To the Graduate Council:

I am submitting herewith a thesis written by Kristofer M. Nonn entitled "Place Not Of Place: The Moveable Home: A Critique of Suburbia." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Architecture, with a major in Architecture.

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Major Professor

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Accepted for the Council:

Ann Mayhew

Vice Chancellor and
Dean of Graduate Studies

(Original signatures are on file with official student records.)

PLACE NOT OF PLACE:
THE MOVEABLE HOME: A CRITIQUE OF SUBURBIA

A Thesis
Presented for the
Master of Architecture Degree
The University of Tennessee, Knoxville

Kristofer M. Nonn
May 2006

DEDICATION

This project is dedicated to all of the people, in all of the places I've been, who have cared to share all that they know and love with me.

ACKNOWLEDGMENTS

This project would not be what it is without the help of Dean John McRae, Barbara Klinkhammer, Scott Wall, Ted Shelton, Jason Brown, and all of the other UT faculty who helped me each in their own way.

ABSTRACT

Home is an architectural construct, one which historically is a product of a specific place. However, as place has become progressively more and more generic, architecturally, socially, communally, so too has the concept of home become more generic and at odds with the individual person. The purpose of this thesis is to investigate an alternative possibility, one which is based on the person as the design impetus. What if home were not about place, but about person? It is the purpose of this project to formulate a response to a uniquely American history, one which is founded on individualism, nomadicism, and self-sufficiency. This tradition stands in stark contrast to the American Suburb as a representation of how Americans live, and thus this project stands as a critique of the American Suburb as an appropriate American home-form. The counterpoint to the Suburban type and method of life is the moveable home, a home built from the inside out, which adapts as location changes, but as a physical manifestation of home presents a stable and nurturing place, not dependent on place, but in place, not just for a person, but from a person.

PREFACE

7830 Hwy K

I grew up in a valley populated by people who all shared my last name, and had for 5 generations. I came to love that valley where two plains met, hence the name Cross Plains, Wisconsin, the glacial hills defining the cranked cruciform, working with my hands laboring in the fields and barns and sheds, the seasons coming and going, living and dying, the same and different both, time a trace in the cycle.

234 Breese Terrace #2
307 S. Orchard Street #2
1311 Chandler Street
918 E. Dayton #1

From there I went to college, studied music, studied the city, lived in the city. Madison Wisconsin. It was a place I was completely free and could explore on foot and on bicycle, in mind and in muscle. It was a home too.

1305 W. Clinch Ave. #1
8113 Kingsdale Dr.

I headed south, entered Architecture school in Knoxville Tennessee. It was a place to learn from, a place to live on my own and learn how I live.

7225 Russell Rd.
6402 Lakeview Dr.
3906 Wayland Dr.

These places too have been home: Hornell, New York, Buford, Georgia, Nashville, Tennessee; my bags always packed, my bed always where I lay my head, couch or floor or cot or bed not my own, the people around me family for a time, or family always.

And I know there are many more homes in my future. There are so many beautiful places, I wonder why I should have to choose just one?

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1. Introduction

"The man who works with his hands is a laborer;
The man who works with his hands and his mind is a craftsman;
The man who works with his hands, mind and heart is an artist."

attributed to St. Thomas Aquinas

"The world will not evolve past its current state of crisis by using the same thinking that created the situation."

"Make everything as simple as possible, but not simpler."

Albert Einstein

Many Paths Singular

"the architect will be most successful, who, after mastering that which has been done in other countries and in past time, works freshly from the inspiration of his own country – its manners, institutions, and climate. Such an artist will absorb the past...not to reproduce it in feebler forms, but to give greater meaning and stronger vitality to productions that belong wholly to the present."

Andrew Jackson Downing, *Country Houses*, p. 275-76

"the one thing Americans demonstrably have done better than any other culture in history – for centuries – is handle chaos and change, and invent the future. Americans are part of a wildly individualistic, determined culture that may or may not know how to resolve dilemmas, but that does attack obstacles – compulsively and reflexively. Americans believe, endearingly and in spite of all evidence, that for every problem, there is a solution."

Joel Garreau, *Edge Cities*, p. xii

Life is not localized. It moves, wanders, is placeless and each path is known only to its traveler, singular. And while we may know where we want to go, life is less direct than all of that This is what Frank Lloyd Wright's Book One Plate to his 1932 *Autobiography* illustrates (fig. 1). Lives fall into line for a while, but we are ultimately all just ourselves. We each collect our experiences, knowledge, and ideas like we collect possessions, and we take them all with us, are us. Architecture needs to reflect this.

It is not the intention of this project to reinvent how Americans live. It is the intention of this project to rediscover what is unique about American life. Revolution suggests, at its core, a return to beginnings. This project is intended as a return to self-reliant models of our much-glorified and much–fabled past.
This project will not be a utopian solution, although it will attempt to fix more than it breaks. It will not be for everybody. It will be for the people tired of moving, uprooting, losing all that is worked hard for, people who want to know what it could mean to be

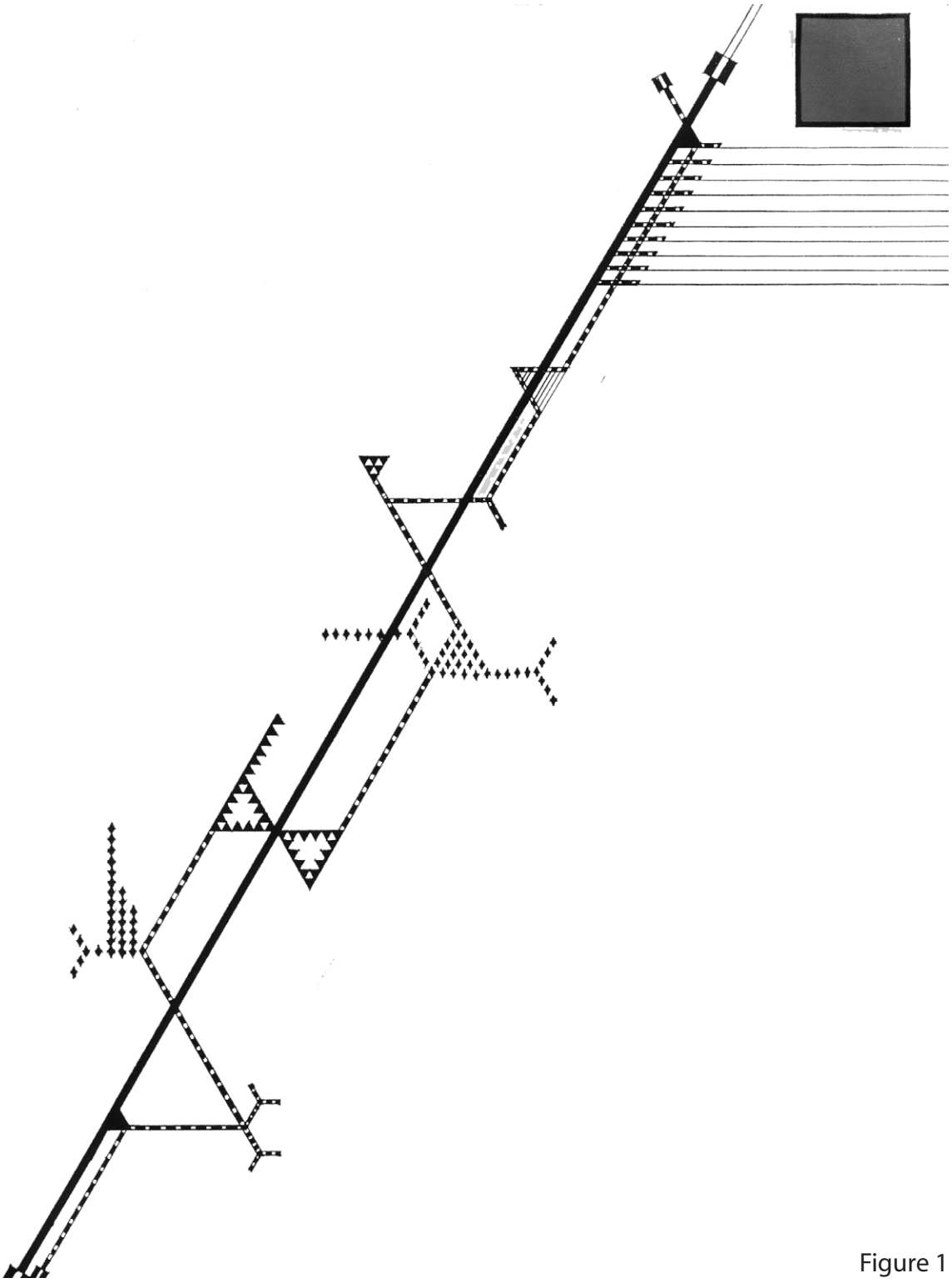

Figure 1
Book One: Family Fellowship
Frank Lloyd Wright
Autobiography , 1932

American. That could be families or single people, barely or handily getting by, young or old or middle-aged, educated informally or formally, lost or found. There is no one group, just like there is no one winner, no one truth. The moveable home would glorify and magnify this.

Thesis Statement: Move to Live

Home is an architectural construct and concept. It grew from the necessities of a place. Contemporary life is no longer so localized. Home will be investigated in terms of person and flexibility rather than specific place, materials, views, resources. The moveable home is an investigation of how home as an architectural construct can be about, for, and borne of the person, the individual, and how it can be the embodiment to the American qualities of mobility, self-sustenance, independence, community. The home has always grown outward from the person, from their particular and universal needs. As more people move more and more, the moveable home becomes a way of maintaining a continuous life in various places, home providing for and existing in the same way in each a new place. This project is conceived of as being in distinct reaction and counterpoint to the suburban model which has taken the American home so far afield of its original meanings and purposes that the effect no longer knows its cause. The moveable home permits and promotes a life in flux, in motion, allowing each individual or family to pursue their own path and live continuously in that path. The moveable home moves as people move.

Statement of Purpose: Our Time

"The dwelling can be read as an image of the body, the household, and the household's relation to society. It is a physical space designed to mediate between nature and culture, between the landscape and the larger built environment."

Dolores Hayden, *Redesigning the American Dream*, p. 58

"If we think of what we do as makers of buildings, as making things in a state of flux, in a flow of movement, then our whole outlook of it dramatically changes. Instead terms like lasting, permanent, timeless trip us up, these ideals deep within our culture and pervasive. Yet in the greater realm, all is a matter of duration. Our personal lives may be shorter than that of some of the more substantial things we design and so from our personal perspective they appear to be long-lived. But when we step back to the greater whole then we begin to realize that our buildings, like everything else, are in movement. What does a building in movement mean? We typically think of a building as a static object sitting indefinitely in a particular location and it is all that. But, at the same time, we can just as well consider that same building in a state of becoming. That is, movement from the largest—the universal—to something considerably smaller and concentrated, being for a while this built thing in its particular location. Then after a time it returns to the larger realm, back to the earth again, the universal; earth,

the immense hereness. Only to be repeated again by some other generation, constantly in a state of movement, for a time collected, arranged and ordered as "building.""

Coleman Coker, "Building as Questioning," p. 4

This thesis will deal with a primarily in-out method of designing, based on the idea of home as the response to a human's needs, and will make an argument for the moveable home, posited as a critique of suburban housing. The moveable home will look to integrate the essential American ideals of movement and self-sufficience into a solution hewn from the same issues which produced the current suburban residential type, but developed in a different direction and with different priorities. The path to doing so will be to look to the mobile home as a truly American archetype, an archetype which has not yet been fully developed, and which would generate a new interpretation of how Americans could live. Being moveable, it would rely neither on being of the country or the city, neither pure rus (rural) nor pure urbs (urban), but rather would have the capacity to exist anywhere on the spectrum between the two. That path also follows the developing patterns of social and economic vagrancy which contemporary Americans are experiencing, something which will no doubt need to be addressed in the near future. The proposal is to reexamine the mobile home and its potential to articulate and facilitate in an architectural form these issues of independence, mobility, self-sustenance, community. The issue of one home with a multiplicity of place would reevaluate what home is, and how it relates both to the inhabitant in material and spatial flexibility, as well as how these moveable homes could be grouped and moved to create expanding and contracting centers of community over time as life ebbs and flows. As individuals, home would be something we take with us, something which would be an expression of the self, and would relate to place environmentally as a reaction to that individual. It would be not an articulation of a specific regionalism, per se, but of a specific individualism, the person a composite of diverse forces and experiences through time. The moveable home would become a symbol of and a tool for a way of life which is self-sustaining, decentralized, personally accountable.

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2. Home

Home Built Around Life

What is home?
What defines home?
What are those forces which have formed and shaped what home is?

There are many who have dealt with the origins and elements of home, as the seminal architectural type. Gottfried Semper has written on the "Four Elements of Architecture," which he asserts are the hearth, the roof, the enclosure, and the mound. The hearth is that "first sign of human settlement after the hunt, the battle, and wandering," the other three "the protecting negations or defenders of the hearth's flame against the three hostile elements of nature (Semper, p. 102). From this we can gather that what home is and always has been primarily a place to be warm and safe from natural and human threats to life. As Robert Geddes points out in his article "The Forest Edge," shelter, as portrayed in Laugier's Primitive Hut (fig. 2), was the first image of home. Again we find the issues of shelter from the elements and security from danger. And Sophia and Stefan Behling, in their survey of sustainable architecture, speak similarly: "Humans' primary means of providing themselves with comfort in the natural environment lies in creating their own protection using clothing and buildings" (Behling, 44). However, through time as civilizations have developed, home has acquired additional layers of meaning: a place to keep warm, to keep cool, a place to rest and a place to eat; a place to meet and a place to remove from the world; a place to raise a family; a place to collect things, tools, possessions, knowledge; a place to learn; a place to work. All of these things have become what we now know as home. Home grew out of the needs of the person, in-out. In-Out: from the personal needs to the outward articulation and facilitation of those needs. These are the things we need from home, the things which are the sole reasons for this architectural construct: a place to keep warm in the winter and cool in the summer, to keep clean, to sleep safely and comfortably, to eat, to store and amass food, to repair from the world, to raise our children, to consider our lives in the world, for this place of home is where we make our life, in-out.



Figure 2
The Primitive Hut
Marc-Antoine Laugier
1753

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3. Life, Liberty, and the Pursuit of Happiness: Pursuing an American Life

Uniquely American

"Immense and Immediate. Efficient and wasteful. Brutal and spectacular. The American landscape, like the culture it embodies, is a magnificent paradox."

James Corner, *Taking Measures Across the American Landscape*, 25.

"Such a people need not fear for the future. They have only to build on the solid accomplishments of their past."

Arthur Schlesinger, "The True American Way of Life" in *Nothing Stands Still*, 156.

Every American learns in school where we as 21st century Americans came from – explorers, pioneers, immigrants, frontier prospectors, homesteaders (fig. 3-4), at every turn fundamentally independents and individuals, people who fought for freedom, fought to move and moved to live. America is founded on the principles of individuality and freedom. The psychological impact of the "frontier mentality" which embodies these principles has produced a unique relationship between land and person, one where each person feels entitled to a space inordinately larger than what they either need or use. The availability of land created by the ever-expanding frontier and the idea of "Manifest Destiny" fomented an environment where Americans had no reason to consider how they were using the land, because the prevailing attitude was that there was always more, would always be more. Very few of us are "native" to this place – "All of us are descended from immigrants," as President Franklin Roosevelt has been quoted as saying (Schlesinger, 149). These notions permeate every aspect and attitude that is defined as "American."

"These newcomers were not a chosen people, but, with the sad exception of the Africans brought over in chains, they were a choosing people who deliberately quit the familiar and near to commence a new life in a strange and distant land. Yet in one sense they were also a chose people, because only the most enterprising and self-reliant made the break.... From the earliest days, too, the pioneer was constantly on the move, hoping to better his fortunes by seeking greener pastures and nearly always succeeding. This restlessness impressed foreign observers as rootlessness.... The passing of the frontier has in no wise altered the American migratory habit, though motives of pleasure now supplement the desire for economic improvement. It is not irrelevant that the American people currently own more motorcars than bathtubs, or that even today the typical citizen seldom dies in the same locality, or even the same state, in which he was born.... Such a people need not fear for the future. They have only to build on the solid accomplishments of their past."

Arthur Schlesinger, "The True American Way of Life" in *Nothing Stands Still*, 149-156



Figure 3
Farmer, Plow, Horse
Author Unknown - Early 20th Century



Figure 4
Down the Road
Author Unknown - Early 20th Century

But there are very few Americans who can say how or where those attitudes and histories are found in the architecture of today, specifically in current residential construction. America has collectively developed a derivative residential architecture, an architecture derivative of style and image, a thing made up of grafts and splices of images and of histories not our own. Our homes simply cannot be descriptive of each of us, because we move so often that there is rarely any value in investing ourselves in any one place. The way in which we create shelter has become so corrupted and short-sighted that it no longer speaks of those fundamental attitudes which we all learned in school. The individual is the basic building block of our society, but its expression, articulation, and realization need to be examined anew.

Consciousness and Creativity: The Individual as Cultural Buildingblock

"So dignity and worth would come to our society if the individual were thus individual; true individuality, no longer written off as some kind of personal idiosyncrasy by way of "taste" but protected as essence"

Frank Lloyd Wright, *The Living City*, p. 26

The individual can no longer hide behind the title: a name now ceases to be enough to shield its bearer from a lie. We can no longer claim that, to paraphrase McDonough and Braungart, it is enough to make the world less bad. We need to establish a world, as the so-called "most advanced society in that world," where our life is no longer a burden on our environment, but is in fact a boon and an improvement – that our existence is in fact good for the world. We are accountable for our actions, and we are smart enough and have enough experience with what does and does not work to think about the implications of our lives and affect them accordingly. We are taught to be thinkers, to think for ourselves, to cultivate the consciousness and intentionality and foresight to make our lives productive for our world needs to be the ultimate product of that training.

The American relationship to the land is an interesting thing, the product of an ever expanding frontier. The term "Manifest Destiny" engrained in the minds of a fledgling nation the belief that it was America's fate and right to claim and settle the continent. This in turn instilled the idea that there was always more land, that there would always be more land, that each citizen had a right to claim their own land. As we are just now beginning to fully understand, we are in a closed system, and there is not an infinite supply of anything, not the least of which is land. We are descended from agrarians, nomads, prospectors, explorers, workers, but we blindly fight for our space like descendants speaking a language we no longer understand. We have a choice – we can

continue on our current path, dominating nature, taking and not giving, spoiling without cleansing, denuding without enriching, or we can relearn that language, rediscover that connection with the life and rhythms of a place which has given us so much unrequited. This is not to suggest that we should forget everything we have learned, everything that "modernity" and technology have taught us, but that we should apply it in a way which is no longer at odds with the rest of life, but is rather complementary to it. How could the most advanced life-forms earth has yet produced be the worst thing that has ever happened to it? Consciousness and creativity need to once more become the tools to live by.

Mobility, Self-Sustenance, Independence, Community

These four words – mobility, self-sustenance, independence, community – they are at the heart of what it means to be American. Americans have always been a mobile civilization, have moved to live and lived to move. From the nomads to the explorers to the prospectors to the frontier homesteaders, American life has always been about movement, growth, change. They have had to take care of themselves. They were a people self-selected by the promise and prospects in this vast new land. "The American preferred to depend upon his own brain and brawn. For projects beyond his single capacity he usually joined with others in voluntary associations" (Schlesinger, p. 153). They were a people who wanted each to have his or her own say, chose a bottom-up government instead of one which functions from the top-down. As the National Land Survey, which proposed to lay out the country on a 6 mile square, 36 section grid, as well as the subsequent Land Ordinance Act of 1785 and the Land Act of 1796 (which accounted for this division) provide for, the country was divided up into what Jefferson felt was a "democratic grid," one which abolished any sort of hierarchy and instead gave equal opportunity to all, "efficiently and equitably...it was about the democratic and legal sale of land and its subsequent settlement. Any person could own a piece of the American dream and share in its bounty" (Corner, 30-1). And so it is with land, and so it should be with home, in the moveable home.

It is the purpose of this project to realize in an architectural construct the synthesis of these two forces – the forces that make home and the forces that make Americans. But first let us look at how this has already been attempted in the form of the American Suburb.

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4. The Suburb: A History in the Middle

Rus + Urbs: Noble Beginnings

"Town and country must be married, and out of this joyous union will spring a new hope, a new life, a new civilization."

Ebenezer Howard, *Garden Cities of To-morrow*, p. 547

Historically, the suburb was the product of Enlightenment ideas which formed the way Americans thought about self and society. It promised that "people could enjoy the freedom to determine their own selfhood" (Archer, p. xvii). This led to the 19th century practice of removing to the country to live, choosing a cleaner, healthier, more relaxed setting in which to repair, repose, and raise a family. In essence, the suburb was conceived of in retaliation to the horribly unclean, unhealthy, and chaotic urban centers of the Industrial Revolution. This is clearly illustrated in the frontispiece to Leo Marx's *Machine in the Garden* (fig. 5) as well as *The Lackawanna Valley* by George Inness (1856) (fig. 6), the locomotive - the icon of the Industrial Revolution, bursts onto an idyllic pastoral scene. This image, then, of the cultured learned class repairing to the country to live came to be associated with the nouveau riche, the bourgeoisie, who considered themselves too sophisticated and refined to live in the wild, unkempt countryside and too educated to be engulfed in the billowing soot and bustling shuffle of the city. The suburb was seen as the solution was then the town, not rustic and wild, not sooty and dangerous, but a middleground between the two, as illustrated by Ebenezer Howard in his *Garden Cities of Tomorrow* (fig. 7). The source of this "object in an idyllic landscape" imagery was the Palladian villa: the refined, reasoned object placed in nature. An interesting issue is the way in which this image ultimately became a model and a template not only for individual houses, but also for larger developments, something it was never intended or suited for. The villa was at its inception a singular event, the duplication of which shifted the balance between nature and artifice, so that over time the relationship came to describe an ambiguous and identity-less middleground.

Image Grafting

"The pattern books of Andrew Jackson Downing, a widely respected Hudson River Valley landscape gardener, offer a systematic presentation of this period's code of domesticity. Like other ante-bellum designers, Downing foresaw a far-reaching, pastoral landscape, dotted with pleasant homes, varied but always orderly, each one set in its own extensive, well-tended garden."

Gwendolyn Wright, *Building the Dream*, p. 82

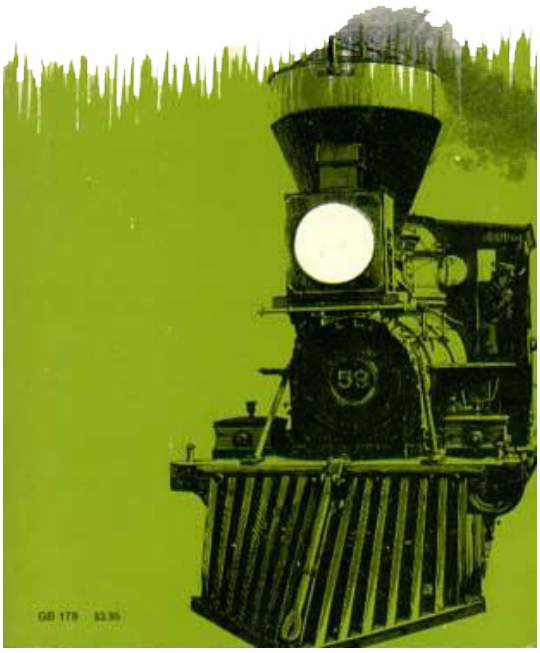
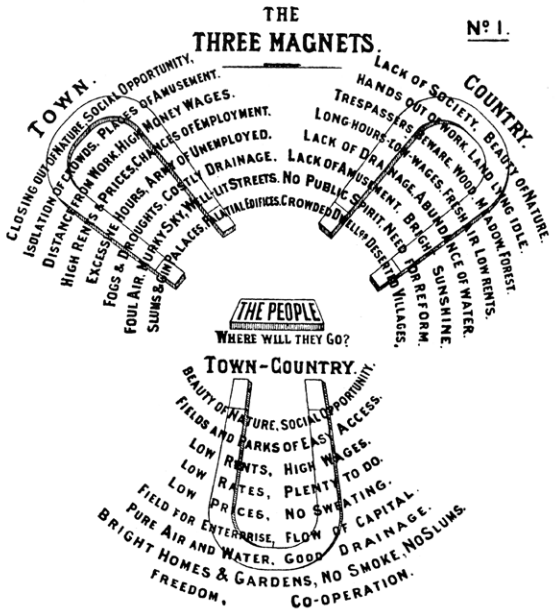


Figure 5
frontispiece
Leo Marx
Machine in the Garden, 1964



Figure 6
The Lackawanna Valley
George Inness, 1856



THE THREE MAGNETS

Figure 7
Three Magnets
Ebenezer Howard
Garden Cities of To-Morrow, 1902

The proliferation of pattern (or plan) books in the mid 19th century had a major impact on the image and form of the suburban house, by making accessible to a large audience the plans of "rural" and "country" dwellings which were advertised as being "republican homes" and the "home of the virtuous citizen" (Gwendolyn Wright, p. 84). The publication of Andrew Jackson Downing's Cottage Residences (1842) and Country Houses (1850), as well as Edward Shaw's Rural Architecture (1843) and Calvert Vaux's Villas and Cottages (1854), had a major impact on residential construction during this period. These publications were widely circulated, and many many houses were built on the plans contained within those volumes. These and other pattern books propagated designs for Italianate, Second Empire, Tudor, Gothic, Craftsman, and other such styles, none of which were indigenous to or said anything specifically about America or Americans. Downing has been touted as "establishing the ideal type of American country/suburban house" (Downs, p. 52), but succeeded only in entrenching foreign styles in the American suburb, the ultimate effect of which was to compound the problem of the suburb as a not-of-this-place architecture.

Selling the American Dream

"Veterans, with their World War II savings, were encouraged by a national policy promoting homeownership in suburban areas to participate in the transformation of the American city and the American economy."

Dolores Hayden, *Redesigning the American Dream*, p. 54

"Far from being an inevitable evolution or a historical accident, suburban sprawl is the direct result of a number of policies that conspired powerfully to encourage urban dispersal."

Andres Duany, *Suburban Nation*, p. 7

The beginning of the 20th century saw America confronted by the largest housing boom in its history. In the periods following World War I and, especially, World War II, there was unprecedented growth in housing, in places such as Levittown (fig. 8), most of it occurring in suburban developments subsidized and otherwise encouraged by the Federal Government through its support of infrastructural developments such as the Interstate System. As Christopher Leinberger of the Brookings Institute has calculated, the government has encouraged suburban growth, via subsidies, to the point where it would have cost anywhere between 8 to 22 times as much to arrive at the same level of development. Also, through the creation of the Federal Housing Administration and the Veterans Administration, the single family house outside of the city was funded and financed above all other forms of housing, providing mortgages which generally cost less than rent on a per month basis. The American Dream was and continues to be something

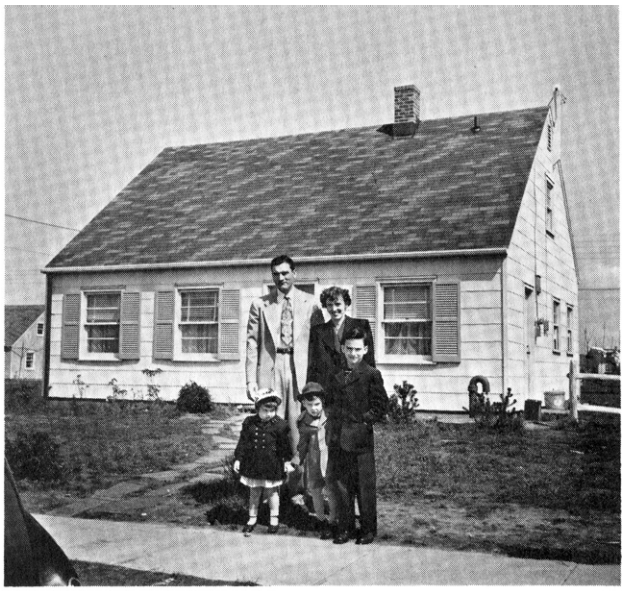


Figure 8
Levittown
Bernard Hoffman
LIFE Magazine, 1950

endorsed by the government, far beyond its practical and economic limitations, and it has had profound implications on the way Americans live today. Furthermore, the mass-production techniques (fig. 9) learned during World War II helped developers think of the house as a "marketable product: the yard was second, the community was the result of whatever local regulations were in force in the area ... Nature was seen as something to be subdued, paved over, rationalized" (Barnett, p. 32-3). The house shifted from being primarily a construct of social and climatic influences to being a construct of economic influence. It became a product.

Usonian Suburbia

"Usonia was Frank Lloyd Wright's vision of America, a place where design commingled with nature, expanding the idea of architecture to include a civilization, a utopian ideal that integrated spiritual harmony and material prosperity across a seamless, unspoiled landscape. Usonia was a state of mind combining an evolving prescription for the elimination of high-density American cities and their replacement by pastoral communities organized around modern transportation and communications technology with a new type of home for middle-class families."

Alvin Rosenbaum, *Usonia*, p. 13

In the 1930s and 1940s Frank Lloyd Wright developed an idea which he thought would become a new vision of the suburb – the idea of the Usonian house: an organic house in an ideal community which would symbolize the best of what America stands for. The Usonian plan would reduce the living square footage, but would increase the engagement with the outdoors, and would make the single family house both an image of place and a symbol of a new civilization and American identity. While it did produce an image of suburbia which was derived from an American way of life, it served only to refine and develop the already entrenched suburban type. It did not create a new organization or communal interaction, but basically was a more intricate and elegant articulation of the suburban type. It was an old idea in new, though admittedly lovely and rich, clothes – a picturesque villa reshaped and redressed, but a picturesque villa nonetheless. It did very little to affect the way the house functioned and interacted with its neighbors and with the community. In fact, some Wright analysts, such as Professor Narciso Menocal of the University of Wisconsin – Madison, have considered the way houses such as the Jacobs I House, the first Usonian house (1936) (fig. 10), in Middleton, WI, turn their back on the street. The high street elevation windows and the L shaped plan framing the private garden serve to focus the house inwardly, shielding the inhabitants from the surrounding community. This inward focus has be likened to the Biblical hortus conclusus often found in Renaissance paining. Conclusus implies that something is being excluded, namely the prying eyes of the neighbors and passersby on the street. Wright had hoped

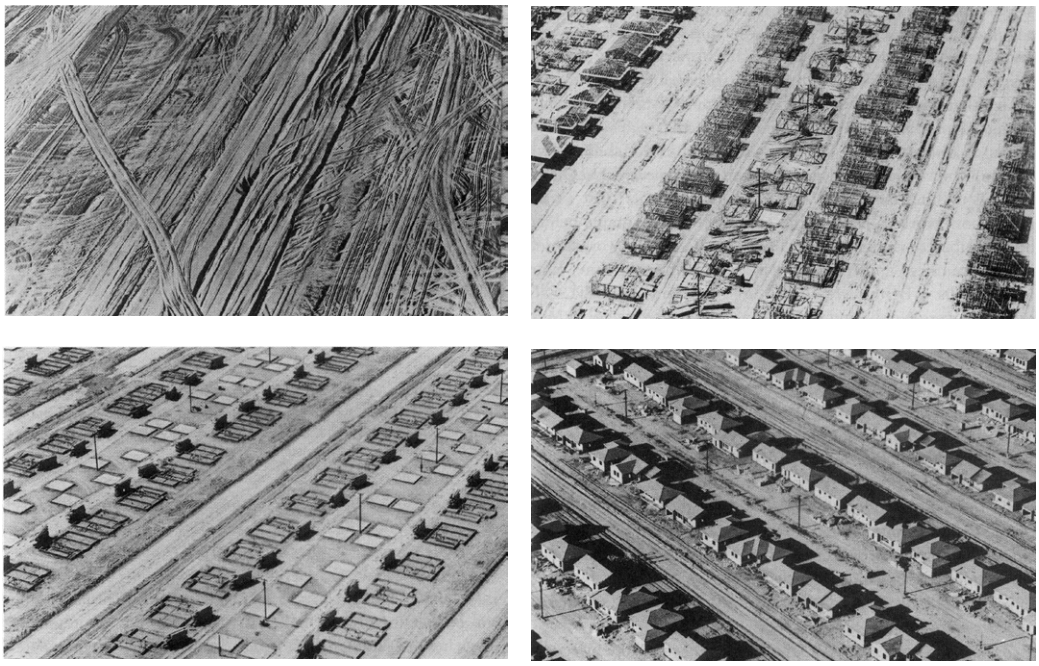


Figure 9
Four Views of California Tract Housing
William Garnett
1955

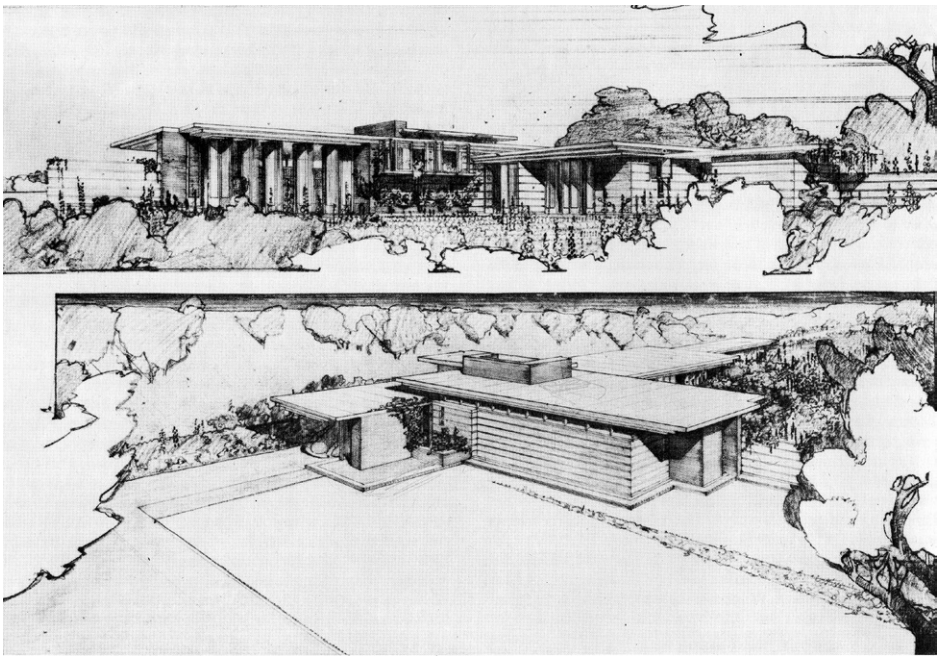


Figure 10
Herbert Jacobs I House
Frank Lloyd Wright
Middleton, WI (1936)

that the Usonian style would not be a localized occurrence, but would rather become a universal type. What was not so clear was how these beautiful individual houses would do other than illustrate the unique, almost elitist nature of middle-class living.

Cheaper, Faster, Easier: The Post-War Suburban Machine

"Buildings that present a bland, uniform front rise in communities where structures were for decades, even centuries, beautiful and culturally distinct. ... Landscapes are flattened into lawns of a single species of grass, artificially encouraged to grow but constantly cut back, with controlled hedges and a few severely pruned trees. The monotony spreads and spreads, overwhelming the details of place in its path. What it seems to seek is simply more of itself."

McDonough and Braungart, *Cradle to Cradle*, p. 119

"The dream houses were utopian. No one counted how much they might cost. Dream houses got out of control economically, environmentally, and socially because they carried unacknowledged costs: they wasted available land; they required large amounts of energy consumption"

Dolores Hayden, *Redesigning the American Dream*, p. 60

Americans are always looking to improve, looking to make cheaper, faster, easier. This is what we call progress. This notion took a huge step forward following World War II, when the "war machine," which had been turning out airplanes and jeeps, converted to producing housing en masse. This was in response to the serious housing shortage created by many thousands of GIs coming home from the war. This housing boom, facilitated by the industrial mass production of homes, played a major role in creating what we see today as suburbia. Because of this one can now go to the supermarket and buy a plan book and get just the house they want. Picking out a house design is as simple as picking out a car, and, sadly, just about as personal. Also pervading this logic is the idea that the ultimate goal is to build your own house, regardless of whether it looks just like everyone else's. Despite fairly stable populations, many cities continue to sprawl as new homes are built, as people functioning under this type of logic continue to move up and out, sprawling toward nowhere. This has resulted in a complete lack of awareness of the implications of such actions.

The Car: Modern Mobility

"The myth prevails that the car offers Americans freedom and independence."

Gratz and Mintz, *Cities Back from the Edge*, p. 33

"...it is the car which has played the critical role in undermining the cohesive social structure of the city. There are an estimated 500 million cars in the world today. They have eroded the quality of public spaces, and have encouraged suburban sprawl. Just as the elevator made the skyscraper possible, so the car has enabled citizens to live away from city centres."

Richard Rogers, *Cities for a Small Planet*, p. 35

"Suburbs struggle because they have let developers run amok, oblivious to traffic growth, sewer system capacity, or even recreational needs....In many areas you need a car to get anywhere or do anything – from buying a quart of milk to jogging."

Emerging Trends in Real Estate,1999 (in *Once There Were Greenfields*, p. 3)

The automobile was the watershed invention for individuality and mobility in America, in that it allowed people to go when and where they liked. People such as Le Corbusier as well as Wright were fascinated by the idea of the automobile, and it showed in their designs, from Corb's Villa Savoye to Wright's Wingspread, using the car's turning radius as a form driver or as a way of approaching the house. It facilitated and supported a whole new type of architecture – the suburb, a place accessible exclusively by car. The automobile, though, was and continues to be a misguided luxury, an invention which only relieves people of the burden of considering how or where they live, because they can support almost any sort of lifestyle with the automobile. The problem is when we take this "freedom" so far that we no longer think of anyone else but ourselves. The automobile is in service of no one but the self. Individuality, an American trait, becomes selfishness.

Non Rus/Non Urbs: The Complete Degradation of an Idea

"The suburb is the social climber's imagined paradise...The suburban house is so pathetic in its pretense of an individualism which doesn't exist. The little gingerbread attempts to achieve difference are so palpably hollow and unsuccessful."

Christine Frederick, *Is Suburban Living a Delusion?*, p. 313

"It is neither city nor country, nor can it ever supply the place of either."

Mary Stewart Cutting, *The Suburban Whirl*, p. 189-90

The suburban type, as it exists today, has many spatial and architectonic problems, which result in both social and communal dysfunction: there is a conflicting duality that exists, the suburb trying to be both the English Picturesque object in an Arcadian landscape as well as following the age old tendency to group houses together to establish community. This has the effect of making either impossible because of the

other. The spaces around suburban single family houses are at once leaky and exclusive, generic and pointilized. The suburban house, which, in its infancy, was touted as "having originated as a combination of rus plus urbs, to have evolved in Darwinian fashion to a higher stage on the evolutionary scale beyond country or city" (Archer, p. 228), has become something which is neither rural nor urban, but exists between the two extremes (fig. 11) – too spread out to facilitate easy interaction and exchange between people and too compact and misappropriated to provide for each person. It represents the worst of individuality – it claims a plot, too big and underutilized, yet the groupings deny any real privacy, ignoring its neighbors so close. Not isolated, not compact, the suburban house looks like its neighbors on either side, yet shares nothing with them.

This Disposable Life

Life is disposable. We turn up the heat, turn up the a/c, leave lights on, throw out anything requiring any effort to fix, pour nasty chemicals down the drain, and bury our trash in the ground or dump our trash into the ocean (fig. 12) without much of a thought of what that means for our home and our planet. A house, even, is disposable, something that lasts in its original state for only about 30 years, instead of the hundreds of years buildings in the rest of the world last. I've seen houses, perfectly fine houses, not 40 years old, that have had the backhoe taken to them. Torn down in a day, taken to the landfill, because it was cheaper than fixing it up. What kind of system is this, when our legacy has the lifespan of not even one lifetime? The disposable house. Is that progress, and if so, progress toward what?

Where We Are/We Are Here

This is where we are now, saddled with a residential type which is nothing more than an empty shell bereft of and cut off from any and all essential meaning or purpose, one more unit tapping the resources we consume without so much as a thought. The home has been deconstructed into little more than a shell for our possessions (fig. 13 -14). We are lost and disconnected from who we are, where we came from or where we are going. We are merely here now, and don't even consider that fact in much detail. "The taking of measure is what is poetic in dwelling," says Martin Heidegger, but "our unpoetic dwelling, [our] incapacity to take the measure, derives from a curious excess of frantic measuring and calculating" (Heidegger, 221,228). As Albert Hofstadter has said, "Man's measure is not a quantity that can be calculated. Only man's being itself can tell what its measure is, by the fiery test of the living encounter of the human self with reality...

Human measure is to be sought in the quantity of our belonging – in the magnitude, direction, and degree of our being with the other as with our own" (Hofstadter, 2). We are so busy living that we do not think about what it means to live.



Figure 11
Housing Density Transect
Alex MacLean (image 1)
Jim Wark (images 2-3)
Metro Planning Department of Nashville, TN 2002 (image 4)



Figure 12
Garbage
Jim Wark
A Fieldguide to Sprawl, 2004



Figure 13
Win A House Full Of Beautiful Furniture
Dolores Hayden
Redesigning the American Dream, 64

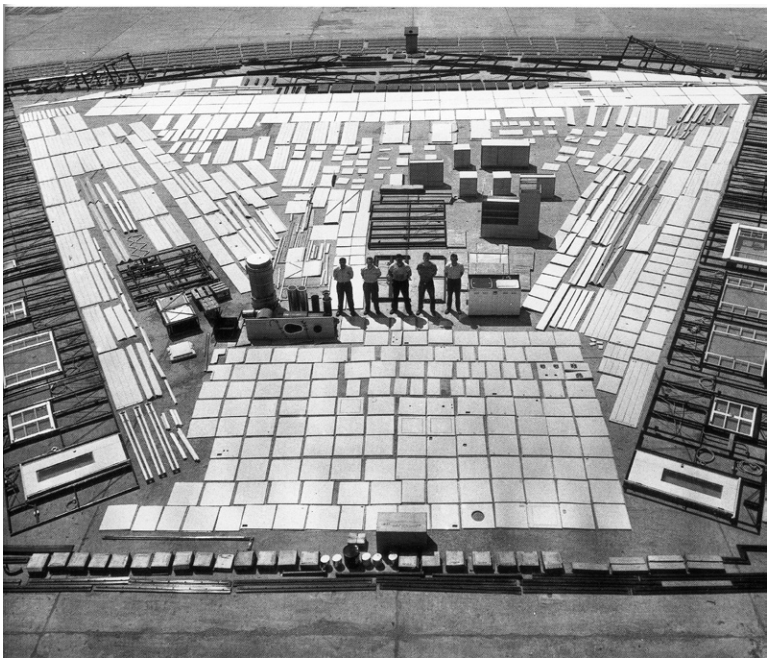


Figure 14
The Lustron House
Arnold Newman
1947

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The Nomad and the Cave-Dweller: The Mobile and the Static

"They broke the ties of attachment to their native soil long ago, and have not formed new ones since...a restless spirit, immoderate desire for wealth, and an extreme love of independence...without such restless passions the population would be concentrated around a few places and would soon experience... needs which are hard to satisfy."

Alexis de Tocqueville, Democracy in America, p. 283

"Americans descend from people who moved about, and they consider freedom of movement so precious – and commonplace – that they rarely think about it at all."

Stilgoe, *Borderland: Origins of the American Suburb*, p. 8

Mobility has always been a quality inherently American. When de Tocqueville recorded these thoughts in 1848, America had already been growing, clamoring over the land, pouring west in search of a life individual and self-supporting. This is a quality which is truly American, and yet it is completely suppressed by the limited living options Americans are presented with. The obvious articulation of such mobility is the mobile home. This tradition of nomadicism falls into line with Frank Lloyd Wright's critique of the two types of humans and their disparate types of dwellings:

"Go back far enough in time. Mankind was divided into cave-dwelling agrarians and wandering tribes of hunter-warriors...Ingrained yearning of the mobile hunter for freedom now finds more truth and reason for being than the stolid masonry defenses once upon a time erected in necessity to protect human life from humankind...Man's value now depends not so much upon what he has made static (that is to say, saved, stored up, fortified) as upon what he can do – still better – by proper use of new scientific resources."

Frank Lloyd Wright, *The Living City*, p. 21-3

Let me repeat that last part: "Man's value now depends not so much upon what he has made static as upon what he can do." The nomad is something which our society is beginning to rediscover, an ungroundedness and a plurality of home and place which is due to the socially and fiscally vagrant and placeless nature of life in America today. We grow up in a place, (generally) go to college in a different place, go to work in various different places, retire to another place, and travel all the while, visiting friends and family all following their own wandering life-paths. We as Americans are a people of movement, of seeking out our place, finding out that we are not where we are, but what we have seen and done. We need a structure of living which facilitates and glorifies this.

Mobile Home: The Poor Man's American Dream

"Contemporary top-end mobile homes attempt to avoid the problem [of looking like a mobile home (ed.)] altogether by imitating the facades of houses, and while there may be some tactical advantage in this procedure, such homes suffer in their turn from looking too much like low-end houses, instead of establishing themselves as the best examples of a distinct type of dwelling."

David Rigsbee, *Trailers*, p. 51-3

The mobile home is the poor man's piece of the American Dream. For those who can't afford to have a house built for them, there is an alternative, a way to "keep up with the Joneses," another of the horribly destructive and degenerative mentalities to grow out of the "American Dream." The mobile home is a product of the always-logical, always-practical manufacturing industry, capitalizing on the possibilities of mass production to reduce cost and thus increase its availability and affordability (fig. 15). However, the trailer home is something masquerading as a thing not itself. It is all veneer and faux and tries to be something it is not, tries to be a stick-built house, in appearance as well as in function. "The new multi-sectional double-wides, which consist of two halves that are transported separately, joined at the site, and never moved thereafter, are virtually indistinguishable from conventional site-built houses" (Hart et al, p. 1) (fig. 16). The mobile home is un-self-realized, in that it is not true to its name and concept, but is rather a site-placed house in lieu of a site-built house. This much is obvious when one sees a mobile home with a porch or lean-to added on, an act acknowledging the false illusion.

The Immobile Home: Premade Suburbia

"This is a chief paradox of trailers: they do not move."

David Rigsbee, *Trailers*, p. 42

The prevalence of mobile homes is staggering, and their importance in getting poorer Americans in on the "American Dream" is clear, as "the average American family can no longer afford the price of a conventional site-built house" (Hart et al, p. 1), with mobile homes accounting for "20 percent of all new single-family housing starts and about 30 percent of all new single-family homes sold" (Ibid, p. 1). But most mobile homes are sited and left: only 18 % of all manufactured/mobile homes are ever moved from their initial location (2003 American Housing Survey for the United States). Their mobility is not utilized, is in fact no more than a result of their cheaper construction method. They are masquerading as something they are not.



Figure 15
Lebanon,TN Trailer Park
author
2006





Figure 16
Double-Wide In Transit
author
2006

But the concept of the mobile home is the embodiment of a thing distinctly and fundamentally American, as de Tocqueville and Wright clearly illustrate. It embodies in its very essence and concept the spirit of what it means to be American – to always be moving, to follow prosperity and possibility and potential where they lead. They acknowledge their flexibility rather than sit stubbornly in the soil waiting for life to come passing by. "The trailer embodies the magic possibility of a home space so rooted to the individual that it can be moved at will and need never be left behind" (Burch-Brown and Rigsbee, p. viii). The mobile home does not have to scar the ground to be: it can simply touch it, in every sense, support what supports it, symbiotically. It could acknowledge what suburban single-family homes deny – that we are going, moving, living, but are here now.

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6. The Pursuit of Life: Move to Live/Live to Move

Stand On Our Own Two Feet

"Americans, as about seven percent of the world's population, accounted for about a fourth of the world's annual nonrenewable resource consumption."

U.S. Department of Energy, 1999

"We leave aside the old model of product-and-waste, and its dour offspring, "efficiency," and embrace the challenge of being not efficient but effective with respect to a rich mix of considerations and desires."

McDonough and Braungart, *Cradle to Cradle*, p.72

To be self-supporting was a vital necessity to the American nomad. And in order to do that, those nomads needed to be in tune with the rhythms and patterns of nature, needed to understand and know their place (fig. 17). But because of the industrialization of life, "no longer were people so dependent on natural forces...They could override nature to accomplish their goals as never before" (McDonough and Braungart, p. 128). With more and more sophisticated civilization came more and more "creature comforts." Specialization and compartmentalization became so prevalent and economically viable that we as individuals are now completely dependent on the infrastructure which makes us "the most advanced society in the world," as is often stated, printed, heard, read. But to have slowly given up our independence at the hands of convenience has also slowly whittled away at the foundations of individuality discussed above. There is no accountability perceived on the level of person, because it is thought, "what can one person do?" What one person can do is take care of themself, and after that, take care of others. This is how the individual can go from being self-centered to being self-sufficient. And as the outward symbol of life and sustenance, the house, to pick up on the imagery of Bauhaus master Oskar Schlemmer, would become clothes for living. The house should once again become the basic self-supporting unit for life.

A Framework for Life Renewable: Freedom Within the Box

"Architecture, however...is not only described by types, it is also produced through them. [the architect] is initially trapped by the type because it is the way he knows. Later he can act on it; he can destroy it, transform it, respect it. But he starts from the type. The design process is a way of brining the elements of a typology – the idea of a formal structure – into the precise state that characterizes the single work."

Rafael Moneo, "On Typology," p. 23



Figure 17
On The Road
author
2006

The proposal is to reexamine the mobile home as it relates to the topics of independence, community, self-sustenance, and mobility. The mobile home, as quintessentially American, is a form which has become, as discussed above, a scar on the land, a blight, the worst product of the suburban mode of thought and form, and yet it is the most hopeful image America has yet presented as far as producing a true architecture emblematic of the here and now. The new mobility in home would speak to issues of sustaining the life within while not harming the life without; it would speak to issues of mobility, plurality, describing a path and a journey (fig. 18) lived and sought; it would speak to issues of land as precious, as something not to be claimed but something to be touched for a time; it would speak to issues of the image of house as a regenerative element; it would speak to issues of conscious awareness and critical thought, a symbol of a life-sustaining life.

"Freedom within the box" exemplifies a concept which even the composer Igor Stravinsky recognized the importance of and subsequently commented on when, in his Poetics of Music, he wrote, "my freedom thus consists in my moving about within the narrow frame that I have assigned myself for each one of my undertakings" (p. 68). Humans instinctually seek out their boundaries. They push against them, break them down, challenge them, but true freedom comes from the challenge and subsequent challenging of the boundary. In this way the frame of the mobile home would engage the inhabitants with both the inside and outside.

Technical/Technique

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This self-sustaining life would be technically implemented through multiple self-contained systems, such as: natural cooling via shading and ventilation according to prevailing winds; natural heating via solar gain and thermal storage; electricity generation via photovoltaics; water collection, filtration, and storage; waste water treatment; waste composting. A connection to the world at large would be made possible via wireless communications systems. And the major moves and associated energy requirements would abate day-to-day travel requirements, greatly cutting down on the overall energy consumption associated with transportation.

The ability to alter and adjust many aspects of the mobile home would engage the inhabitants and articulate their varied personalities. The angle and position of the roof, the amount of wall folded down into exterior living space, the amount of sun shading, the arrangement and organization of the interior spaces, would all serve to articulate and differentiate. The interior would be taught, flexible, variable, taking its cue from traditional Japanese designs for the conservation of space through ingeniously conceived

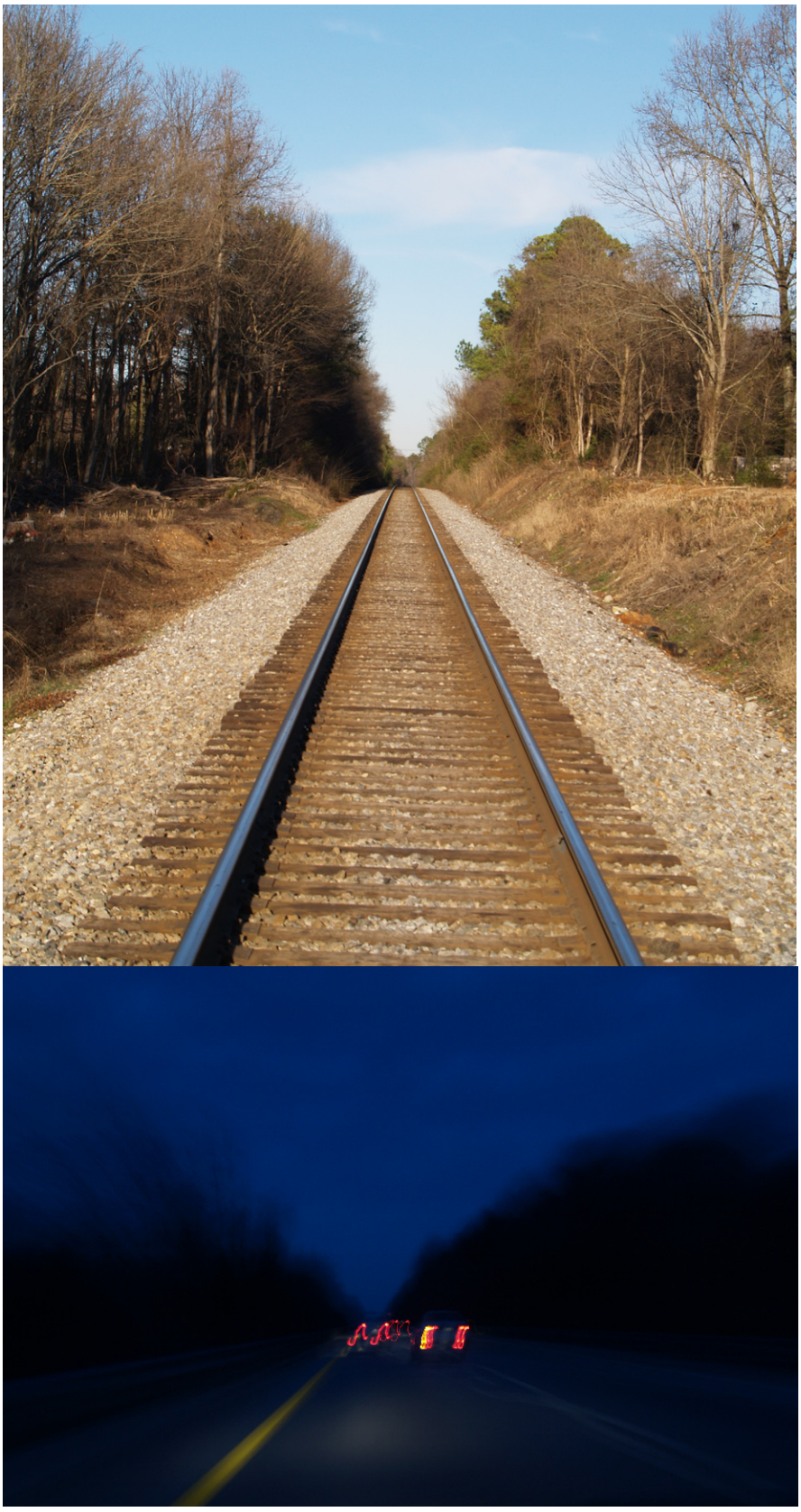

Figure 18
Different Paths
author
2006

elements such as roll-up sleeping mats and stow-away storage. The whole structure would work as a piece of furniture or clothing, taking the shape of and providing for the betterment of the inhabitants within.

As discussed in the section on Home, we have some basic elements which we require from home – a roof, walls, a heat source, food, sanitation, protection, rest. These describe the parts of home, the elements which arise out of necessity.

The Home as a Container for Living

Home is now something that, as has been discussed above, is disconnected from what we identify with as ourselves. When asked where home is, it becomes increasingly difficult to pick one place. It seems obvious, then, that home is where each of us is, contained within us, and that we should not have to choose between homes, but rather could take home with us, so that it relates not so much to place as it does to person. This shift in the perception of home is already occurring, as people spend significant amounts of time and energy moving their lives from one shell to another. In this way that shell, once the fundamental image of home, is now devalued as merely a stopping-off point along the line. The mobile home, conversely, would allow people to invest in home, as they could take it with them, and home could come to say something about the cumulative life of each house.

Moving Through the [Rural to Urban] Continuum

"The average American moves every six years."

U.S. Census Bureau, 1997 Report on Geographical Mobility

There are great possibilities for the moveable home. Homes could be put on trailers and hauled from place to place. They could be put onto train cars. They could be put onto ships (fig. 18). And the idea of not needing utility hookups would alleviate the complications of differentiating types based on their proximity to the rural/urban continuum, or the complications of depending on services provided by a community. These houses could just as easily be placed on a farm as in an empty lot in a downtown. The moveable home and its placement would not be about being either rural or urban, but instead would be about the best location for its inhabitants at a given time.

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The Machine and The Garden: An American Solution

As Leo Marx so aptly articulated in his book *The Machine in the Garden*, the industrial revolution had a profound impact on the romantic, picturesque way that pre-industrial America lived. It provided great potential for making architecture accessible to everyone through mass production. But as Stephen Kieran and James Timberlake have asserted in their *Refabricating Architecture*, Mass Production has failed, because we are not all the same. They have proposed Mass Customization as the appropriate alternative, and this mode of thinking allows for an integration of the ideas presented above – home as a place of and for the person, home as sustainable, home as flexible, home as moveable and adaptable, home as the expression of an American way of life. This project seeks one possible solution which deals both with the rustic and the industrial, the natural and the man-made – seeks "a resolution of the conflict between the opposed worlds of nature and art" (Marx, 22). This is what the moveable home will do.

The Signs of Us After We Are Gone

So what would it mean to live a life always going, always moving? Is that not the definition of life? And so what would it mean to have a structure be there for a time and then leave? What would be the artifacts that signal that place and time? Those too are fleeting, a worn foot path overgrown, a compost heap disintegrated into the earth, a rock wall or stepping stones even, all with their own specific half-lives. The point would be that, when gone, the moveable home would not leave behind burdens for the next person, but would leave positive artifacts telling of how someone once lived there, signals to memory.

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Appendices

Appendix 1: Terms & Definitions

prefabrication, in architectural construction, a technique whereby large units of a building are produced in factories to be assembled, ready-made, on the building site. The technique permits the speedy erection of very large structures. It has been applied to urban housing for more than a century. Major architects, including Walter Gropius, Konrad Wachsmann, and Buckminster Fuller, have been involved significantly in the development of prefabrication. See also module.

http://www.answers.com/prefabrication

manufactured housing (known in some countries, including the United Kingdom, as prefab housing) is a type of housing unit that is largely assembled in factories and then transported to sites of use.
Because of lower cost and the fact that their value tends to depreciate more quickly than site-built homes, manufactured housing is traditionally, although certainly not always, used by lower-income people. This has led to prejudice and negative zoning restrictions, built around the stereotypical concept of a trailer park where the housing occupies small, rented lots and often remains on wheels, even if it stays in one place for decades. Modern units, especially modular homes, often belie this image and can be identical in appearance to site-built homes.
In the United States, the term manufactured housing is colloquially used to include both mobile homes and modular homes, but its technical use is restricted to a class of homes regulated by the Federal National Manufactured Housing Construction and Safety Standards Act of 1974. These homes are regulated by the United States Department of Housing and Urban Development and as such avoid the jurisdiction of local building authorities.
http://www.answers.com/topic/manufactured-housing?hl=manufactured&hl=house
mobile home A large trailer, fitted with parts for connection to utilities, that can be installed on a relatively permanent site and that is used as a residence. Also called manufactured home.

mobile homes are housing units built in factories, rather than on site, and then taken to the place where they will be occupied, usually by being carried by tractor-trailers over public highways. They are usually much less expensive than site-built homes, and are often associated with rural areas and high-density developments sometimes referred to as trailer parks.
Although the name "mobile" implies that these houses will move around, they usually are placed in one location – often a rented lot – and left there for the life of the structure.

However, they do retain the ability to be moved, and this is in fact required in many areas. Behind the cosmetic foundation-work normally fitted at installation to hide the base, there are strong road-going trailer frames, axles, wheels and tow-hitches.

The two major forms of mobile homes are single-wides and double-wides. "Single-wides" are sixteen feet or less in width and can be towed to their site as a single unit, whereas "double-wides" are twenty-four feet or more wide and are towed to their site in two separate units, which are then joined together. Triple-wides, although rarer, are also manufactured.

Mobile homes are not self-propelled vehicles containing housekeeping space inside them: Such vehicles are more properly referred to as motor homes or RVs.

History

This form of housing goes back to the early years of automobiles and motorized highway travel, and derives from the travel trailer, a small unit with permanently attached wheels often used for camping. Larger units intended to be used as dwellings for several months or more in one location came to be known as house trailers, a term now considered to be somewhat derisive.

The original focus of this form of housing was its mobility, and units were initially marketed primarily to persons whose lifestyle was necessarily mobile, such as construction workers. However, largely beginning in the 1950s, mobile homes began to be marketed primarily as an inexpensive form of housing designed to be set up and left in a location for long periods of time or even permanently installed with a masonry foundation. Many persons who could not afford a traditional site-built home or did not desire to commit to spending a relatively large sum of money for housing began to see mobile homes as a viable alternative for long-term housing needs, and the units were often marketed as an alternative to apartment rental.

However, the tendency of the units of this era to depreciate rapidly in resale value made loans using them as collateral far riskier than traditional home loans, and terms were generally limited to less, often far less, than the thirty year term typical of the general home-loan market, and interest rates were generally higher, often considerably so. In other words, mobile home loans resembled in many ways motor vehicle loans far more than traditional home mortgages.

Legal complications

The rise of the mobile home brought with it complications to a legal system which had not been set up to contemplate it. At first, mobile homes tended to be taxed as vehicles rather than real estate, which often resulted in very low property tax rates for those who lived in them. This led to moves by taxing jurisdictions to reclassify them as real property for taxation purposes.

However, rapid depreciation often resulted in their occupants paying far less in property taxes, even with this change, than had been anticipated and budgeted for many

homeowners to pay. The ability to move many mobile homes into a relatively small area very rapidly often resulted in strains to the infastructure and governmental services of the affected areas, sometimes resulting in inadequate water pressure and sewage disposal and highway congestion. This led most jurisdictions to take steps to limit the number of mobile homes within them, most often by placing limitations on the size and density of developments that could be made utilizing them.

As noted above, early mobile homes, even well-maintained ones, tended to depreciate in value over time more like motor vehicles rather than appreciate in value, as is more typical with site-built homes. The arrival of mobile homes in an area tended to be regarded with alarm, particularly by the owners of more valuable real estate who often feared, with some reason, that their property values could become depressed.

This combination of factors has led most jurisdictions to restrict even further by zoning regulations the areas in which mobile homes can be placed, as well the number and density of mobile homes permissible on any given site. Often other restrictions, particularly minimum size requirements, limitations on exterior colors and finishes, and foundation mandates were enacted as well. There are many jurisdictions that do not allow any future mobile homes, and others have strongly limited or forbidden entirely all single-wide models, which tend to depreciate more rapidly in value than modern double-wide models.

Mobile home parks

Modern mobile home parks are not necessarily the trailer parks of the past, which were often associated with being substandard and frequently with good reason. Most have standards with regard to the permissible size and styles of homes which may be set up within them, and many are somewhat similar to more traditional subdivision developments with mobile homes in place of traditional site-built ones. In some, including most of the more desirable ones, all of the homes are owned by the individual occupants and only the spaces, or pads are rented, not the units themselves. Developments in which the mobile homes are sold on lots that are also purchased by the buyers are almost indistinguishable from traditional subdivisions and far removed from the typical image of a trailer park. In lower-end parks, some or all of the units tend to be rental units owned by the operators of the park. These sorts of developments are often considered to be particularly objectionable by the owners of surrounding property.

Newer mobile homes, particularly double-wides, tend to be built to much higher standards than their predecessors and meet the building codes applicable to most areas. This has led to a reduction in the rate of value depreciation of most used units.

Additionally, as the industry has parted farther from its travel trailer roots, modern mobile homes tend to be built from materials similar to those used in site-built homes rather than inferior, lighter-weight ones, and are also more likely to physically resemble site-built homes, with often the primary way of differentiation being that mobile homes

tend to have less of a roof slope so that they can be readily transported underneath bridges and overpasses en route to being set up.
The number of double-wide units sold now exceeds the number of single-wides, in part due to the zoning restrictions alluded to above and in part due to the spaciousness and appointments available in many double-wide units, which in the higher-end are now often comparable to fairly luxurious site-built homes. Single-wide units are still popular in some areas, primarily rural ones, where few restrictions against them have been promulgated, and are frequently used as temporary housing in areas affected by natural disasters, when restrictions are often temporarily waived.

Modular homes

Mobile homes are often confused with but are not identical to modular homes, which are usually hauled to their use locations on flat-bed trucks rather than being towed, and lack axles and an automotive-type frame typical of mobile homes. (Both are properly referred to as manufactured housing.)
Most zoning restrictions applying to mobile homes have been found not to be applicable or only partially to modular homes, often after considerable litigation on the topic by affected jurisdictions and by plaintiffs failing to ascertain the difference. Most modern modular homes, once fully assembled, are indistinguishable from site-built homes, as their roofs are usually transported as separate units, making the telltale mobile home roofline unnecessary. The market for modular homes is likely to grow in the future as the legal differentations between the two becomes more codified.
The traditional mobile home industry would seem to have a bright future as well, as the demand for housing continues to grow, the price of housing continues to increase rapidly, and the quality and features lead to greater acceptance by a growing segment of the marketplace. Additionally, insurers and lenders are now more likely to treat the higher-end double wide more as they would a traditional home with regard to coverages and lending practices.

http://www.answers.com/mobile%20home

modular homes are houses that are manufactured in a remote facility and then delivered to their intended site of use. They differ from mobile homes largely in their absence of axles or a frame, meaning that they are typically transported to their site by means of flat-bed trucks.
Modular homes usually lack the shallowly-sloping rooflines typical of mobile homes as the roof can be transported separately from the other components. Many modular homes, though, come preroofed. Once assembled on the site, a process taking hours or days rather than weeks or months as is typical with site-built housing, they are essentially

indistinguishable from typical site-built homes. For this reason, the rapid depreciation in market value typical of mobile homes does not apply to them. Given these facts, many courts have ruled that zoning restictions applicable to mobile homes do not apply to modular homes. This development is expected to increase the sales of modular homes greatly in the near future.
Modular homes can be assembled over full basements and built to multi-story heights. Some hotels have been constructed of modular rooms and suites.

http://www.answers.com/modular%20home

taken from Wikipedia.com via Answers.com

Appendix 2: The History of Manufactured Housing

The manufactured home of today is an evolution of style and amenities that has its roots in a history of answering the American public's demand for quality housing at an exceptional value.

In the 1920s, "trailer coaches" were built to serve the American traveler who wanted the ability, when vacationing, of having a ready-made place to sleep at a campsite. During Word War II, these temporary dwellings were used to house factory workers who came from miles around to aid in the war effort.

When the war ended, veterans came home to find affordable housing in short supply. The industry answered this call by building homes that were large enough to house a veteran and his family. However, these homes could still be moved from one location to another to provide the mobility that the family desired.

In the 1960s, American consumers wanted even more out of the industry. The demand was for bigger trailers with more amenities and the new appliances that were rapidly coming on the market. And still, it had to be mobile. History buffs may remember Lucille Ball in the movie, "The Long, Long Trailer."

From this demand was born the mobile home. Mobile homes were bigger in size, nicer in appearance and met the needs of prospective young American homeowners.

In 1974, Congress passed the National Mobile Home Construction and Safety Standards Act, also known as the HUD Code. This watershed legislation made mobile homes the only form of private and single-family building subject to federal regulation. Even site-built homes did not enjoy such strict regulation. These regulations, which became effective in June of 1976, preempted any existing state or local construction and safety codes applying to the product.

The effect of federal regulation was to more clearly define mobile homes as buildings, rather than vehicles. The Housing Act of 1980 adopted this change officially, mandating the use of "manufactured housing" (factory-built homes) to replace "mobile homes" in all federal law and literature for homes built since 1976.

The manufactured home you see today is truly a home and it bears little resemblance to its 'tin-box' predecessor, the trailer. Often, you may not even recognize a manufactured home – so close is it in design and structure to its site-built counterpart. Thanks to

sophisticated production processes and the demands of the consumer, manufactured homes have become a model of efficiency, affordability, and innovative design options.

from http://www.manufacturedhousing.org/lib/showtemp_detail.asp?id=448&cat=1

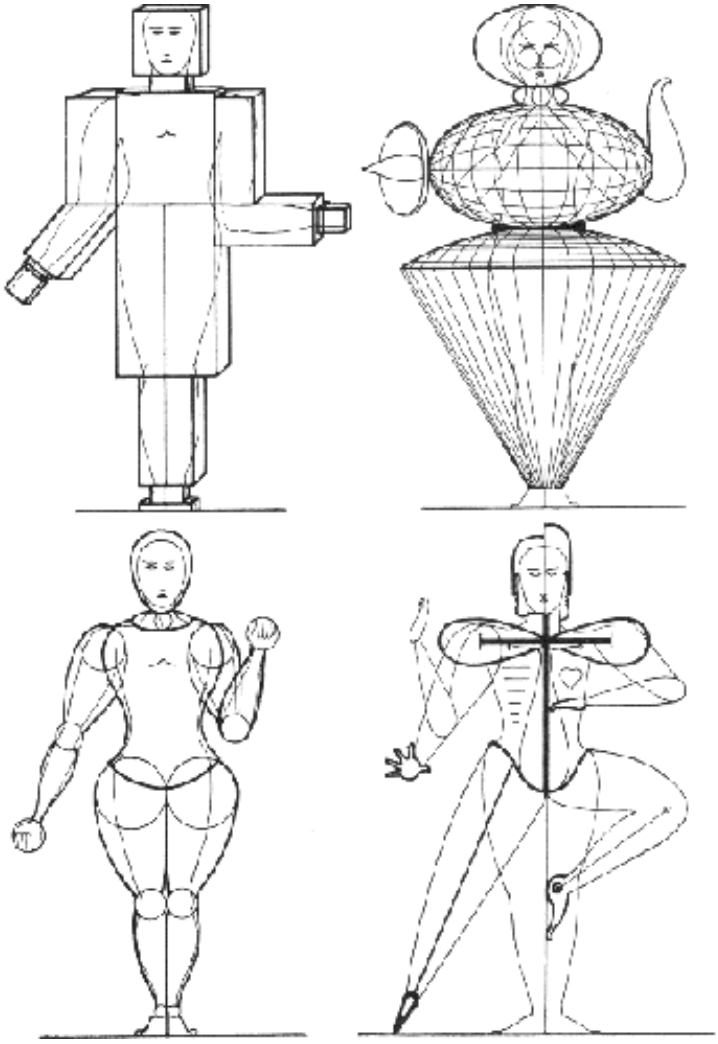
Appendix 3: Precedent/Case Studies

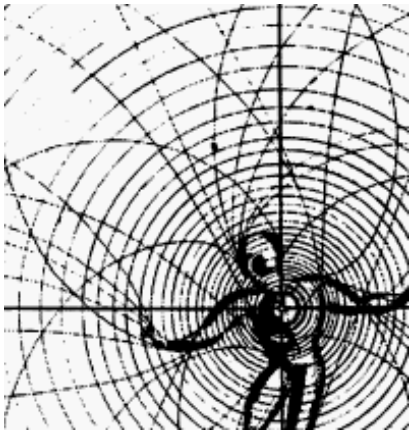
These Precedent and Case Studies were selected because of the aspect unique to each of them which contributed to the development of thinking about the issues discussed above. The seminal images of how to create space around a body are inspired by the costume design and drawings by Bauhaus master **Oskar Schlemmer**. The portrayal of movement and the image overlap of art and nature are seen in **Gerhard Richter's Firenze** series. From this theoretical starting point, the precedent studies (those dealing with the same programmatic type – that of the moveable home) and the case studies (those dealing with more abstract concepts related to the project) describe layers of investigation into the different scales involved in the moveable home. The issues addressed proceed from how a "unit" moves from place to place via different modes of transportation [**International Shipping Container**], to how "units" can be grouped [**Paul Rudolph's Oriental Masonic Gardens**], to how a unit can be relocated and sited [**Geoffrey Warner's weeHouse**], to how a "unit" can stow and pack up to move [**Sean Godsell's Future Shack**], to how smaller spaces can engage the outdoors [**Frank Lloyd Wright's Usonian Jacobs I House**], to how a "unit" can come to touch the ground in a minimal and symbiotic way [**Glenn Murcutt's houses**], to how interior spaces can come to overlap to expand the amount of useable space [**Johannes and Oskar Leo Kaufmann's Su-Si house**], to how those box-spaces can be expanded [**Lot-EK's Mobile Dwelling Unit**], to how to make this scale of project self-supporting [**U.S. Department of Energy's Solar Decathlon**], to how those spaces can come to be defined and modulated [**Steven Holl's Fukuoka Housing Project**] and [**Bo Larsson's Optibo**]. In addition to these specific issues, the precedent of American mobility is represented in the **Airstream Trailer** and **Paul Welschmeyer's Edison** project dealing with the shell of an Airstream. **R. Buckminster Fuller's Dymaxion House** is a clear forefather to all of the manufactured housing produced after World War II, the likes of which have been adapted into manufactured housing products by companies such as **Clayton Homes**. These projects and systems serve to form the historical and theoretical basis for thinking about a moveable home which is grounded not in a place, but in a discourse, a history, a tradition.

Body Defining Space — Oskar Schlemmer

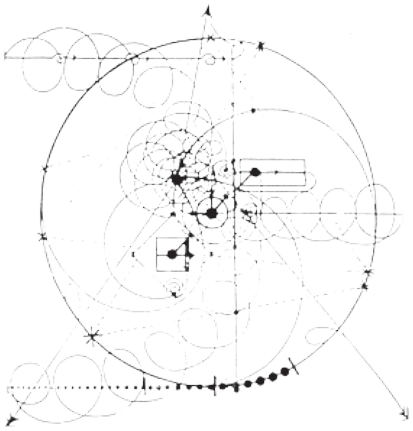
These images, from Bauhaus costume designer and master instructor Oskar Schlemmer, convey the way in which spaces surrounding the body come to be defined by and reflect the body, and subsequently the personality. These images of space defined by the body are the theoretical foundation and the source images for the idea of the moveable home which moves with the body, both in immediate motions and in long-term travels. Architectural space defined by the motion of the body, architectural space in service of the body.

Dancers
Oskar Schlemmer





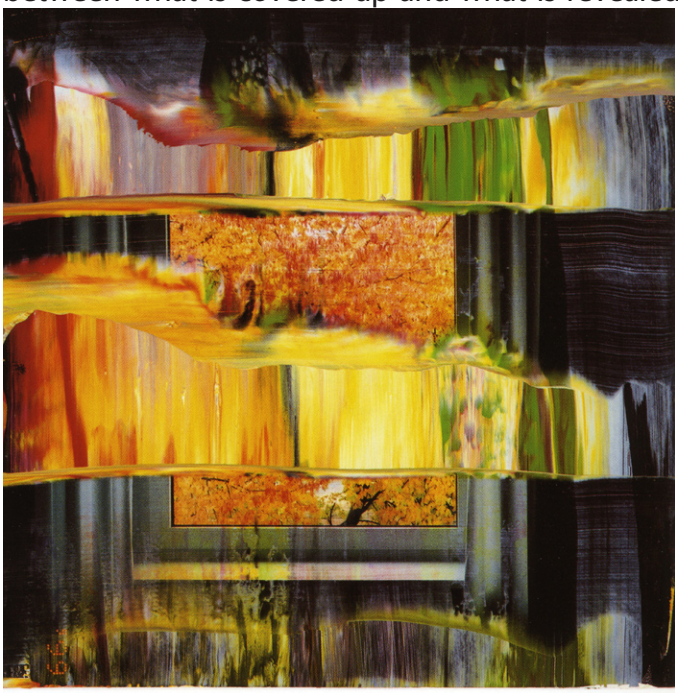
Incorporation
Oskar Schlemmer



Dance Web
Oskar Schlemmer

Firenze **Gerhard Richter** **(1999-2000)**

This series, done by Richter from December 1999 to December 2000, is the result of him painting with a palette knife over photographs, really more snapshots. The image, now screened and filtered by painterly interventions, insertions, and instaurations, evokes a dialogue between the traditional image and the imposed composition. It also causes the viewer to wonder and inquire about the image behind, and consider the relationship between what is covered up and what is revealed. This sort of dialogue is to me the perfect visual summary of what architecture is - a requalifying and reframing of common and naturally occurring scenes and experiences. The fact that the technique of the palette knife seems to imply motion only adds to the poignancy of these images and their relavance to the project of the moveable home, for this archetype would become a lens through which to view the world, one which is both changing and static, and would instigate a new way of looking at the world outside our door.



1.12.1999

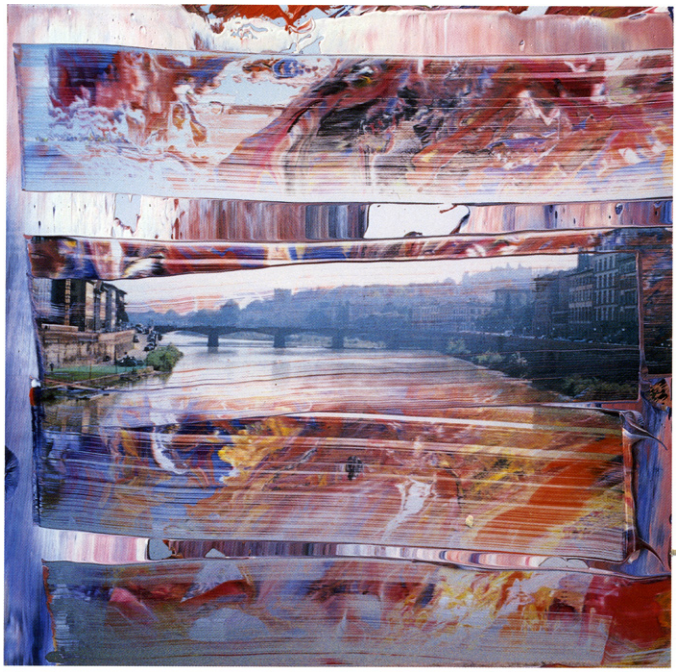


24.12.1999

Firenze **Gerhard Richter** **(1999-2000)**



9.1.2000

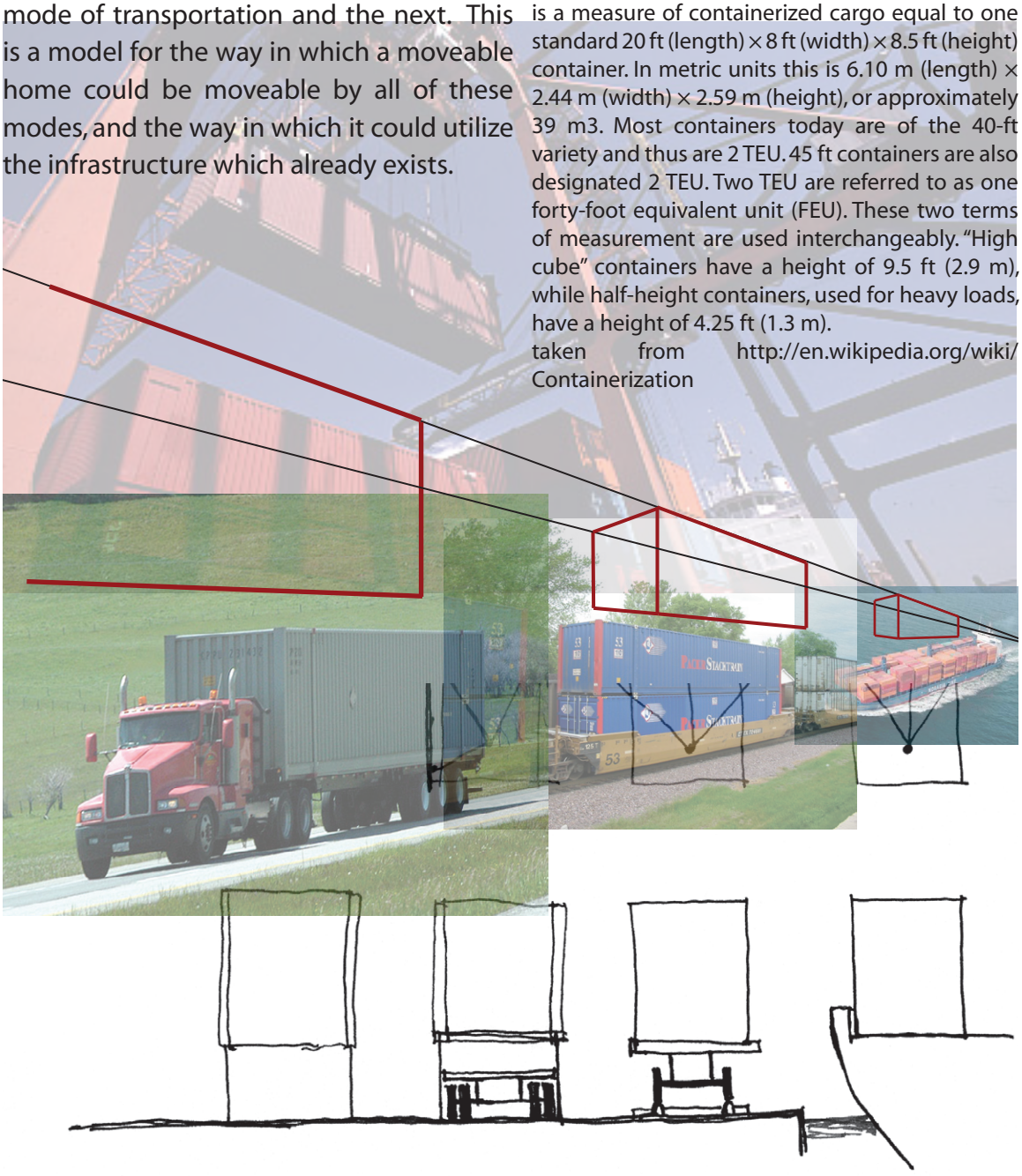


21.2.2000

Shipping Container Module : International Freightage Module

The ISO (International Organization for Standardization) Shipping Container is exemplary of the way a universal module can be developed for all modes of transportation, including truck, train, and ship, and the way in which the transition is made between one mode of transportation and the next. This is a model for the way in which a moveable home could be moveable by all of these modes, and the way in which it could utilize the infrastructure which already exists.

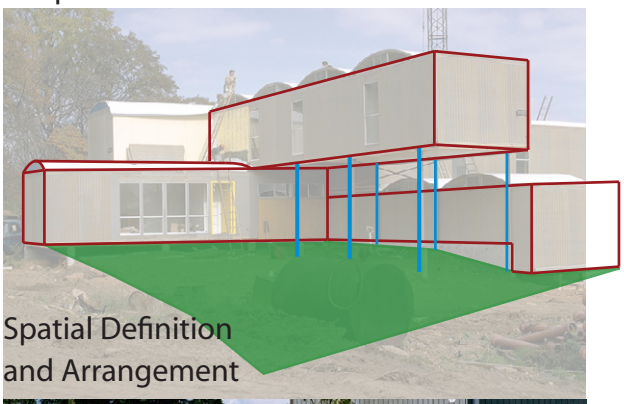
Containerization is a system of intermodal cargo transport using standard ISO containers that can be loaded on container ships, railroad cars, and trucks. There are three common standard lengths, 20 ft (6.1 m), 40 ft (12.2 m) and 45 ft (13.7 m). Container capacity (of ships, ports, etc) is measured in twenty-foot equivalent units (TEU, or sometimes teu). A twenty-foot equivalent unit is a measure of containerized cargo equal to one standard 20 ft (length) × 8 ft (width) × 8.5 ft (height) container. In metric units this is 6.10 m (length) × 2.44 m (width) × 2.59 m (height), or approximately 39 m3. Most containers today are of the 40-ft variety and thus are 2 TEU. 45 ft containers are also designated 2 TEU. Two TEU are referred to as one forty-foot equivalent unit (FEU). These two terms of measurement are used interchangeably. "High cube" containers have a height of 9.5 ft (2.9 m), while half-height containers, used for heavy loads, have a height of 4.25 ft (1.3 m).
taken from http://en.wikipedia.org/wiki/Containerization



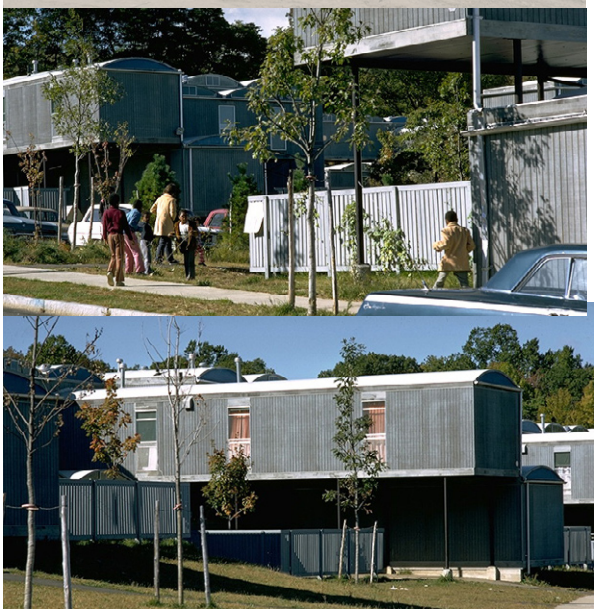
Oriental Masonic Gardens
New Haven, Connecticut

Paul Rudolph
(1968-1971)

This housing project deals with the module of the mobile home and the issues of manufactured housing. It is of particular interest because it addresses ways of grouping the modules to frame and create spaces, similar to the way Wright used the L-shaped plan to frame the garden space in his Jacobs residence. Rudolph also planned for different types of module elements, such as utility modules, living space modules, and sleeping space modules, with the possibility to be added to or subtracted from based on the particular needs of the residents.



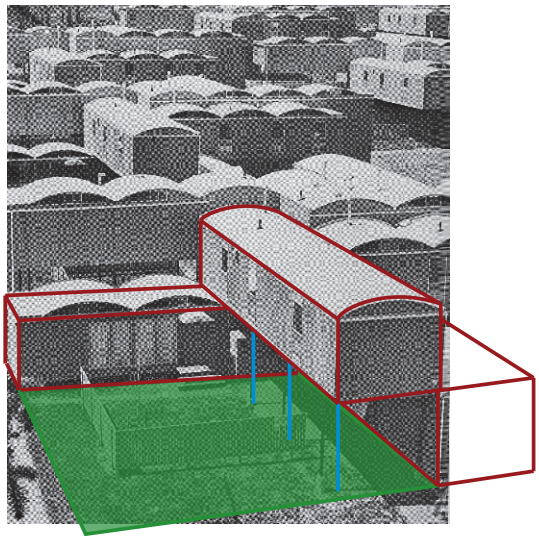
Spatial Definition
and Arrangement



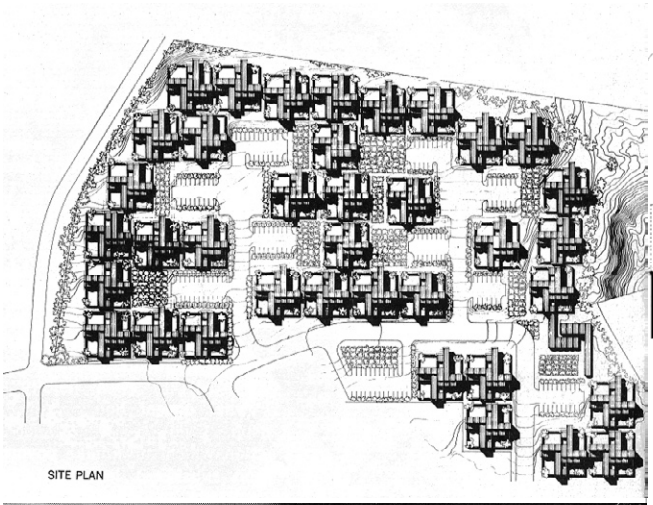
Built by the Prince Hall Masons with a HUD mortgage for 3.5 million dollars, Oriental Masonic Gardens consists of 148 units on 12.5 acres. Residences are grouped in fours around a utility core. In every home, a lower module contains living spaces. A second module above it houses two or three bedrooms. And a third module may be added, parallel to the lowest one, for additional bedrooms. This stacking organization creates a sheltered outdoor space for each unit. The units are factory assembled with plumbing, wiring and finishes, then trucked to the site.

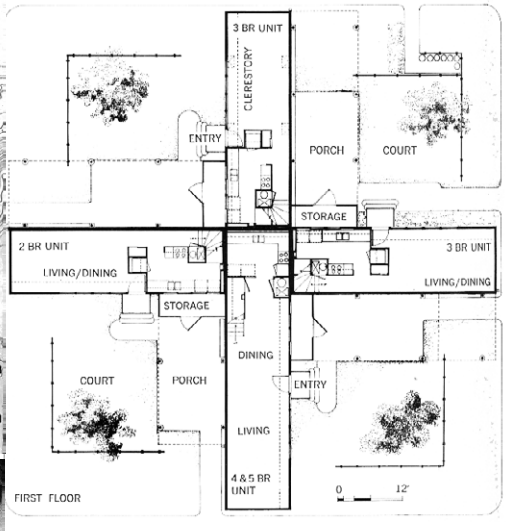
Each module, 12 feet wide by 27, 39 or 51 feet long, cost $17.16 per square foot. Masonic Gardens units sold for between $21,000 and $23,000, close to the cost of a site built house, due to a series of setbacks. Subjected to local building codes, these modular units could not be produced with the cost efficiency of mobile homes. At the time of the project, building mobile homes was more lucrative so few companies were interested in taking on the risk of modular housing. Costly problems were also encountered when the homes were inspected on site, after being produced and transported to New Haven.

(taken from http://www.gsd.harvard.edu/studios/s97/burns/p_rudolph.html)

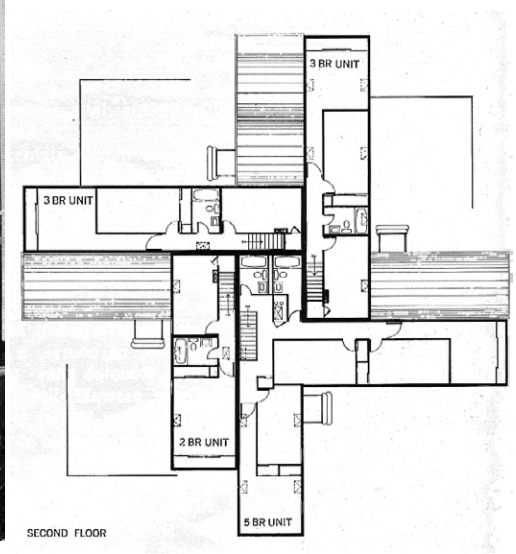


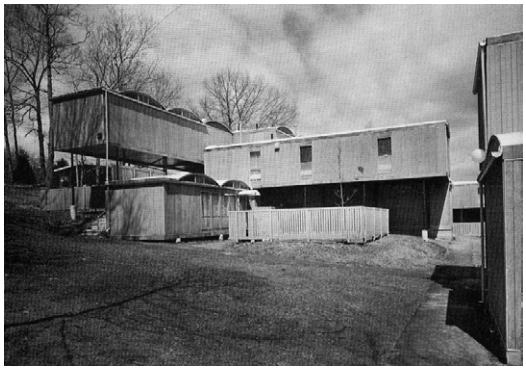
Oriental Masonic Gardens **Paul Rudolph**
New Haven, Connecticut **(1968-1971)**


SITE PLAN



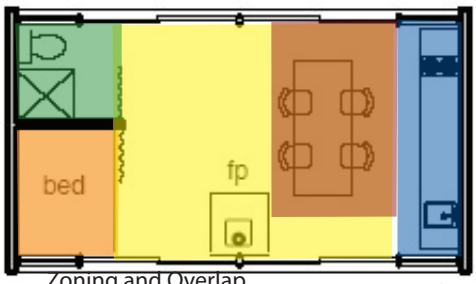






wee House Geoffrey Warner (2001)

The wee House illustrates the way in which a prefabricated, moveable dwelling can be sited and situated in the landscape without necessarily being designed for that landscape. The fenestration is oriented southwest to capture solar gain, and it is placed on the cusp of a hill on the edge of a field to utilize views. These site-specific issues were able to be addressed despite their lack of involvement in the "design" of the wee House. It also illustrates to make the most of space, and how moving and siting are considered in the design.



wee House Plan

Zoning and Overlap

Bathing: 30 f²

Sleeping: 40 f²

Living: 220 f²

Eating: 80 f²

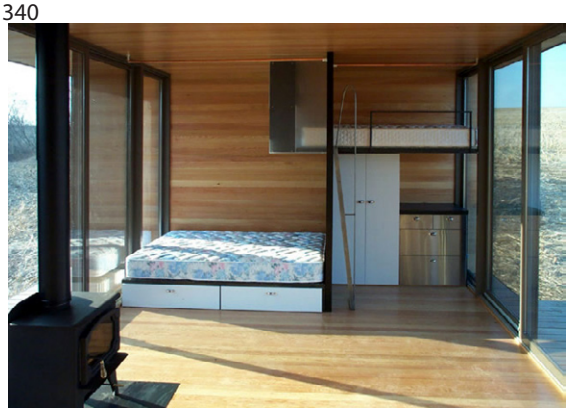
Cooking: 85 f²

Total Living Space: 455 f² Total Conditioned Space: 340



wee House in a Minnesota field





the interior in either direction

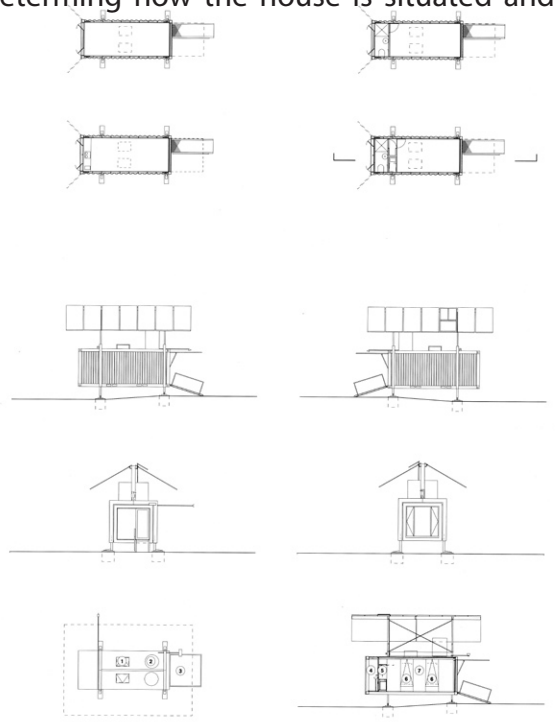


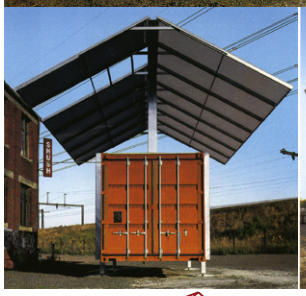
moving siting living

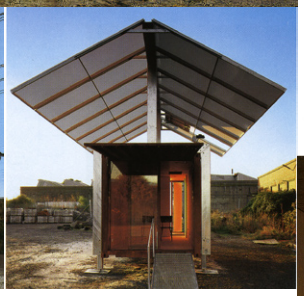
Future Shack Sean Godsell (1985-2001)

Study of the Future Shack shows how a simple box can be manipulated to create a rich diversity of spaces within and without, and how it can be portable without sacrificing expressiveness. The use of the shipping container implies a universal mocule and thus a universal design, but the roof elements determing how the house is situated and oriented.

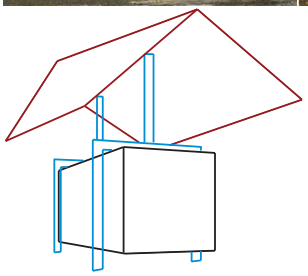


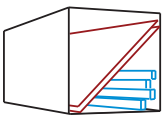


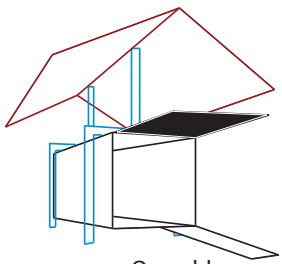


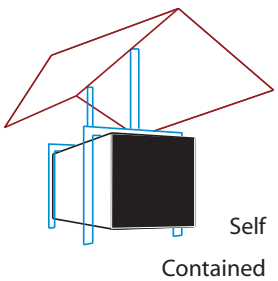


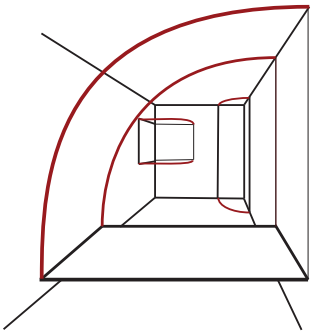












Operable Box

Self Contained Mobility

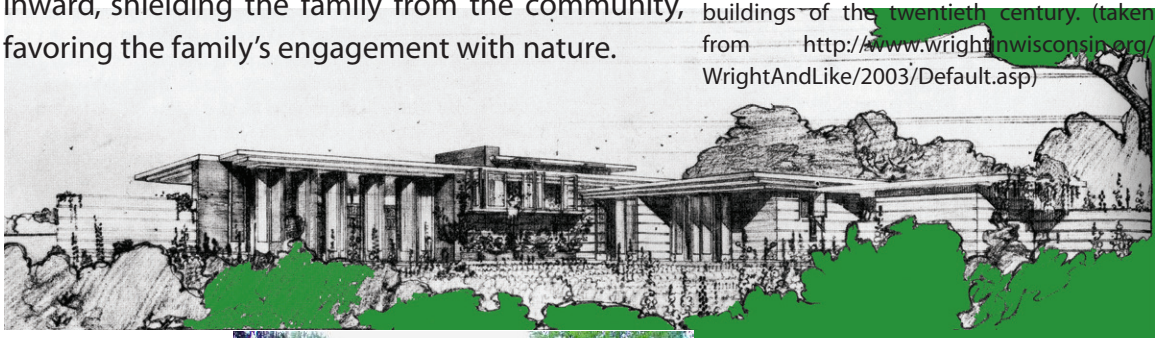
Convertible Interior Space

Jacobs I House
Middleton, Wisconsin

Frank Lloyd Wright
(1936)

This house compresses the interior spaces, subsequently engaging the exterior spaces as extensions of the living areas. The configuration blurs the line between in and out, making it all simple space for living. The space is, however, focused inward, shielding the family from the community, favoring the family's engagement with nature.

This was the first of Wright's famed "Usonian" designs ever erected—a dwelling "of and for" the United States. Its in-floor heating, sandwich walls, carport, and corner windows influenced residential architecture around America and led the Royal Institute of British Architecture to declare it one of the twenty most important buildings of the twentieth century. (taken from http://www.wrightinwisconsin.org/WrightAndLike/2003/Default.asp)

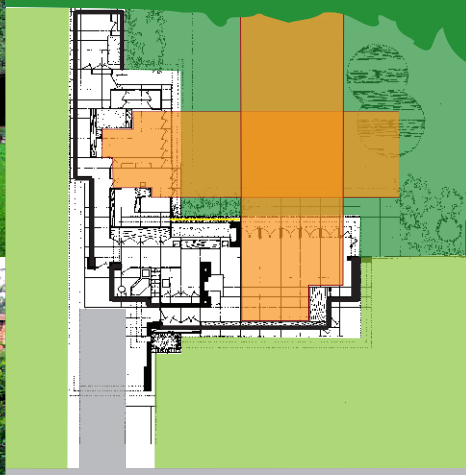


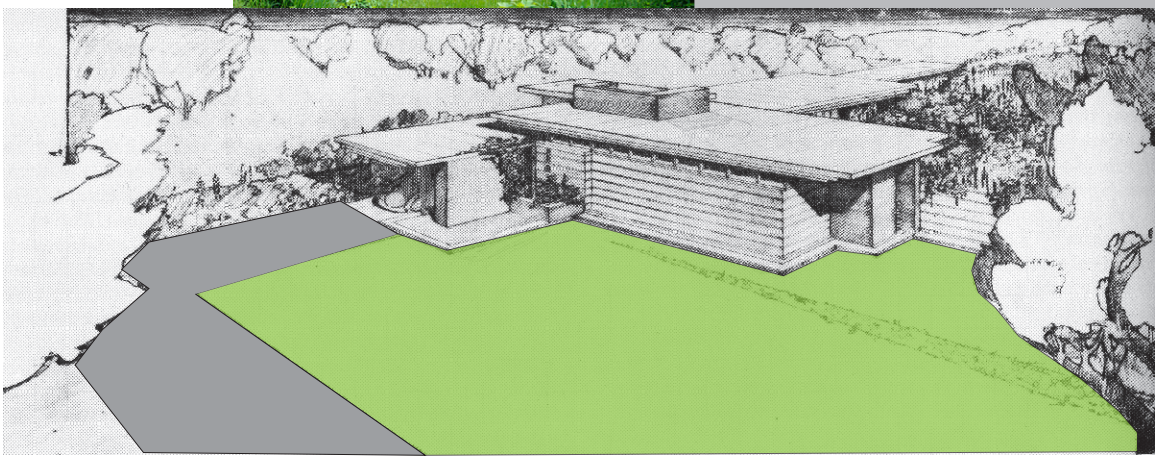
Garden Side:
Interior and Exterior Spaces Flow Into Each Other



Street Side:
Interior Spaces Are Shielded From Public View

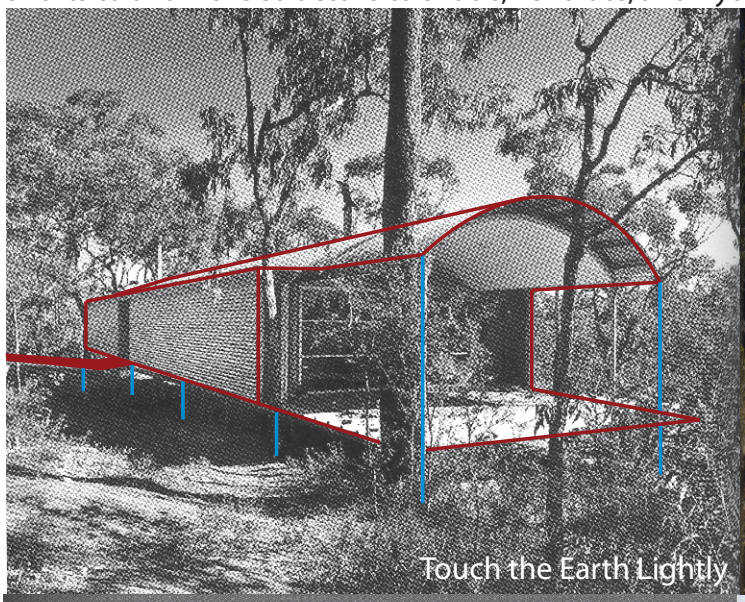




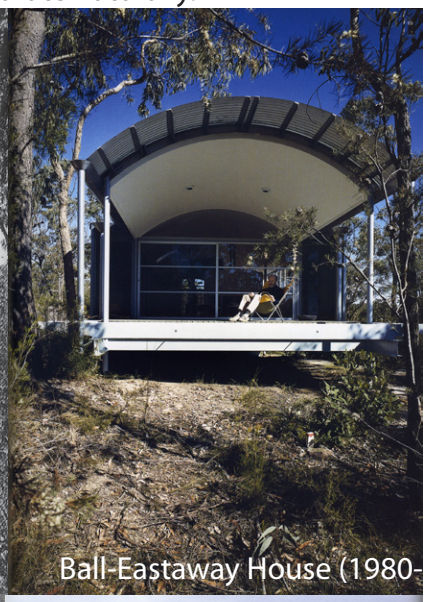


Environmental Self-Sufficiency Glenn Murcutt Australia

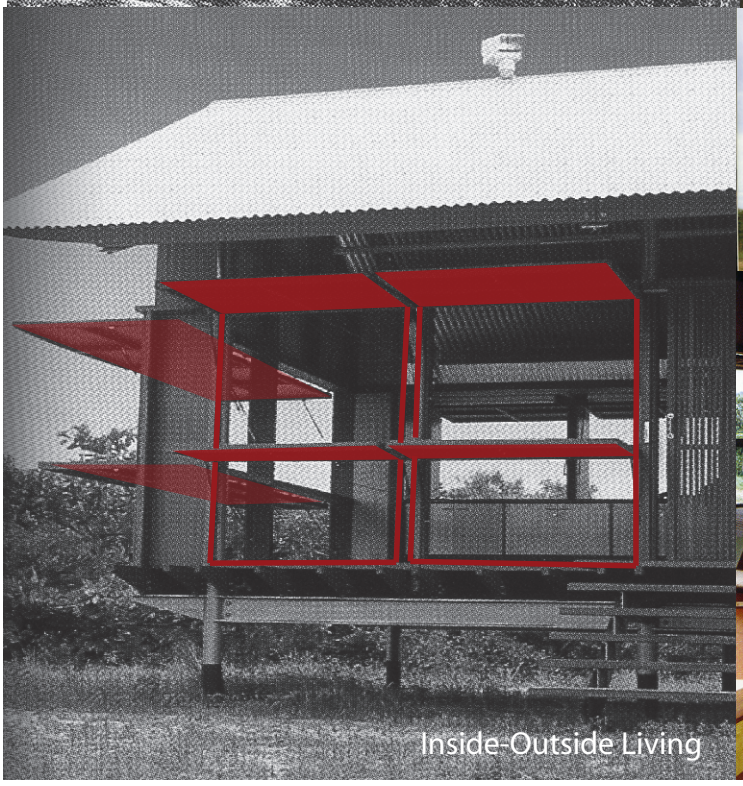
The conceptual parti of all of Glenn Murcutt's architecture is to touch the earth lightly. This idea is embodied in the way his buildings physically meet the ground, minimizing their impact on the land and the landscape. This mantra is also conveyed through the efforts to allow the structure to shade, ventilate, and hydrate naturally.



Touch the Earth Lightly

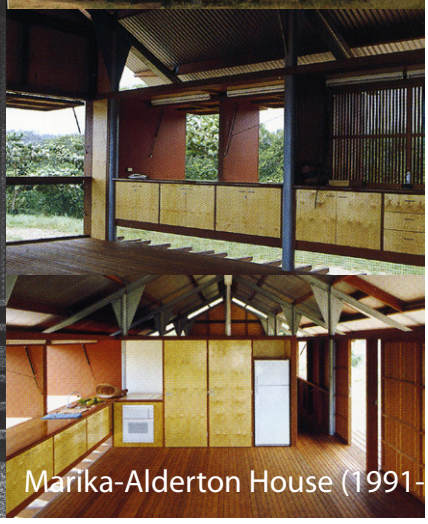


Ball-Eastaway House (1980-



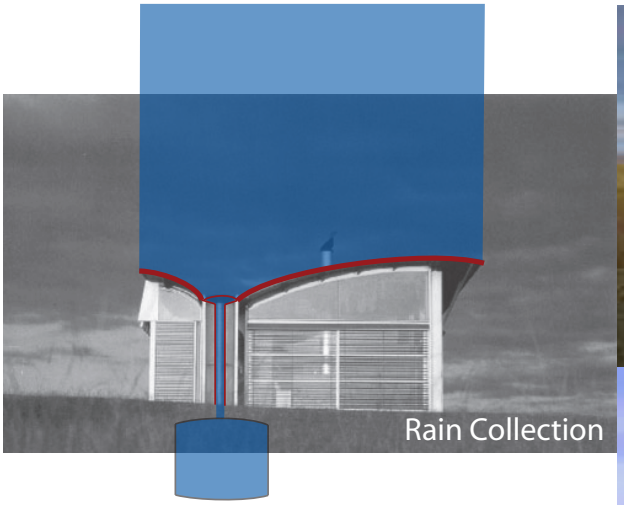
Inside-Outside Living



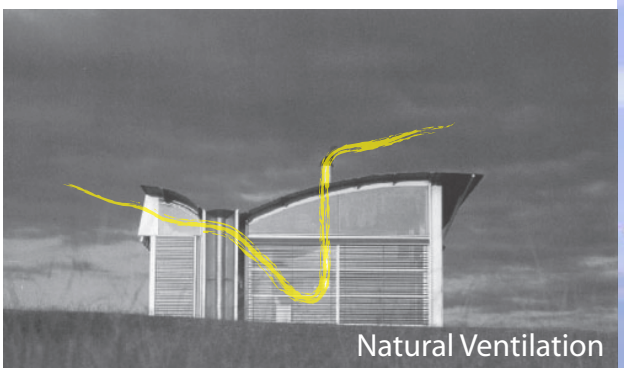


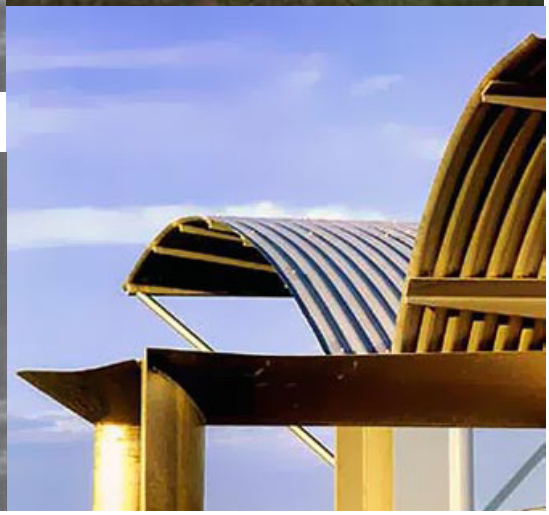
Marika-Alderton House (1991-

Environmental Self-Sufficiency **Glenn Murcutt** **Australia**









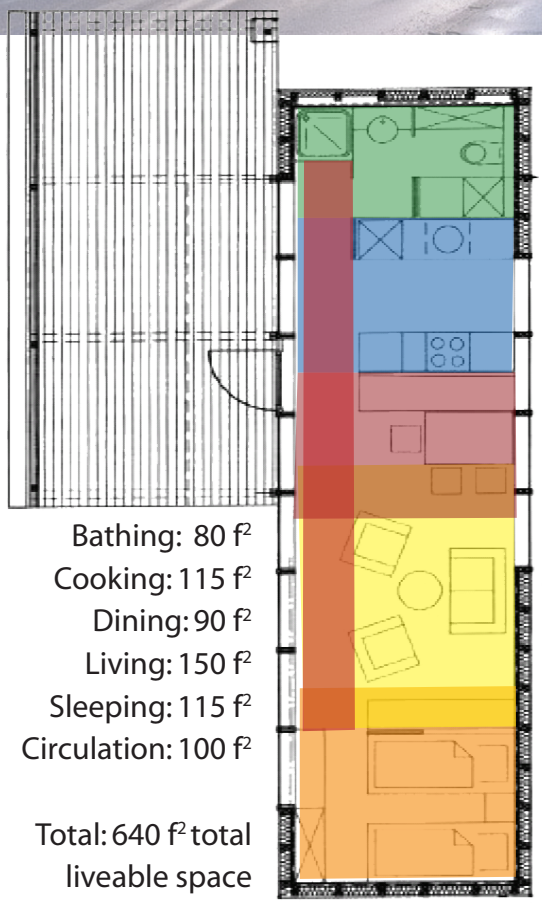
Su-Si house
Reute, Austria

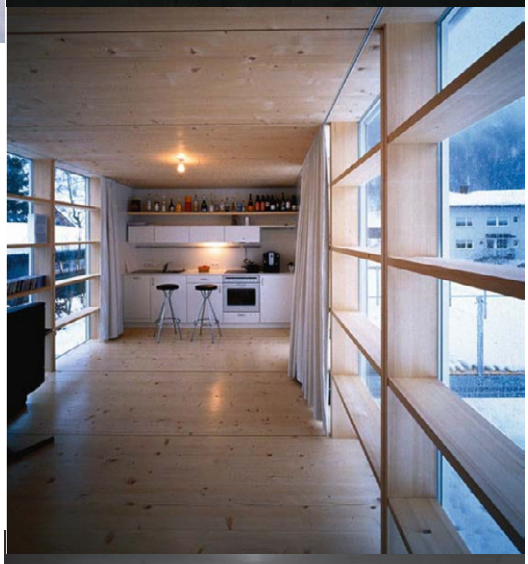
Johannes and Oskar Leo Kaufmann GmbH
(1998)

The Su-Si house represents a contemporary design dealing with manufactured housing and issues of portability, as well as the creation of overlapping program zones, which allow for a sense of spatial expansion within the box.









Bathing: 80 f²
Cooking: 115 f²
Dining: 90 f²
Living: 150 f²
Sleeping: 115 f²
Circulation: 100 f²

Total: 640 f² total liveable space

As compared to 450 f² total conditioned space



Spatial Overlap of Program Zones

MDU (Mobile Dwelling Unit) Lot-EK (2001)

The Mobile Dwelling Unit is one of many projects attempting to reuse the international shipping container as a preexisting module for living, one which would take advantage of the already-in-place infrastructural network of trains, ships, and trucks which transport shipping containers around the world. This specific project articulates ways of expanding the rigidly defined space once the MDU reaches its destination, and this is expressed on the exterior as well as on the interior. It takes its cues from the more timid attempts of spatial expansion found in RVs and motor homes. It still, however, does nothing for the inhabitants' relationship to the outside world, either to the natural world or the community, but acts only as a hermetically sealed "container for living."











2005 Department of Energy Solar Decathlon Washington, D.C.

The Solar Decathlon, a biennial competition held by the U.S. Department of Energy, showcases college-level designs which attempt to demonstrate how energy efficience can be integrated, and in the best examples, create good designs for living. The projects are of interest because of their obvious emphasis on sustainability, as well as their limited size and organization. The issue of their having to be transported is also of interest, because this makes them necessarily moveable/mobile.



University of Colorado



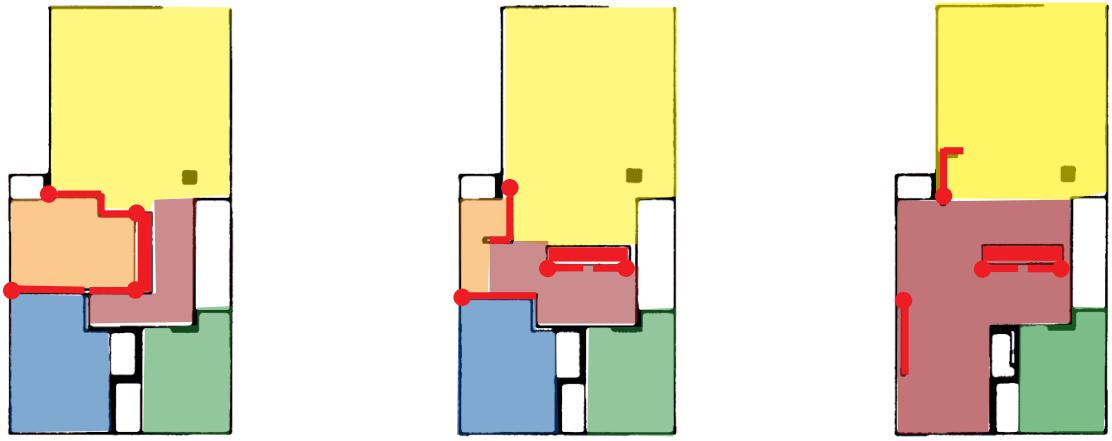
University of Massachusetts - Dartmouth



University of Texas

Hinged Space **Steven Holl**
Fukuoka, Japan **(1991)**

The Fukuoka Housing Project is a study of flexible space, in that it allows for walls to be moved on pivots to create different spatial arrangements, while at the same time providing a definition of the spaces and a sense of permanence within the household, as the hinged elements cannot be removed. This allows the spaces to adapt to the different inhabitants' spatial needs and desires throughout the course of the day, year, and their tenure in the space.

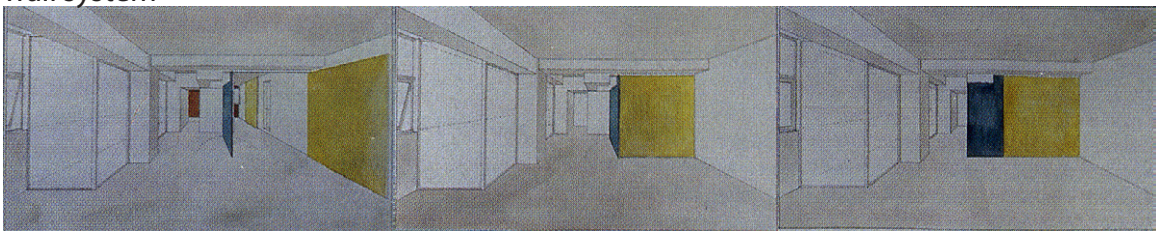


Hinged Space Diagrams, showing the way spaces can expand or contract



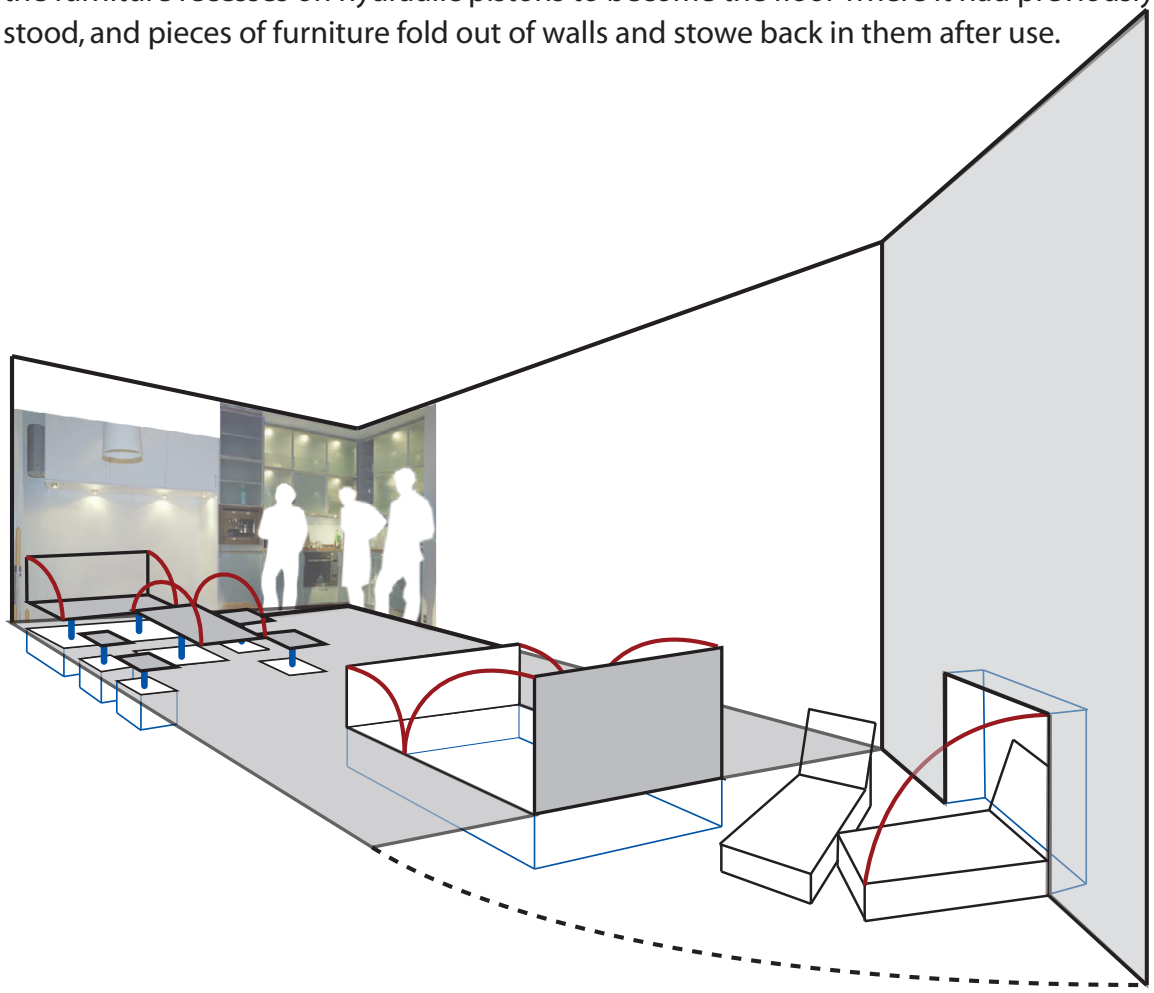
Interior Photos

Holl's drawings of the same space in three different configurations defined by the hinged wall system



Optibo **Bo Larsson**
Goteborg, Sweden **(2004)**

This 268 f^2 apartment is conceived of as transformable living space, in that the same areas have multiple possible uses. This has the effect of expanding the perceived space, and at the same time conserving much-needed space. The 24 inch interstitial zone beneath the floor and the thick wall cavities make all of this changing and converting possible, as the furniture recesses on hydraulic pistons to become the floor where it had previously stood, and pieces of furniture fold out of walls and stowe back in them after use.



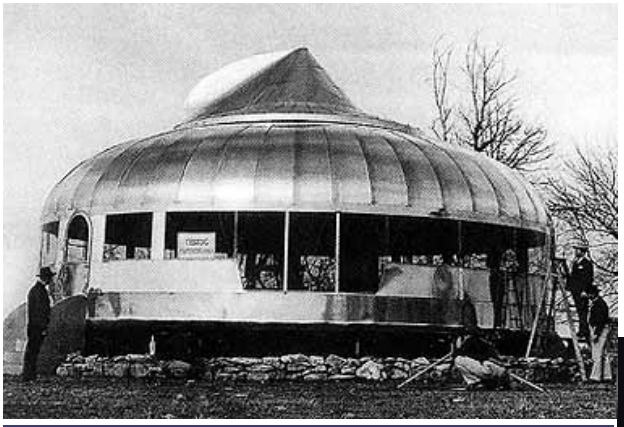


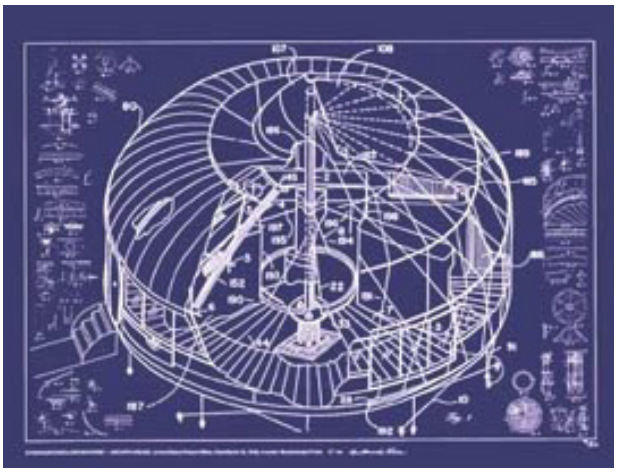




Dymaxion House R. Buckminster Fuller (1926-46)

The Dymaxion House is one of the major precedents in studying the tradition of the prefabricated home. As well it was a powerful precursor to many of the "sustainable" designs proposed and built today, in that it attempted to take care of its own water, power, waste, and climate control. Like the Airstream, it was heavily influenced by aeronautical technology, and technology and industry in general, and it bore the mark of a self-contained unit, only touching the ground with one central support. Dymaxion House was a vision of how people could live, different from the way they now live.



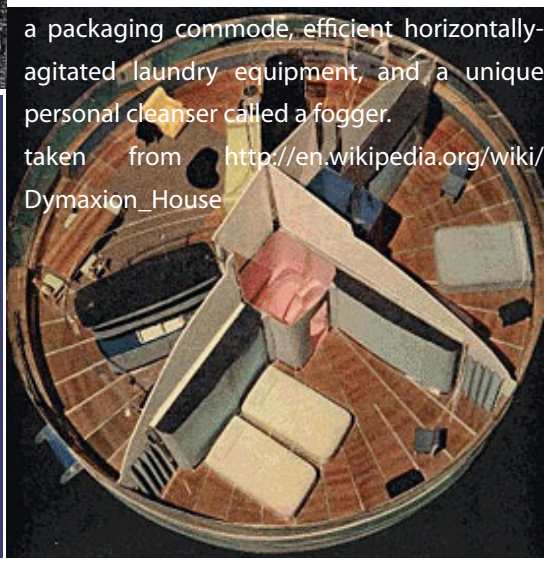


The final design of the dymaxion house used a central vertical stainless steel strut on a single foundation. Structures similar to a bicycle-wheel hung down from this supporting the roof, whilst beams radiating out supported the floor. Pie-shaped fans of sheet metal formed the roof, ceiling and floor. Each structure was assembled at ground level and then winched up the strut. The dymaxion house was the first conscious effort at an autonomous building in the twentieth century.

It used a packaging toilet, water storage and a vacuum-based wind turbine built into the roof. It was designed for the stormy areas of the world: temperate oceanic islands, and the great plains of North America, South America and Eurasia. At the time, solar cells were not available, so the wind turbine was the only practical way to provide electricity.

In most modern houses, laundry, showers and commodes are the major water uses, with drinking, cooking and dish-washing consuming less than twenty liters per day. The Dymaxion house reduced water use by a greywater system, a packaging commode, efficient horizontally-agitated laundry equipment, and a unique personal cleanser called a fogger.

taken from http://en.wikipedia.org/wiki/Dymaxion_House



Airstream Trailer Wally Byam (1935-present)

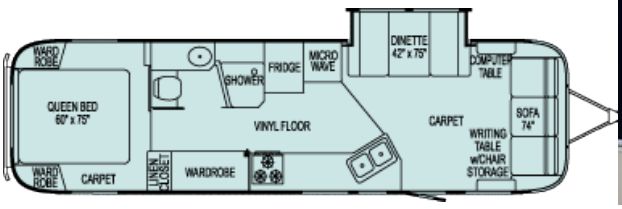
The Airstream Trailer is the embodyment of Americans' desire to be mobile. This trailer, originally intended for vacationing, has become something of cultural force, its stainless steel shell, reminiscent of an aircraft fuselage, evoking associations with nomadic inclinations or lifestyles. Some, like Paul Welschmeyer with his "Edison," have even undertaken to "rethinking" the Airstream as an architectural type. Of interest to this thesis is the completely contained, permanently mobile living space, universal as a standalone unit, constantly seeking out new places, constantly coming to rest somewhere else, constantly coming to gaze out onto a new landscape, perpetually speaking of a modern nomadic way of life.







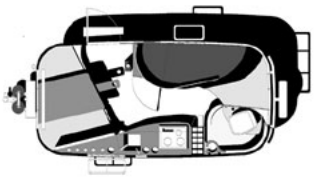


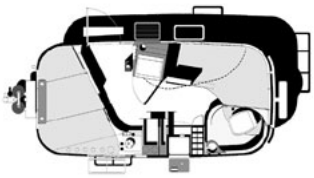


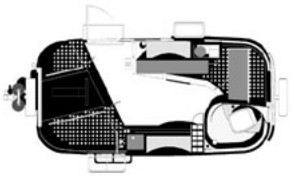


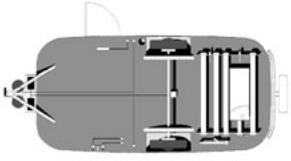
Edison Paul Welschmeyer (2000-2002)

Dubbed the "The Ultimate Portable Structure" by Dwell Magazine writer Allison Arieff in their December 2002 issue, "Edison" is conceived of as a dual duty entity - office and residence. "Architect Paul Welschmeyer was more interested in functional systems than a nostalgic showpiece. He began by developing a 'Trailering Tao', which stipulated above all that 'everything must have two or more uses'." (p. 82) This economy of space and multiplicity of function created a spatial diversity and richness which makes a "small" space like the 96 square foot Edison an desireable place to live and work.









Edison Plans







images from http://www.pwarchitects.biz/edison.

Manufactured Housing Clayton Homes (1966-present)

Clayton Homes, Inc., founded in 1966 and acquired by Berkshire Hathaway, Inc. in 2003, is a vertically integrated manufactured housing company operating in 49 states. The Company builds, sells, finances, leases, and insures manufactured homes and re-locatable commercial and educational buildings. The company's distribution includes approximately 1,100 independent retailers, and 392 company owned sales centers in 30 states.

taken from http://www.claytonhomes.com/about/history.cfm

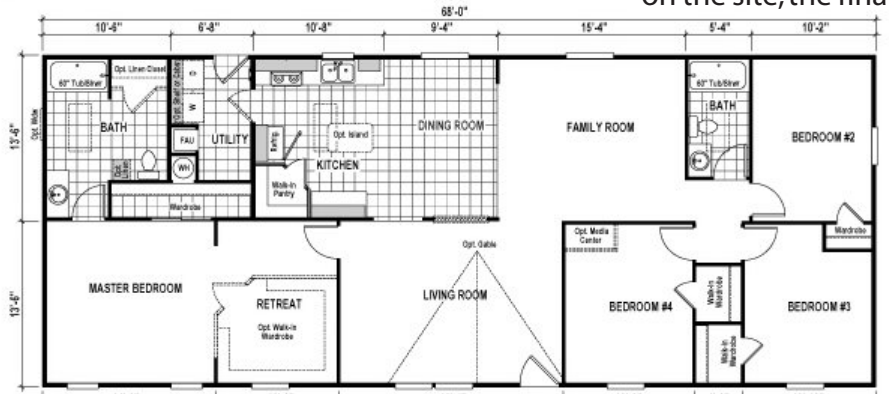


This single-wide has 1130 f^2 of conditioned space. It is quite a common type and arrangement, laid out in a shotgun/en suite arrangement.





This double-wide has 1836 f^2 of conditioned space. It is also quite a common type and arrangement, zoned with the living/dining areas dividing the master suite from the other bedrooms. The double-wide is just that - two modules put together on the site, the final siding and roofing done on-site.



Appendix 4: Program

First let me start by saying what the moveable home is not:

The moveable home is not for everyone. It is not the new solution, a cure-all or a quick fix. It is not trying to take the place of or mimic the suburban house, as this paper asserts the current mobile home is. It is, however, trying to address many of the problems and lost goals which are bound up with what it means to be American. The moveable home is for that section of American society who want to have life be about who they are when they are where they are, and are willing to be active participants. It is for those who don't want to have to uproot, pack up, and reorder their lives every time they change locations. They would instead be rooted in a home mobile and flexible. They could invest in home without worrying about the next move, because their investment would travel with them, adding meaning to meaning as the residual deposits of time and place build upon and within.

The mobile home is now marketed toward the lower class and at the elderly, the fringe groups who cannot afford to live otherwise. The "transient" generation referred to in the central proposition, on the other hand, is admittedly a more educated and worldly group than the current mobile home demographics. The goal is to make the moveable home a thing which is not charged with negative connotations, but is a symbol of a way of life, one which is not limited to one economic or social class, but which can facilitate life on a number of levels, ranging from basic shelter to environmental comfort to aesthetic pleasure to personal self-expression and self-realization (to draw on the five levels of Abraham Maslow's "Hierarchy of Needs.") The moveable home is not attempting any sort of "gentrification of image" or "type" (that is, trying to make the mobile home appealing to the middle class) – it is merely trying to reveal the inherent possibilities now shrouded in associations and stigmas.

The compressed living space in the mobile home creates the necessity for the overlapping of traditionally dedicated program spaces, from sleeping to living to eating to working to learning to bathing, and would create not cellular spaces single in their function and subsequent meaning, but instead create a transparent framework for all aspects of domestic life. The various functions would be able to be stowed or revealed as use determined, and would articulate the spaces in various ways based on the occupants. This contracted living space would also press on the inhabitants, who would open their home up and engage the outdoors.

Life would also be about maintaining your own life – making sure the shading is set to

either heat or cool, making sure the water is being collected and filtered, controlling the ventilation, being conscious of how much electricity the photovoltaics are generating relative to how much is being used, and so on. Life would once again require an active and conscious participant.

Appendix 5: Sites

Because of the transient and temporal condition of the moveable home, site investigation will be about how it deals with and adapts to the range of topographic and climatic conditions which could be encountered in the United States. The topographic conditions would range from a flat site to a sloping site of up to 40% grade. The climatic conditions in the US range run the gamut from hot-humid to hot-arid to temperate continental, temperate costal, and cool climates, as defined by the AIA Research Corporation (p. 12, 1978). Brown and DeKay's Sun, Wind, and Light will be the source of the climatic information (SWL, p. 56, 294), as well as the online climatic data available at www.ecodesignresources.net.

The specific sites for the moveable home will deal with two intersecting transects of conditions, so to speak, that of the continuum of built structure from rural to urban as well as the continuum of climates from cool to hot, dry to wet.

The site at **714 N. 5th Ave.** on the block between 4th and 5th Aves. N, McKinley and Pierce Sts. in Evans-Churchill, Phoenix, Arizona deals with a hot arid climate, a first ring neighborhood placement, and a flat site condition.
33 deg 27' N 112 deg 04' W elevation 1090'
8" of precipitation per year

The site at **512 Gila Trail** in Kingston Woods Neighborhood, Knoxville, Tennessee, deals with a temperate climate, a suburban placement and a steep-sloping site condition.
35 deg 54' N 83 deg 55' W elevation 1060'
47" of precipitation per year

The site at **7916 Hwy K**, at the intersection of Highways K and P in Cross Plains, WI, deals with a cool climate, a rural placement and a moderate-grade hillside condition.
43 deg 08' N 89 deg 36' W elevation 1080'
31" of precipitation per year

Technical Sources

The insulation ranges are ostensibly equal across the first five residential zones R-1 to R-5 (SWL, p.214), which means the moveable home would meet insulation recommendations in all the climates listed above, whether to protect against excess heat gain or loss.

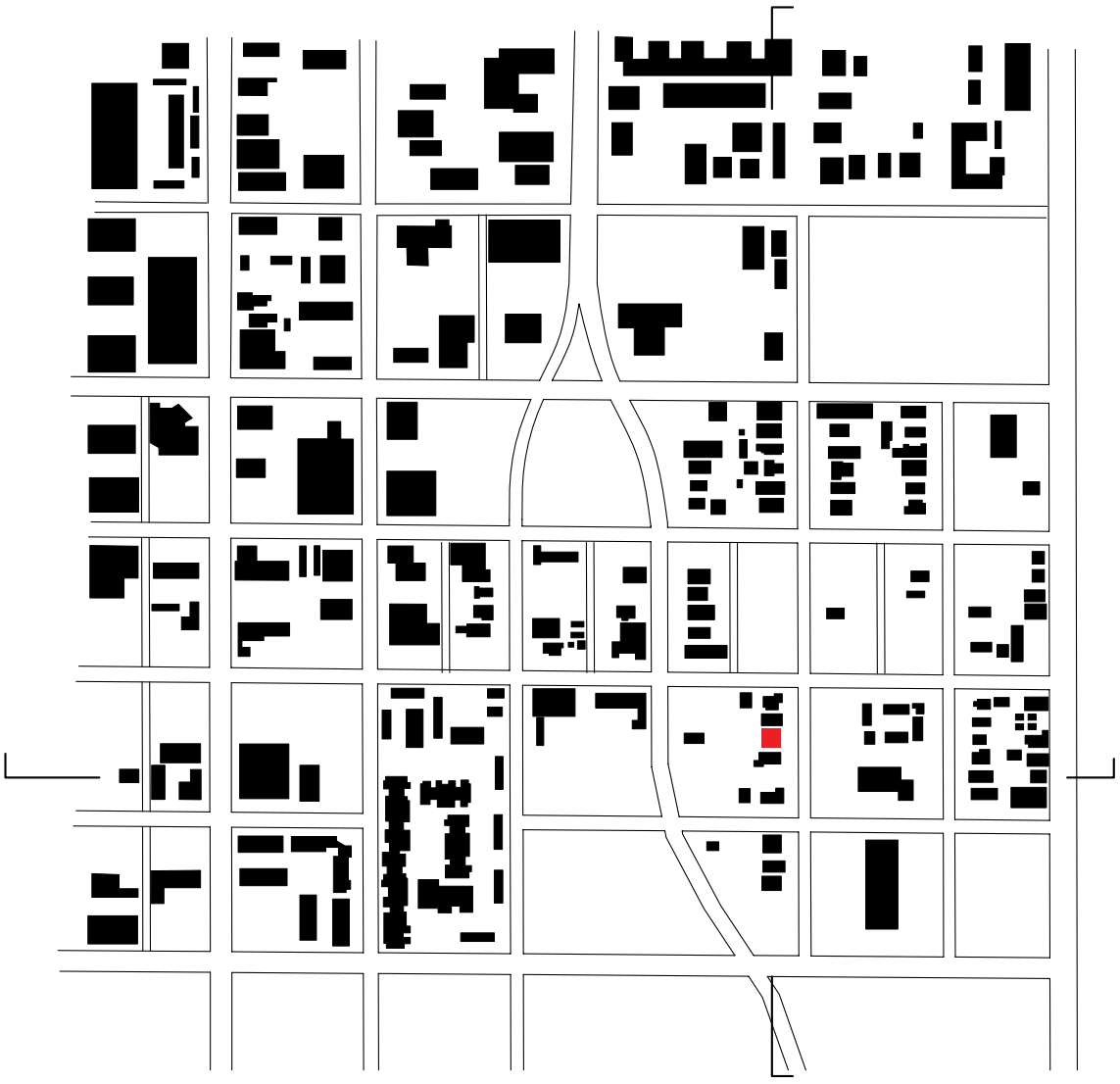
Water use for the household versus water collection potential in each climate http://www.tampagov.net/dept_water/conservation_education/Customers/Water_use_calculator.asp

Electricity use
http://rredc.nrel.gov/solar/codes_algs/PVWATTS/
http://www.meanradianttemperature.com/kwh_calc.htm

714 N. 5th Ave.
Evans-Churchill Neighborhood
Phoenix, Arizona
33 deg 27' N 112 deg 04' W elevation 1090'

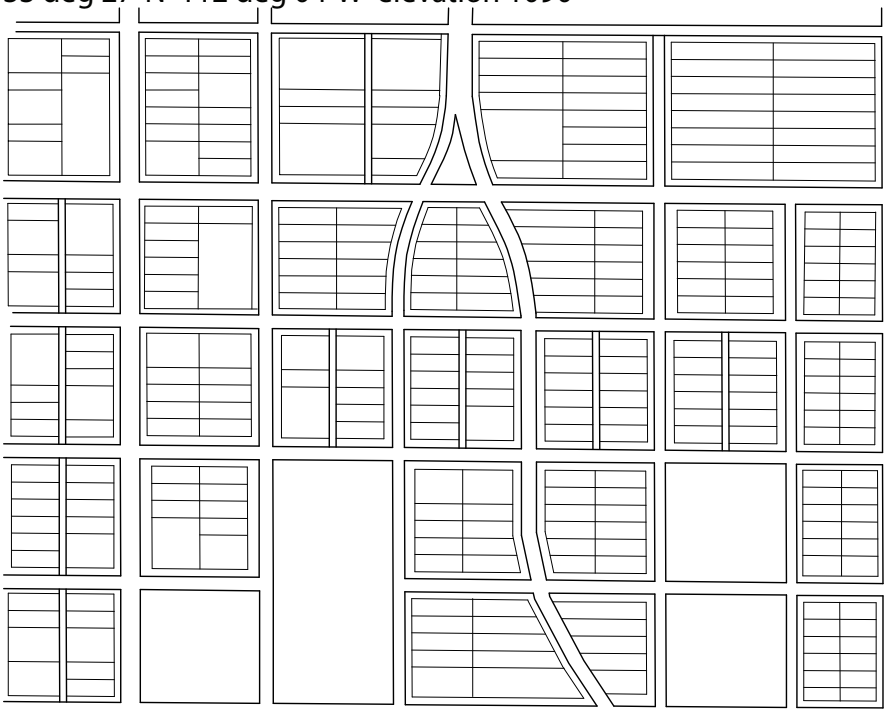


locator

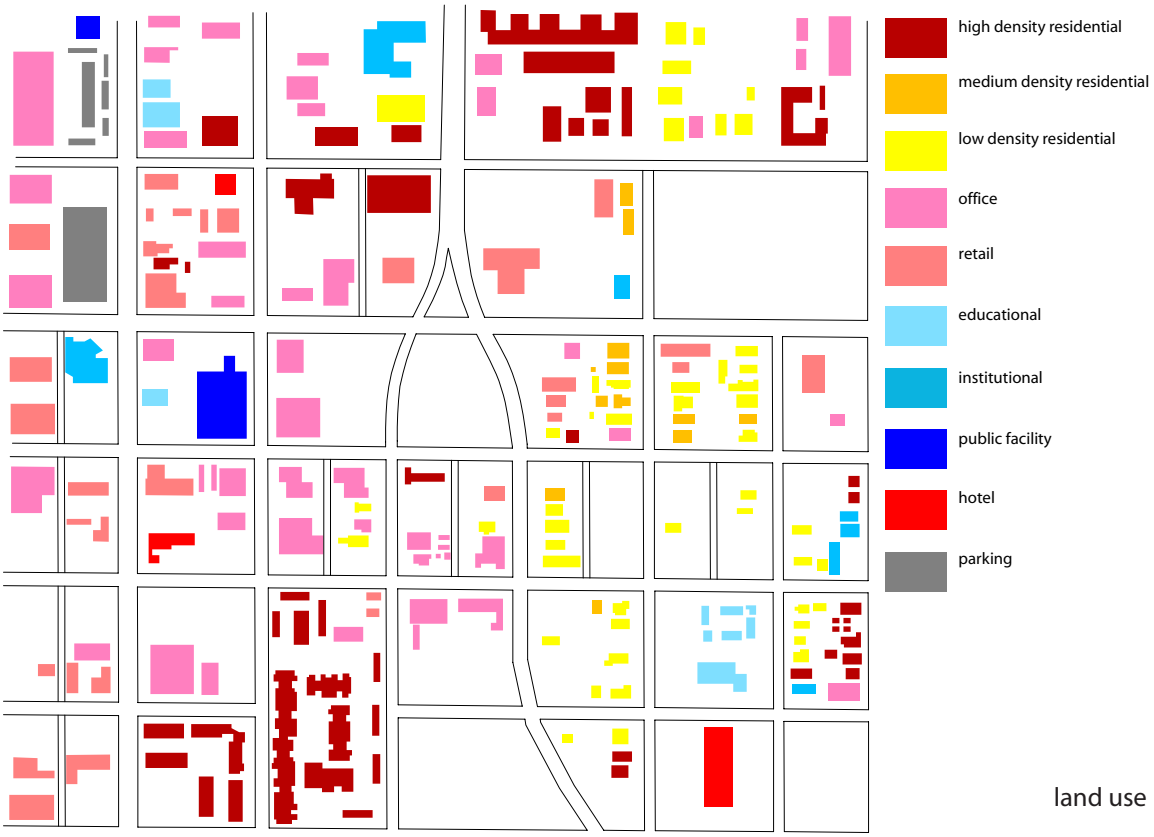


site plan

714 N. 5th Ave.
Evans-Churchill Neighborhood
Phoenix, Arizona
33 deg 27' N 112 deg 04' W elevation 1090'

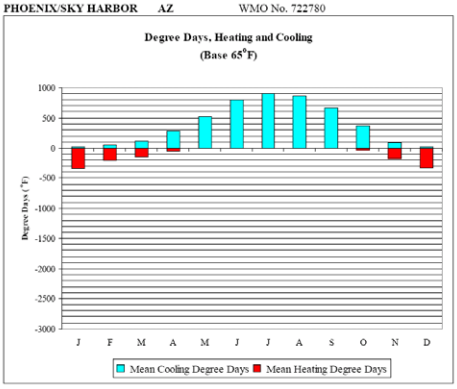


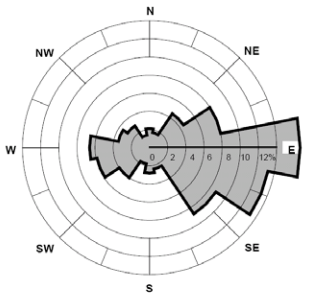
Lots: typical 50' x 140' lots = .17 acres east-west elongated



land use

714 N. 5th Ave.
Evans-Churchill Neighborhood
Phoenix, Arizona
33 deg 27' N 112 deg 04'W elevation 1090'





Wind Rose: January

	J	F	M	A	M	J	J	A	S	O	N	D
1 am	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1	6	8	4	1	0	0	0	0
7	0	0	4	20	41	45	30	20	12	5	0	0
8	4	12	32	78	106	112	86	73	60	39	17	6
9	34	57	91	152	177	180	152	143	131	100	63	39
10	82	116	145	213	235	236	218	199	191	156	112	84
11 am	127	162	199	263	284	275	263	247	237	199	156	125
12 noon	161	193	230	292	310	300	287	283	267	228	181	150
1 pm	175	214	245	304	321	317	306	300	274	235	190	156
2	167	202	245	291	306	311	302	289	261	218	173	143
3	139	173	216	255	273	279	281	253	226	185	136	119
4	94	132	166	200	226	232	234	212	170	132	91	78
5	42	78	112	132	162	172	172	150	107	68	36	26
6	7	24	49	69	94	105	101	82	45	16	6	3
7	0	2	9	16	31	42	38	23	8	0	0	0
8	0	0	0	0	3	7	6	2	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11 pm	0	0	0	0	0	0	0	0	0	0	0	0
12 mid	0	0	0	0	0	0	0	0	0	0	0	0

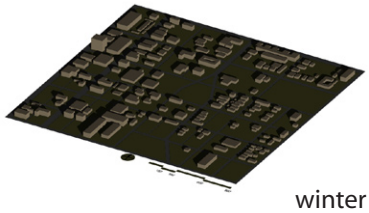
0 | 1-100 | 101-250 | >250

Radiation Calendar
Mean Hourly Global Horizontal Radiation (Btu/ft²)

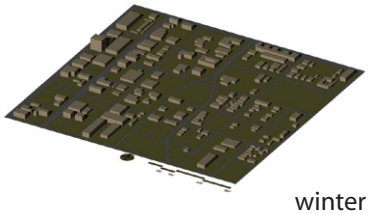
	J	F	M	A	M	J	J	A	S	O	N	D
1 am	49.1	47.6	55.4	62.3	70.4	82.4	86.1	85.3	78.0	64.9	56.0	48.4
2	48.3	46.3	54.4	59.8	68.0	79.9	84.3	83.6	76.9	63.1	54.7	47.2
3	47.1	45.4	57.1	58.2	66.1	77.9	83.1	82.4	75.1	61.8	54.0	46.1
4	46.4	44.2	55.9	56.5	64.1	76.2	81.6	80.9	74.6	60.4	53.3	44.9
5	46.0	43.5	54.5	54.8	62.1	74.1	80.3	79.4	73.6	59.1	52.6	44.3
6	45.7	42.6	53.6	57.7	65.6	74.4	79.9	80.8	72.8	60.3	52.8	44.0
7	45.6	41.7	52.8	60.6	69.1	79.5	82.2	82.3	73.5	61.7	53.1	44.1
8	45.7	42.8	55.9	63.6	72.7	84.4	86.1	83.6	79.2	63.0	53.4	44.7
9	48.1	48.6	61.0	68.3	76.6	89.2	89.6	86.7	84.4	68.4	58.7	48.1
10	51.8	53.6	65.1	72.9	80.5	93.1	92.5	89.7	88.1	73.8	63.9	52.0
11	55.5	57.7	68.3	77.5	84.4	95.3	95.5	92.7	90.9	73.8	69.1	55.4
12 noon	58.6	61.1	71.2	80.2	86.5	96.0	97.6	94.9	93.5	81.7	71.5	57.6
1 pm	61.5	63.4	73.5	82.9	88.7	99.5	99.3	97.0	95.1	84.3	74.0	60.1
2	63.3	65.0	75.2	85.7	90.8	100.7	101.3	99.2	96.7	86.8	76.4	61.6
3	64.5	66.4	76.6	85.7	91.2	102.1	102.6	99.6	97.3	87.0	76.2	62.9
4	64.7	67.0	76.8	85.6	91.5	102.8	103.6	100.0	97.5	87.1	76.1	63.0
5	63.6	66.5	76.5	85.6	91.8	101.7	103.3	100.5	96.7	87.2	75.9	61.5
6	61.0	65.2	75.4	82.3	89.3	101.5	102.2	98.8	95.4	83.5	72.3	58.5
7	58.0	62.4	73.0	78.9	86.8	99.5	99.7	97.0	92.0	79.7	68.6	56.4
8	55.6	59.9	70.9	75.5	84.2	95.2	96.2	95.2	88.5	75.9	64.9	54.3
9	54.1	56.7	67.6	72.8	81.2	92.8	93.4	92.7	85.4	73.3	62.6	52.8
10	53.1	54.3	64.8	70.1	78.3	89.5	91.1	90.3	83.0	70.7	60.3	51.6
11 pm	52.0	51.9	62.9	67.3	75.4	87.5	89.2	87.8	80.7	68.1	58.0	50.7
12 mid	50.5	50.5	60.8	64.9	73.0	84.7	87.8	86.5	79.1	66.3	56.8	49.6

Cold | Cool | Comfort | Hot
< 32 | 32-55 | 55-69.9 | ≥ 70

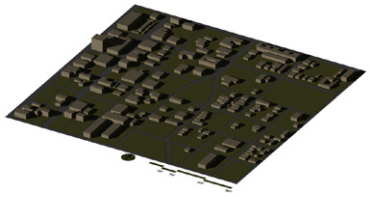
Temperature Calendar, SLD Building
Mean Hourly Dry Bulb Temperature, (F°)



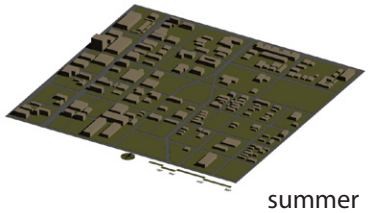
winter
9 a.m.



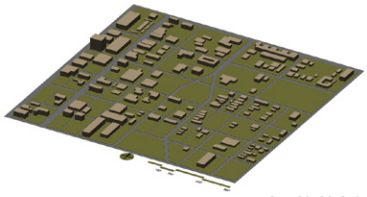
winter
noon



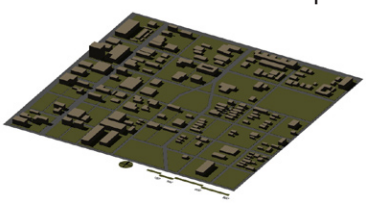
winter
4 p.m.



summer
9 a.m.



summer
noon



summer
4 p.m.

714 N. 5th Ave.
Evans-Churchill Neighborhood
Phoenix, Arizona
33 deg 27' N 112 deg 04' W elevation 1090'








Housing Typology
Late 1800s/Early 1900s Bungalow/Craftsman houses, with front porches, deep overhangs, and prominent roof elements. Construction is wood, with minimal insulation. Stucco is a common cladding material.

History of Evans Churchill Neighborhood

The area north of Roosevelt up to McDowell from Central Avenue to Seventh Street was platted in 1887 as Central Place Addition. J.W. Evans was the real estate broker for the addition. In 1890 the area was replatted as the Evans Addition mainly to rename the north-south streets to correspond with existing city street names possibly to facilitate a future annexation. The area from Central to Third Street was replatted as Evergreen Place in 1907, and the area from Third Street to Seventh Street was replatted as East Evergreen in 1909. The area south of Roosevelt from Central to Seventh Street was platted in 1888 as the Churchill Addition with 49 blocks comprised of 12 residential lots per block. It was annexed into Phoenix in 1895.

714 N. 5th Ave.
Evans-Churchill Neighborhood
Phoenix, Arizona
33 deg 27' N 112 deg 04' W elevation 1090'



from 5th street

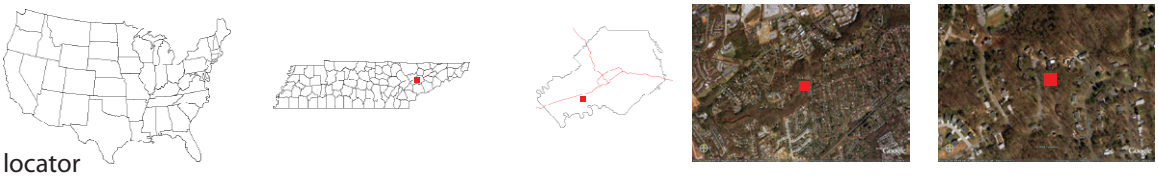


from the south



from the north

512 Gila Trail
Kingston Woods Neighborhood
Knoxville, Tennessee
35 deg 54' N 83 deg 55' W elevation 1060'



locator

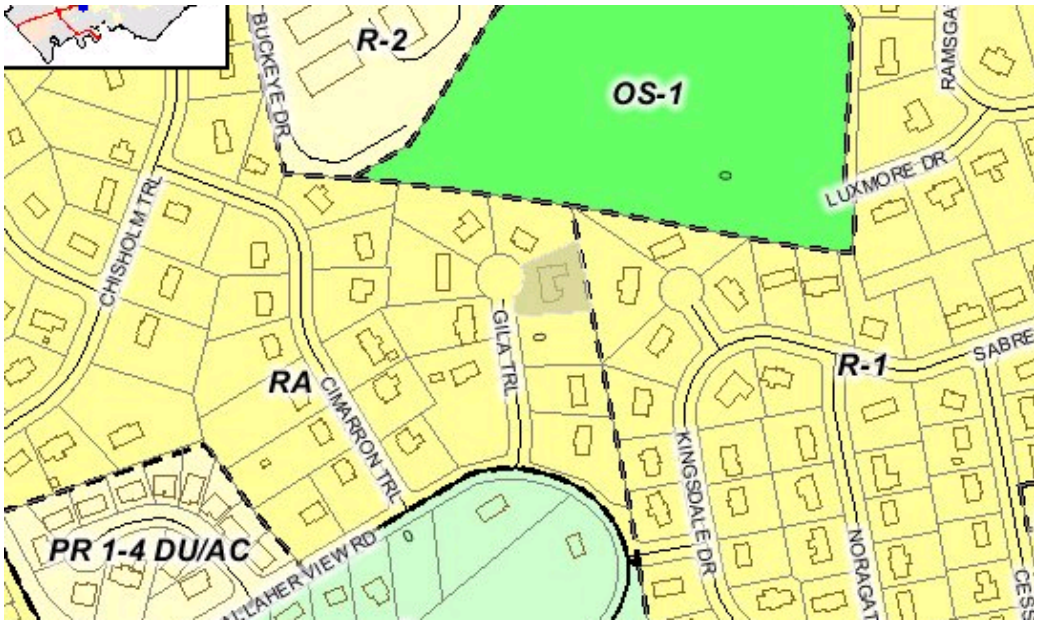


site plan

512 Gila Trail
Kingston Woods Neighborhood
Knoxville, Tennessee
35 deg 54' N 83 deg 55' W elevation 1060'

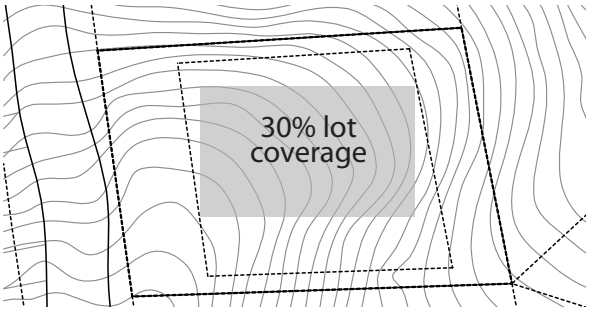


lots



zoning

Lots: irregular geometries
lot sizes = .4 to 1.1 acres

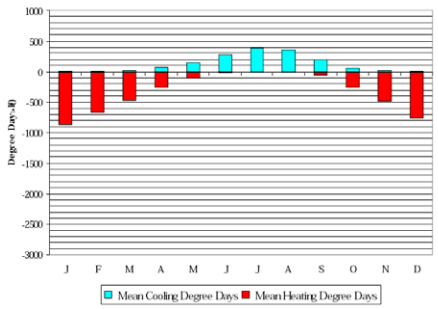


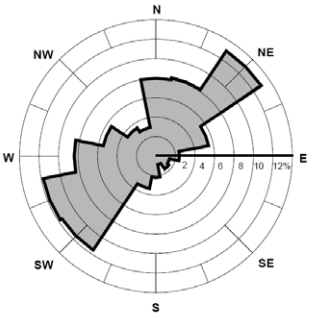
512 Gila Trail
RA Zoning

512 Gila Trail
Kingston Woods Neighborhood
Knoxville, Tennessee
35 deg 54' N 83 deg 55'W elevation 1060'

KNOXVILLE TN WMO No. 723260

Degree Days, Heating and Cooling
(Base 65° F)





Wind Rose: January

	J	F	M	A	M	J	J	A	S	O	N	D
1 am	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	3	5	3	0	0	0	0	0
7	0	0	2	10	23	28	22	12	6	2	0	0
8	1	7	22	46	66	70	63	52	34	21	8	3
9	19	35	65	94	120	124	116	105	82	65	37	22
10	52	73	109	135	158	175	160	150	123	106	71	54
11 am	84	104	146	178	194	205	205	192	164	144	100	81
12 noon	104	134	175	199	218	228	230	213	190	174	128	107
1 pm	117	147	185	209	211	238	230	205	174	177	129	114
2	112	139	177	218	215	229	232	219	167	170	122	109
3	85	128	166	196	200	210	210	196	167	142	96	88
4	68	96	124	157	165	172	177	146	128	103	65	59
5	37	61	91	115	120	140	134	113	84	57	29	24
6	8	22	46	64	72	89	84	69	39	15	5	3
7	0	2	8	17	28	36	36	24	7	1	0	0
8	0	0	0	1	5	8	8	3	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11 pm	0	0	0	0	0	0	0	0	0	0	0	0
12 mid	0	0	0	0	0	0	0	0	0	0	0	0

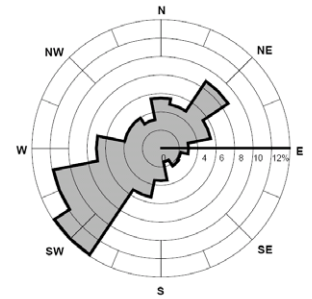
0 | 1-100 | 101-250 | >250

Radiation Calendar
Mean Hourly Global Horizontal Radiation (Btu/ft²)

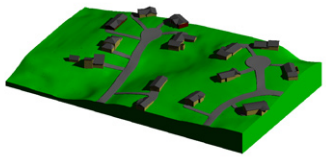
	J	F	M	A	M	J	J	A	S	O	N	D
1 am	35.1	36.0	45.1	54.4	61.1	67.2	71.1	72.0	65.7	54.0	44.5	41.2
2	34.6	35.3	44.3	53.8	60.5	66.5	70.4	70.9	64.9	53.3	43.5	40.7
3	34.2	34.6	43.5	53.1	59.8	65.8	69.6	70.7	64.4	52.6	43.0	40.1
4	33.9	33.9	42.7	52.4	59.1	65.1	69.1	70.1	63.7	51.8	42.7	39.6
5	33.3	33.2	42.0	52.0	59.5	65.3	69.1	69.6	62.7	51.3	42.0	39.6
6	32.3	32.8	41.4	51.6	59.8	65.5	69.2	69.2	62.5	50.8	41.9	38.9
7	32.0	32.4	40.7	51.1	60.1	65.7	69.2	68.5	62.6	50.3	41.4	38.9
8	31.8	32.2	43.1	53.9	62.6	68.8	72.2	71.8	65.4	52.9	41.7	38.8
9	33.0	34.9	45.5	56.7	65.0	71.8	75.2	74.8	69.0	55.8	44.5	40.0
10	35.0	37.9	47.9	59.4	67.5	74.7	78.2	77.8	72.2	58.2	48.3	42.3
11	37.2	40.7	50.1	61.6	69.2	76.6	80.3	80.2	74.6	58.9	51.5	44.4
12 noon	38.6	43.0	52.3	63.8	70.9	78.5	82.3	82.1	77.0	63.3	54.3	47.2
1 pm	40.2	45.1	54.4	66.0	72.6	80.4	84.4	82.8	78.7	65.9	56.6	49.7
2	41.5	46.1	55.5	67.1	72.9	80.7	84.7	84.1	79.5	66.7	58.6	50.9
3	42.3	47.1	56.5	68.2	73.2	80.8	85.0	83.5	79.8	67.6	59.1	51.8
4	42.8	47.8	57.6	69.3	73.5	81.1	85.3	83.5	79.8	68.5	59.1	51.8
5	42.0	47.6	56.2	68.3	72.4	80.1	83.9	83.1	78.9	66.2	58.3	50.3
6	40.5	45.5	54.8	67.3	71.4	79.2	82.4	82.3	76.9	63.9	54.8	47.5
7	39.1	43.2	53.3	66.2	70.3	78.2	80.9	79.9	73.9	61.5	52.3	46.3
8	38.5	41.5	51.6	63.9	68.3	75.6	78.5	77.6	71.9	59.9	50.2	45.1
9	37.6	40.2	49.8	61.6	66.4	73.1	76.2	75.8	69.8	58.3	48.2	43.9
10	37.0	38.8	48.1	59.3	64.5	70.6	73.8	74.5	68.3	56.7	46.9	42.9
11 pm	36.2	37.6	47.2	57.6	63.4	69.5	72.9	73.3	67.2	55.9	45.9	42.3
12 mid	35.7	36.8	46.3	56.2	62.5	68.5	72.1	72.5	66.3	54.8	44.9	41.2

Cold < 32 | Cool 32-55 | Comfort 55-69.9 | Hot ≥ 70

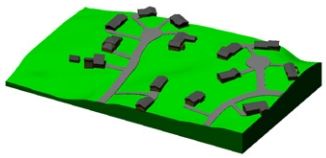
Temperature Calendar, SLD Building
Mean Hourly Dry Bulb Temperature. (F°)



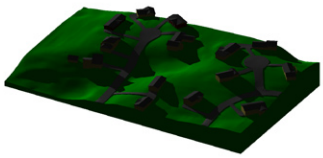
Wind Rose: July



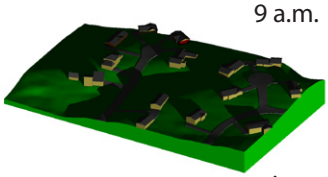
summer
9 a.m.



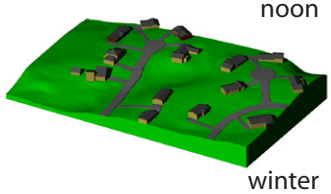
summer
noon



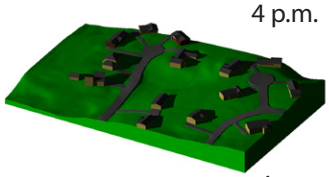
summer
4 p.m.



winter
9 a.m.



winter
noon



winter
4 p.m.

512 Gila Trail
Kingston Woods Neighborhood
Knoxville, Tennessee
35 deg 54' N 83 deg 55' W elevation 1060'


501 Gila


505 Gila


509 Gila


500 Gila


508 Gila


516 Gila

Housing Typology

Developed in the early 1960s, as Knoxville grew to the West along Kingston Pike/I-40, Kingston Woods is comprised of single-family homes, either single story or split-level ranch, generally skirted with brick, with shallow roof slopes, oriented to the meandering streets.

512 Gila Trail
Kingston Woods Neighborhood
Knoxville, Tennessee
35 deg 54' N 83 deg 55' W elevation 1060'



from the intersection

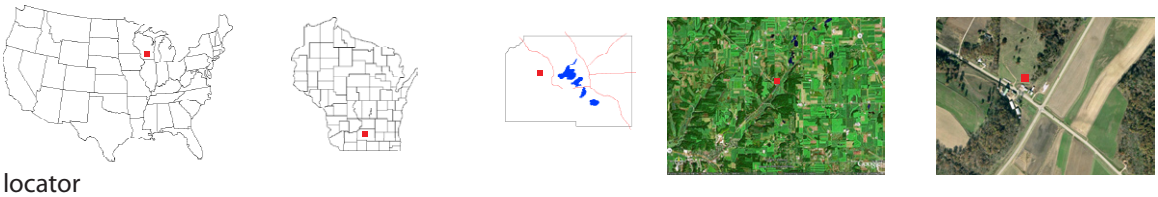


from the street



from the cul de sac

7916 Hwy K
Springfield, Wisconsin
43 deg 08' N 89 deg 36' W elevation 1080'



locator

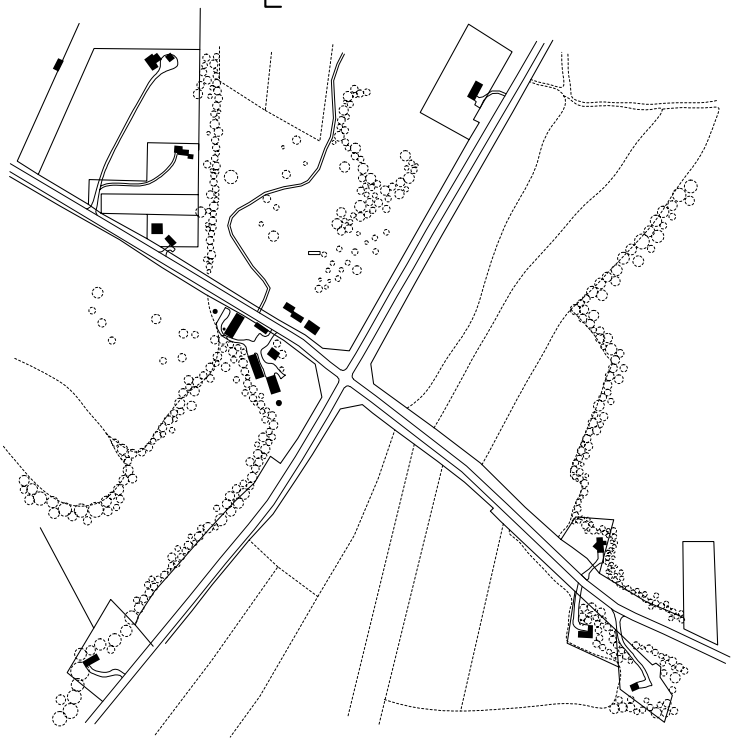


site plan

7916 Hwy K
Springfield, Wisconsin
43 deg 08' N 89 deg 36' W elevation 1080'



sections

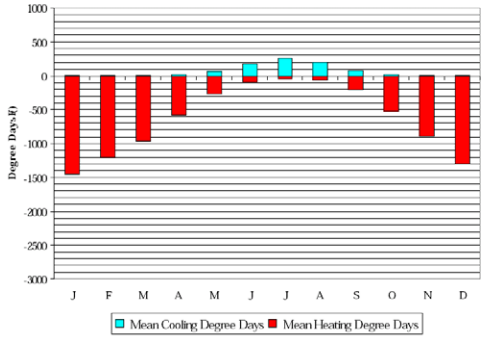


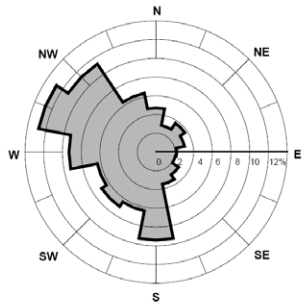
lots/fields

7916 Hwy K
Springfield, Wisconsin
43 deg 08' N 89 deg 36' W elevation 1080'

MADISON/DANE CO. RGNL WI WMO No. 726410

Degree Days, Heating and Cooling
(Base 65°F)





Wind Rose: January

	J	F	M	A	M	J	J	A	S	O	N	D
1 am	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	2	4	2	0	0	0	0	0
6	0	0	0	6	18	23	19	9	2	0	0	0
7	0	1	9	32	57	63	52	43	23	9	1	0
8	5	14	38	66	110	100	100	89	65	34	14	6
9	25	49	76	112	146	146	146	138	101	73	43	26
10	54	88	116	142	186	195	198	183	143	107	72	55
11 am	84	119	155	177	215	235	222	209	166	133	87	82
12 noon	100	136	165	190	228	240	231	227	165	147	93	90
1 pm	102	145	162	180	220	245	236	228	177	140	93	93
2	91	130	151	163	206	225	226	207	160	121	77	78
3	64	97	114	141	181	186	198	173	125	83	53	51
4	33	64	88	107	146	157	156	139	94	53	25	21
5	8	25	45	64	103	114	109	90	49	18	5	3
6	0	4	12	27	50	58	65	43	14	2	0	0
7	0	0	0	6	14	24	23	10	1	0	0	0
8	0	0	0	0	3	4	4	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11 pm	0	0	0	0	0	0	0	0	0	0	0	0
12 mid	0	0	0	0	0	0	0	0	0	0	0	0

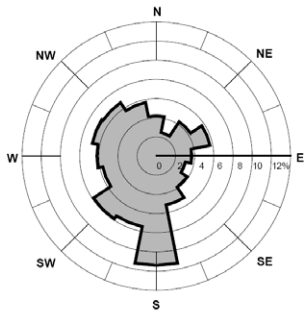
0 | 1-100 | 101-250 | >250

Radiation Calendar
Mean Hourly Global Horizontal Radiation (Btu/ft²)

	J	F	M	A	M	J	J	A	S	O	N	D
1 am	14.8	19.2	29.5	42.9	50.2	60.1	65.4	60.7	54.8	43.3	33.7	21.2
2	14.3	18.8	28.9	42.0	49.3	59.4	64.4	59.9	54.2	44.9	33.0	20.9
3	13.8	18.5	28.4	41.4	47.8	58.6	63.8	59.4	53.6	44.8	32.5	20.6
4	13.4	18.0	28.1	40.8	47.1	59.3	63.1	59.1	53.5	44.4	32.1	21.0
5	12.9	17.4	27.9	39.9	46.9	60.0	62.8	58.1	53.3	43.6	31.8	21.4
6	12.5	16.9	27.6	40.0	49.4	60.7	65.3	59.6	53.2	43.5	31.1	21.8
7	13.2	17.9	29.1	42.8	52.8	63.3	67.8	64.1	55.9	44.9	31.1	22.4
8	13.8	19.0	30.7	45.6	55.8	65.7	70.4	67.5	58.6	48.2	32.2	23.0
9	14.4	20.1	32.3	48.1	58.6	68.6	73.0	70.6	61.3	52.0	34.8	23.6
10	16.6	22.2	34.3	50.2	60.8	70.4	75.6	72.7	63.1	54.2	36.8	25.0
11	18.7	24.3	36.3	52.3	63.5	72.3	77.7	74.2	64.9	49.6	38.5	26.4
12 noon	20.9	26.4	38.4	54.2	65.2	74.1	78.2	75.8	66.7	58.8	39.7	27.8
1 pm	21.5	27.3	39.1	55.2	66.2	74.6	79.5	77.0	67.3	60.3	40.5	28.0
2	22.1	28.2	39.9	55.7	67.2	75.2	80.6	77.3	67.9	60.8	41.2	28.1
3	22.8	29.1	40.6	55.8	67.7	75.8	80.8	77.7	68.5	60.7	41.2	28.3
4	21.3	27.7	39.2	55.5	67.7	74.8	80.6	77.3	66.8	59.5	39.8	27.0
5	19.9	26.4	37.7	54.6	67.2	74.0	79.4	76.2	65.0	57.0	38.5	25.8
6	18.4	25.0	36.3	52.1	65.5	73.1	77.9	74.2	63.3	52.9	37.2	24.5
7	17.7	23.9	34.8	48.9	62.3	70.0	74.9	70.1	61.4	51.1	36.4	24.0
8	16.9	22.8	33.4	46.7	58.6	67.0	71.1	66.9	59.4	49.2	35.8	23.4
9	16.2	21.8	31.9	45.9	55.8	64.0	69.3	64.7	57.5	48.6	35.1	22.9
10	15.6	21.2	31.4	45.3	54.3	62.9	68.2	63.5	56.7	47.5	34.7	22.3
11 pm	15.0	20.7	31.0	44.0	52.9	61.9	67.0	62.3	55.9	47.3	34.2	21.6
12 mid	14.5	20.2	30.5	43.6	51.5	60.8	66.4	61.4	55.1	46.6	33.7	21.0

Cold < 32 | Cool 32-55 | Comfort 55-69.9 | Hot ≥ 70

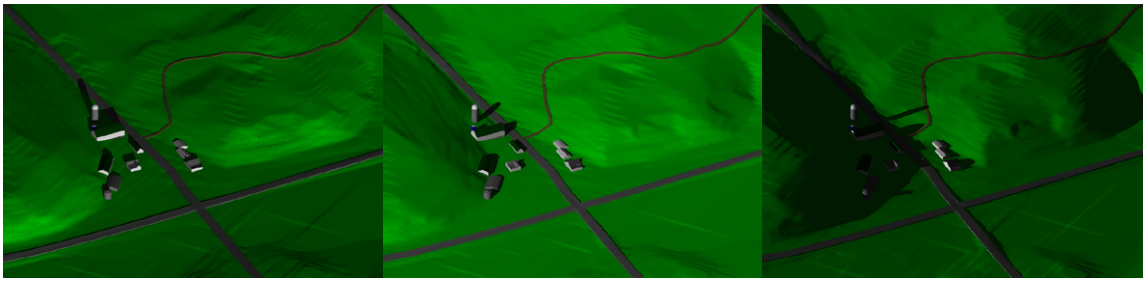
Temperature Calendar, SLD Building
Mean Hourly Dry Bulb Temperature, (F°)



Wind Rose: July



summer 9 a.m. summer noon summer 4 p.m.
winter 9 a.m. winter noon winter 4 p.m.



7916 Hwy K
Springfield, Wisconsin
43 deg 08' N 89 deg 36' W elevation 1080'



across the valley



at the intersection



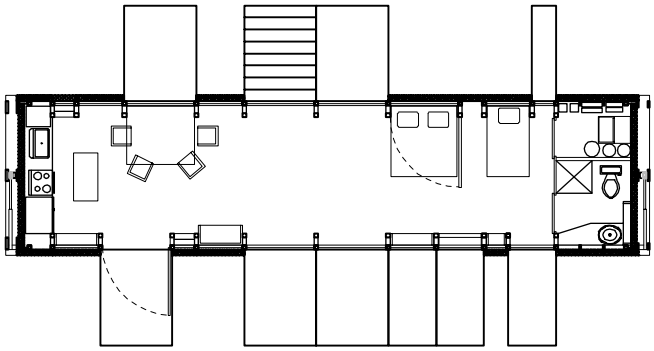
looking up at the hill

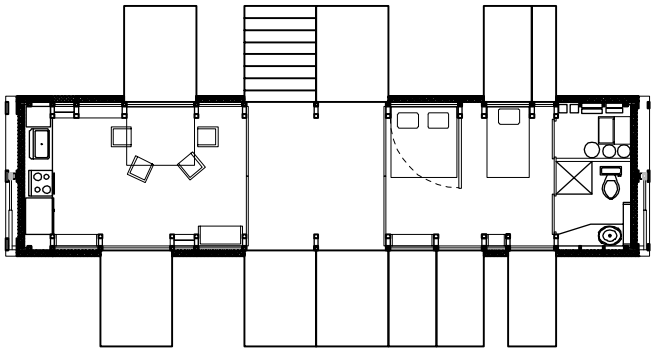


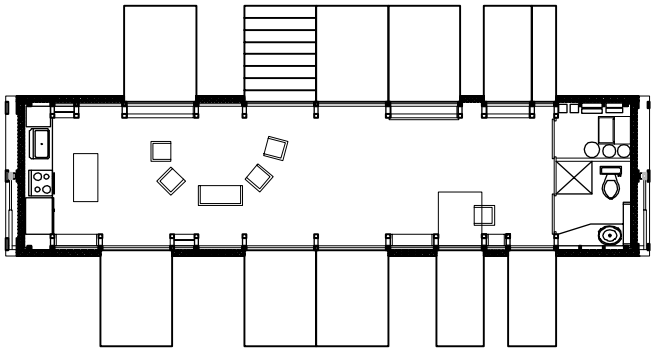
looking down from the hill

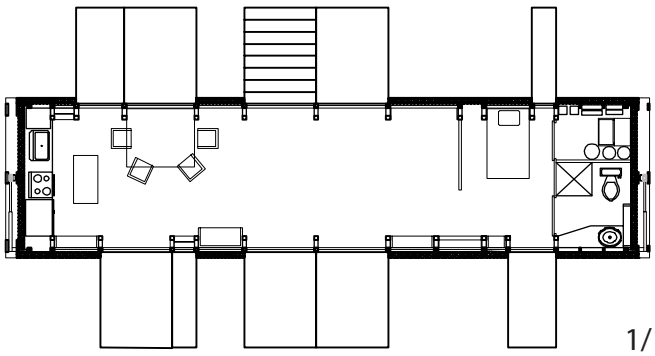
Appendix 6: Design Solution

Universal Drawings



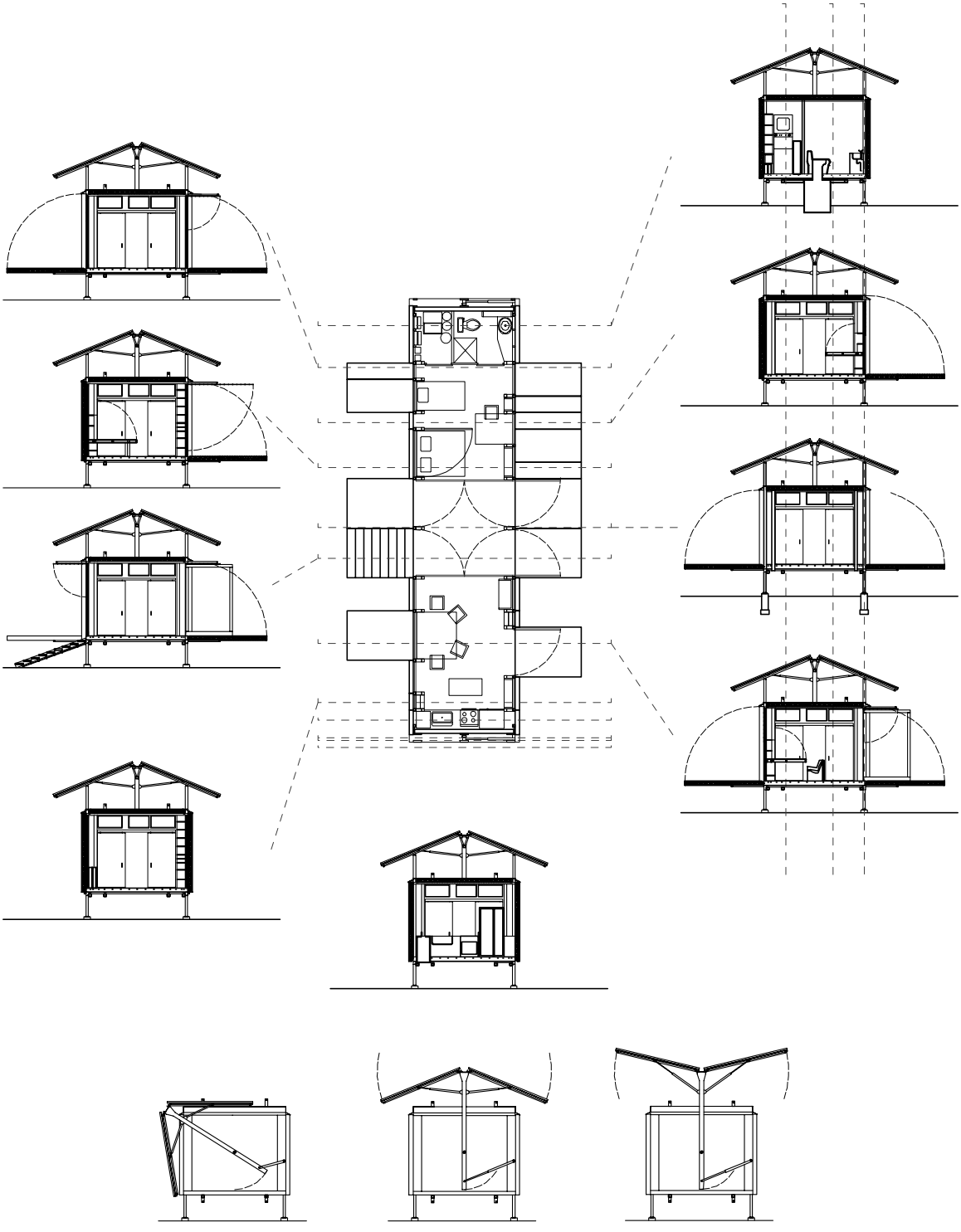






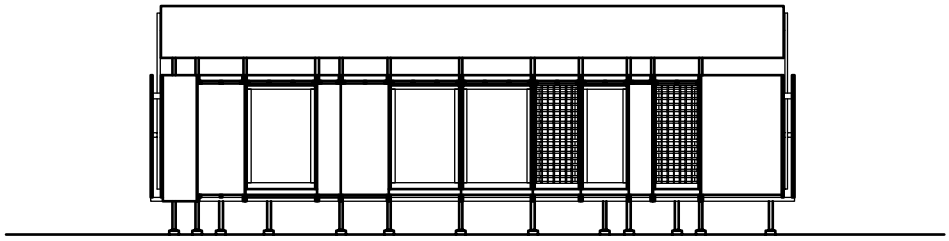
plans
1/16″ = 1′-0″

Universal Drawings

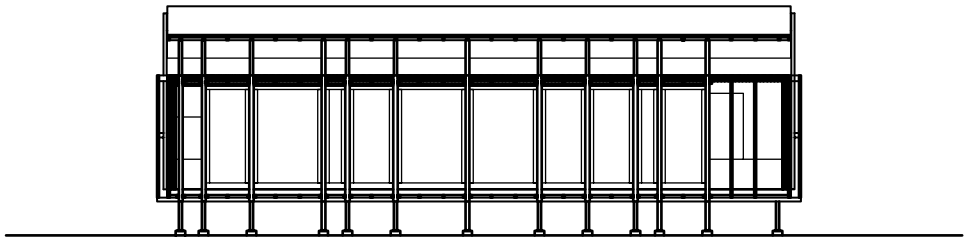


short sections
1/16″ = 1′-0″

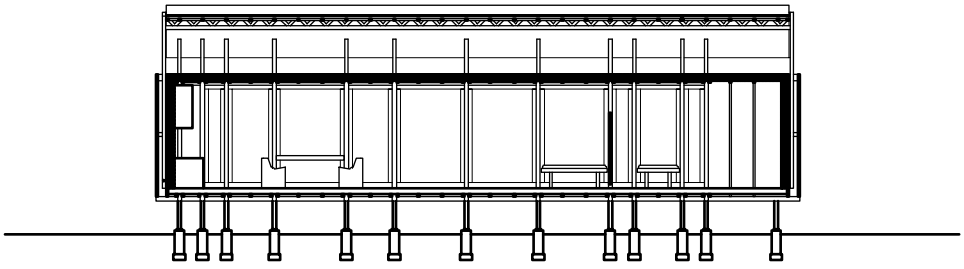
Universal Drawings



long elevation
1/16″ = 1′-0″

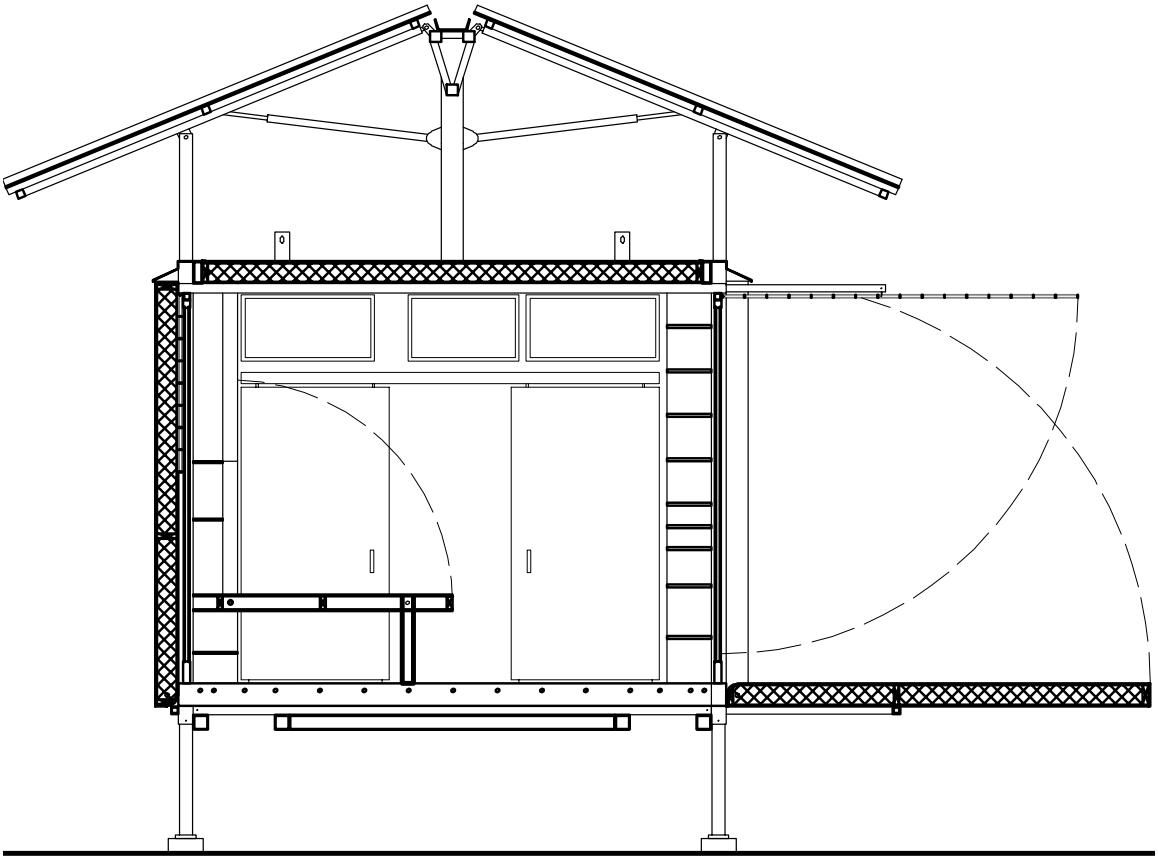


long section 1
1/16″ = 1′-0″

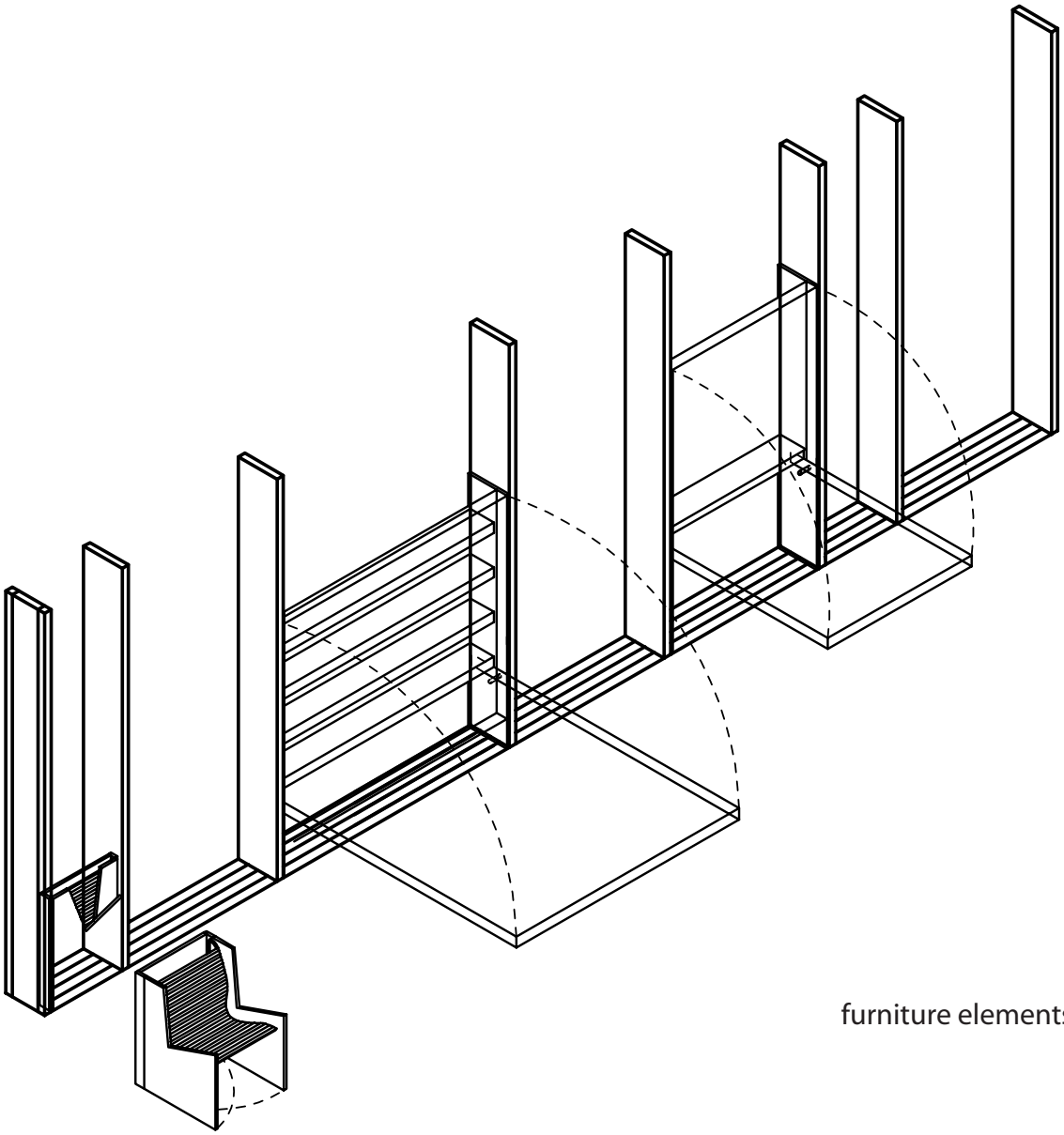


long section 2
1/16″ = 1′-0″

Universal Drawings

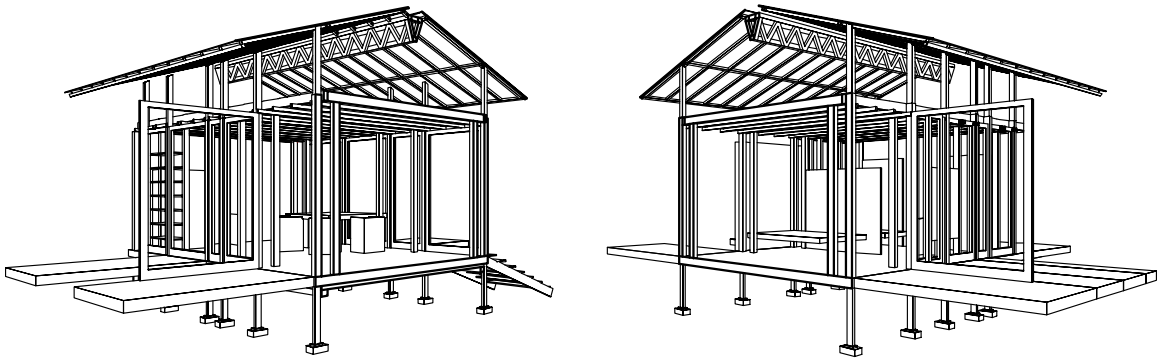


short section
1/4″ = 1′-0″

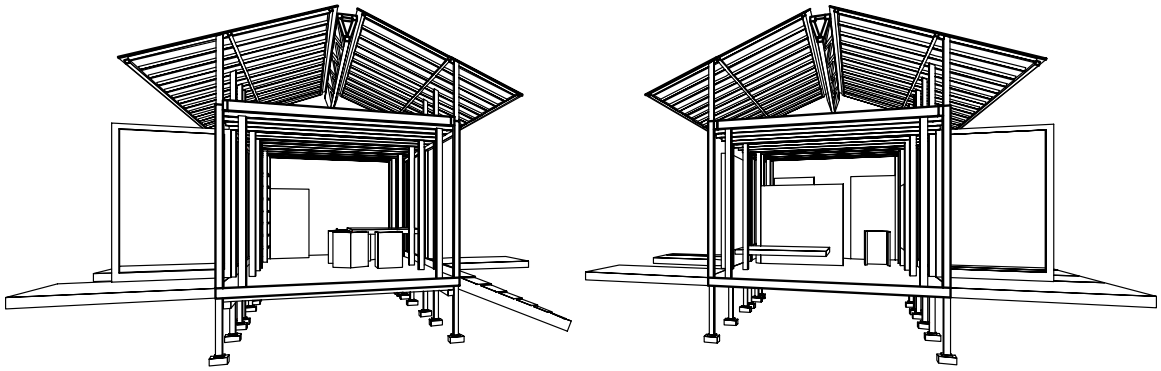


furniture elements

Universal Drawings

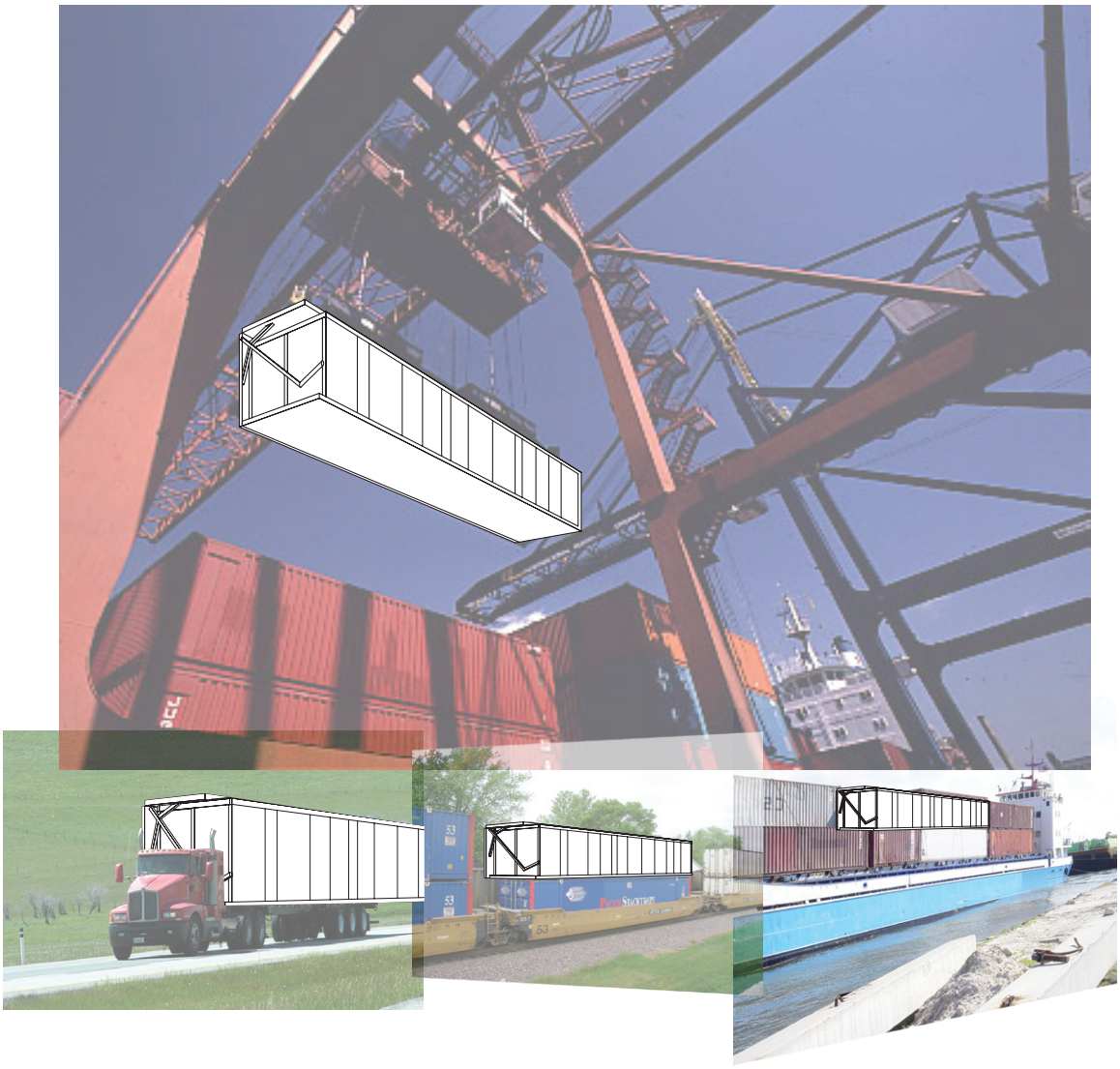


exterior section perspective



interior section perspective

Universal Drawings

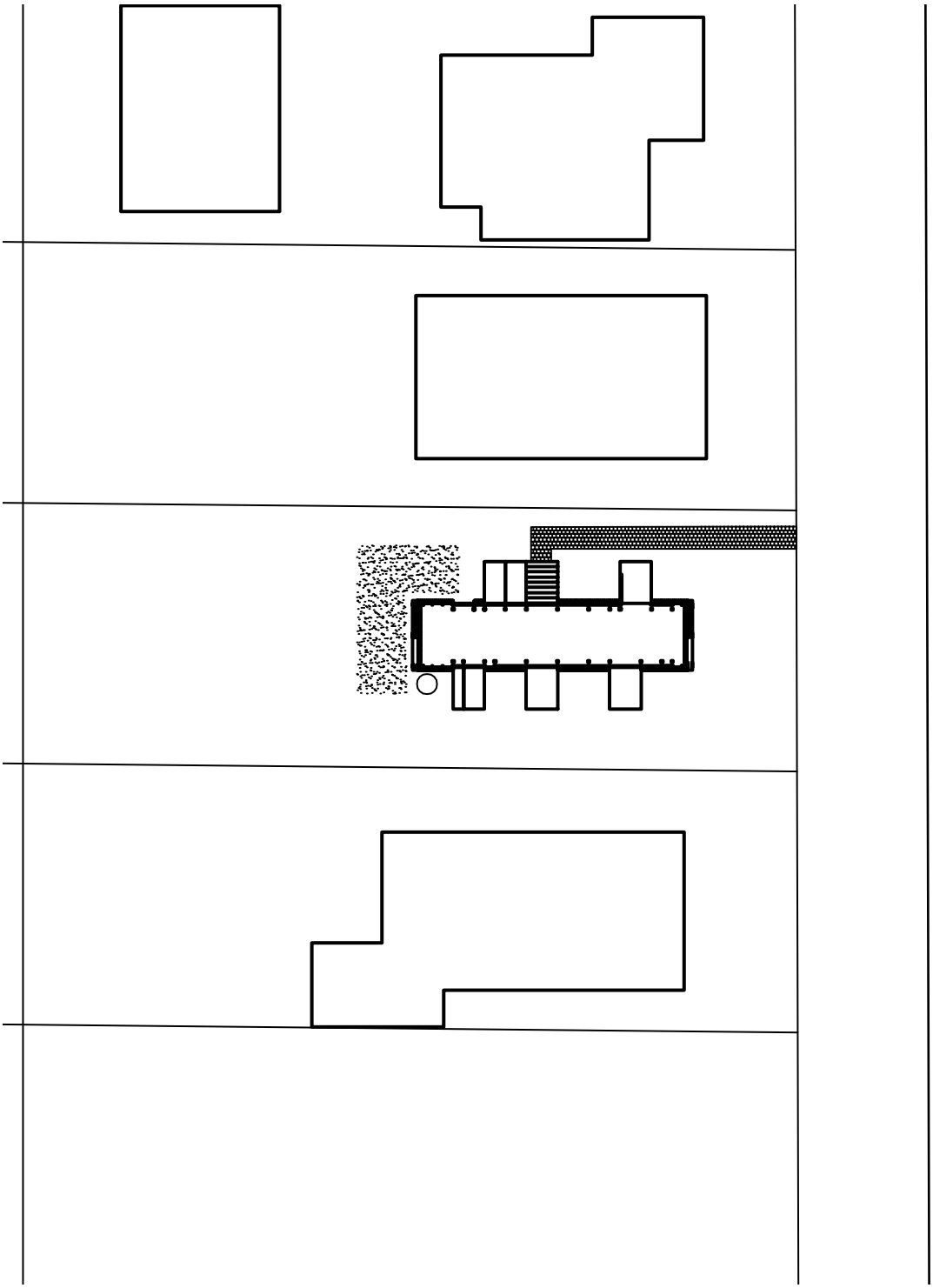


Site: Phoenix



site plan
1″ = 200′

Site: Phoenix

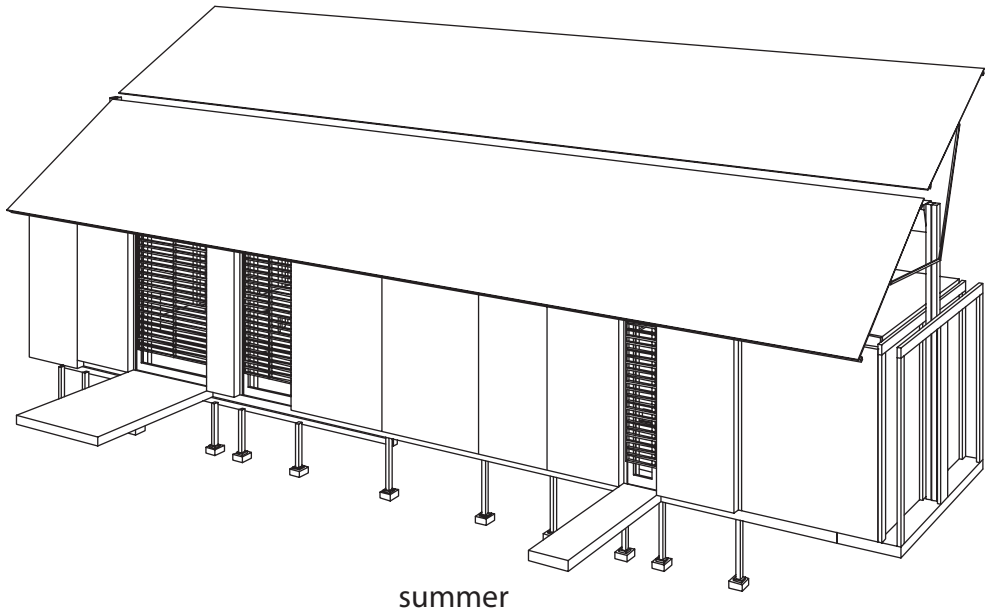


site plan
1/32″ = 1′-0″

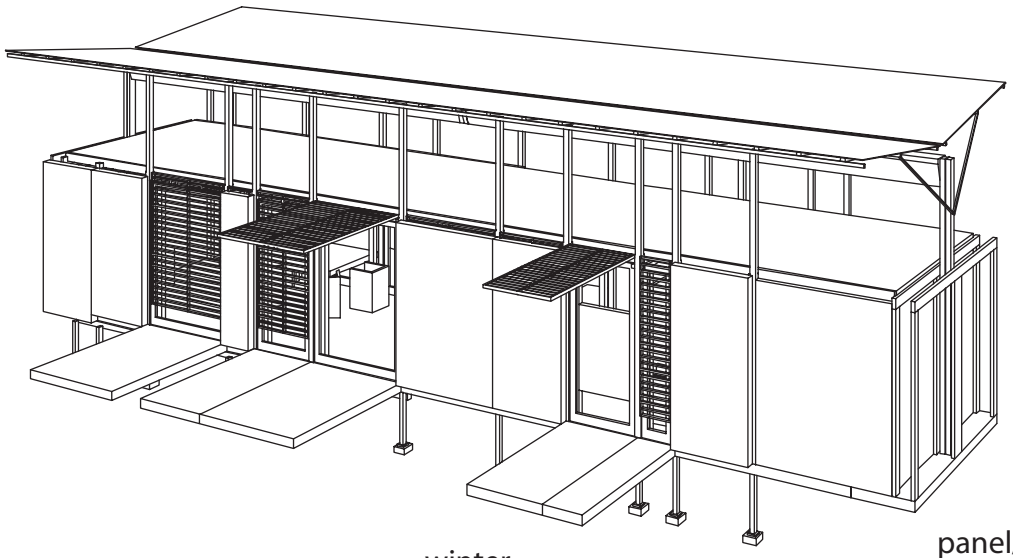
Site: Phoenix



site section
1′ = 100′



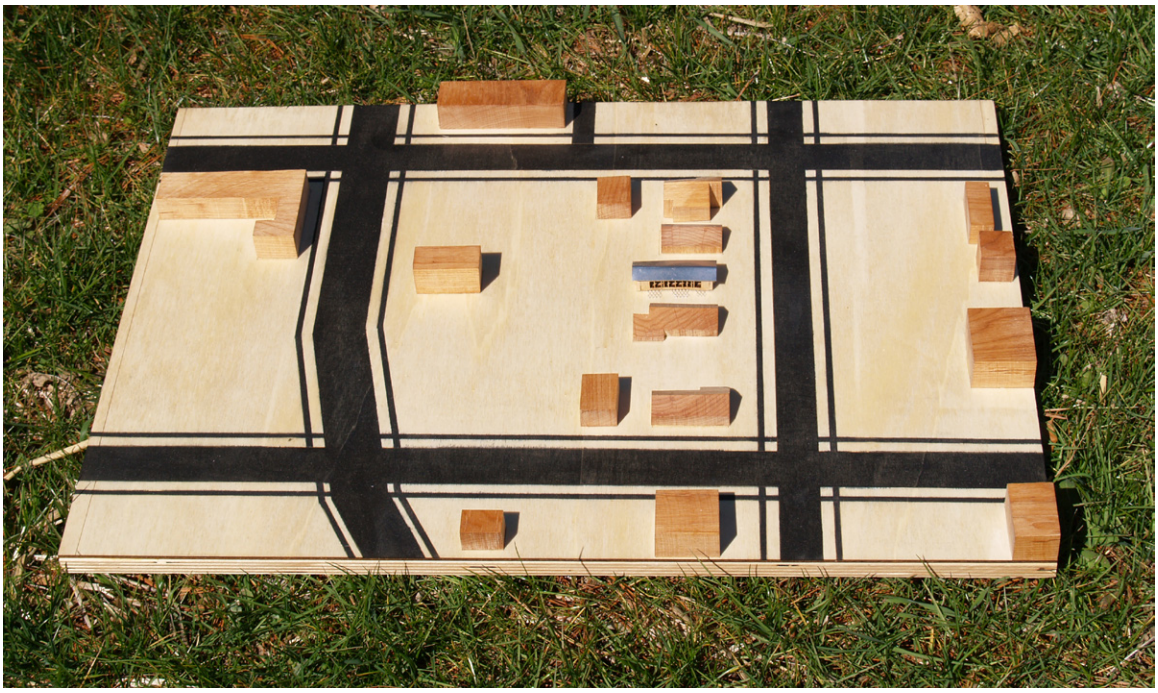
summer



winter

panel/roof
adaptation

Site: Phoenix



1/32″ = 1′0″
physical model

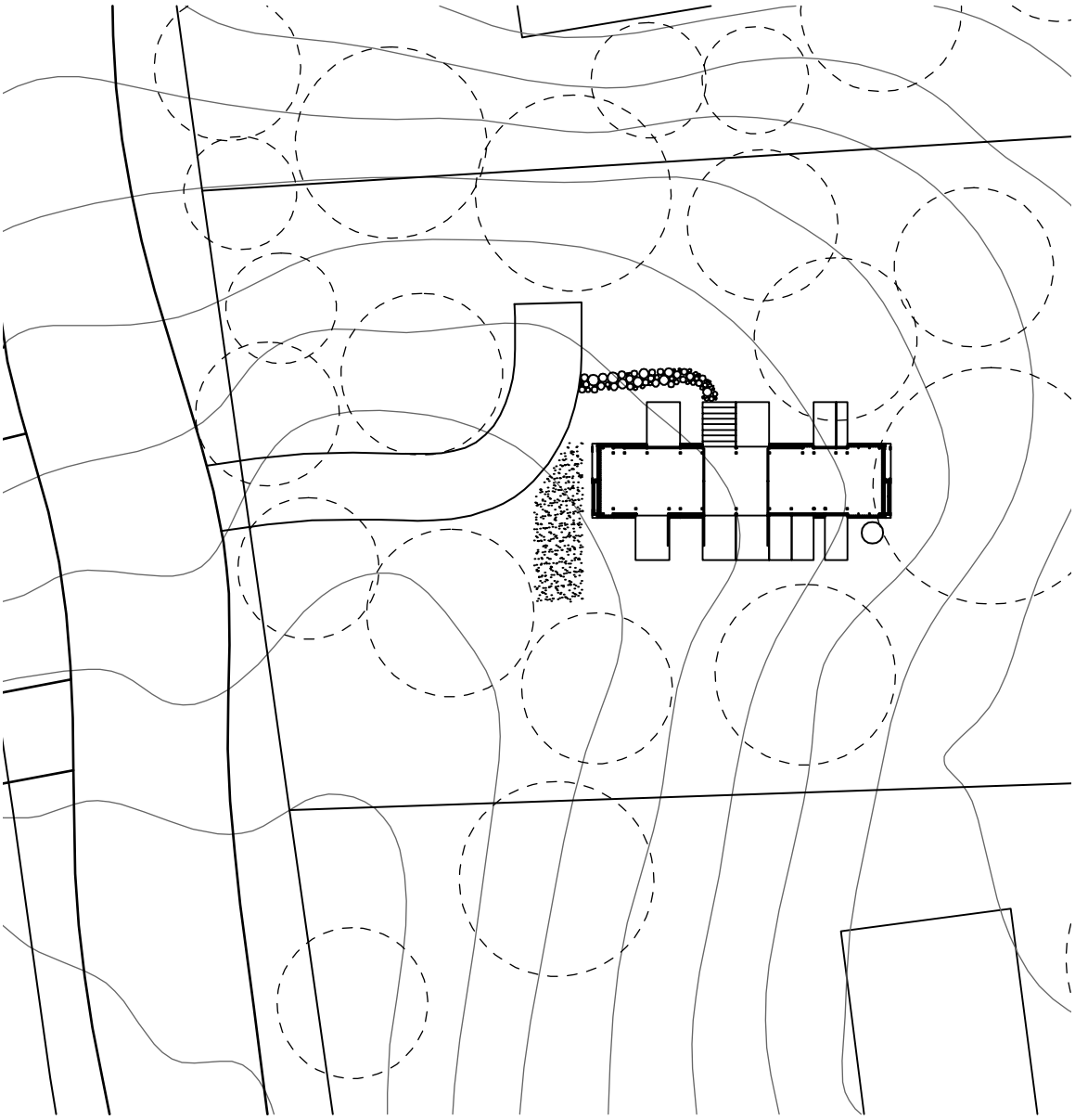


Site: Knoxville



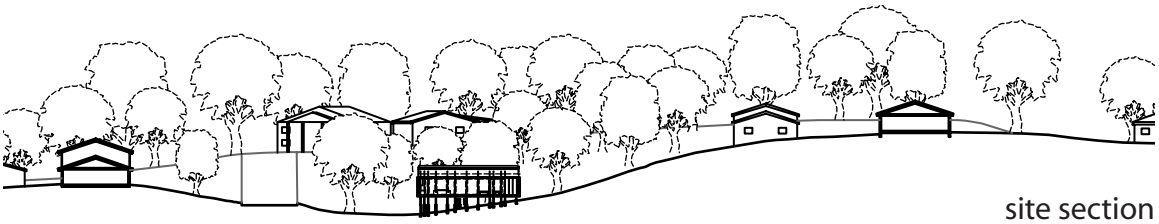
site plan
1″ = 200′

Site: Knoxville

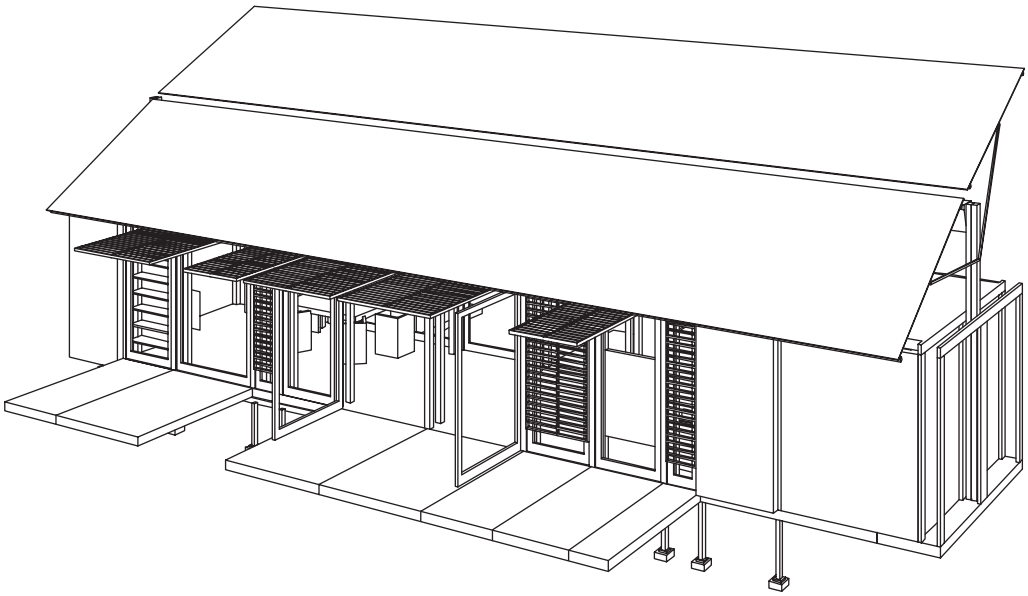


site plan
1/32″ = 1′-0″

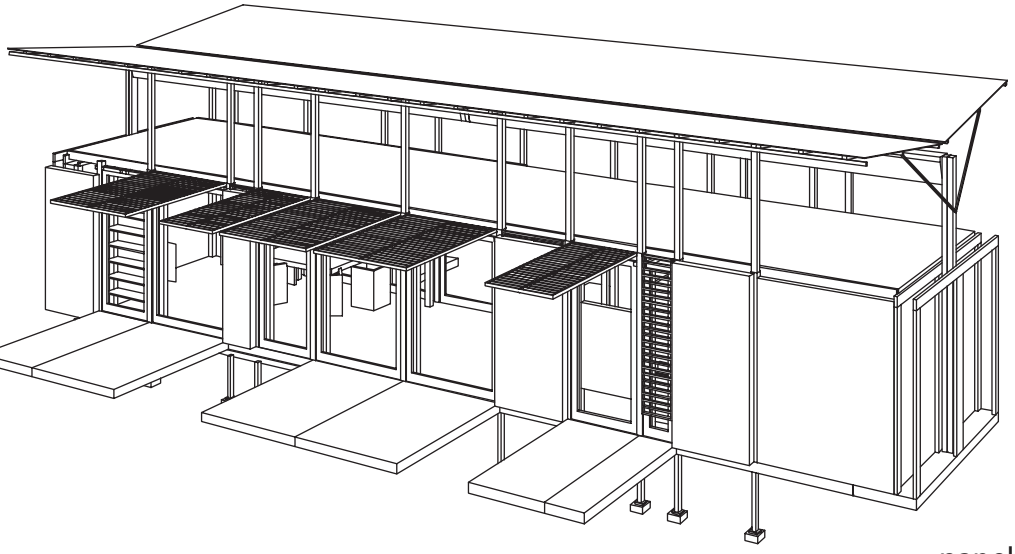
Site: Knoxville



site section
1′ = 100′



summer



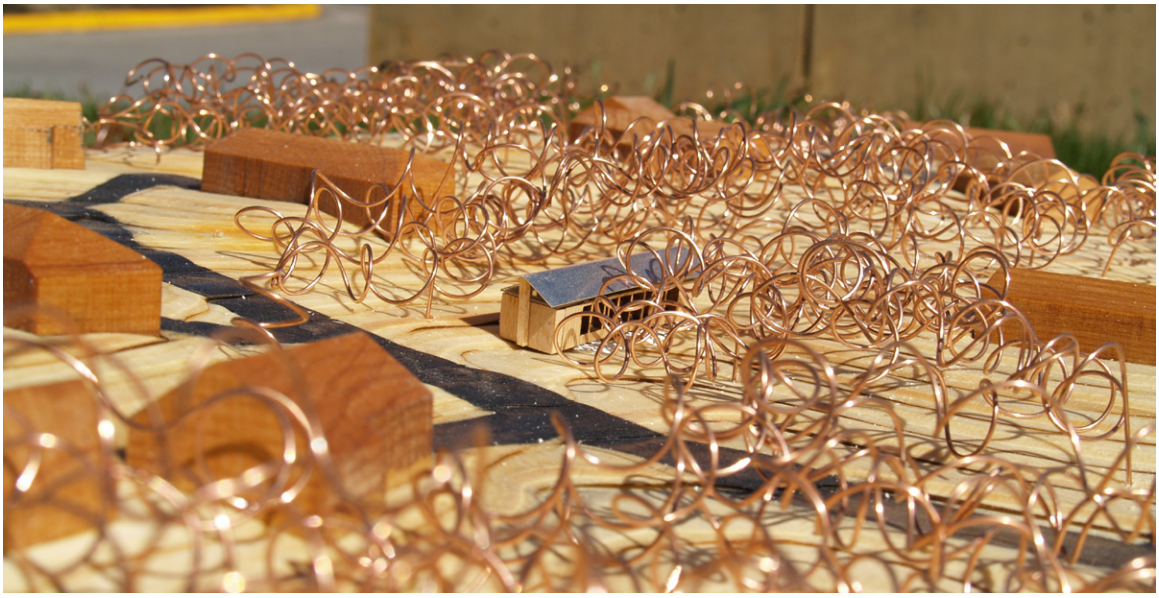
winter

panel/roof
adaptation

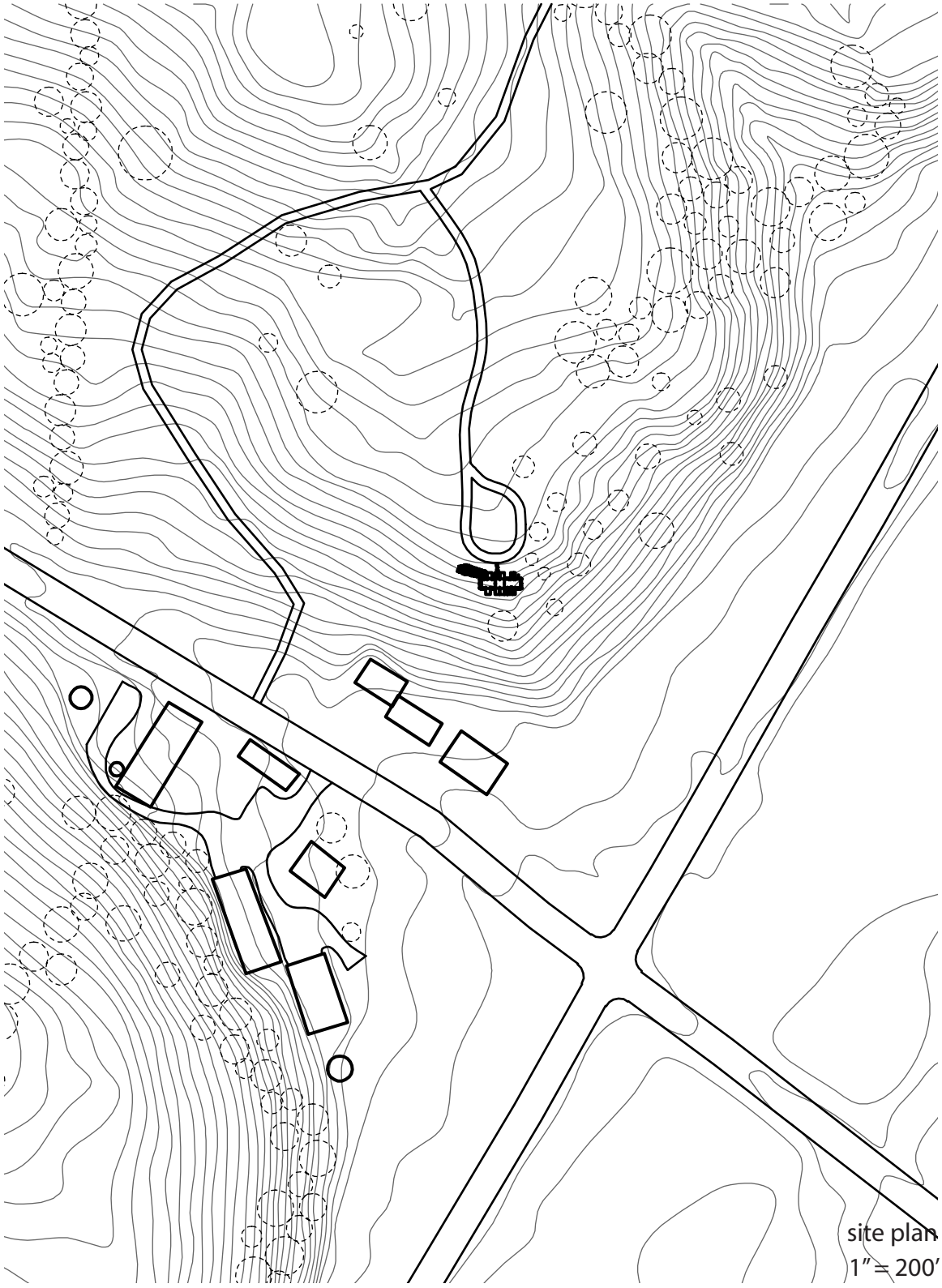
Site: Knoxville



1/32″ = 1′0″
physical model

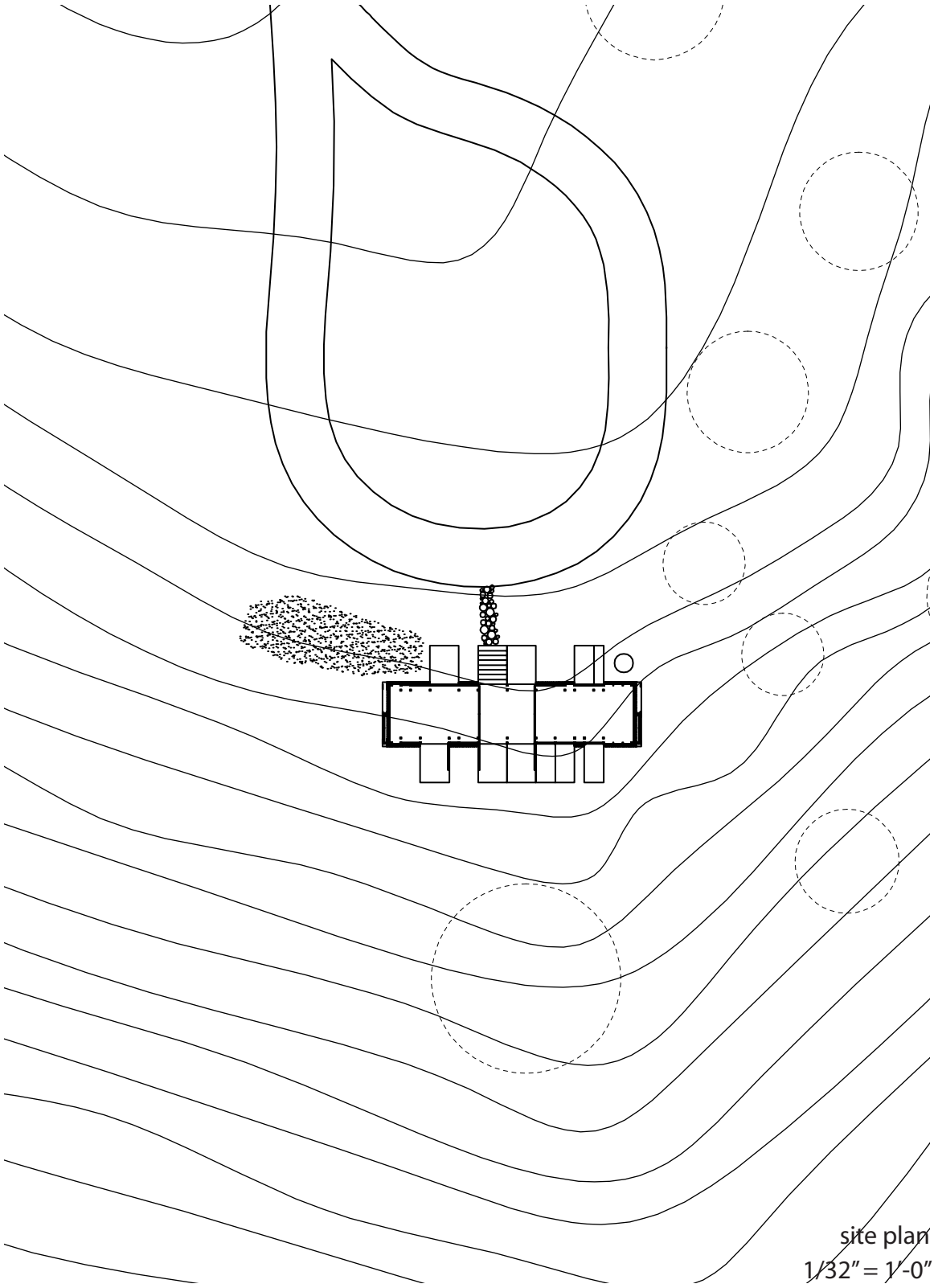


Site: Springfield



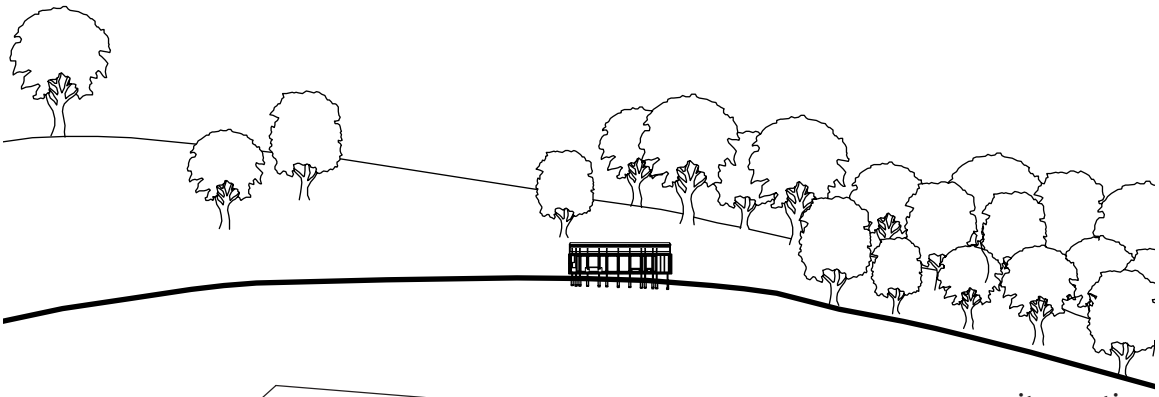
site plan
1″ = 200′

Site: Springfield

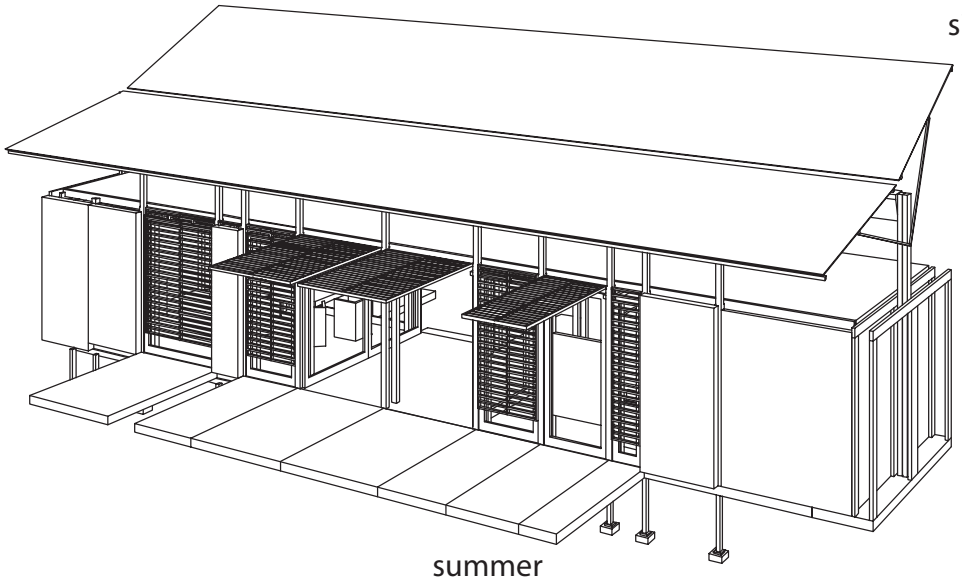


site plan
1/32″ = 1′-0″

Site: Springfield



site section
1′ = 100′



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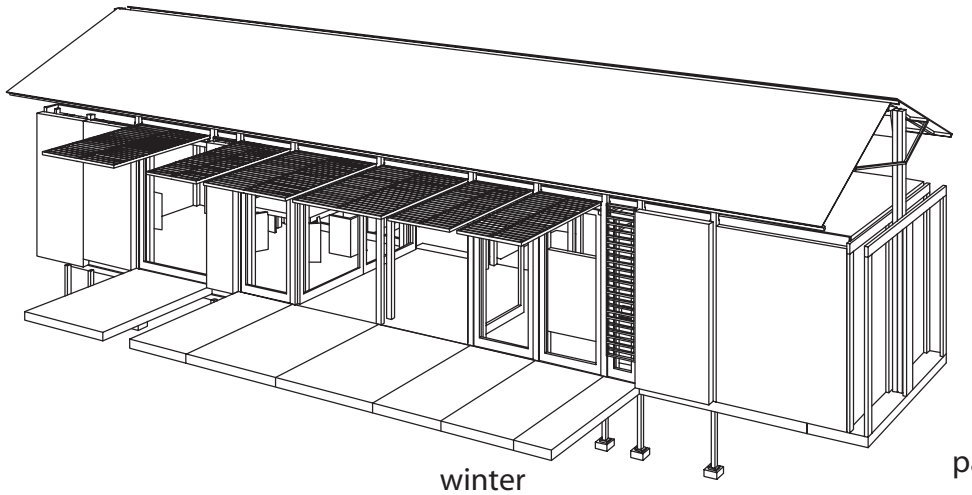


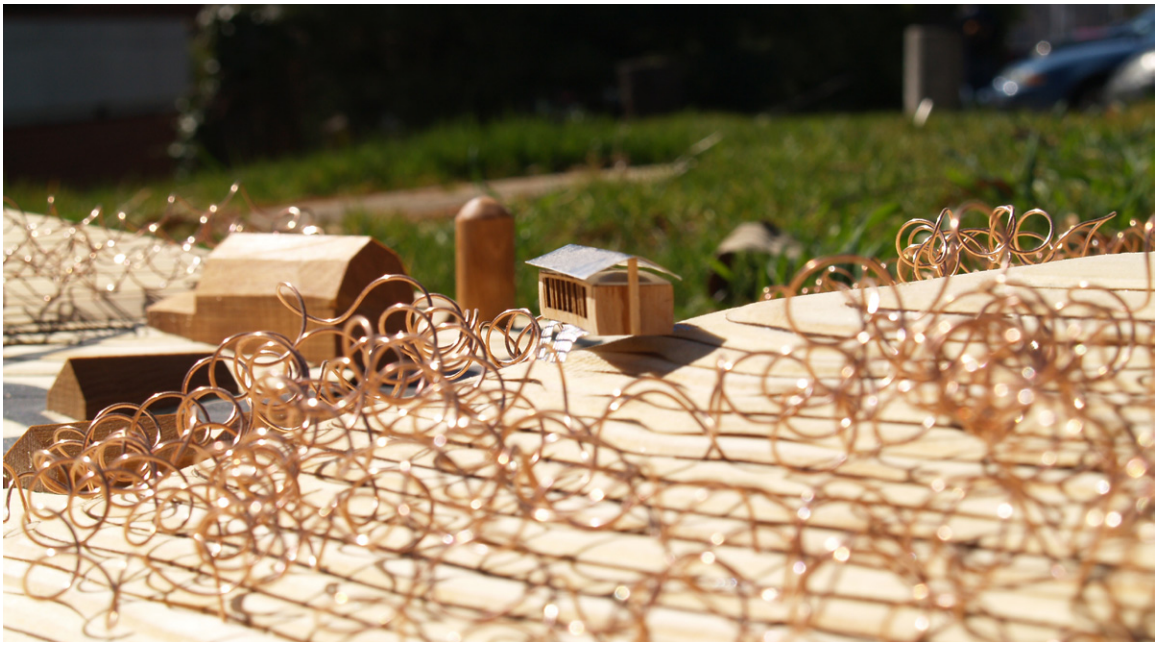
winter

panel/roof
adaptation

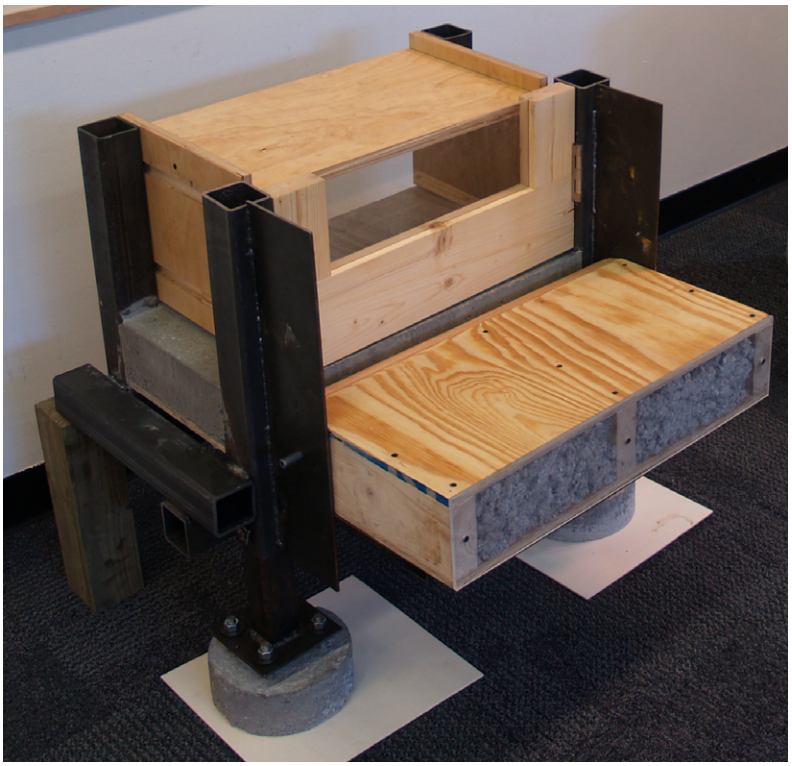
Site: Springfield

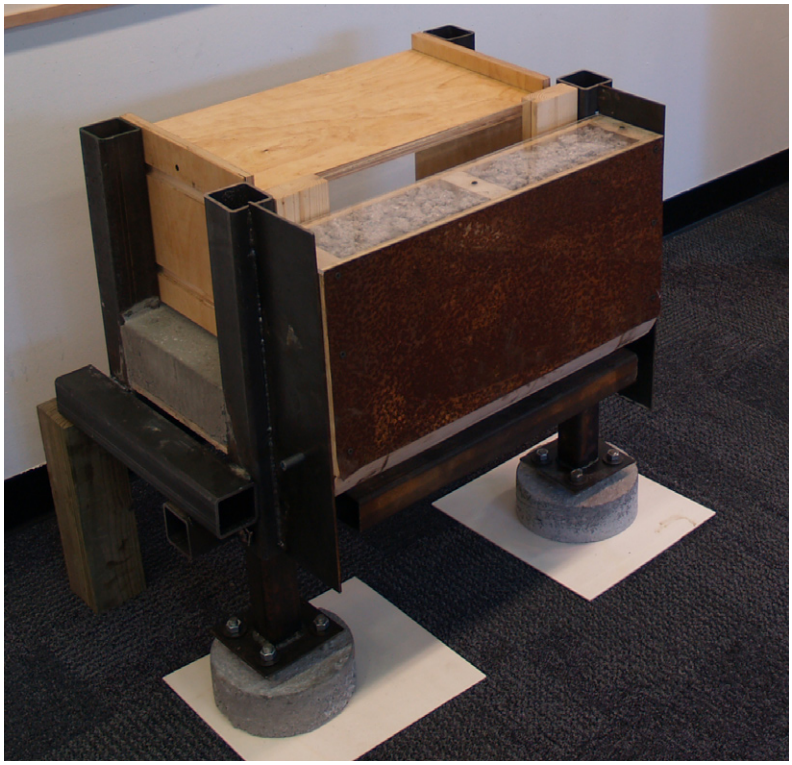


1/32″ = 1′0″
physical model



Full Scale Representation





elements::

tube steel structure

concrete footings

fold-up insulated panel

concrete floor

shelf

window

panel outrigger

connection
detail
study

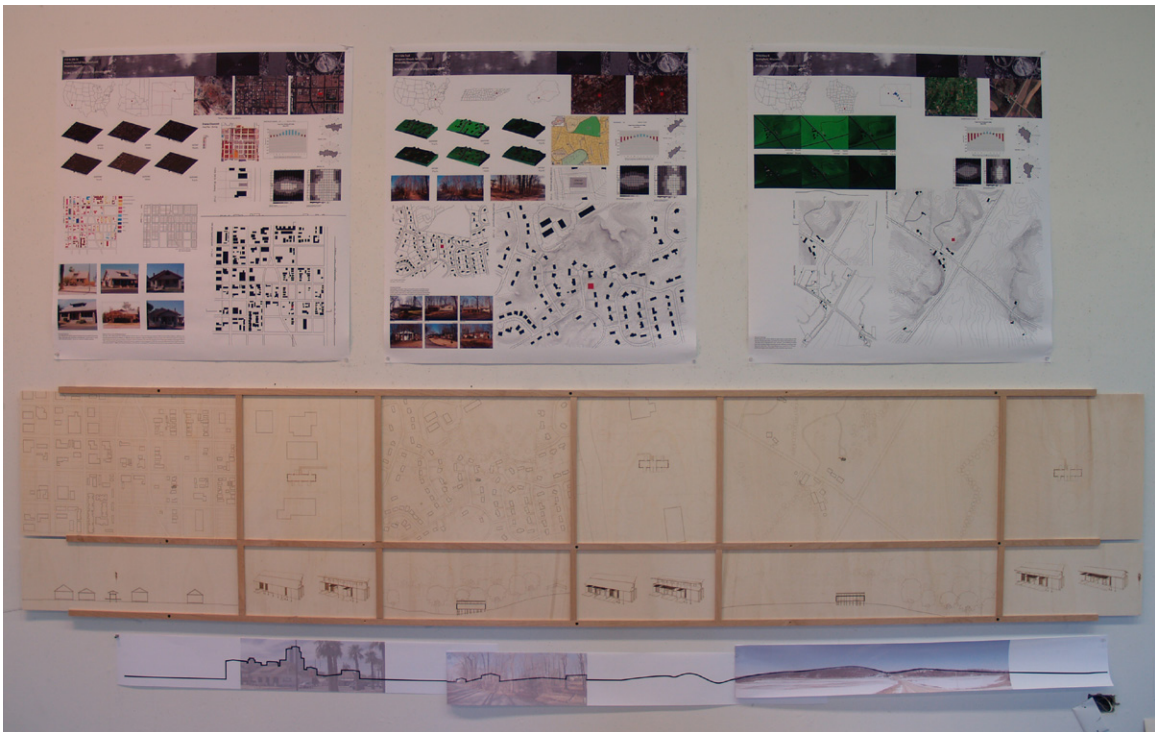
Full Scale Representation

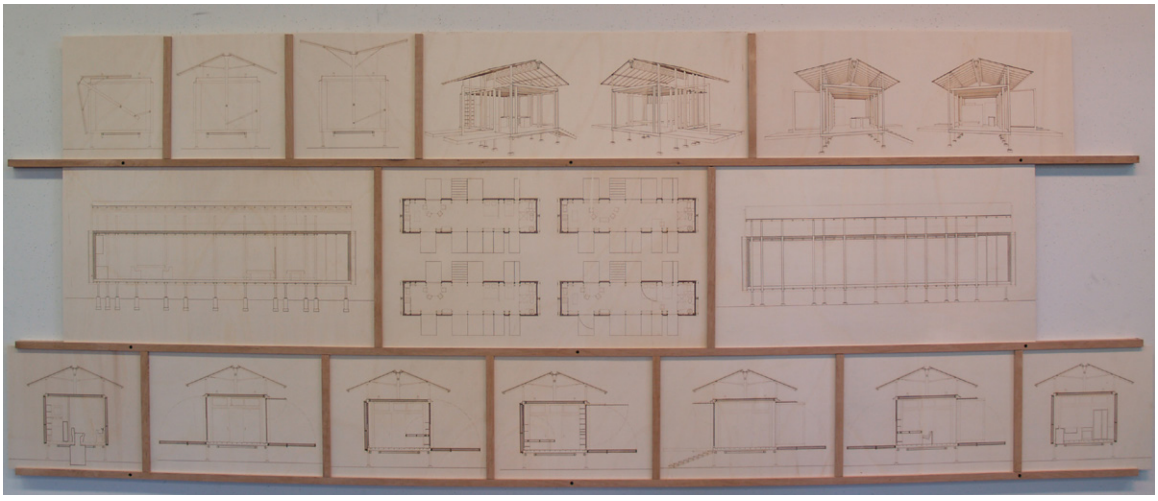




rolltop chair

Full Scale Representation





etched drawings

Vita

Kristofer M. Nonn was born September 18, 1979, and grew up in Cross Plains, Wisconsin. He grew up working on the family dairy farm, and at an early age began learning the piano, trumpet, and singing. In high school he played baseball, and was second in his graduating class. From there he went to the University of Wisconsin - Madison and studied Trumpet Performance. While there, he engaged in a wide variety of ensembles, including brass quintet, symphony and chamber orchestra, jazz big band, jazz combo, and solo recitals. He played in the Madison Symphony, the Wisconsin Chamber Orchestra, and the Madison Opera, among others. After receiving his Bachelor of Music - Performance degree in 2002, he worked for a year on that same family dairy farm he grew up working on. He entered the Masters of Architecture program at the University of Tennessee in Knoxville in 2003. He has no idea where he is going, and has enjoyed where he has been.