cleanse at the tsukubai, journey to the earthwork...transition to the serpentine vegetable garden...experience the shade and inner peace...

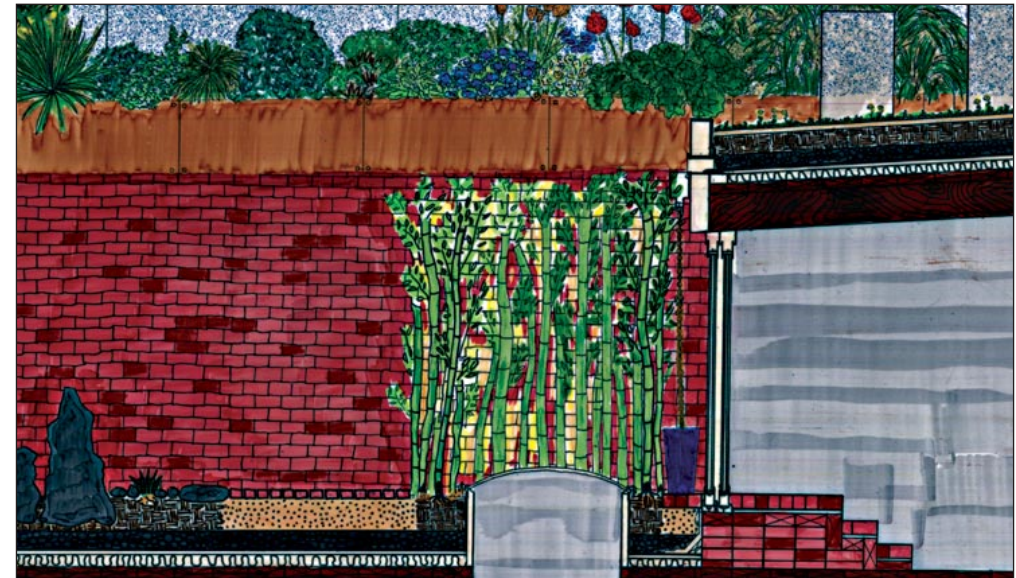


above: section through zen garden looking south

recycled antique brick

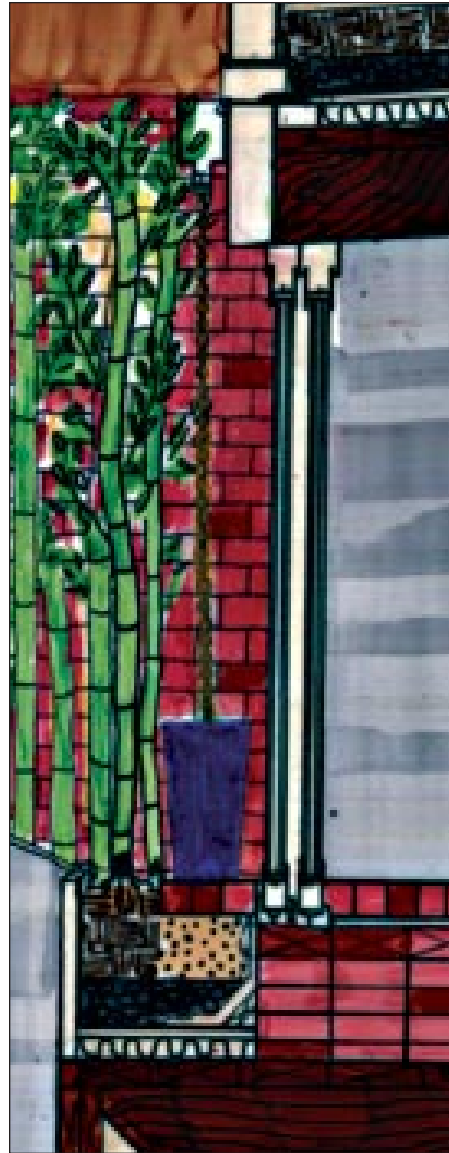


above: early sketch, design, rendered section



a patio of recycled antique brick leads to the zen garden



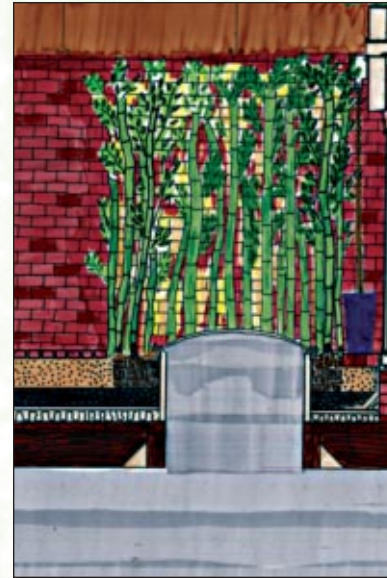
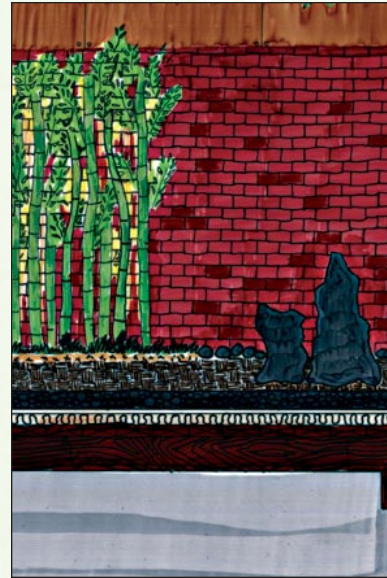
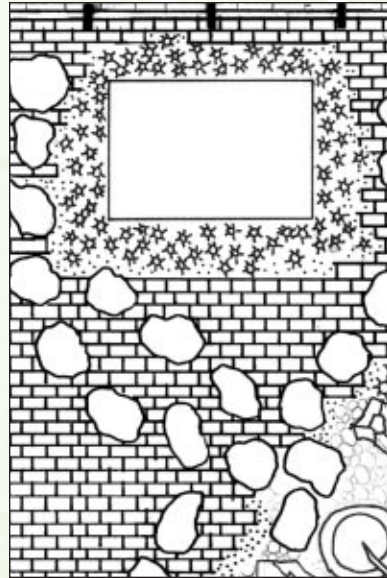
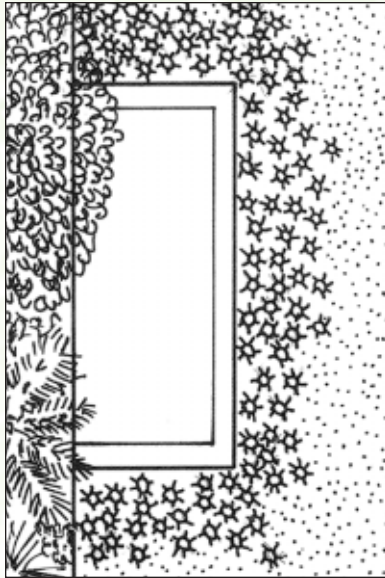


left to right, top to bottom: rendered section, photos from Kamakura, Japan

water dances down copper chains to fill a porcelain basin and overflows into the shade garden

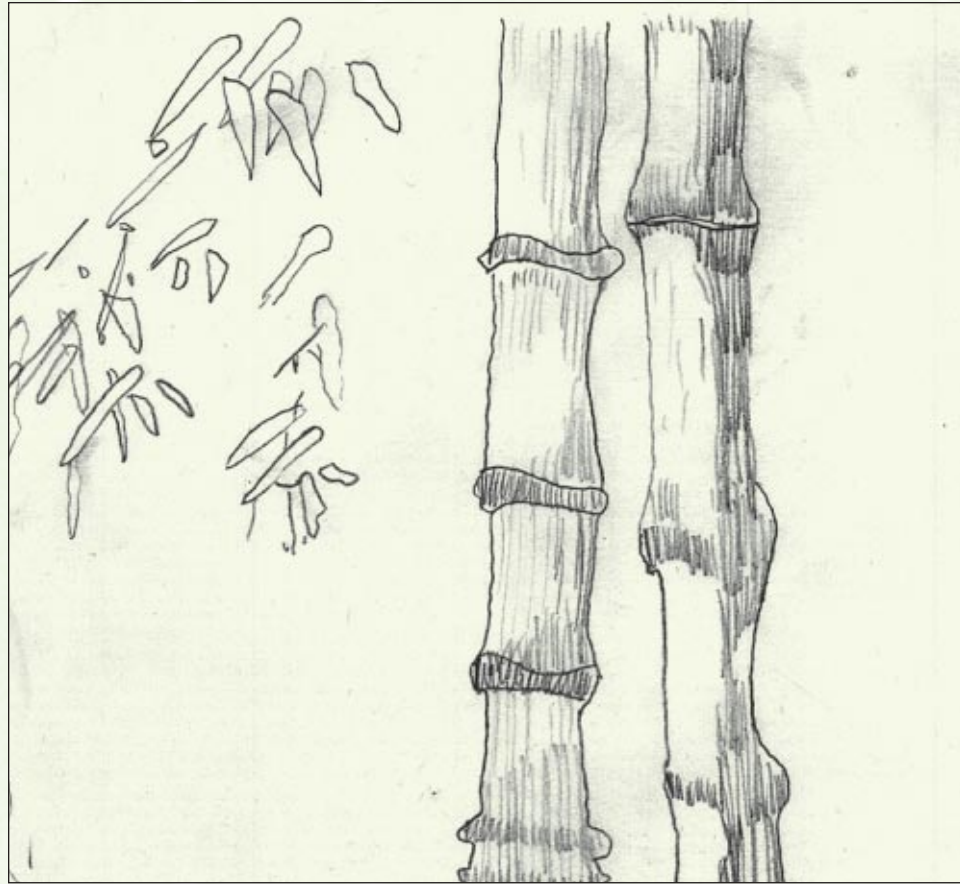


bamboo groves



above: design, rendered section

groves of bamboo disguise light wells eliminating the need for guard rails



sketch and photo of moso bamboo, from Hokuji zen temple, Kamakura, Japan

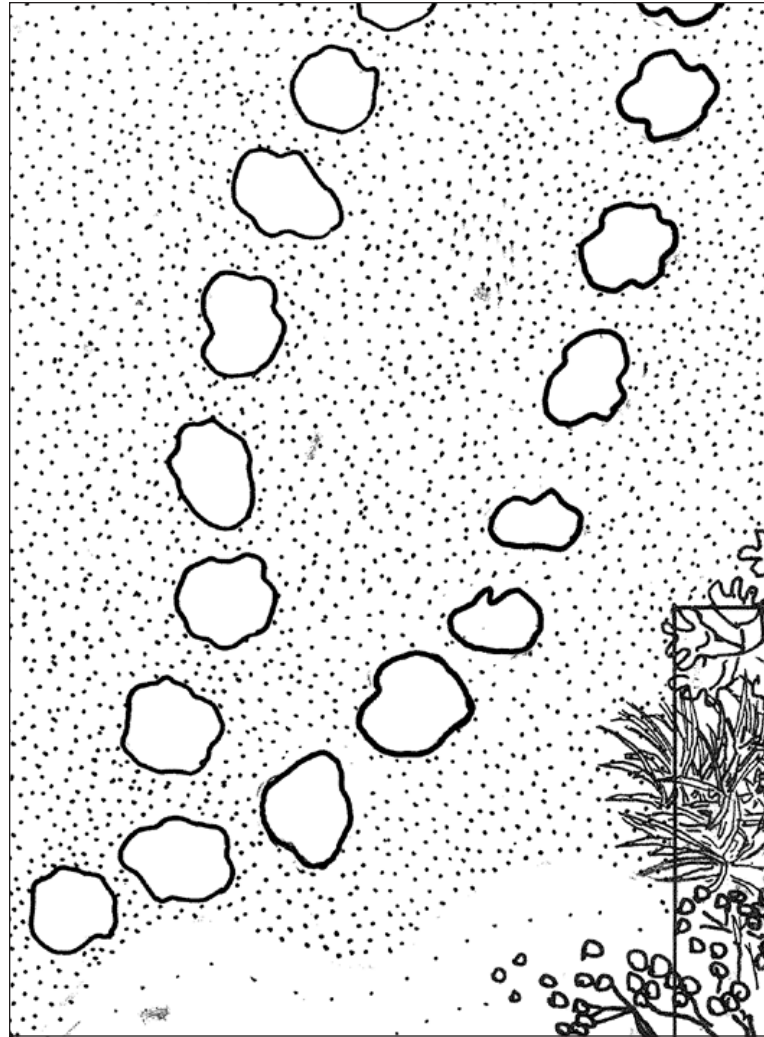
the flicker of bamboo leaves



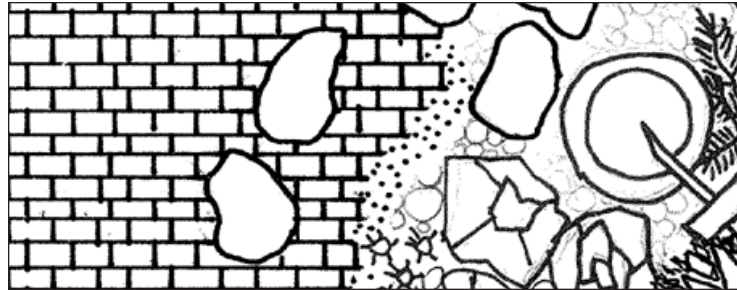
stepping stones



above: a variety of stepping stones from both public temples and residents, Kamakura, Japan



Stepping stones rise out of a carpet of *Ophiopogon japonicus* 'Gyoko-ryu', Dwarf Mondo Grass



above: a variety of tsukubai from both public temples and residents, Kamakura, Japan

above: design, detail of journal entry inspired in Kita-Kamakura, Japan

bend to cleanse and enter with respect; the crouching basin is a symbol of physical and spiritual purity in Japanese culture



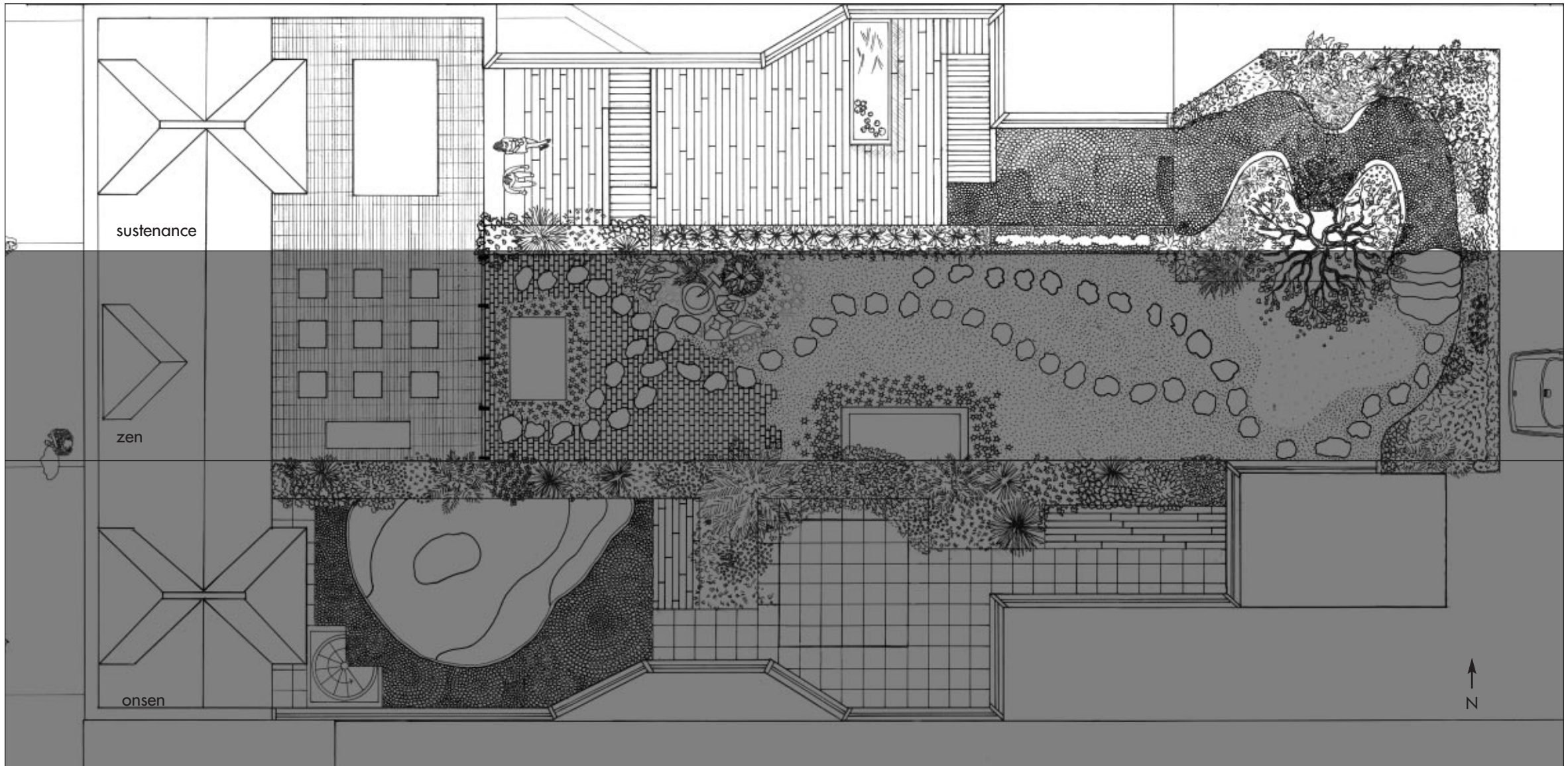


above: detail of journal entry, inspired at Meigetsu-in Temple, Kita-Kamakura, Japan. right: detail of early section of earthwork



a hill under the shadow of a Sakura tree

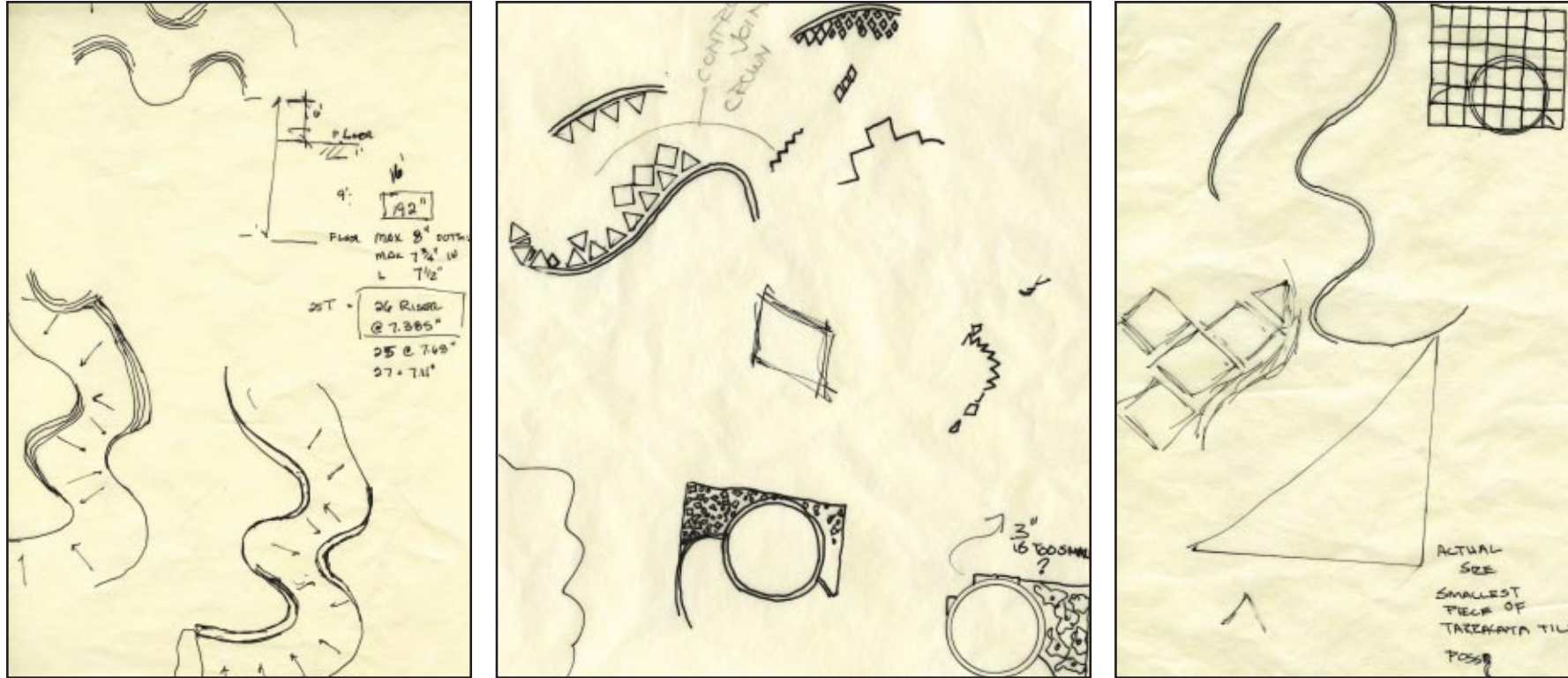






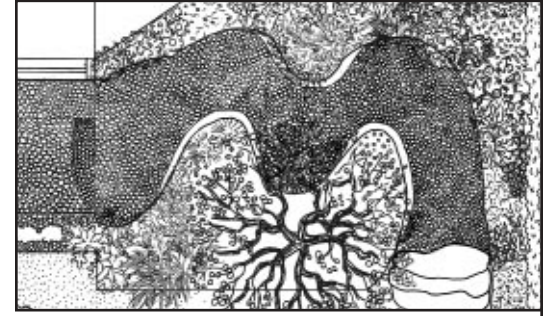
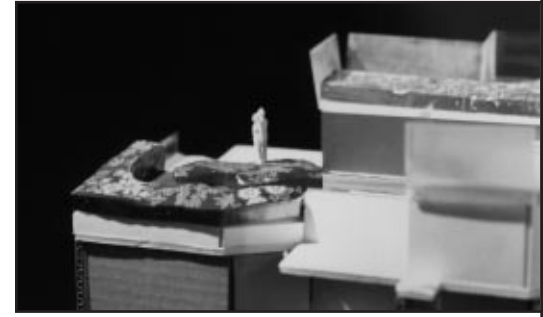
above: section through sustenance, looking south

enter the sustenance garden from the zen garden; transition through the serpentine vegetable garden to a series of wooden terraces terminating with a lookout bench, providing a panoramic view of the city

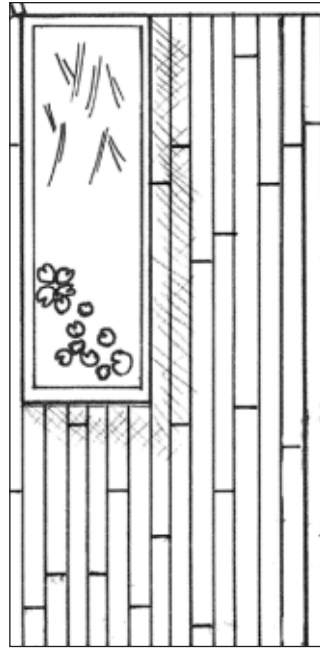


above: early sketches of serpentine vegetable garden

planting space is maximized around the meandering pebble path; the entire garden provides refreshment and support, restoring the aesthetic pleasures of reaping and sowing to the urban dweller

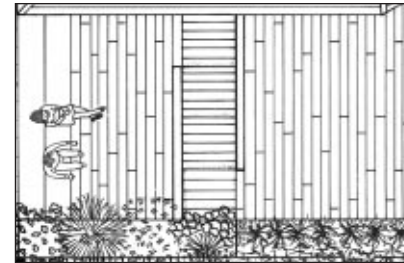
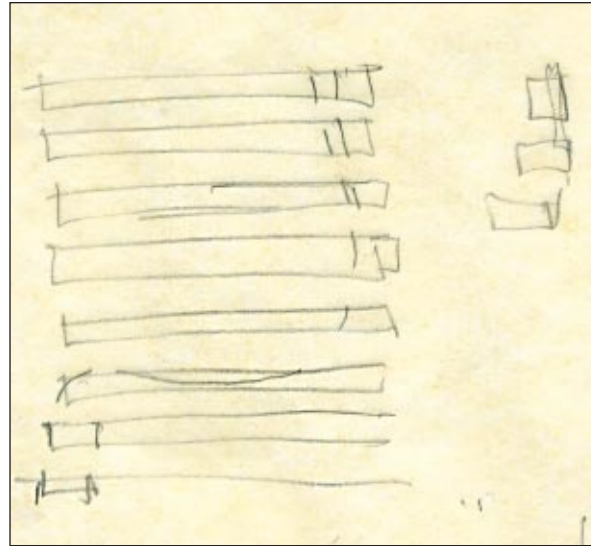
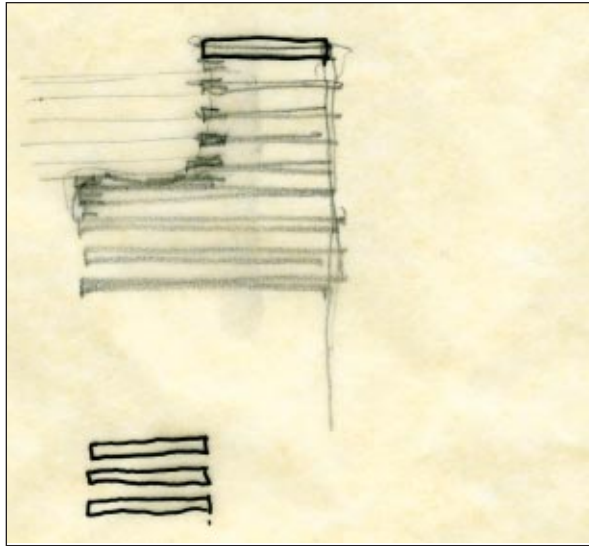


top to bottom: model, design, rendered section



the craftsmanship of the antique water tank is revealed as it is transformed into a koi pond; koi are often referred to as “living jewels” or “swimming flowers” and were originally bred as a protein source

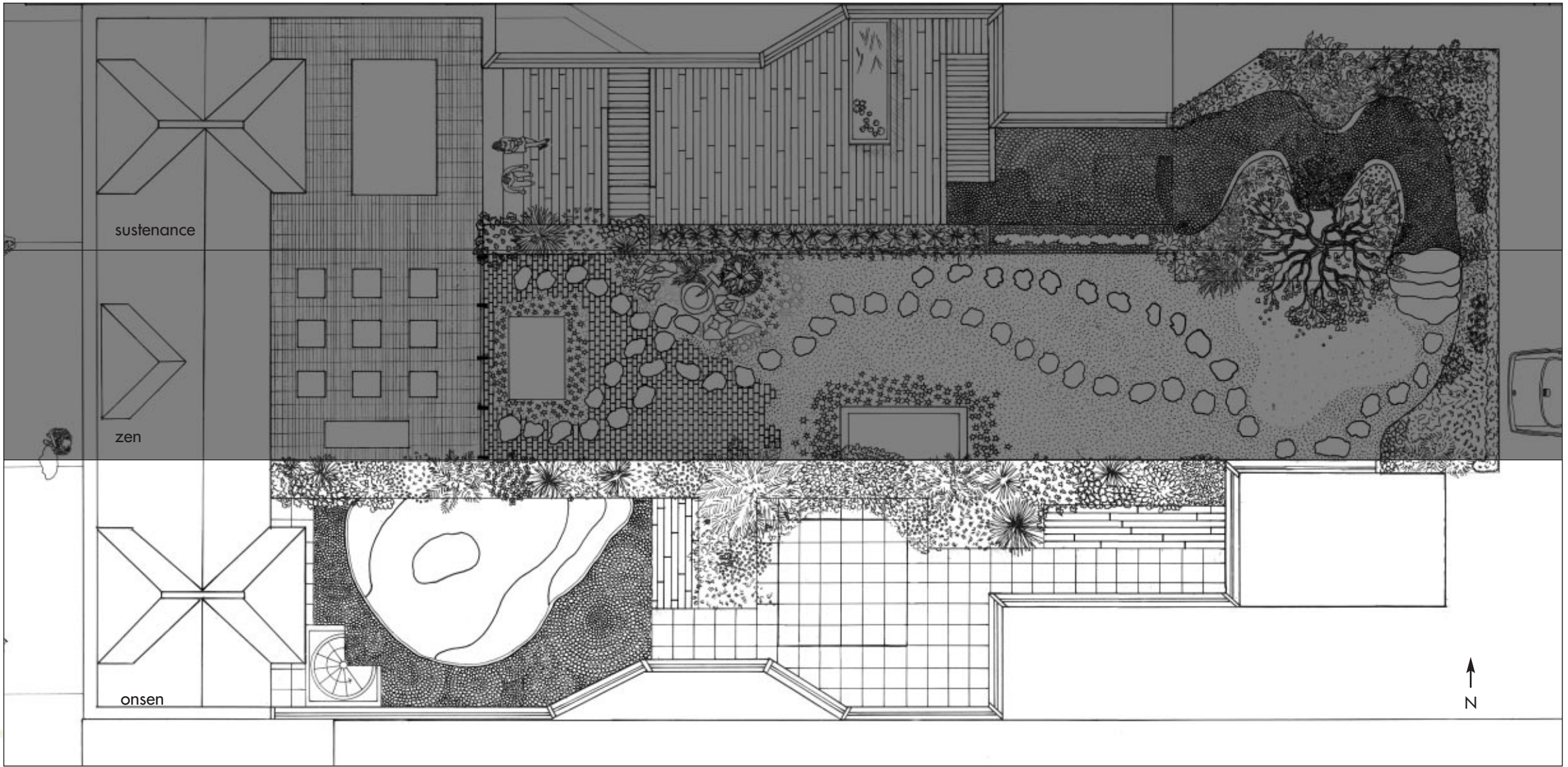




above: early design development sketches, rendered section, design

the terraced deck terminates with a bench, eliminating the need for a guard rail; a panoramic view of the city is exposed and the Washington Cathedral revealed for the first time







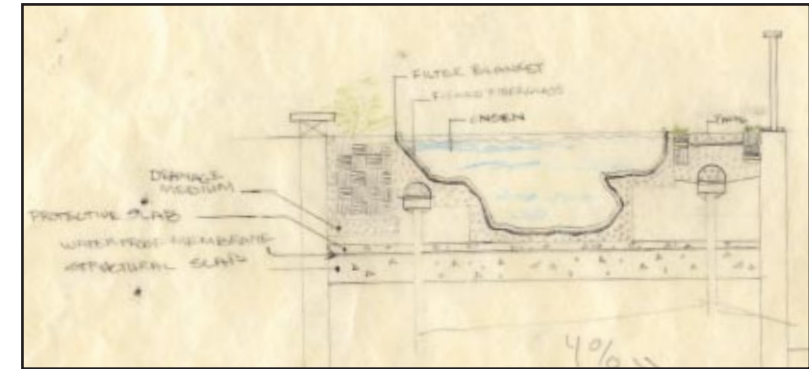
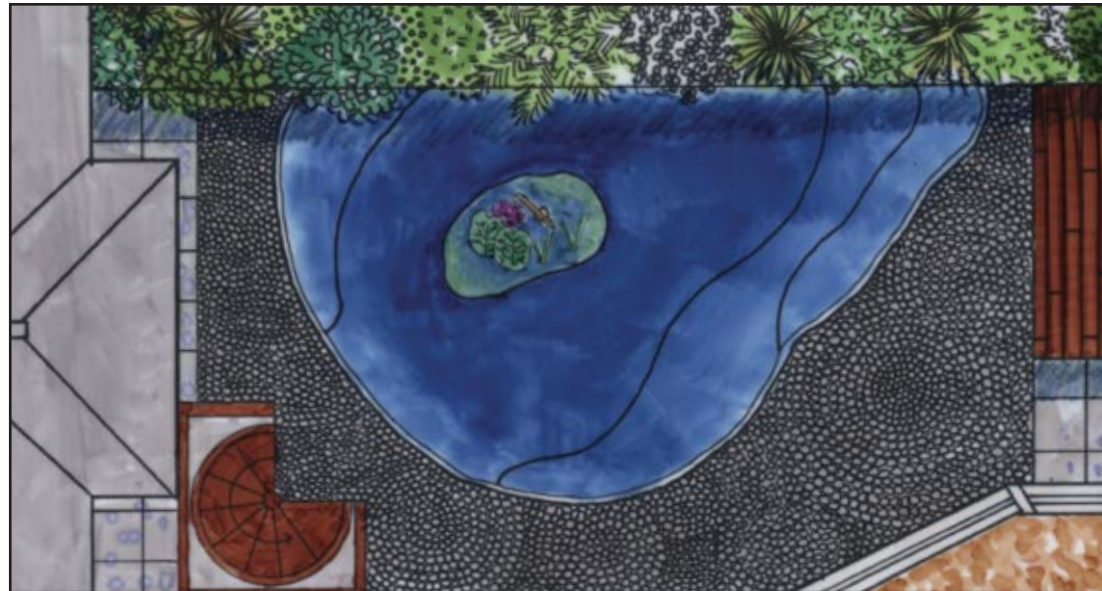
above: section through onsen garden looking north

after showering ascend the spiral staircase from the master bathroom to the onsen garden... transition to the meditation platform or a day bed.... view the city in a state of harmony and relaxation.



american elm seed, (*Ulmus americana*)

Onsen
おんせん
温泉
Hot Springs

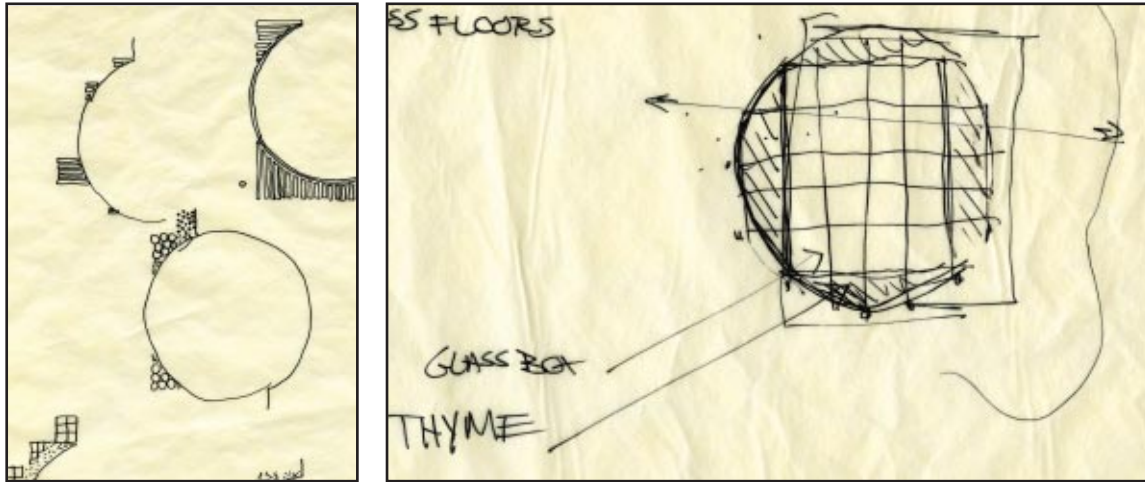


left to right, top to bottom: rendered section, rendered design, early section

In early spring the seeds of the *Ulmus americana* dance their way to the rooftop. Inspired by the seed of the *Ulmus americana*, the spa contains a central planting island featuring a traditional Japanese shishi odoshi or “deer scarer.” Originally used in the rice fields to scare deer and small animals, the shishi odoshi is now a common addition to the Japanese garden. Water from a feeding spout flows into a hollow bamboo tube, which tips forward and then drops back onto a sounding stone, with the resulting “clack” scaring off deer. In the onsen garden the shishi odoshi gives a feeling of solitude as it breaks the silence.



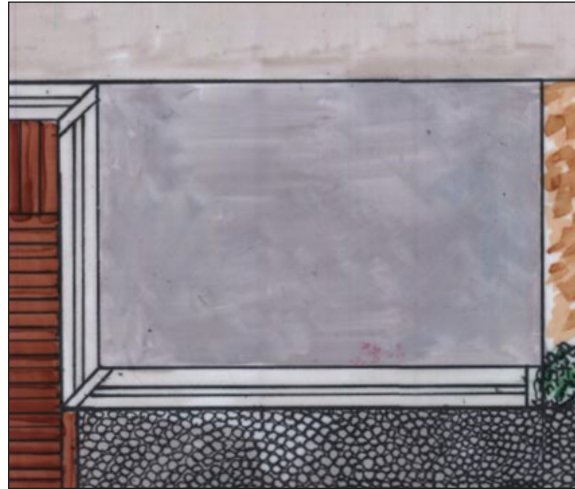
meditation platform



above: early design development sketches, rendered section, rendered design



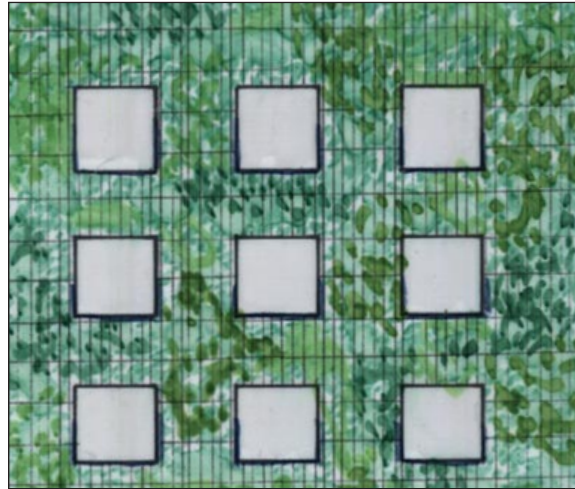
a glass meditation platform is designed to bring light into the building and soul



above: rendered design

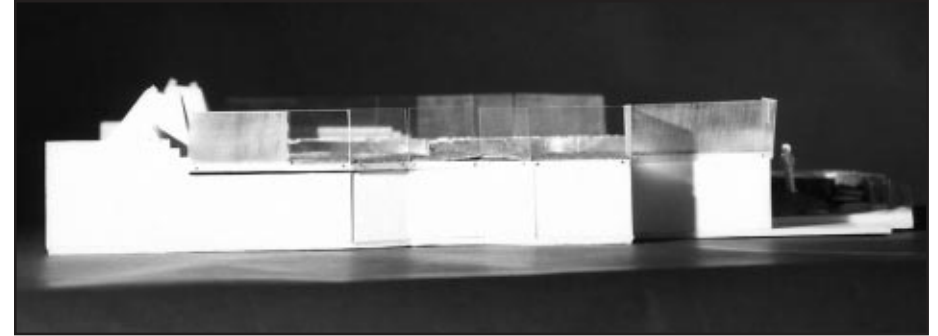
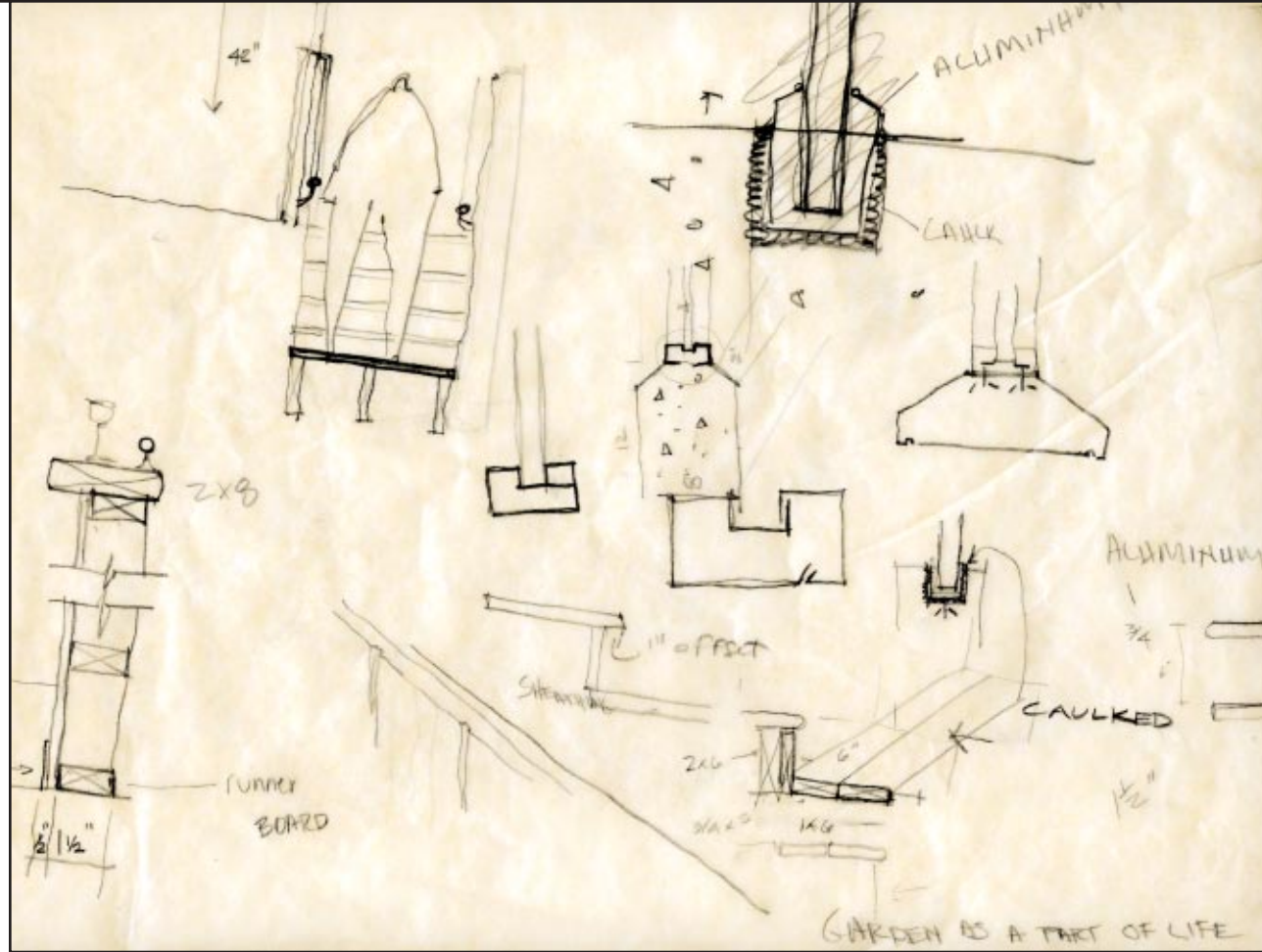
The rooftops of the two historic fire escapes are covered with broken glass increasing their Albedo value and creating a shimmering water like appearance.





above: rendered design and section

a steel grate holds the utilities above a planted carpet of Sedum



above: early sketches, model, rendered section

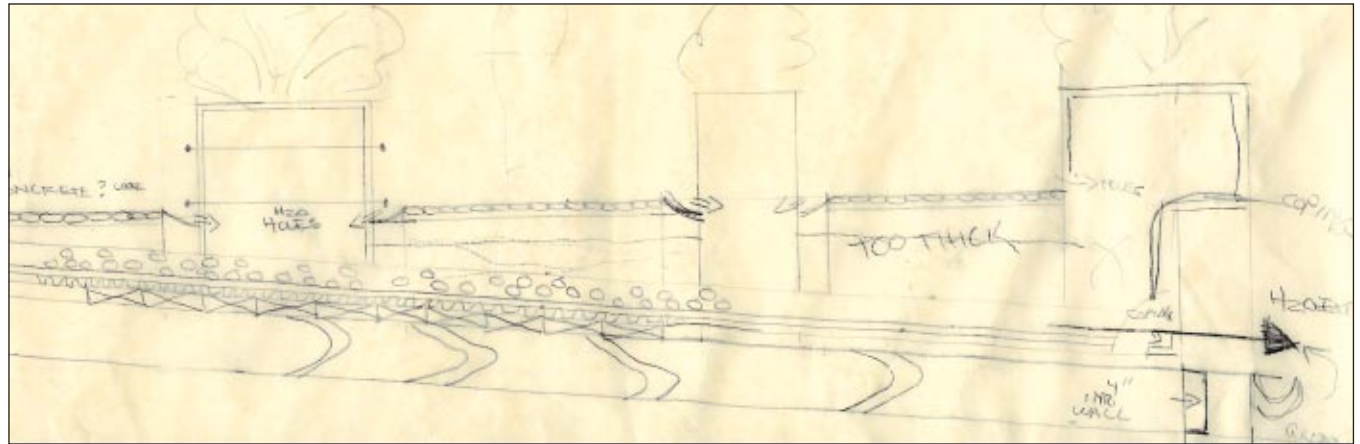
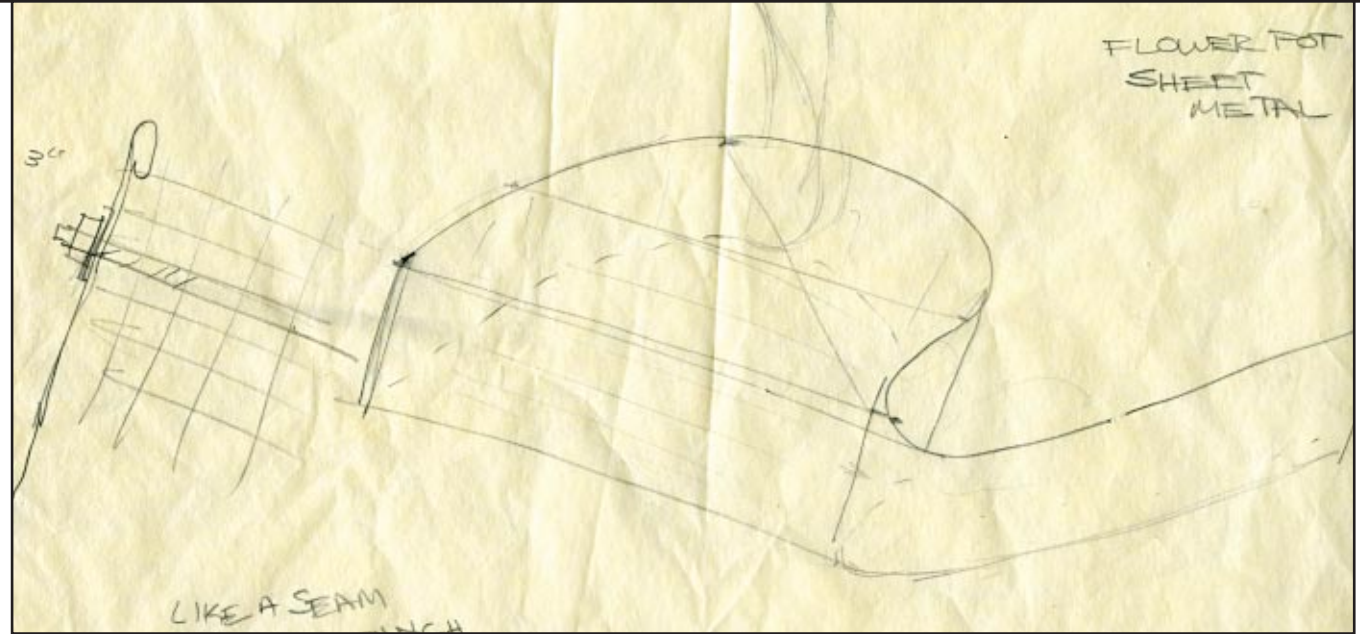
a 6 foot glass railing surrounds much of the rooftop; panels are both translucent and transparent, affording both privacy and views



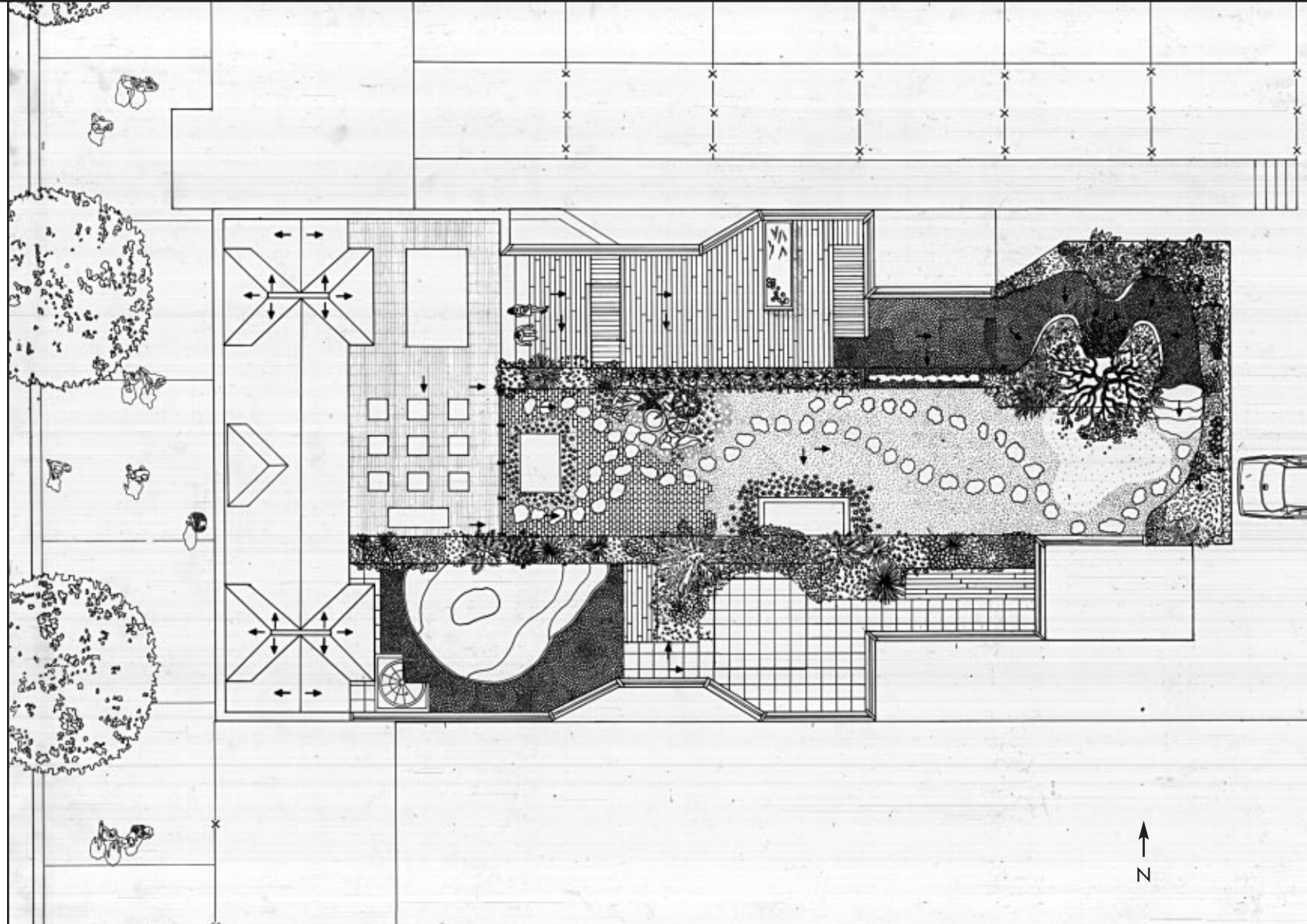
copper planter



above: design, rendered section, early design development sketches



Most surfaces on the rooftop are sloped towards the interior load bearing walls where copper planters are located to delay, cleanse, and cool run-off. Water is treated by bacteria within the stone layer of the planters which capture almost all of the pollutants, forming part of the cooling and irrigation system for the building.



left: proposed water flow is indicated by the arrows

Water capture improves efficiency and cooling by reducing fresh water needs for supplemental irrigation and cleaning. Water capture delays runoff, enabling the water to cool before it runs down the copper downspots.



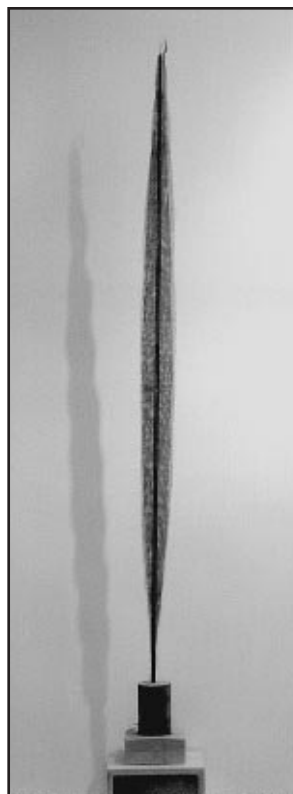
Literature and my own experiences have solidified my belief that humanity must strive to reduce our impacts and restore our natural world. I have designed a rooftop garden which cleans air and water, brings health and vitality to the city, and provides respectful coexistence with nature.

Green roofing, propagated across the urban landscape, can improve the ecological and economic health of Washington, DC by reducing impervious surfaces, increasing urban plant life, and moderately filtering water. Currently, 61.4%* of the District of Columbia are impervious or urban, causing excessive runoff, pollutant loads, and heat absorption. Green roofs offer one of the few remaining options for reducing the impact of impervious surfaces. Additionally, green roofs provide options for increasing foliage in Washington, DC thereby mitigating particulate and gaseous air pollutants. Tree lined streets reduce dust particles and pollutants by up to 90%, capturing and filtering particulate matter before it is inhaled by humans.

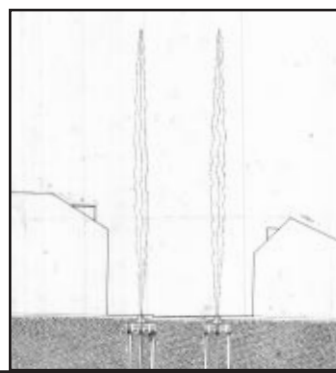
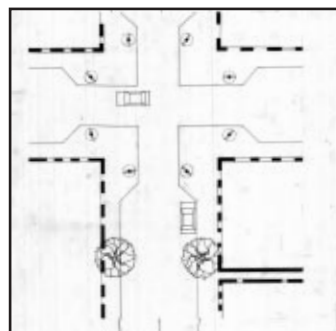
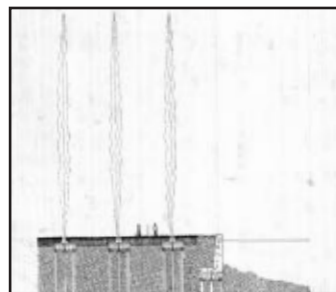
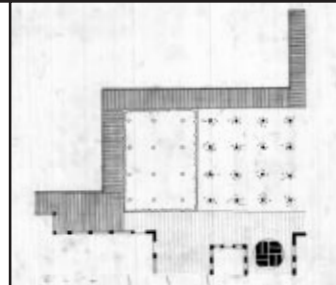
As an urban dweller, environmentalist, and avid proponent of landscape architecture, I have sought to bring more of nature into our cities by way of green roofing. Aesthetic and spiritual benefits to the integration of landscape and building design by way of green roofing are significant, and are accompanied by improvements in building water filtration, air purity, and energy efficiency. These improvements are delivered by way of creative water capture and drainage systems, increased foliage, and decreased overall heat absorption.

* American Forest. "The City of Washington, DC,: Rapid Ecosystem analysis for 2001". American Forest, 2001.





first semester studio design, king street terminus



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Education

Virginia Polytechnic Institute and State University Masters of Landscape Architecture, May 2004	Alexandria, Va
Yokohama National University Fellowship April-September 2002	Yokohama, Japan
The George Washington University Landscape Design Certificate and Woody Landscape Plants Certificate, Spring 2001	Washington, DC
American University, College of Arts and Sciences Bachelors of Arts, Sociology, May 1996	Washington, DC
University of Pittsburgh International curriculum included extensive travel throughout: Venezuela, Brazil, South Africa, Kenya, India, Vietnam, Cambodia, Hong Kong, and Japan. Study regarded host country's political persuasions, history, theology, economics, and commercial trade	Semester at Sea

Professional Experience

Freelance Landscape Designer	2000-Present
Fine Garden Specialist Landscape Designer Responsible for residential and commercial landscape design maintenance and installations	1997-Present
Pop Stars, LLC Owner/Manager Directed and managed Pop Stars, a night club promotion company Designed and created all promotional material including flyers, business cards, posters and website Developed and executed a weekly party featuring local pop art and music	1997-1999
Hillwood Museum Volunteer Received instruction in germinating and transplanted techniques Responsible for maintenance and cultivation	1997-1998



left: saké barrels in Kamakura, Japan, exceptance stamp to Yokohama Natinal University, Japan

thesis question

what are the relative ecological advantages and design strategies of a green roof

jenn russ
virginia polytechnic institute and state university
masters of landscape architecture
defended january 13, 2004
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