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Saturating Suburbia

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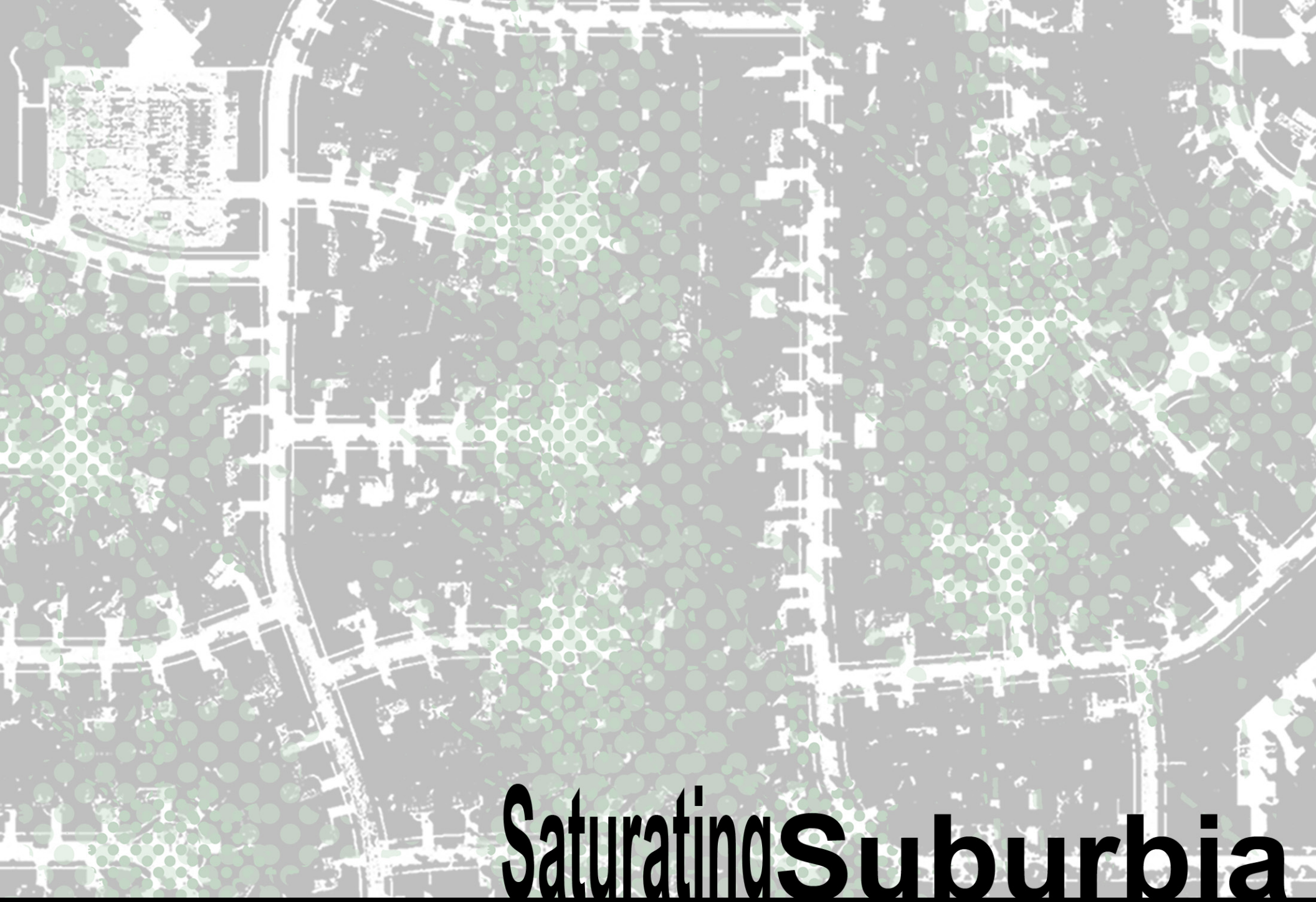

Saturating Suburbia

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by
Erin Ostendorf
A Terminal Project
Presented to the Faculty of
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In Partial Fulfillment of Requirements
For the Degree of Master of Architecture
Major: Architecture
Under the Supervision of Professor Peter Hind
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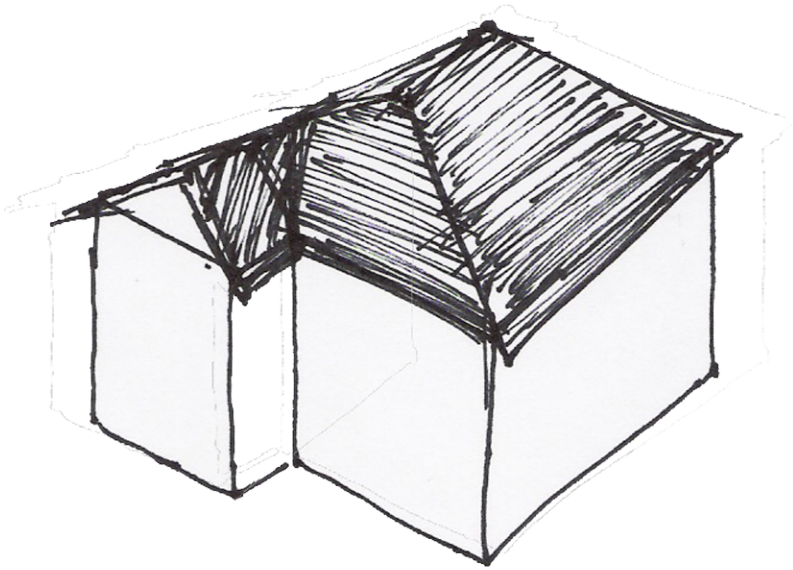

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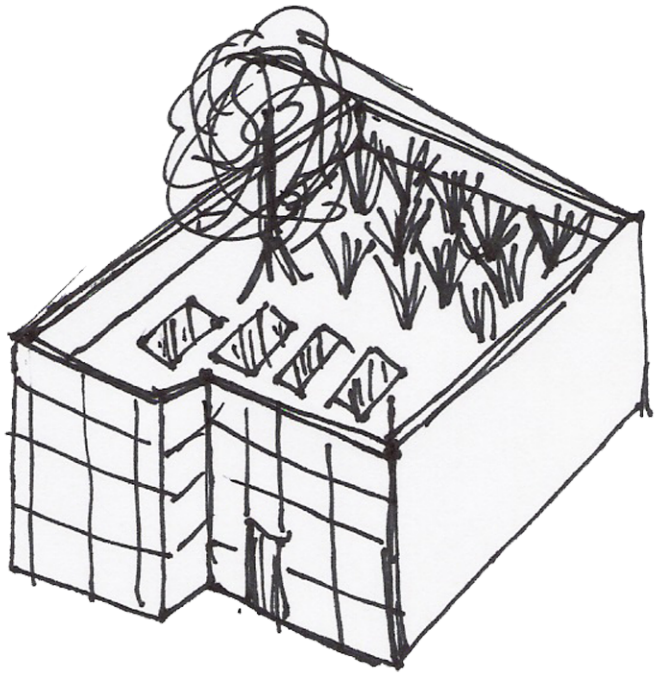

My thesis began with an interest in wanting to explore how architecture is going to be redefined by the phenomenon of climate change. Climate change will undoubtedly change the face of our planet, and as a young student, I wanted to understand more about this change. What will it mean for me as a person, but also as an architect.

My approach began with a look at global warming and the coastlines of the world. How will the coastal landforms change? What does this change mean for the architecture that exists there? Is it realistic to continue to build in such an environment? As I began to answer these questions, I found myself becoming more intrigued by another. How can architects design a means of habitation that truly impacts change?

I was learning more about the potential outcomes introduced by global warming, and I found myself feeling that the answer wasn't along the coastlines, but rather within the interior cities. This is when my focus shifted from coastal cities to the typical suburban environment. As a place to shelter ourselves, many find the suburb as the perfect home. But global warming will demand that this ideal changes. A new density is required. How can this occur while still maintaining the quality of life that suburbanites enjoy?

I made the choice to focus my design on the cul-de-sac. After analysis of the suburb, the cul-de-sac held the most potential for a drastic change. It is my hope that this new space considers the land in a more positive manner than in which is currently exists.

I ended my project with the design of an individual home within this new framework. I wanted to further develop the feeling of living in my new space.

Introduction

Rising Waters: Rising Houses
Expanded Project Proposal
2008-2009
Mentor: Peter Hind

Introduction
Since the development of communities and cities began, people have been attracted to living near bodies of water. As one of the necessities of survival, people first lived near water for its source of sustenance and nutrition. As time progressed, it became a mode of transportation of both people and goods. Today, bodies of water still reflect upon these, but even more they now often represent recreation or wealth.

Parallel to this development is the transformation of these bodies of water. Since the Industrial Era, the world has seen an increase in greenhouse gases, which has also lead to an increase in methane, CFCs, and nitrous oxide among other things. The levels of CO2 and CH4 are higher than any other time in the last 650,000 years. While it is believed that the burning of fossil fuels is the leading cause of this increase, other land-use changes, including deforestation can not be ignored. These increases have lead to a phenomenon called global warming. Global warming is the increase in the Earth's near-surface air temperature and increase in the oceans' levels. This rise has begun to affect the cities that have built themselves around the water. With the increase in levels, cities are being forced to rethink their master planning and architecture as flooding has begun to create problems. While the increased temperatures are creating more drastic weather patterns and can cause flooding, it is only temporary. It is the problem of what will happen to cities and communities as the polar ice melts and the ocean levels rise that needs to be addressed.

CASE STUDY 1:
Salt House…. UK

The Salt House by Alison Brooks Architects, located in the United Kingdom has been hailed as a "prototype of flood-proof residential construction". As a sea-side residence, particular flood risk planning had to be incorporated into this design. The concrete slab has been elevated upon mini-piles. This process allows water to move beneath the house, reducing hydrostatic pressure on the foundations. While it hasn't been necessary, the house has the potential to be jacked up to higher levels should the need occur from rising water.

CASE STUDY 2:
Maasbommel Housing Development…. Netherlands

A forty-six residence housing development in Maasbommel has attempted to tackle the issue of rising water in a manner that has provoked much interest. The firm Dura Vermeer has developed a floating house, that does what the name suggests, floats, and an “amphibious” house, one that will stand on dry land, but as waters rise, is able to rise with them. The amphibious house is intended to return to its resting place on dry land so its orientation is more for flooding than the permanent problem of global warming. Both houses are comprised of large concrete tubes that contain air to provide the initial buoyancy. They are then moored to huge steel piles that prevent any horizontal movement. As the water moves in and the house rises vertically along these piles, flexible pipes allow water and electricity to reach the house.

Independent Study
Traveling through Europe, an examination of the various types of residences that exist over water was made. In larger bodies of water, regular boats, be it yachts, sailing ships, or cruise ships, are the most obvious method of living on water. Besides being the most traditional approach, they are made to work in collaboration with waves and tides. Whereas, in Bath, Venice, and several other cities, “narrow boats” or long boats can handle small water movement, but likely not much more. Their size alone indicates their intent for smaller rivers and channels. Both sizes of boats are designed with hulls that sink below the surface of the water and keep the boat buoyant.

Similar in method, houses are being built upon large slabs of buoyant materials, such as Styrofoam. They are then connected via dock to a mainland. While these are buoyant, they are very limited to the amount of rise in water level, due to tide or flooding, nor are they resilient to wave movements.

A third system is pylons. The entire city of Amsterdam is built upon series after series of pylons and columns. Silodam is an example of where the rise in tide level has been considered. The building, coming off a pier, is raised up off the water level several feet and is supported by a series of regularly placed pylons. Like the houses previously mentioned, this building still connects to mainland facilities and is reliant on the stability of land.

Still dependent on land, bridges are another way people have tried to live over water. In Florence, Ponte Vecchio is such an example. This bridge spans over a river with two main support columns going down into the river. While this particular bridge is very basic in design, it does allow for movement of water and rising of tides while allowing people to live and move freely upon it. However, it is also entirely dependent on its land connection.

Goal
The purpose of this project is to explore the architectural elements that already allow people to live on or near water and to expand upon it in a way that will encourage a more permanent solution to rising waters across the world. This proposal will look at two case studies where components are in place to control flooding. The intention is to take the ideas from these examples and use them to create and design a solution more empathetic to the permanent problem of global warming.

Project
This multi-faceted project will begin by attempting to resolve the permanent problem of global warming by investigating and designing a structural system that permits the residence to rise in level. To do this, a specific prototype will be developed that can respond to several unique situations where global warming is already in effect. This system will allow the building to continuously rise on an as-needed basis without limitations. Thus the current dependency upon mainland will be minimized and its independency will be nearly self-sustaining. This project relies upon an entire change of environment and lifestyle.

As a result of exploring flood-proof construction, several unique ideas from other projects can be compiled to assist with the design for this prototype. For example, in a development in the Netherlands, a system has been proposed to handle hydrostatic pressure caused by wave movements. This system not only hampers waves, it takes the energy from them and converts it into electrical energy. This solution has the potential to allow significant independency from connections to any mainland. In Maasbommel, all of the houses are equipped with access for both land and water transportation. This allows for traditional land transportation to be utilized until the time when water transportation must take effect. Though the intention is temporary and meant to be used for flooding, a more stable solution can be planned. As a site becomes immersed in water, aerated and agricultural land will become more limited. This might create a desire to develop greenhouse space or introduce a method called hydroponics, where plants are grown in hanging environments. Ultimately, the objective is to create a prototype that can exist independent from a land environment.

The intention is that this prototype not be site specific, or rather, the site is implied by need. The idea is that this residence can be applied to the areas in which global warming will effect first. Some of these areas may include Venice, New Orleans, Manhattan, Amsterdam, etc.

Original Proposal

Once this basic prototype is developed, other issues will arise. These can include how utilities are maintained, how the residence is accessed, how the rest of the community is accessed, etc. After a basic system is adopted, the prototype can become more site specific in its development. One obvious issue will be what happens to the surrounding community as the residence and the water level rises. If not planned, the residence could become an island itself. Ideally, however, this prototype could not just support residences, but could assist buildings of any kind, ultimately making small communities that can sustain themselves. The solution being proposed in this project could foster small cities that would succeed in a situation similar to that in the movie Water World, where living on land no longer becomes an option.

NAAB
Through the research and design development process, consideration and completion of NAAB Performance Criteria will be maintained and if at all possible, exceeded.

Before any type of structural system begins to be defined, more research into the idea of flood-proof and global warming housing is crucial. An exploration of existing projects will cultivate these ideas and set up a history of precedence. This will allow for a better understanding of what elements are necessary in order to develop this project. The research component of this project is what will contribute to the success of the development of the prototype and structural system. Further education might be obtained through exploration of cities themselves. If necessary, a field trip to one of the previously mentioned cities may take place and more extensive research of how global warming will affect these communities will be completed.

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Something is wrong and we must make it right… or at least find the most effective starting point to effect change.

Global warming is a complex issue; there is no one cause, no single effect. It is a problem that has become connected to nearly every facet of today's society. From species extinction and intensified weather events, to food shortages and rising sea levels, global warming has the potential to change our lives forever. As we face the greatest threat ever posed to mankind, it becomes a question of what to do now? ¬

This project began as an exploration of how coastal habitation might adapt to the changes caused by rising sea levels. Beginning with an examination of the ways in which people currently live in, on, or around water, it became clear that new methods would be necessary to successfully treat this changing condition. The considerations of architectural possibilities proposed by early research were simply reactions to an event whose effects are relatively unpredictable. These reactions would be like designing architecture to be "less bad". The basic re-creation of a house designed to handle rising waters is not good enough, it doesn't suggest an answer to the source of the problem, rather just solves a way to keep going in the same direction. So, how can architects design a means of habitation that truly impacts change?

The Earth has just passed the point in which more than 50% of the world's population lives in cities. As a result, I have chosen to focus on the detached housing unit within the suburban context. The current trend of city expansion (the sprawl effect) occurs in an outward horizontal direction that consumes mass quantities of land. In addition to the spending of the raw materials to create this expanded infrastructure, this growth also is energy intensive. This combined consumption leads to unprecedented amounts of waste. The suburb is the strongest example of this wasteful environment. It is a landscape that doesn't consider the land. While there has been much analysis and proposed solutions for the creation of a better suburban environment, they tend to focus on solutions for the car-oriented lifestyle. This project argues that it is not just the car, but the dwelling that exists within this environment, and that it is crucial to re-evaluate the way in which we choose to shelter ourselves and occupy land. This project will focus on developing a new dwelling that becomes productive instead of consumptive in areas of energy, land, and materials.

Abstract

Critical Criteria

Increase in quality of open and/or public spaces while increasing density

Demonstrate how the suburbs, made of these new dwellings, can absorb population through the increase higher-density living spaces

Demonstrate how the suburbs can shift their focus from mobility to accessibility

Increase productivity in energy for suburban environment through the architectural integration of low and hi-tech technologies such as passive solar heating, photovoltaic panels, geothermal heating systems, etc.

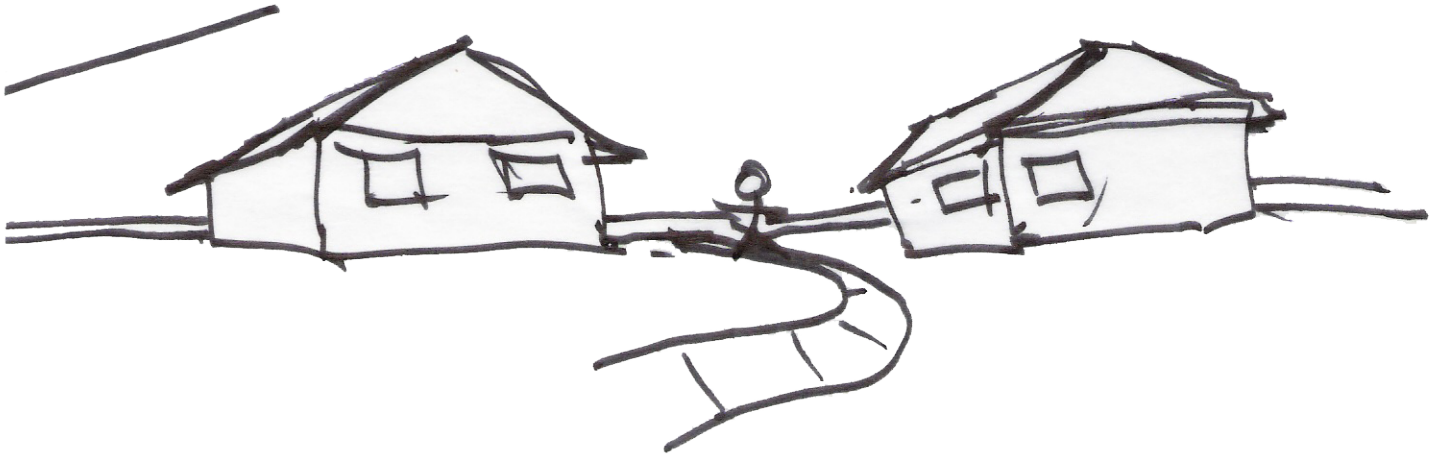
Dwelling produces energy for itself, and for the collective community

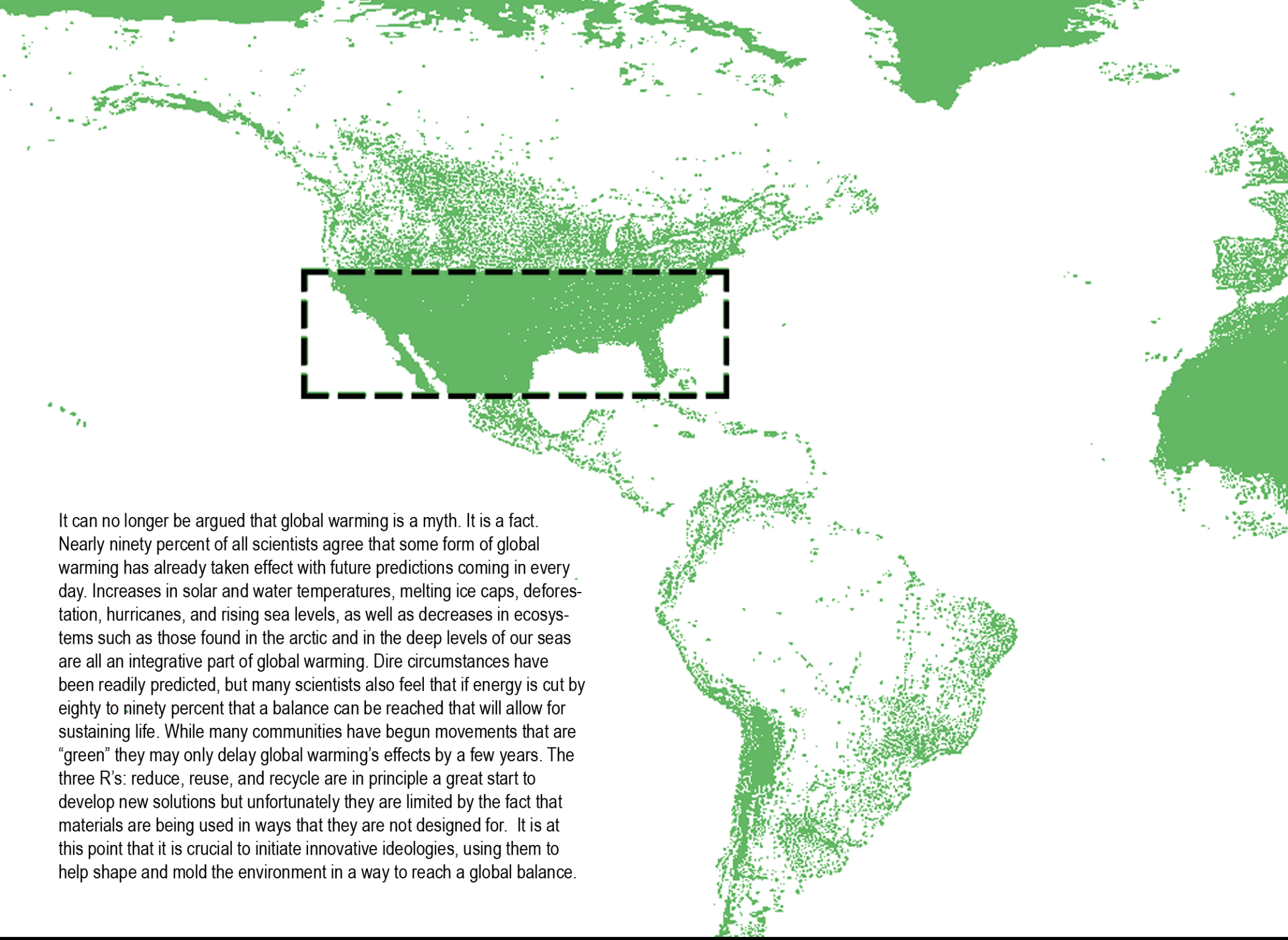
Adaptable to change for future housing expansion and contraction (not a starter house)

Reconsider tectonic methods and the incorporation of locally available materials

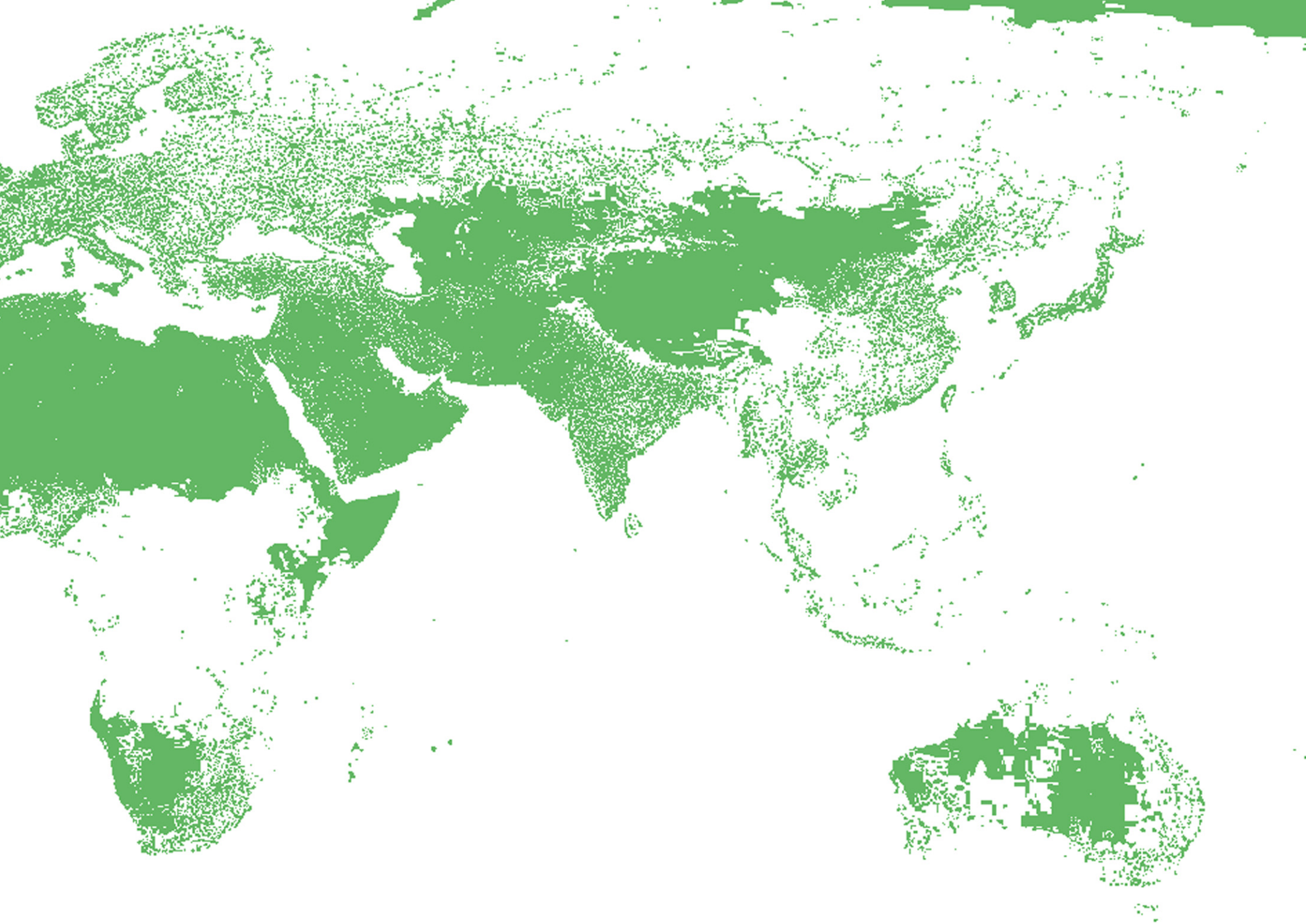
Potential for this dwelling to be cradle to cradle certifiable

- Receives energy from the sun
- Eliminates waste
- Creates micro-climates
- Provides habitats for multiple species (not just humans)





It can no longer be argued that global warming is a myth. It is a fact. Nearly ninety percent of all scientists agree that some form of global warming has already taken effect with future predictions coming in every day. Increases in solar and water temperatures, melting ice caps, deforestation, hurricanes, and rising sea levels, as well as decreases in ecosystems such as those found in the arctic and in the deep levels of our seas are all an integrative part of global warming. Dire circumstances have been readily predicted, but many scientists also feel that if energy is cut by eighty to ninety percent that a balance can be reached that will allow for sustaining life. While many communities have begun movements that are "green" they may only delay global warming's effects by a few years. The three R's: reduce, reuse, and recycle are in principle a great start to develop new solutions but unfortunately they are limited by the fact that materials are being used in ways that they are not designed for. It is at this point that it is crucial to initiate innovative ideologies, using them to help shape and mold the environment in a way to reach a global balance.



Today's coastlines are already seeing the effects of global warming. Distinct weather events are the beginning of a serious era where our coasts will become redefined. While the exact measure of change cannot be readily known, numerous predictions exist. Currently, if the West Antarctic ice cap melts, we may see a rise of seven meters in sea levels. Below is a series of diagrams illustrating the change in land mass that would occur.

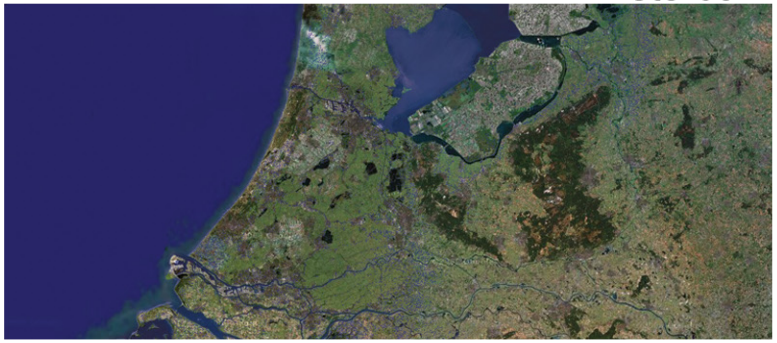
New Orleans

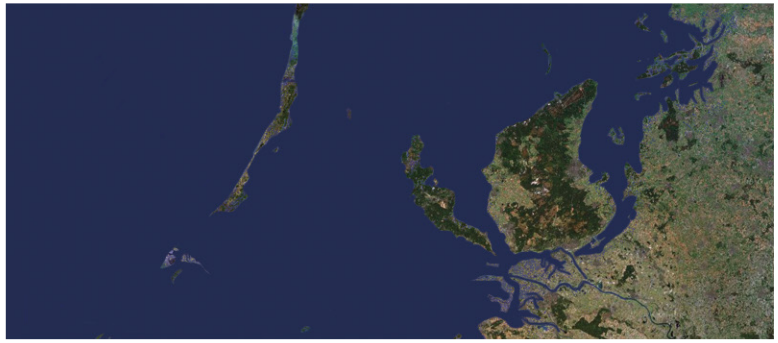
New York City

Potential Coastal Flooding

Venice

Amsterdam





Shanghai

Since the development of communities and cities began, people have been attracted to living near bodies of water. As one of the necessities of survival, people first lived near water for its source of sustenance and nutrition. As time progressed, it became a mode of transportation of both people and goods. Today, bodies of water still reflect upon these, but even more they now often represent recreation or wealth.

This study examines several of the basic systems of architecture that have been developed to accommodate this behavior. The purpose is to begin to understand which structural models can be modified to compensate for future issues such as global

Nomadic

Mongolian yurts can be disassmebled in an hour

Recreation on Native American Teepees

Modern day camping tent

Pylon

Pile Houses on Lake Nokwe by the Toffinou Tribe

The city of Venice is built upon closely spaced wood piles.

Silodam
Pylon housing in Amsterdam

Coastal Habitation

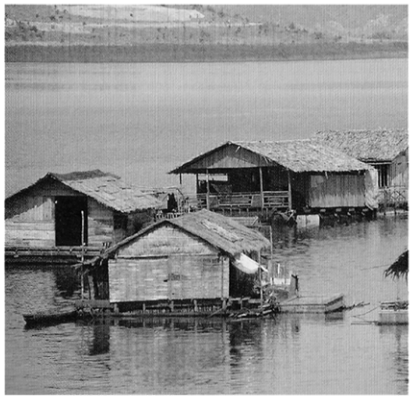
Bridged

Tower Bridge in London

Rialto Bridge in Venice

Ponte Vecchio in Florence

Floating



Floating houses on rafts in the Annam Mountains

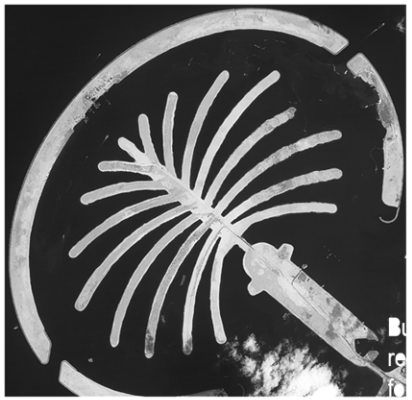
Indian rice boat

Houseboats in Amsterdam

Built-Up

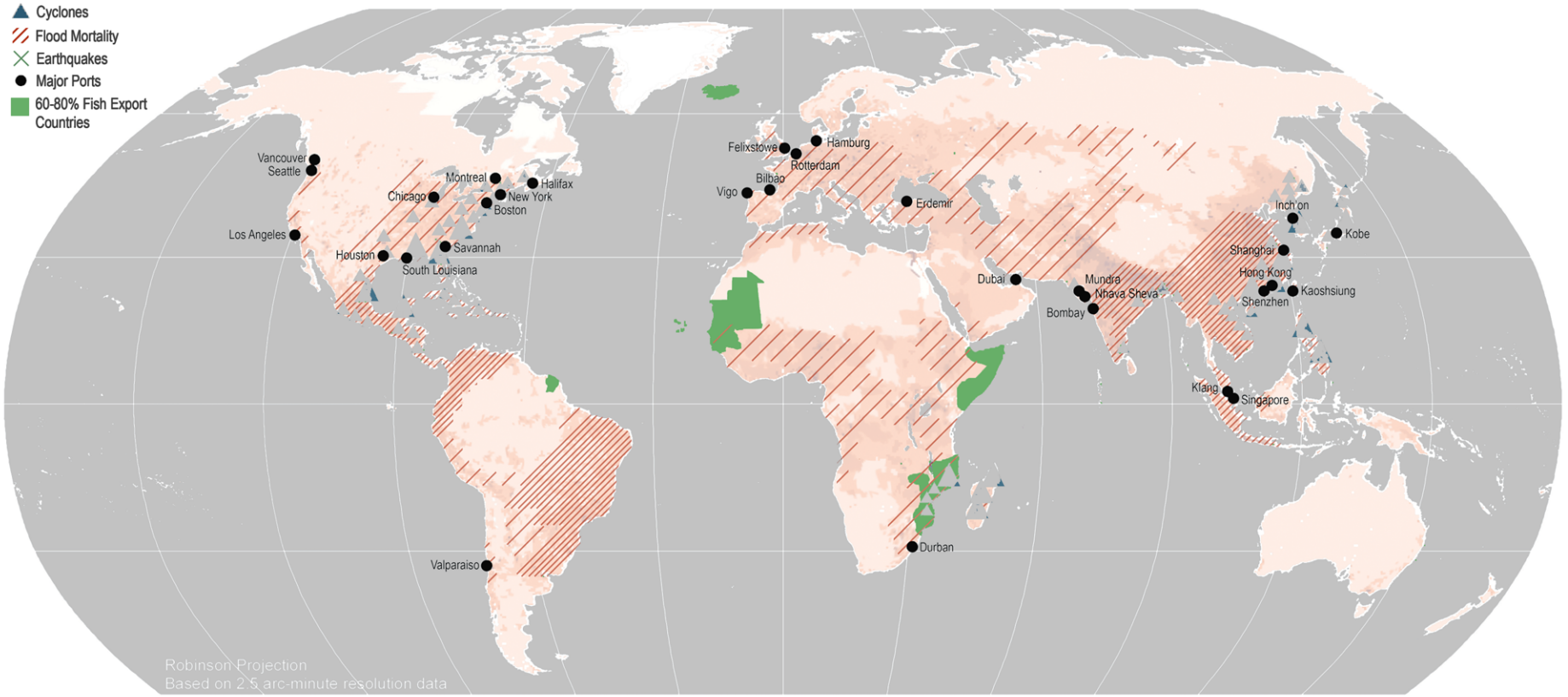
Jag Niwas Lake Palace in India

Borneo Sporenburg, Amsterdam

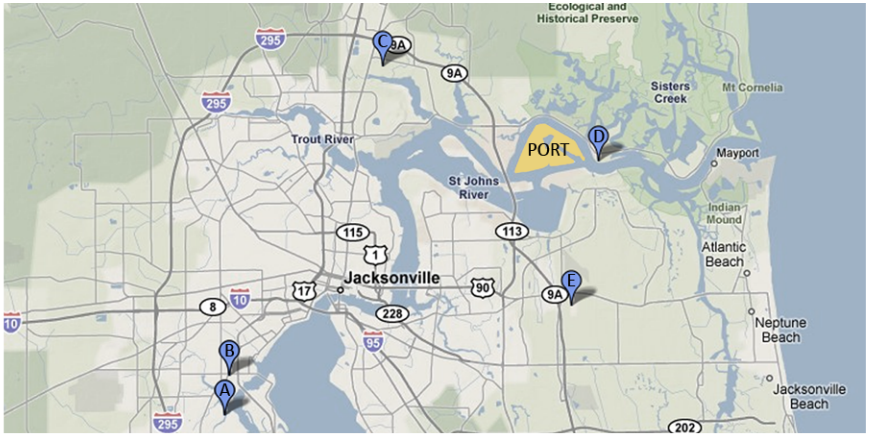


Monorail Palm Island in Dubai

In the course of history, it was a requirement for survival to live near water. Then, it became a requirement of industry. While today it is more likely the pursuit of leisure, there are some economies that still demand that coastal location. Below is a map of the major ports and countries whose fish exports are their primary industry. The original purpose of this was to find a site where that demand for the coastal edge still exists.



Preliminary Coastal Site Investigation



A_ Confederate Point

Built in the 1960s on reclaimed lowlands, technically a small island surrounded by a moat, with one small bridge as access. The area consists of approximately 300 large, single family homes, and approximately 700 condos and apartments that line the south bank of the Cedar River. All of the single family homes are inland, with the apartments and condos lining the shore of the Cedar River.

B_Lake Shore

Built during the time of the first World War, Lake Shore lies on the curving north bank of the Cedar River. Lake Shore consists of approximately 1,000 modest, wood-frame, concrete block or brick homes. . Given the small size of the existing homes, the current trend is for first time home buyers to renovate and retrofit these well built homes to fit today's needs. This is a very well maintained pocket of 1940s and 1950s homes. There is a definite trend to renovate and revitalize this quiet, comfortable neighborhood.

C_San Mateo

Prior to 1956, the area was mostly forest with huge oaks, wild holly trees, magnolias, hickories, pines, wildflowers and abundant wildlife. In late 1955, the first families began moving in. Most homes were built in the late 1960s, though in recent years skyrocketing real estate values have caused a few small homes lying on both Baisden Rd. and along the Broward River to be demolished and replaced by much larger homes.

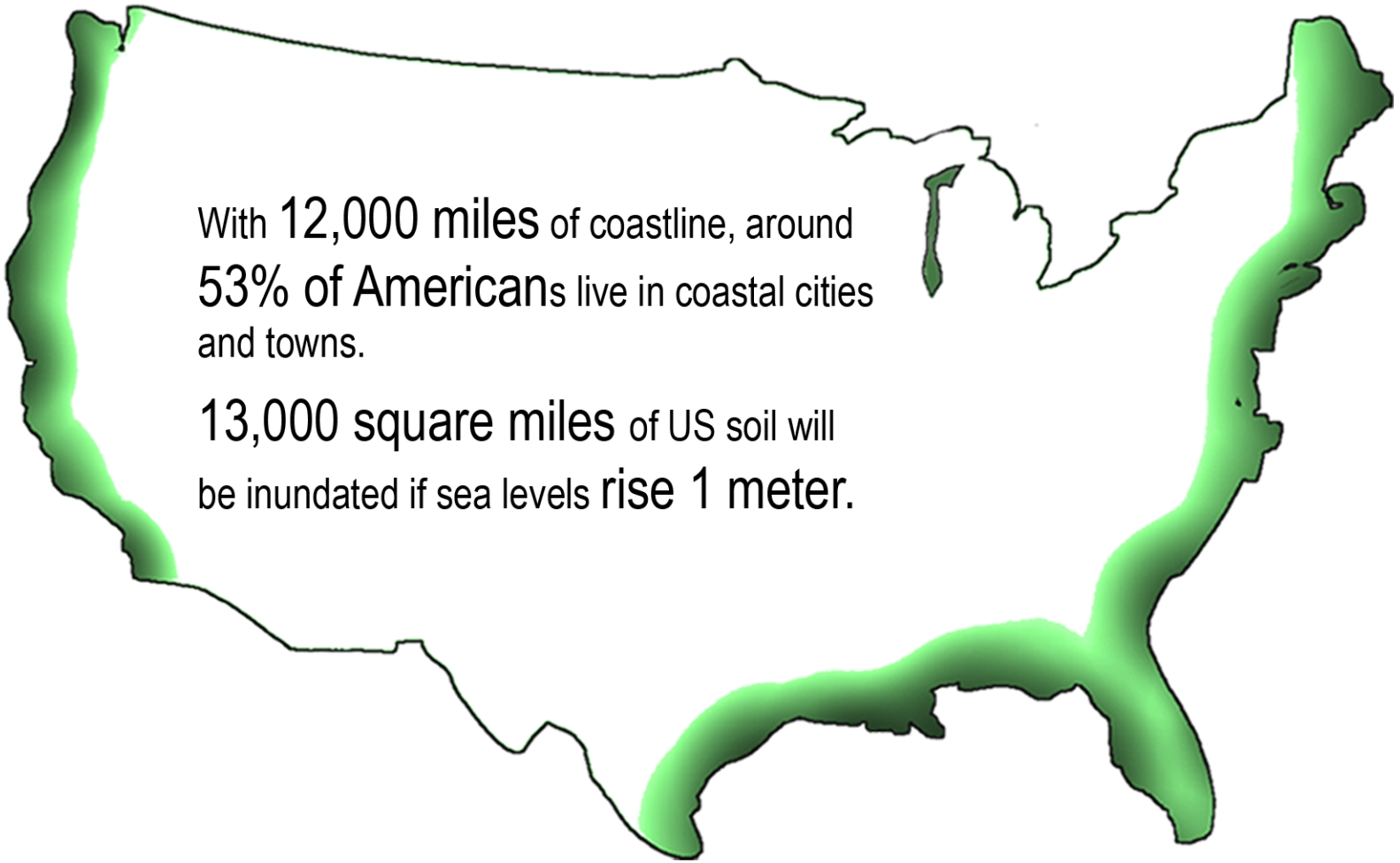
D_White Shell Bay

White Shell Bay is a residential area to the direct east of the Jacksonville port. There are certain covenants that restrict housing individuality.

E_Sandalwood

The Sandalwood neighborhood began developing in the spring of 1960, midway between downtown Jacksonville and the beaches, or about 6 miles from each, was advertised in 1960-61 as "On the Southside - halfway between business and pleasure!" The original Sandalwood consisted of approximately 500 homes. The first families purchased homes in May and June 1960. Many of the first families were U.S. Navy families who were stationed at the Mayport base and others were employed by CSX railroad. In the late 1970s, additional construction began at the southern border by the Sofranko Homes company, nearly doubling the size of the neighborhood.

The IPCC has announced that by 2050 approximately 150 million people will become environmental refugees due to climate change. Scarcity of water and food, coastal flooding, increased temperatures and the spread of disease will all influence this exodus of people. What does 150 million people look like? It can be half of the population of the United States, or it can be the 7 largest cities in the world, including New York City.

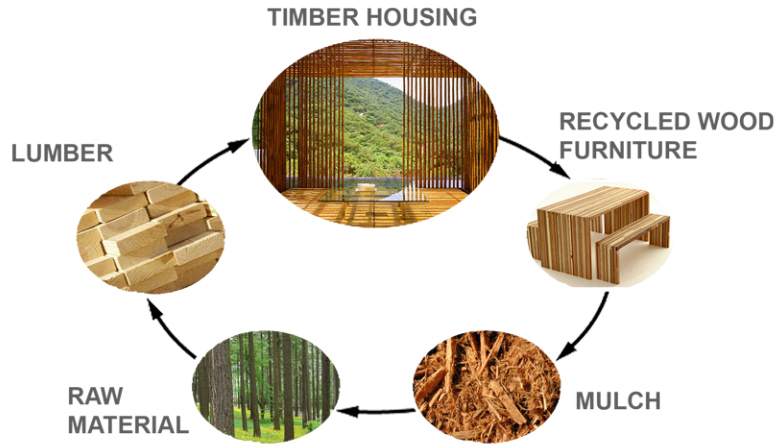


What does 150 million people look like?
Where will they go?

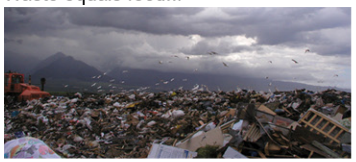
Cradle to Cradle

The “cradle to cradle” design solution, developed by William McDonough and Michael Braungart, suggests design based on natural systems and processes. The cradle to cradle solution both protects and enriches ecosystems, while providing a productive and technical framework for the development and use of high-quality materials. Essentially, this method seeks to promote lifestyles of an efficient and waste free manner, be it industry, urban environments, buildings, manufacturing, or social systems.

Every year in the United States, 136 million tons of construction and demolition waste are tossed into landfills



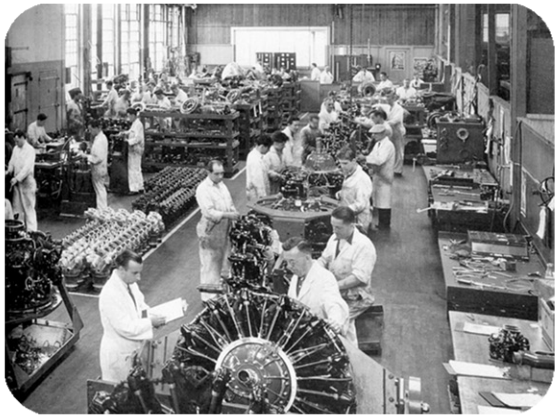
Waste equals food...



Sustainable Methodologies

Cradle-to-Grave

TAKE



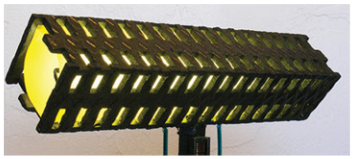
MAKE

WASTE

Cradle-to-Cradle

WASTE

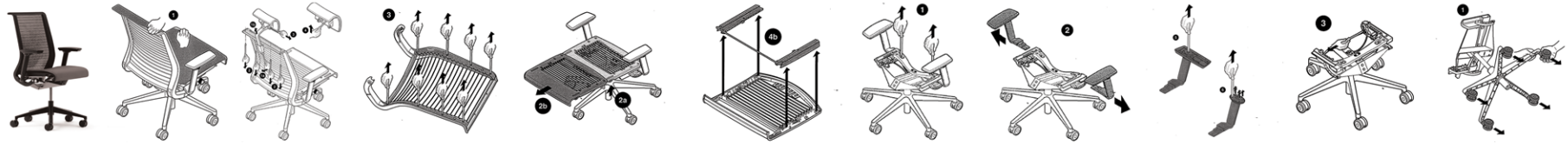
FOOD



Disassembly Planning

Many manufacturers guarantee their projects to last a certain period of time, but after that time, after their “life” is over, those projects continue to take up space in a world where space is becoming smaller and smaller. In designing for disassembly, the ultimate goal would be to create a closed loop where objects are continuously remade and upgraded. By planning the disassembly process into the manufacturing, an object becomes easier to rebuild into new items.

Very few buildings will outlive their creators without undergoing major renovation, refurbishment, or even demolition. Buildings should be designed to be non-permanent structures that can be disassembled and reintegrated as raw materials.



Sustainable Methodologies

Disassembly Connections

BASIC DWELLING COMPONENTS:

.foundation

.external enclosure

.internal lining

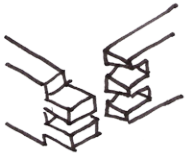
.windows.doors

.flooring

.stairs

.roofing

DOVETAIL JOINT

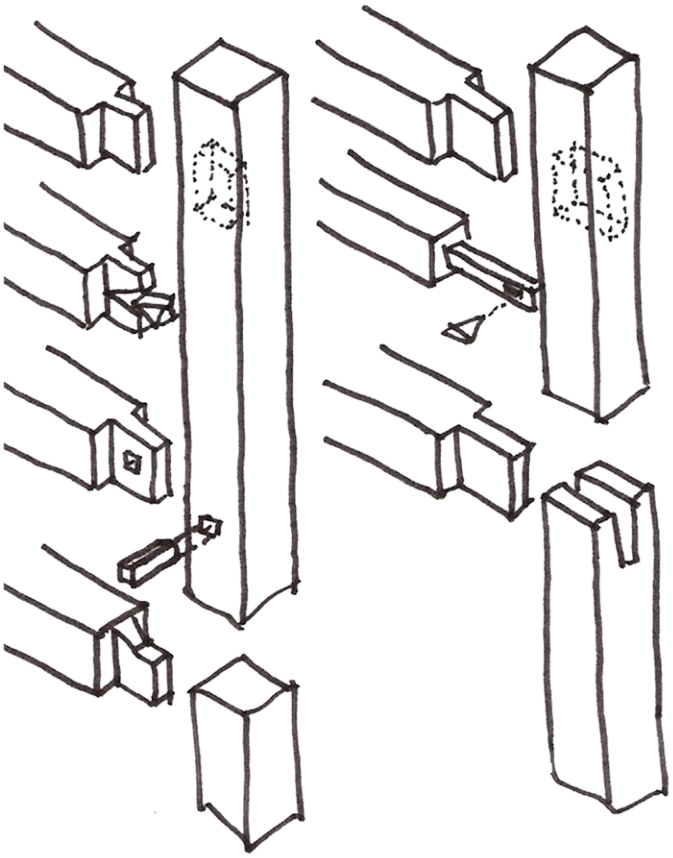


BLIND MORTISE

FOXTAIL WEDGE SPREAD

PINNED JOINT

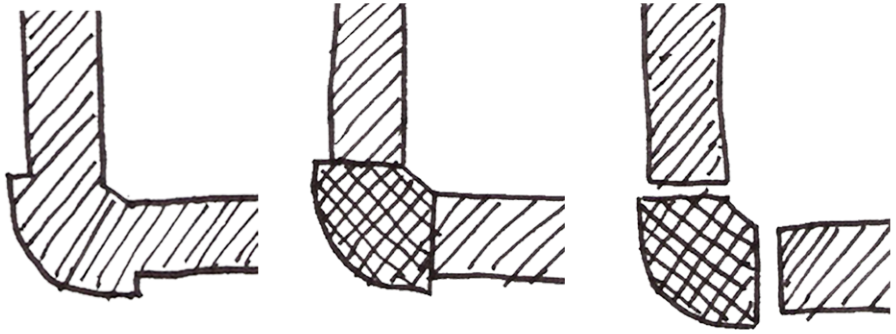
HAUNCHED TENON



THROUGH TENON

KEYED JOINT

OPEN/SLIP MORTISE



PERMANENTLY CONNECTED, SIMILAR QUALITY

PERMANENTLY CONNECTED, IMPROVED QUALITY IN CORNERS

CAN BE DISMANTLED, SIMILAR QUALITY

MULTI-MATERIAL

MONO-MATERIAL

Using mono-materials makes it easier for quality control. With multi-material, the different layers can have variant rates of decay.

Biomimetics

Because nature is constantly field-tested in a battle of survival, it is the ideal inspiration for design solutions. Using nature as model, measure, and mentor is the foundation for the concept of Biomimicry. As a model, nature's organisms lend the ability to solve solutions. To measure nature is to look to the natural world and see what is possible, what works. When nature is treated as a mentor, it becomes a partner, not only showing, but providing teaching. Nature is the best model for designing a building that is no longer consumptive, but instead produces.

Nature as
Model

Form/Function

Using ideas from organisms to solve problems

Nature as
Measure

Process

To look, see, and understand what is possible

Nature as
Mentor

System

To recognize we are part of a larger system

Sustainable Methodologies

Biomimetic inspirations from “Nature’s 100 Best”...

CO2 MATERIAL

ECONOMIC CLUSTER

VACCINES

AIR CONDITIONING

ADHESION

WATER PURIFICATION

SELF-ASSEMBLING GLASS

FRICTION-FREE FANS

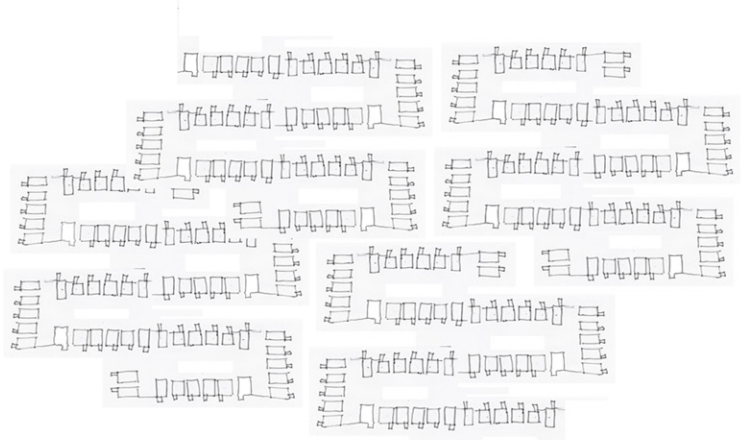
SELF-CLEANING SURFACES

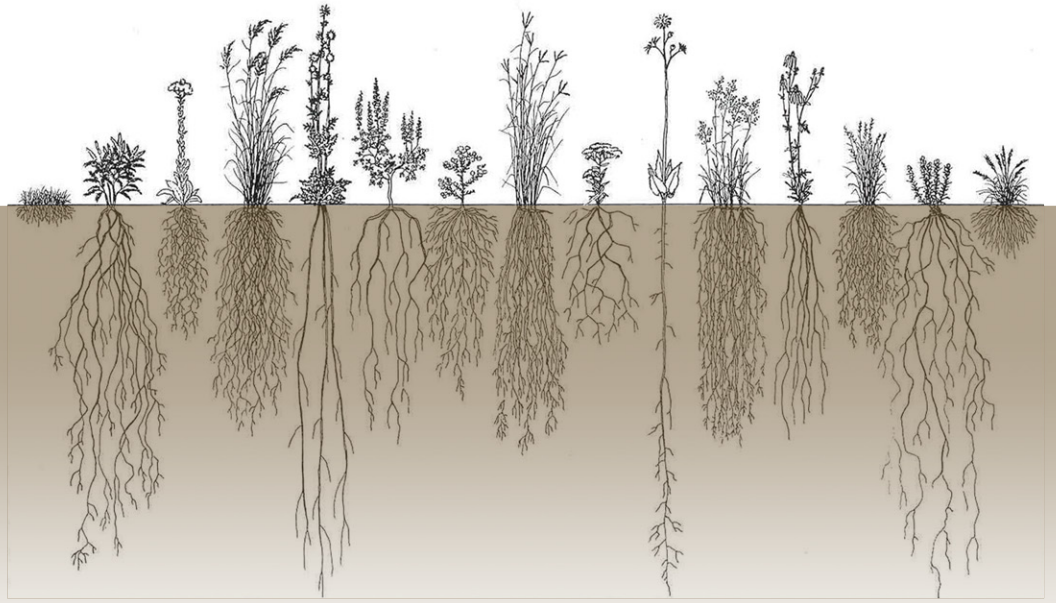
Cherry Tree Design

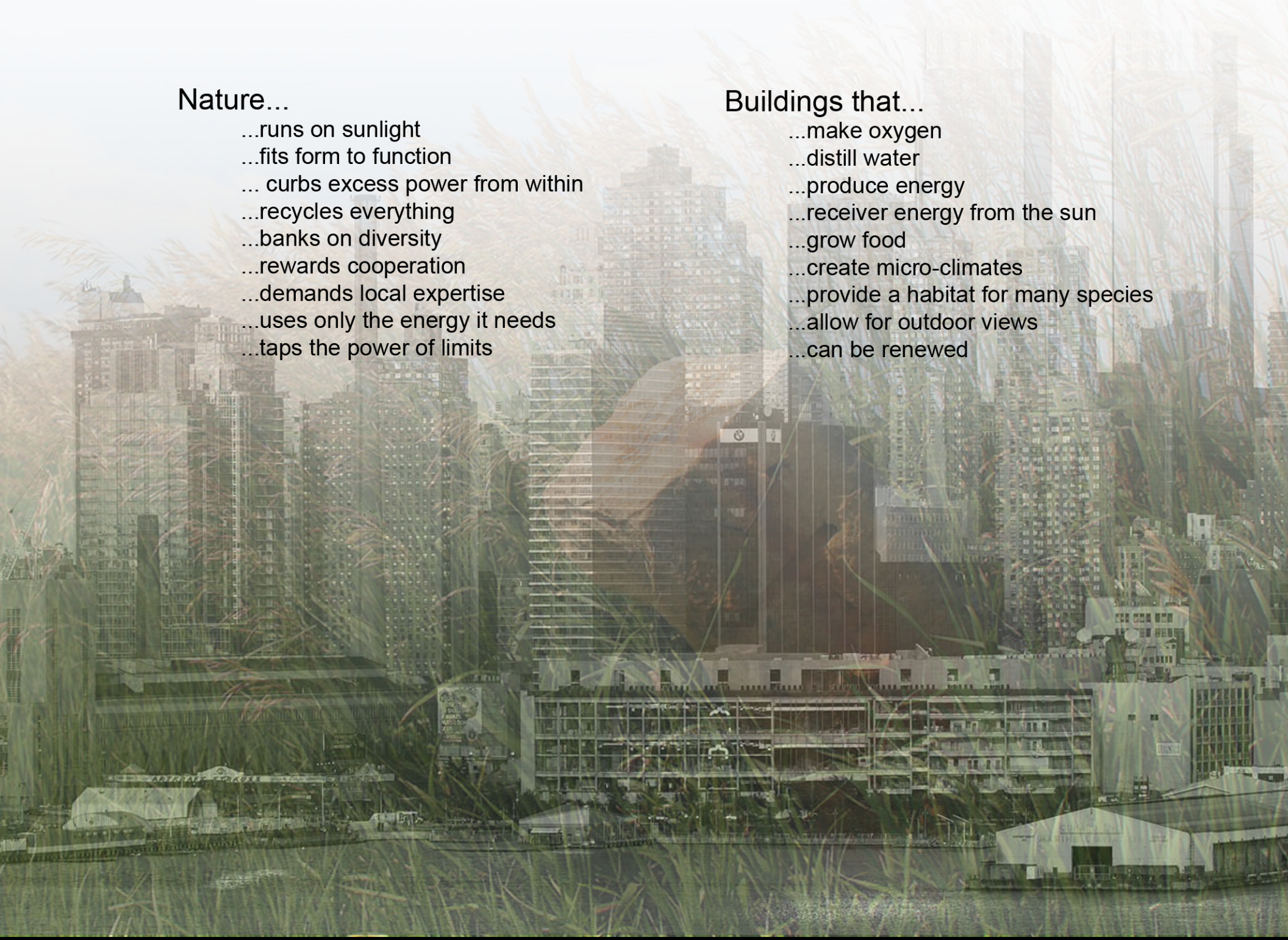
Design a house like a tree, a city like a forest...

To design an eco-efficient house is a step in the right direction, but to design only one limits the potential of what can be achieved. If a tree falls down, maybe a couple people will notice, but if a forest is removed, it makes an impact on not only everyone, but on the environment as well. To really design a house, it is necessary to design the community.

The suburb has become the ‘whipping boy’ for any number of disasters, including the destruction of nature, the eradication of inner cities, the overwhelming presence of consumerism, and the loss of sense of community. The ‘select fantasy’ that has become suburbia is now a vast wasteland that has stripped land of its natural nutrients. Because of this, suburban developments are the ideal location to begin the evaluation and adjustment of values of the way in which people live. Suburbia provides the ideal situation in which to







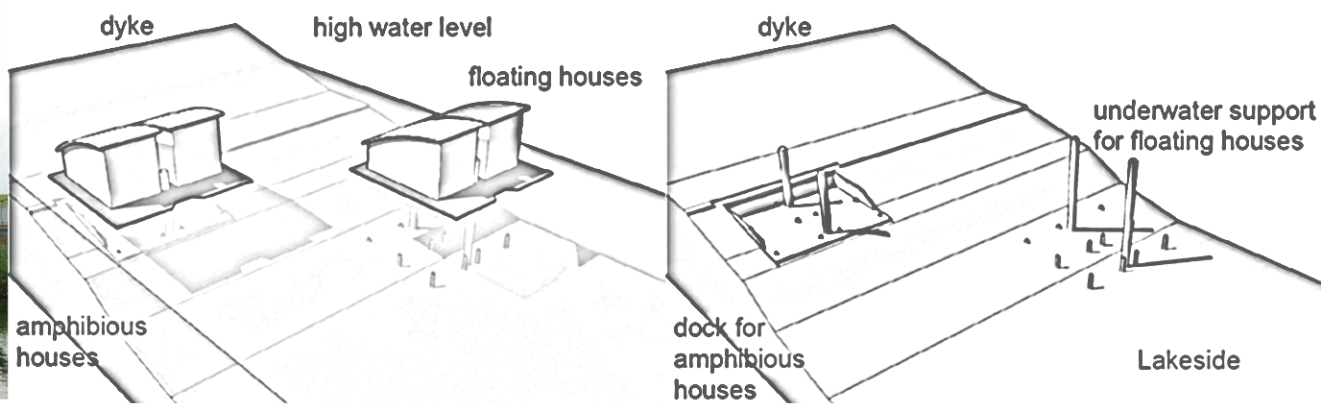
Nature...

...runs on sunlight
...fits form to function
... curbs excess power from within
...recycles everything
...banks on diversity
...rewards cooperation
...demands local expertise
...uses only the energy it needs
...taps the power of limits

Buildings that...

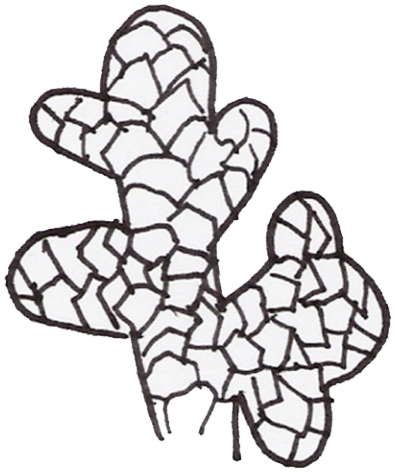
...make oxygen
...distill water
...produce energy
...receiver energy from the sun
...grow food
...create micro-climates
...provide a habitat for many species
...allow for outdoor views
...can be renewed

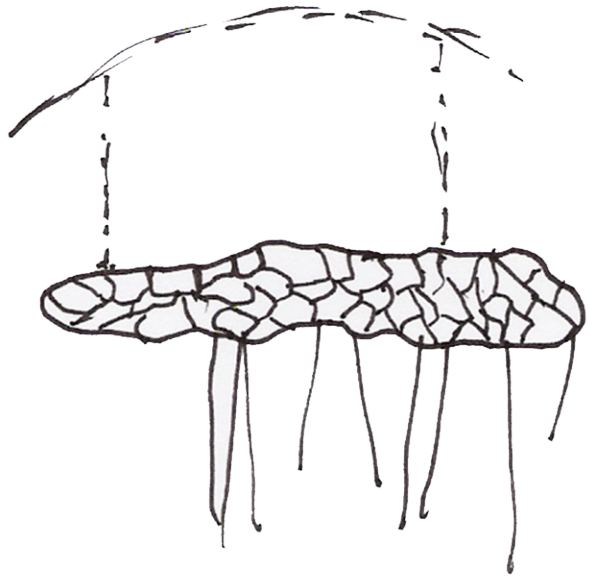
Maasbommel Housing Development



Azolla Rubra

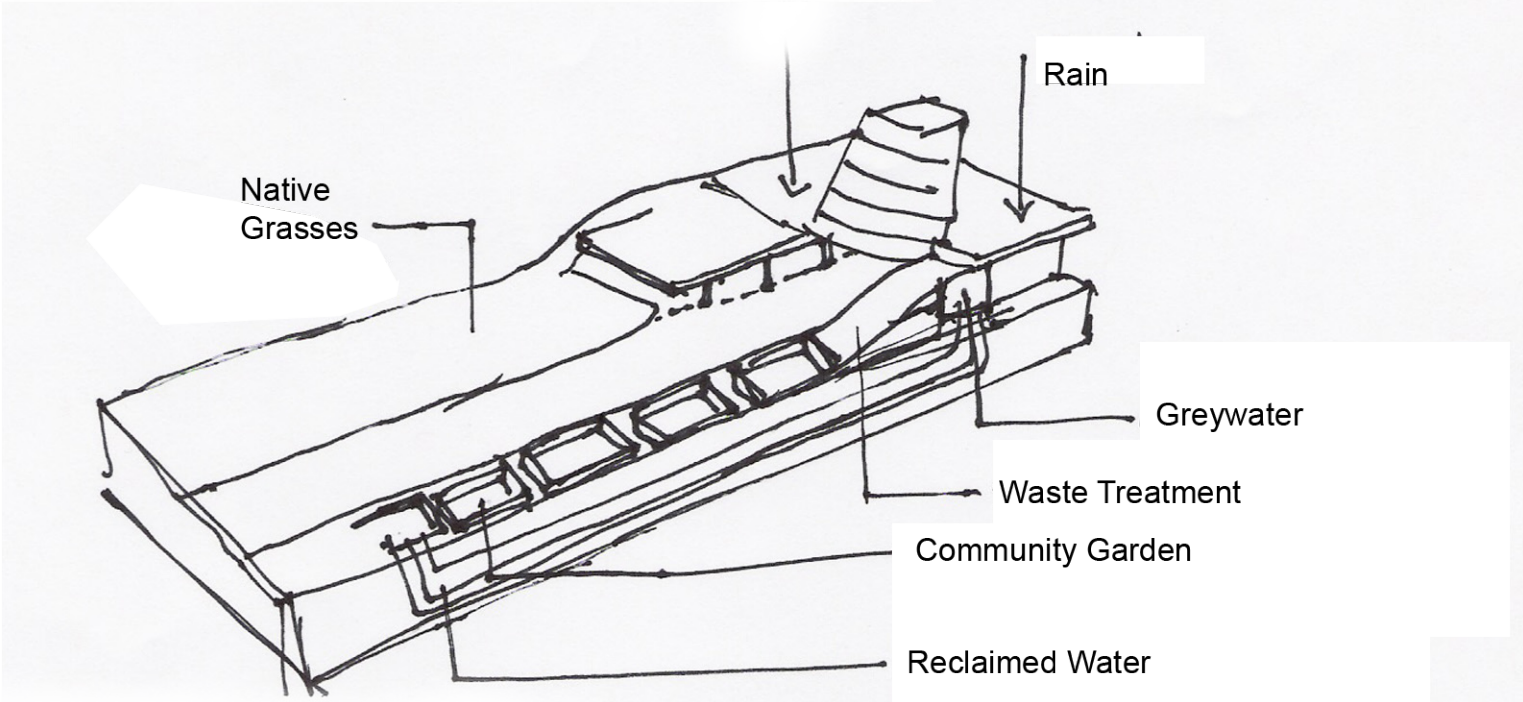
Arrangement of overlapping leaves enables it to remain buoyant



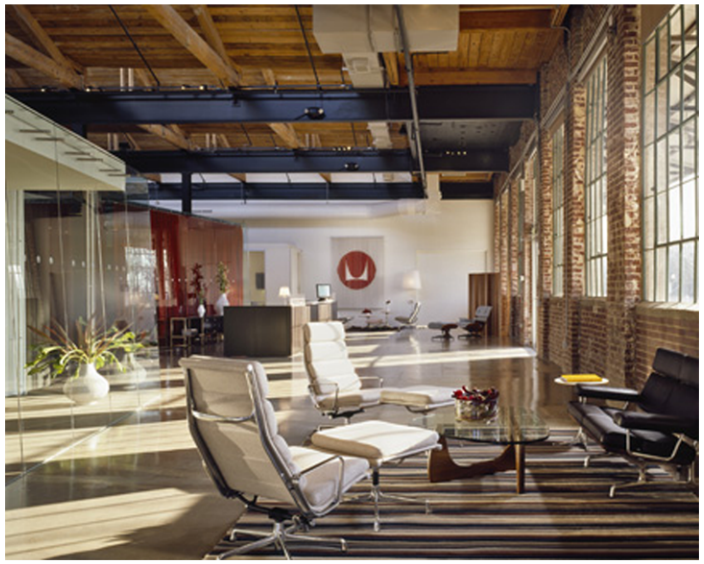


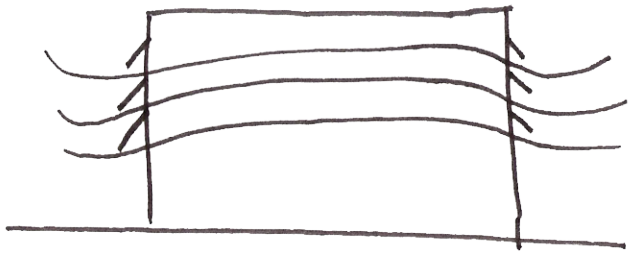
Precedents

Cradle to Cradle House- Roanoke

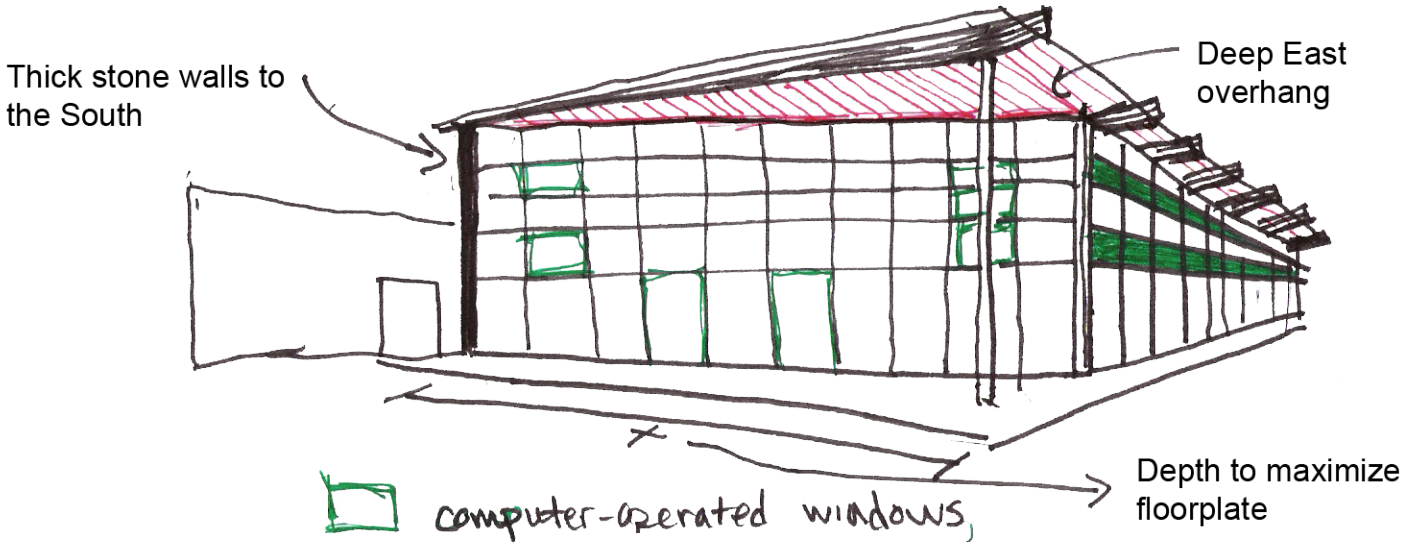


Herman Miller HQ



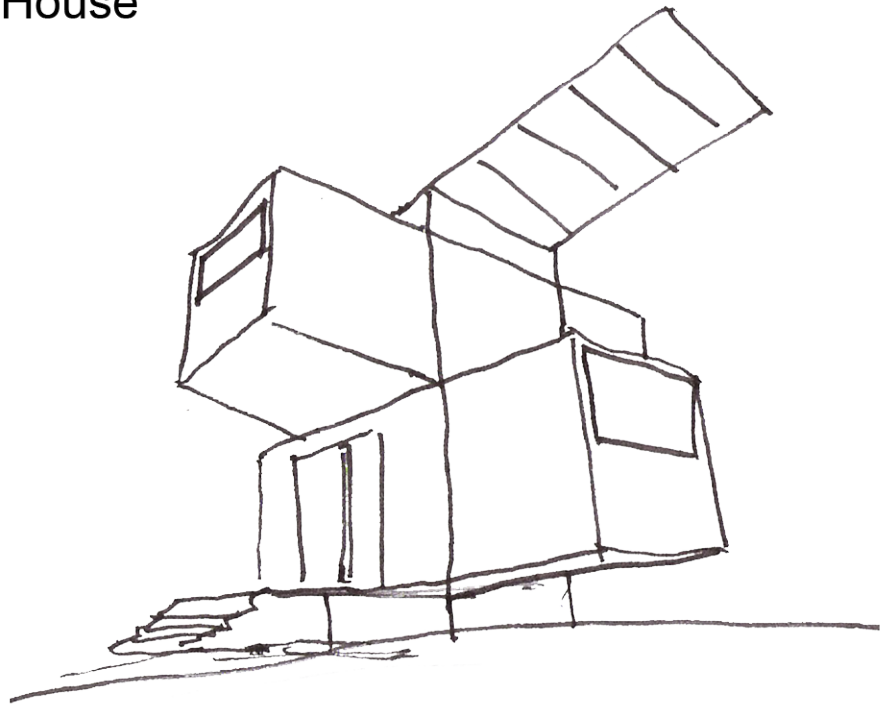


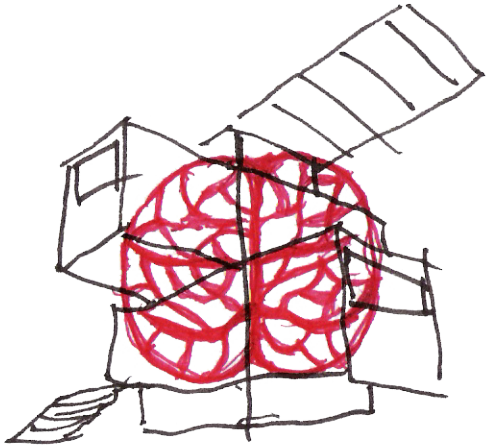
Computer System = Natural Ventilation System



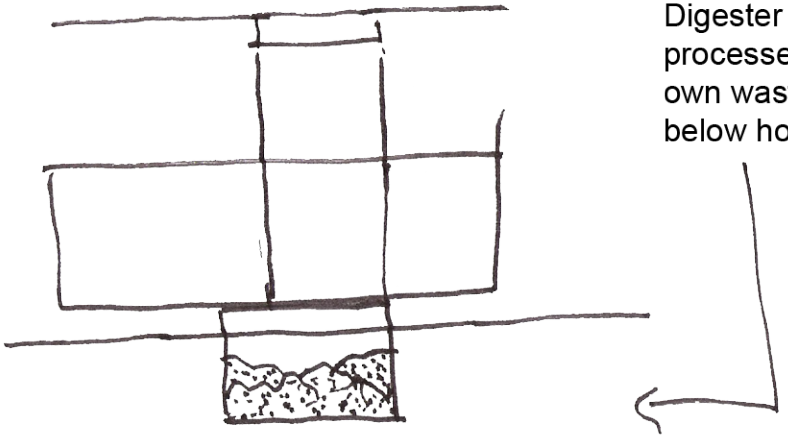
Precedents

zeroHouse

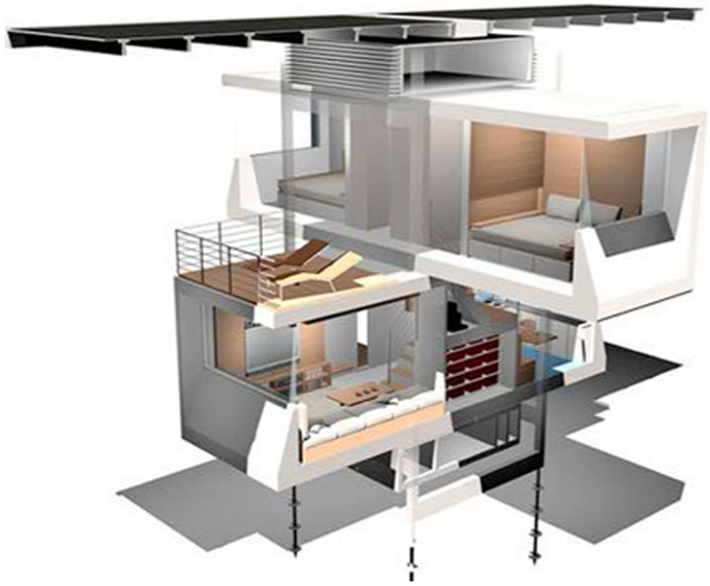


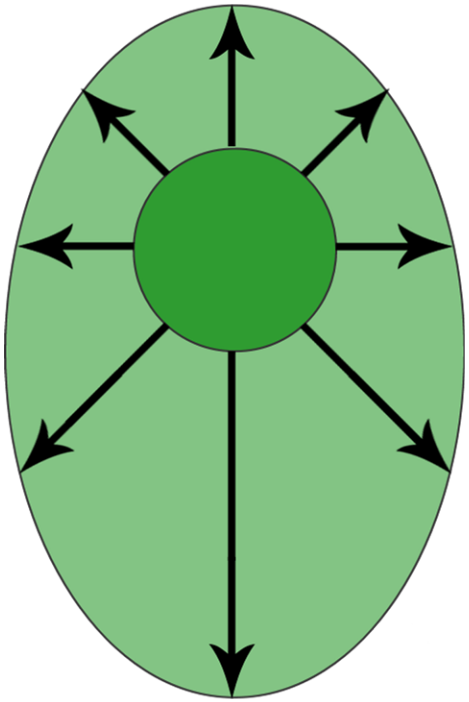


Laptop “Brain” controls house functions



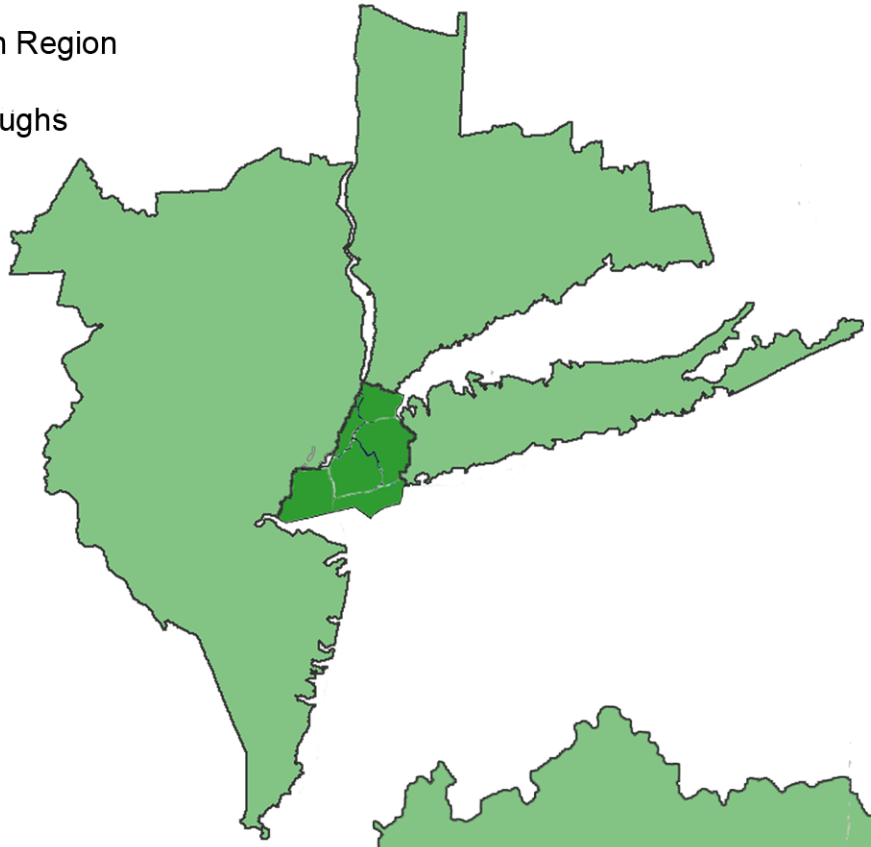
Digester unit processes its own waste below house

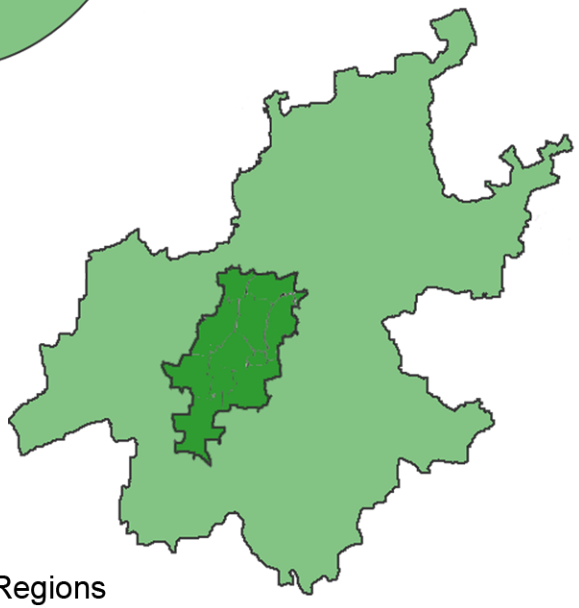




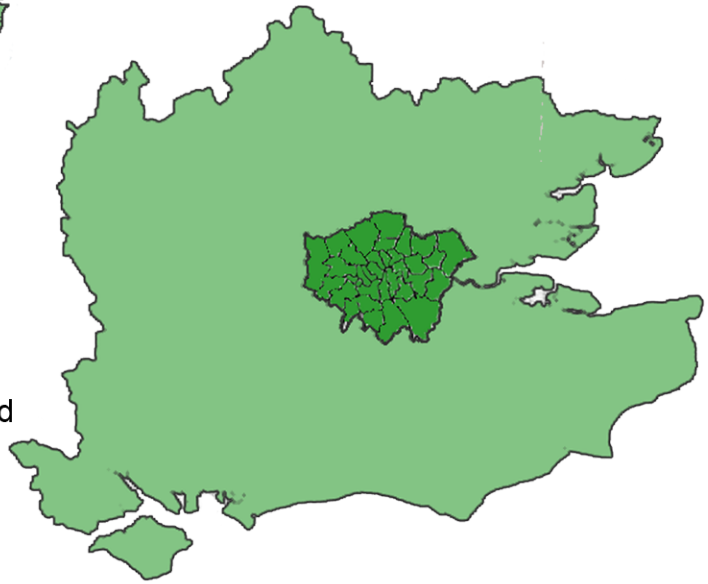
Typical City
Outward Expansion
Consuming Land

New York Metropolitan Region
21,200,000 people
New York City: 5 Boroughs
7,960,000 people





Gauteng Province
9,688,000 people
Johannesburg: 11 Regions
3,888,000

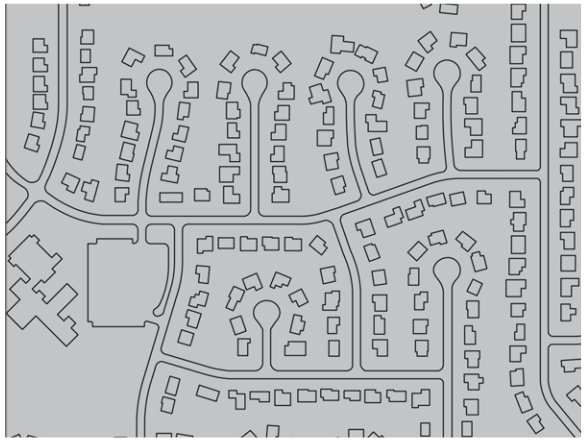


South-East of England
19,030,000 people
London: 33 Boroughs
7,540,000 people

City Development and Growth

American Sprawl

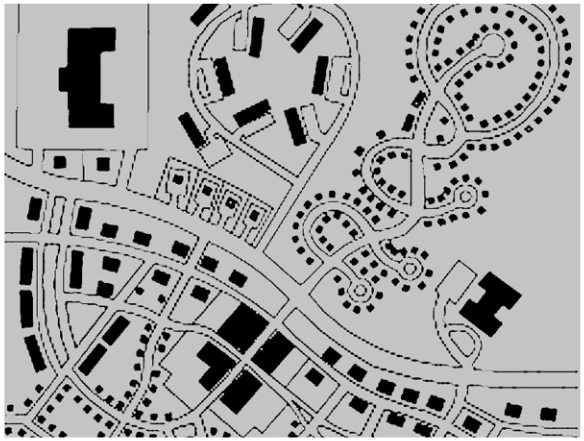
Housing subdivisions
Shopping centers / big-box retail
Office parks
Civic institutions
Roadways



Traditional suburban environment consists of low-density, low-rise housing. To enter and exit many of these spaces, cars are necessary. There are no limitations on expected walking distanced because these communities are geared towards driving the car.

Traditional Neighborhood Developments

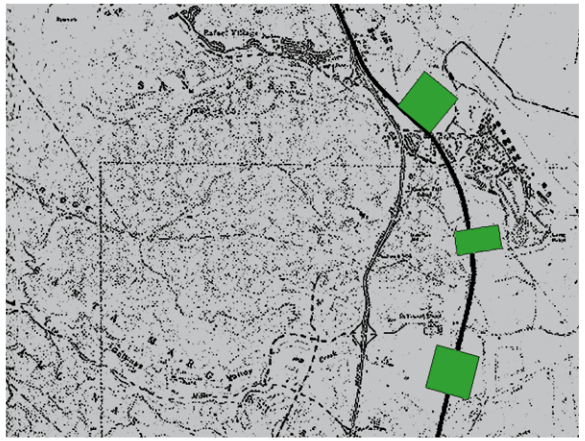
The Center
5 Minute walking radius
Street network
Narrow, versatile streets
Mixed-use buildings
Specific sites for special buildings



The image above is a comparison between the suburb, above, and the traditional neighborhood development, below. The traditional neighborhood development argues that access to the needs of daily life should within a five minute walking distance.

Pedestrian Pockets

Low-rise, high density
Mixed-use “Main Street”
Light rail transit system
Regional shopping mall



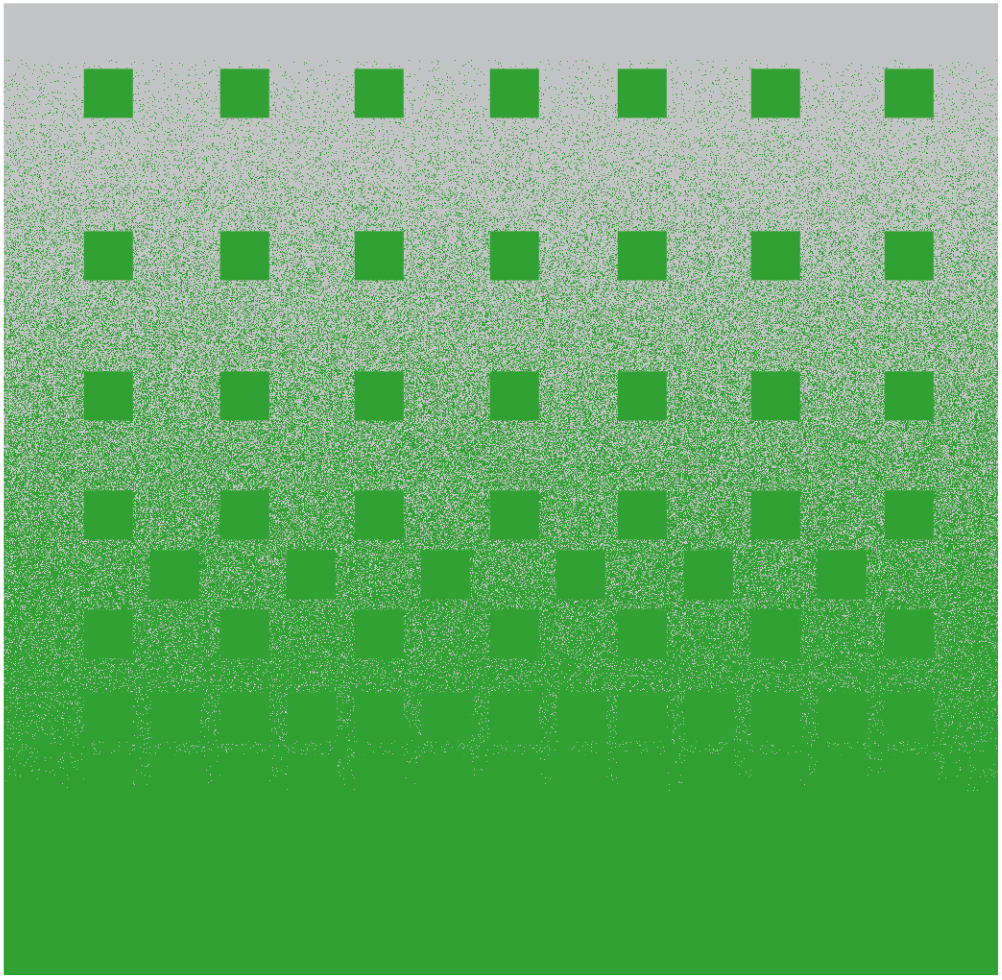
Pocket communities can become good predictors of expected growth. The quarter of a mile radius for the Pedestrian Pocket is similar to the TND, however, at the end of that radius it is expected that there is a transit system, as opposed to an actual destination place.

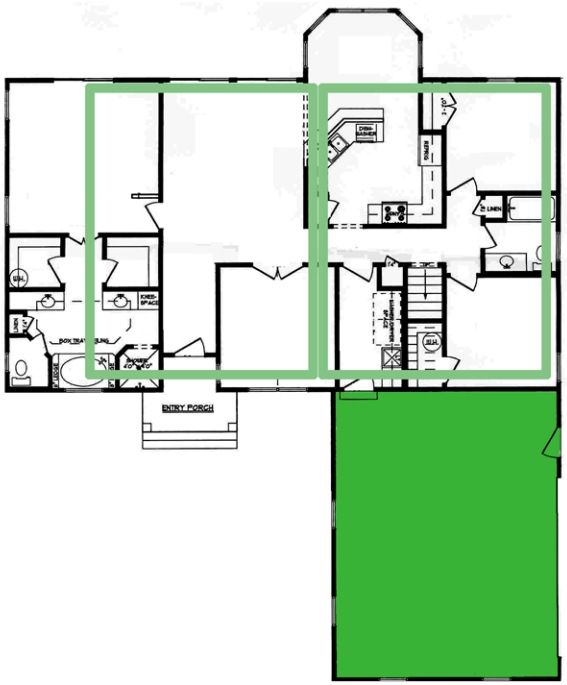
Analysis

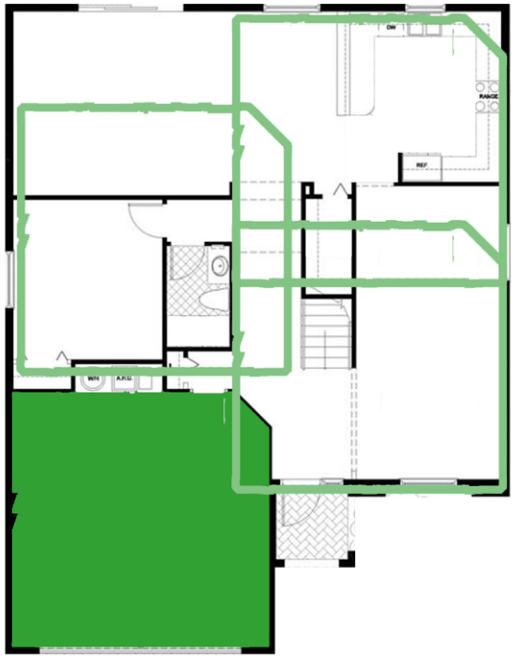
Ideal Components

Mixed-use spaces
Increase in higher density spaces
Access to public transportation
General gathering places

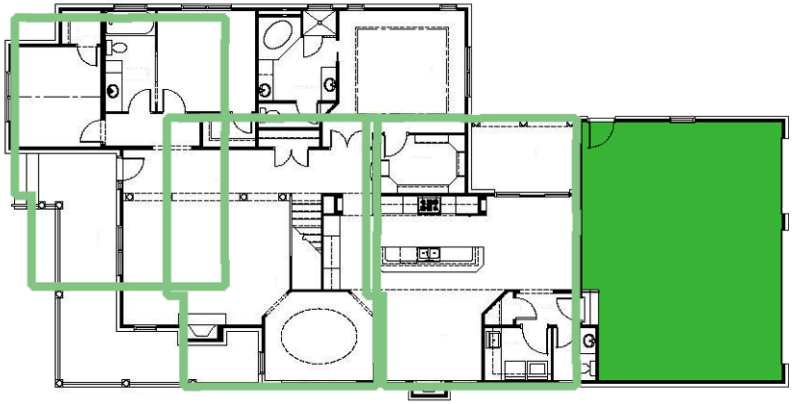
Many of the city planning solutions that are proposed aim at increasing the density of the neighborhoods through one method or another. As a list of rules to follow in planning, these ideas lend themselves to developing a new focused transportation system. However, while these solutions are focusing on the car's impact on transportation, they don't focus on the car's impact on design, on the layout of a lot, and the house itself. How does the addition of a car change the we think about our homes? How does the removal of that car affect this design?

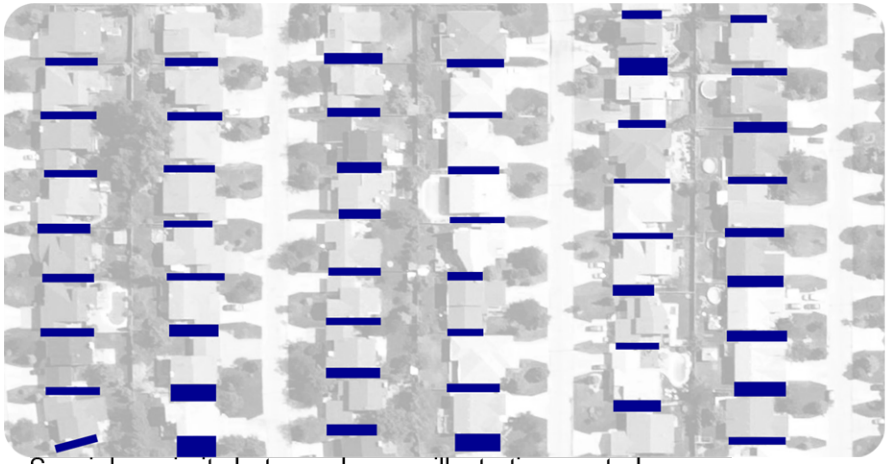




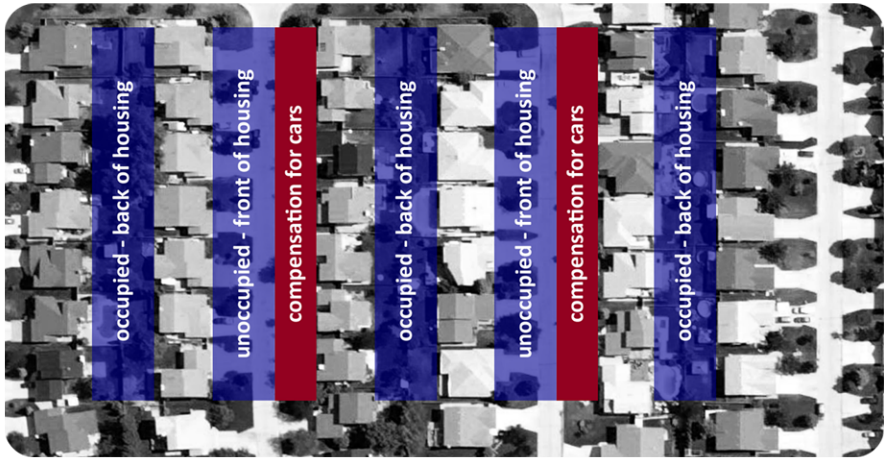


The value placed on the automobile is evident in the architecture of the house. Here it is evident that the garage represents a significant percentage of the home footprint.





Spacial proximity between houses illustrating wasted spaces



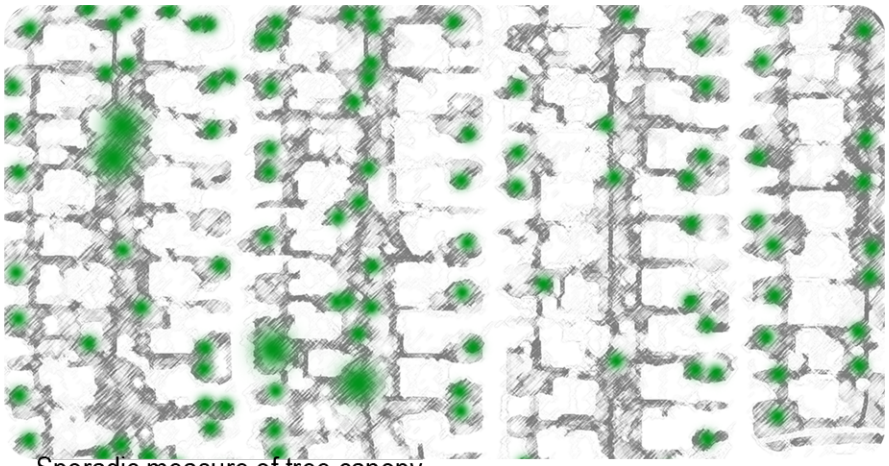
Influence of cars on spacial proximity

Alternative Route

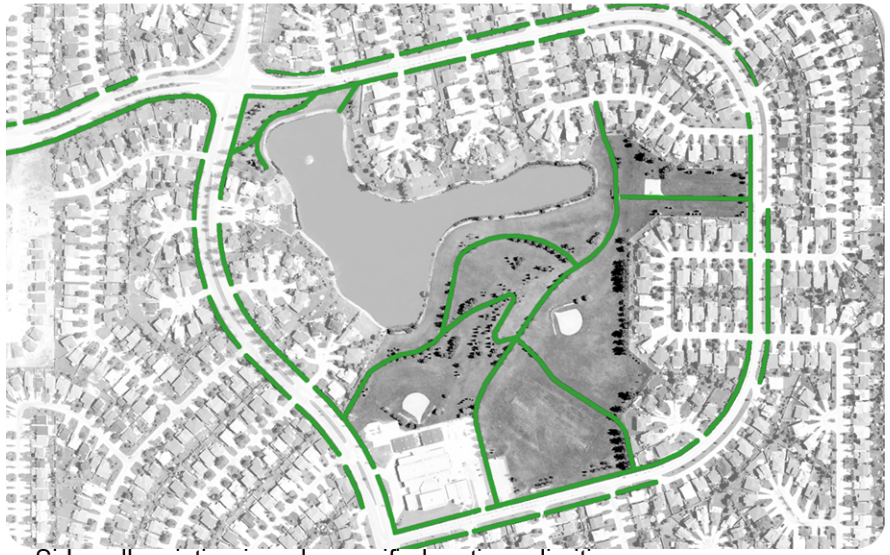
Public green space

Suburban Analysis

Dead-end paved roads



Sporadic measure of tree canopy



Sidewalk existing in only specific locations, limiting walkability of neighborhood

Unused front yard space

Many of these cul-de-sac spaces have to have drainage incorporated into their structure. The asphalt that the cul-de-sacs are made out of are large areas of non-porous materials. If this driving space was covered in a material such as Grasspave or Porous Concrete, the water could be collected. In this manner much of the run-off can be used in grey water systems.

Because of the shape of the cul-de-sac, most lots are triangular in shape. This creates awkward spaces in corners. In addition, it means the public front yard is taken up by a greater percentage of driveway space. In this image, the asphalt has become the dominant feature.

Suburban Analysis

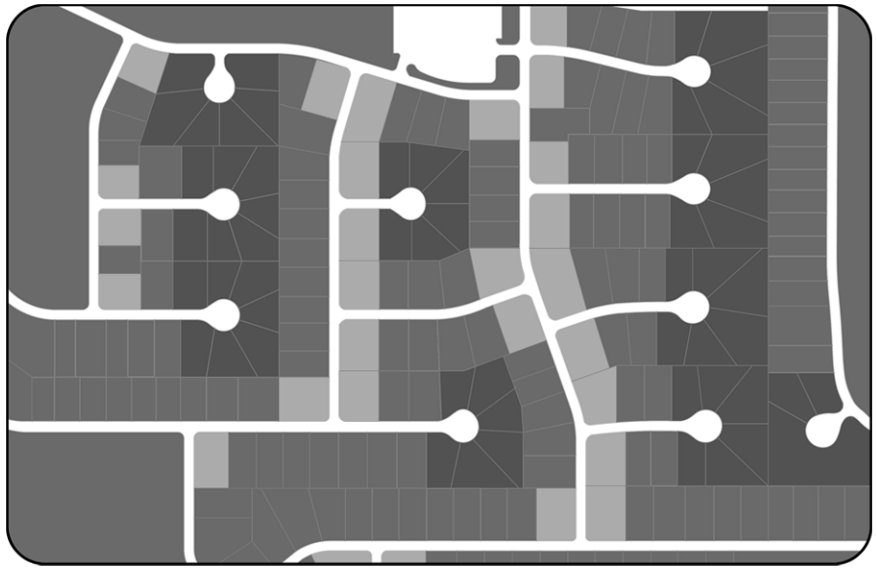
In addition to seeing more cars on the driveway, streets are being inundated by vehicles. Today, most streets are made wide enough to handle a car parked on each side of the road with room for cars to easily pass in between. All of this extra space makes it easier to park outside, again, no longer utilizing the garage.

There is a current trend of using garage space not for cars, but rather for storage. With this influx, more and more cars are being seen parked in driveways. This makes the demand for that driveway space greater. The square footage of driveways are now increasing, going both deeper and wider.

The cul-de-sac is a large, dead-end space covered entirely in pavement. It is uninspiring public space that is shared by the home-owners of the cul-de-sac. Often under-utilized, these spaces become dead spaces.

Whether the cul-de-sac is utilized or not, the space can often be unappealing. Here you see the various cracks in roads in addition to the unsightly grease and oil stains from the cars that often occupy its space. Furthermore, manhole covers and waterlines often occur in these islands of pavement.

Suburban Analysis



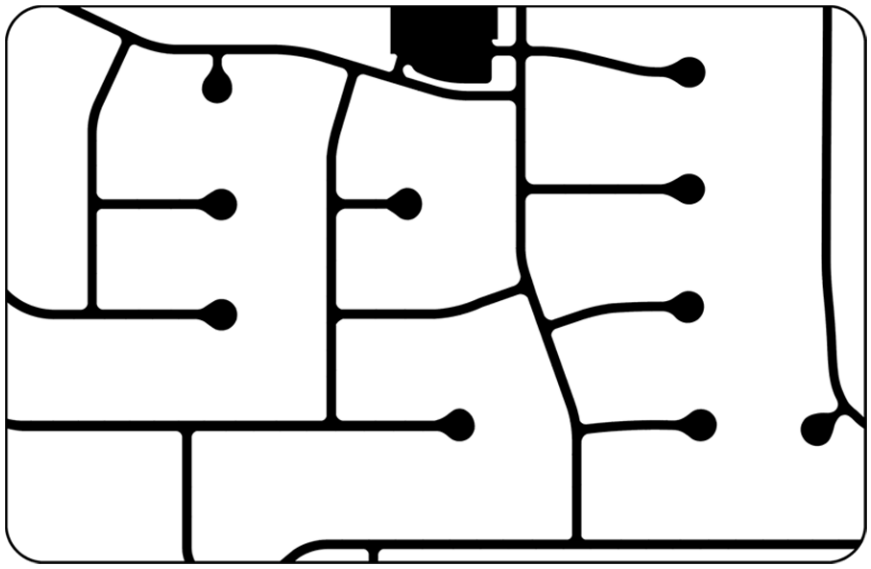
Existing Lot Organization

Existing Green Space

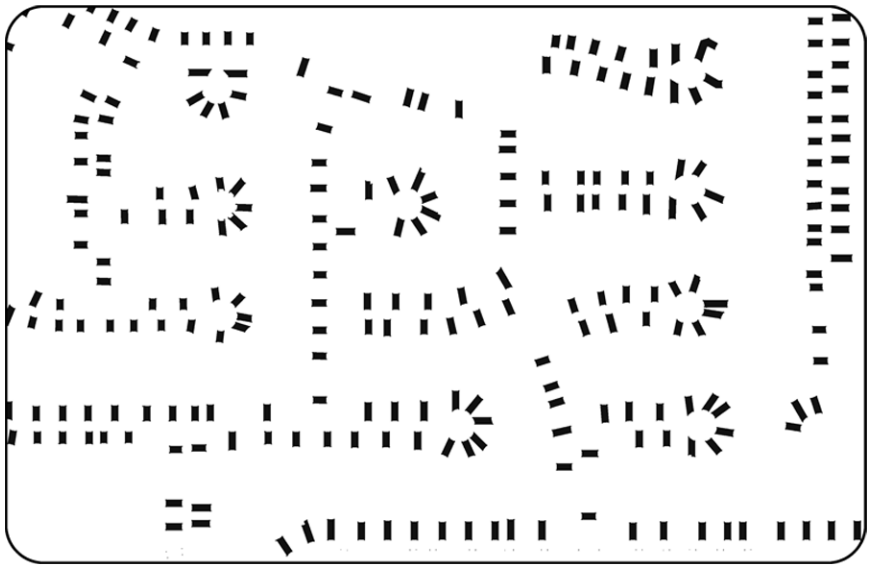
Proposed Lot Organization

Proposed Green Space

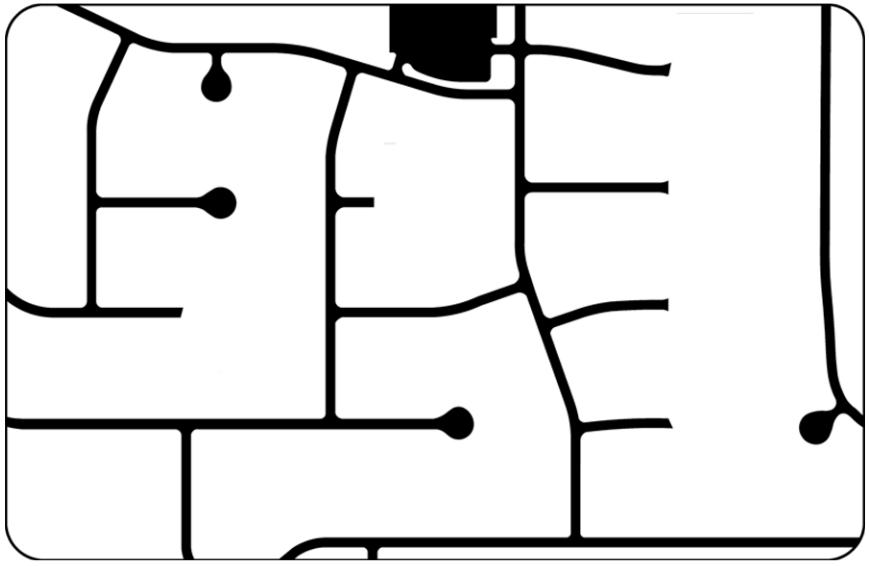
Comparative Study of Suburb



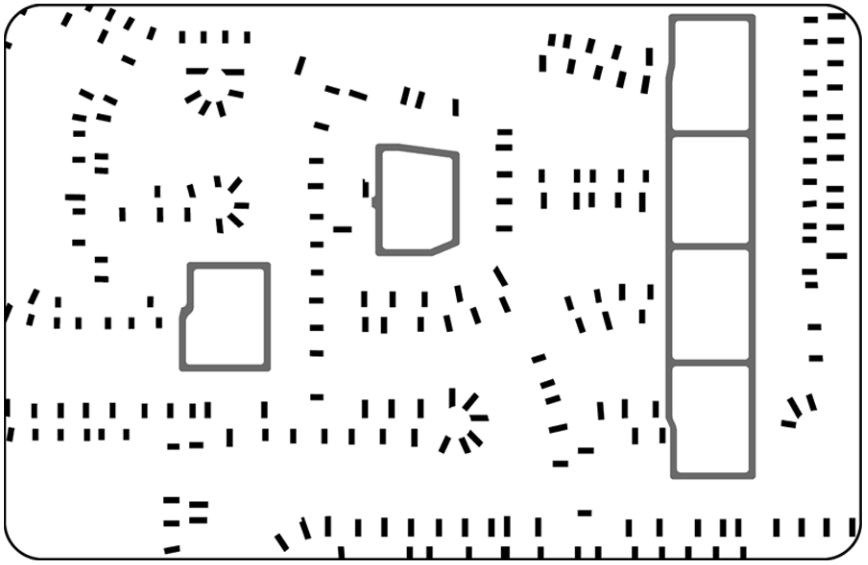
Existing Roadways



Existing Driveways

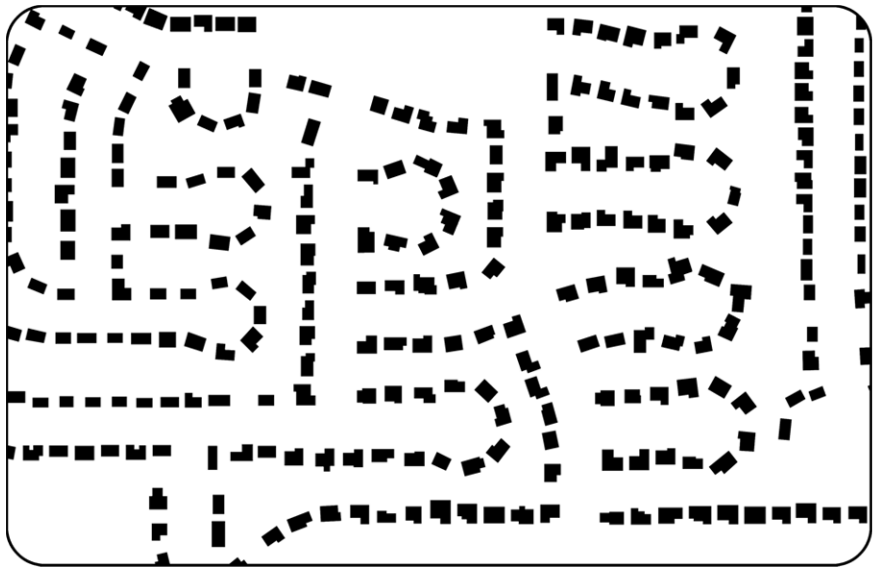


Proposed Roadways

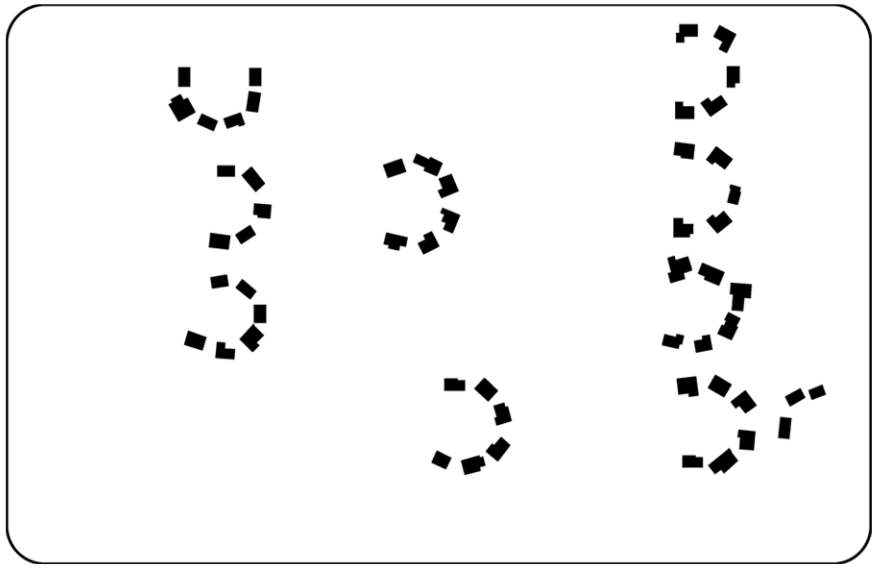


Proposed Driveways

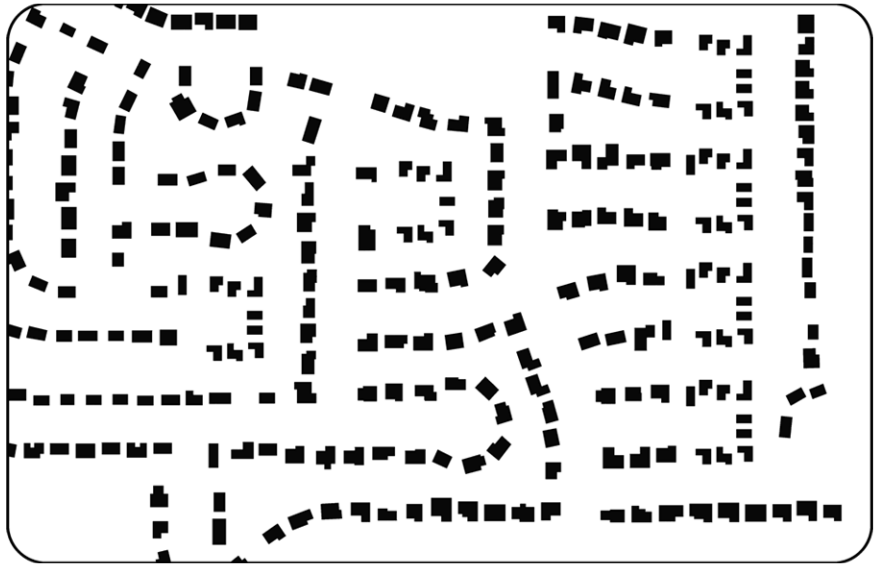
Suburban Analysis



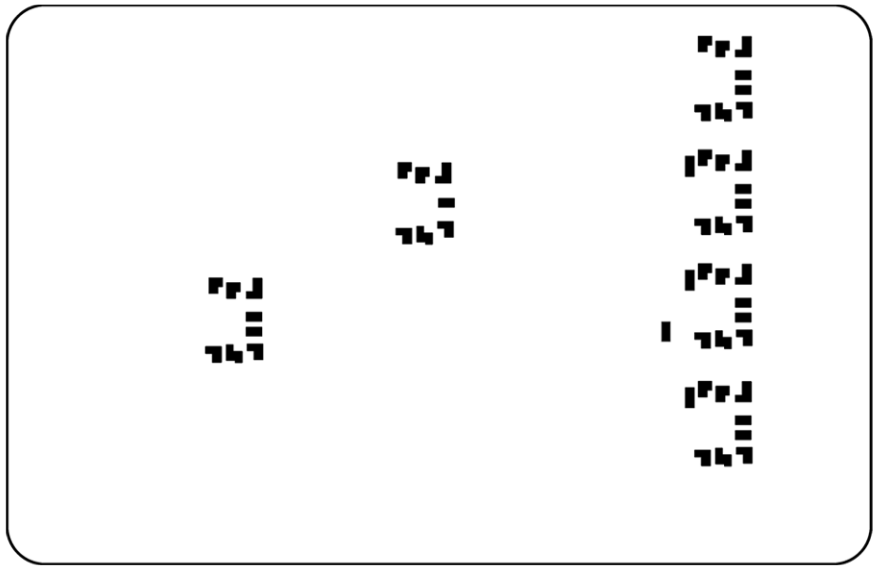
Existing Housing Mass



Existing Cul-de-sac Form

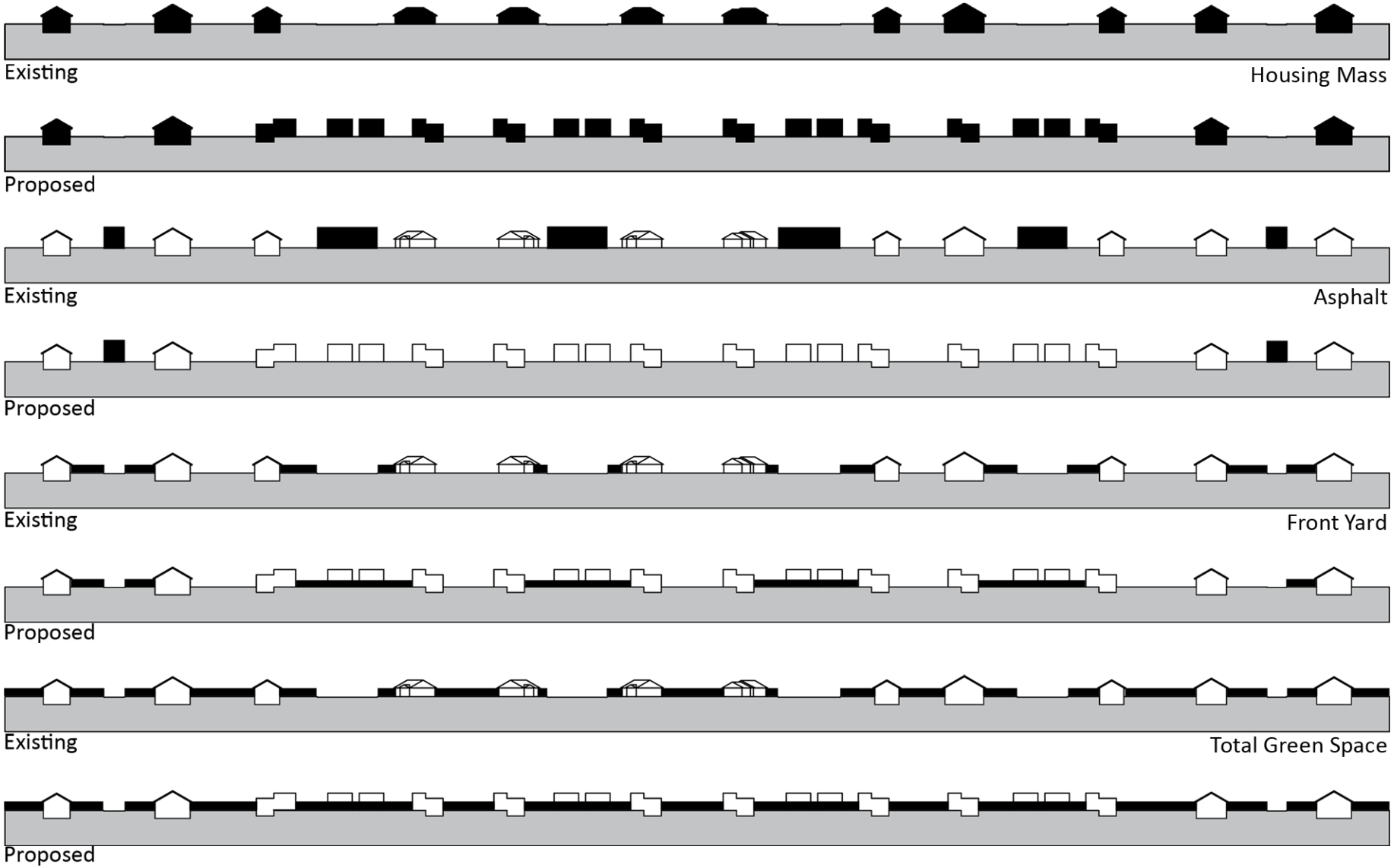


Proposed Housing Mass



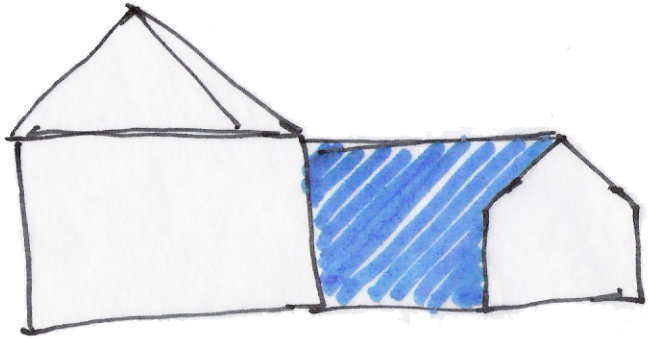
Proposed Cul-de-sac Form

Neighborhood Sections- Existing Vs. Proposed

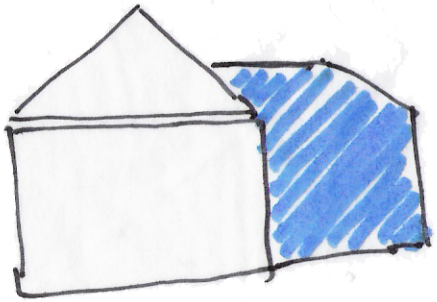


Suburban Analysis

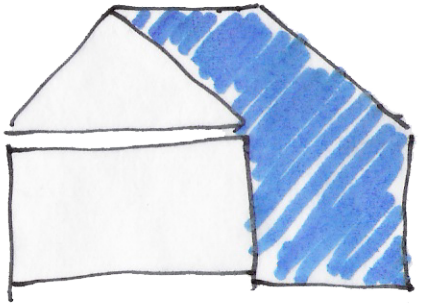
Methods of Adaptive Houses



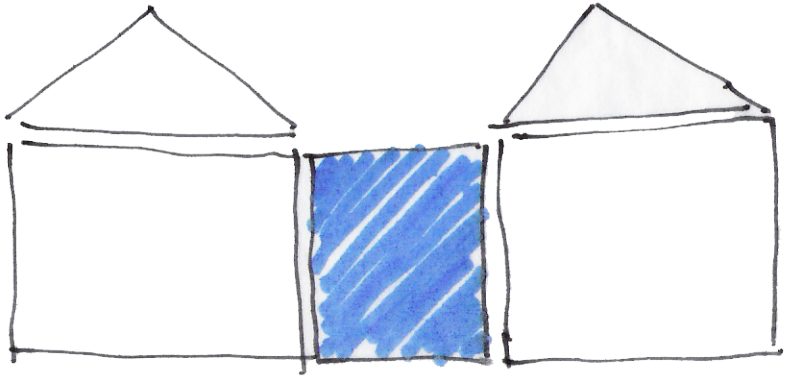
Connecting Ancillary Unit



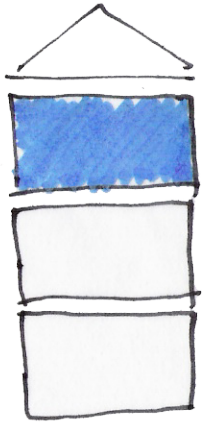
Adding an Extension



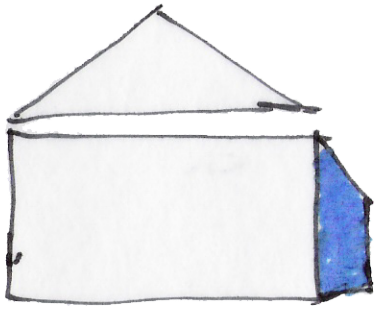
Adding a 2nd Floor



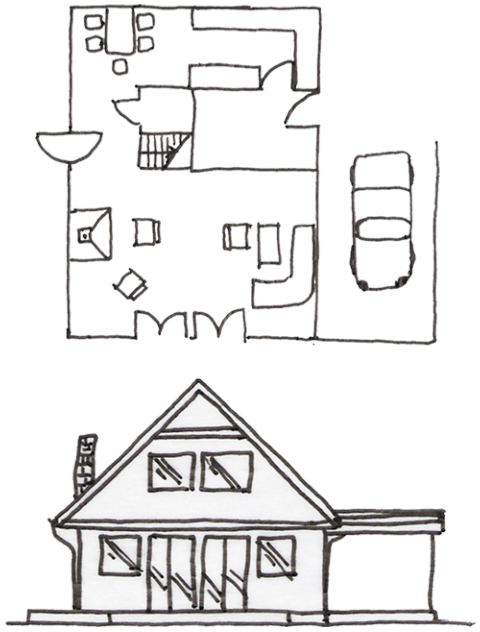
Bridging a gap, filing in

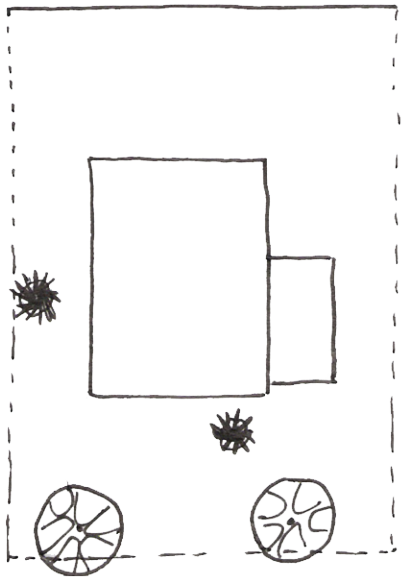


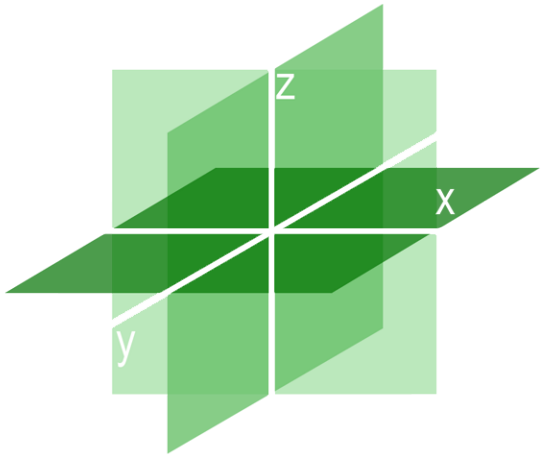
Adding a Floor



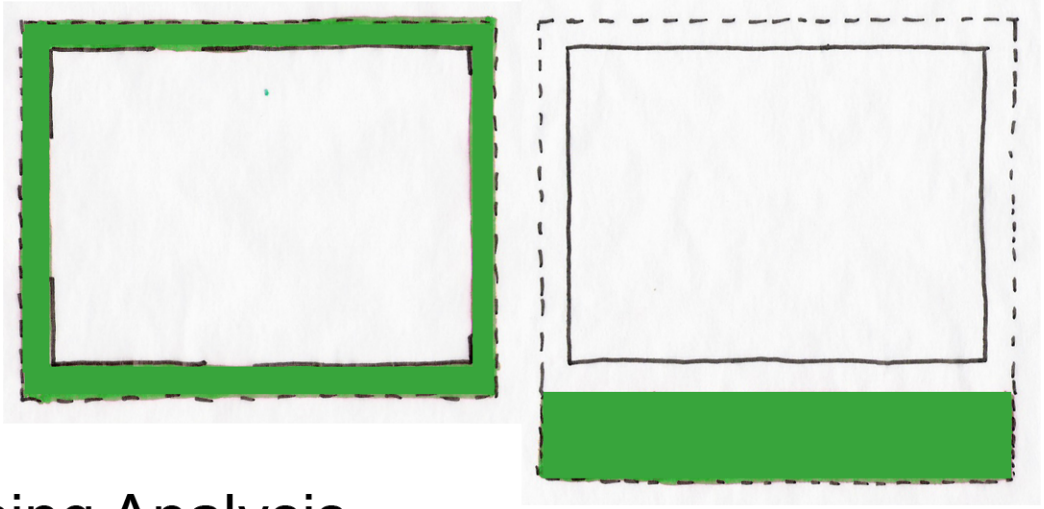
Adding an Connection





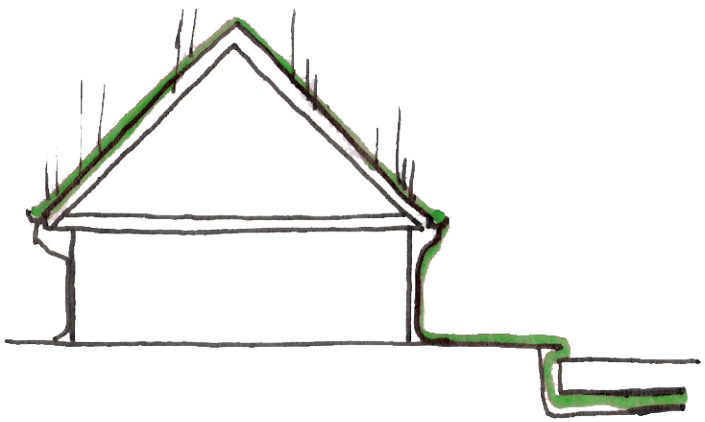


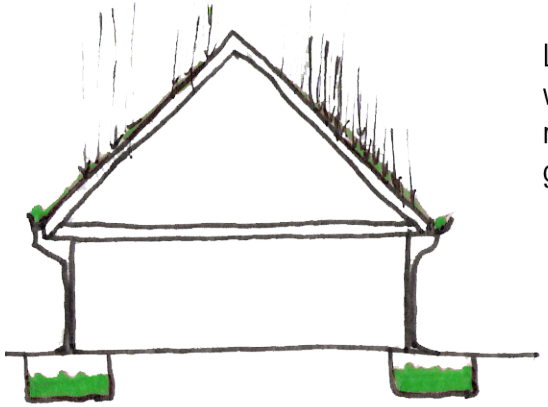
Mass-development homes are often designed first in plan. The elevations are then a response to the spaces of the plan. Less thought is given to the overall three-dimensional form.



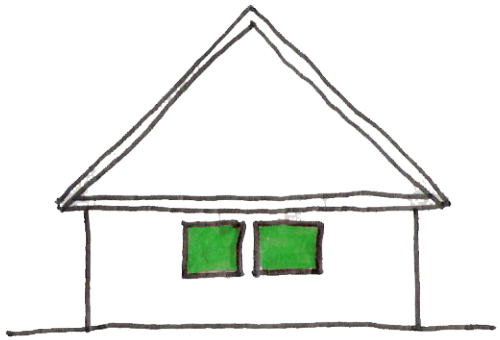
The typical suburban house has an average overhang of two to three feet. This over hang can be extended on the south side in order to provide shading, reducing solar heat gain. This would allow for a reduction in the necessary energy requirements.

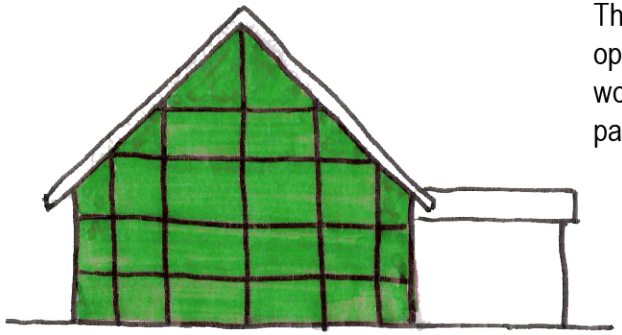
Housing Analysis



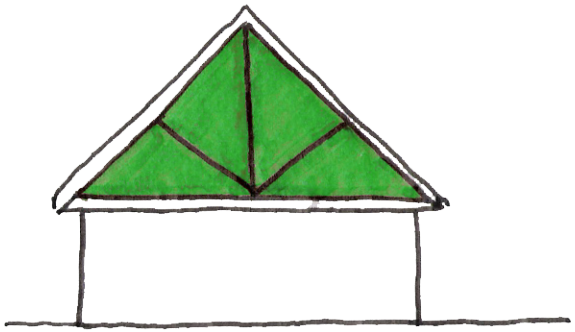


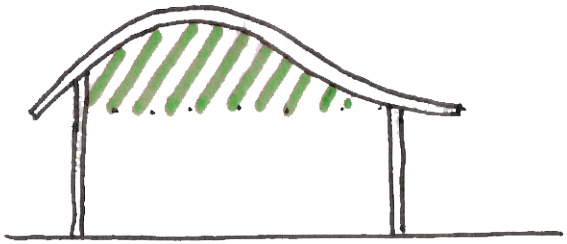
Like a tree, a house has the potential to store water within its “roots”. Rather than let rain run to the sewers, it can be incorporated as greywater.



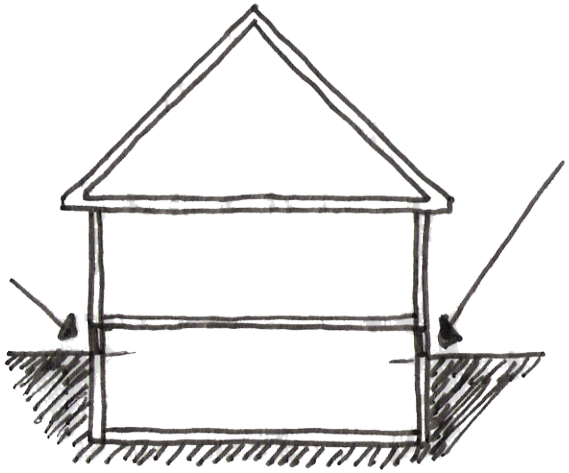


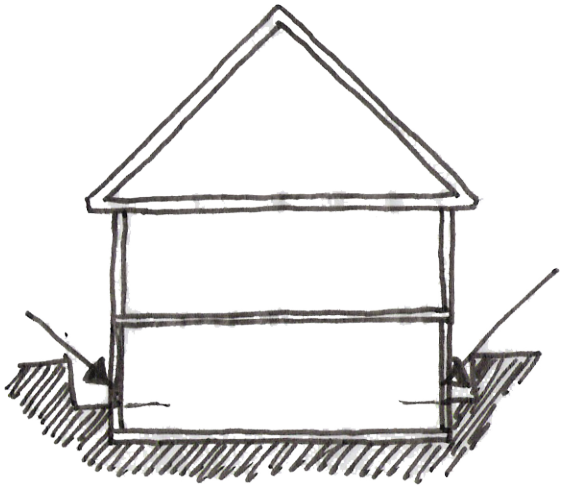
The typical home’s windows are punched openings in an opaque wall. An alternative would be to think about the glass as a transparent wall.



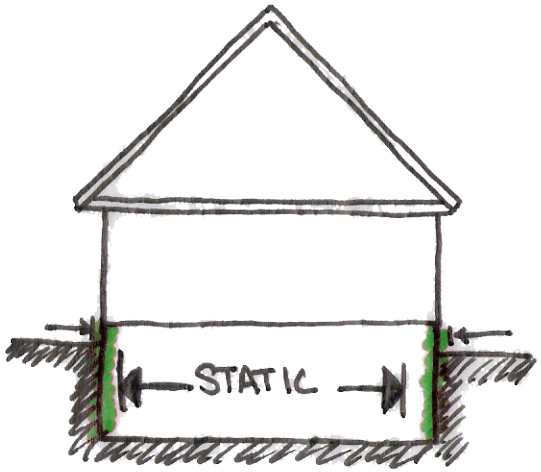


Many homes include attic space that ends up being a storage space for things long forgotten. This space can be utilized as vaulted or raised ceilings that make a room appear more spacious.

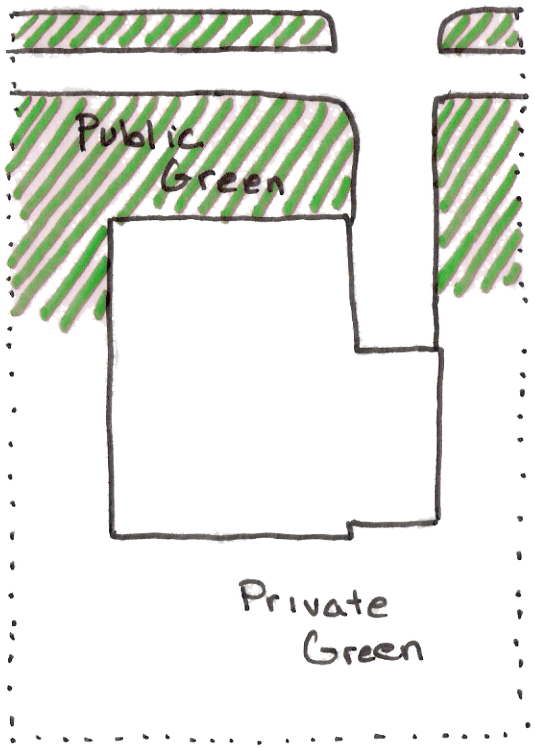


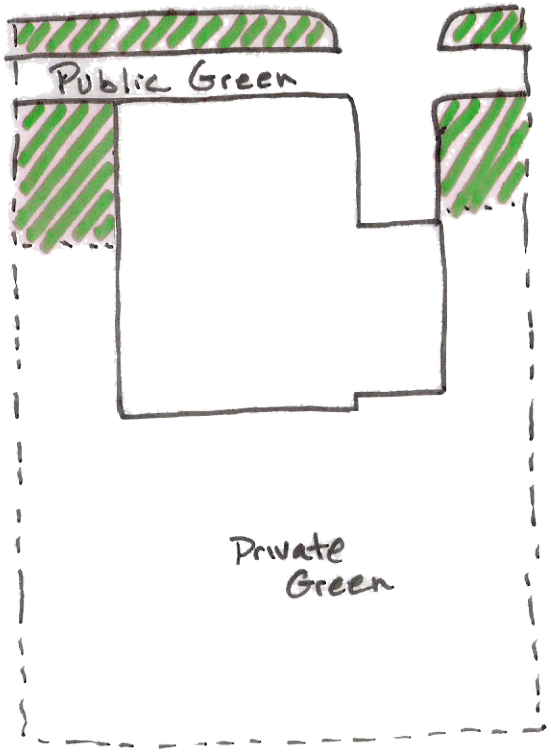


Basements, the foundations for most homes, are sunk into the ground. This limits their ability to allow direct or indirect lighting into their spaces. By reconsidering the land development close to the foundation, perhaps more light may reach in.

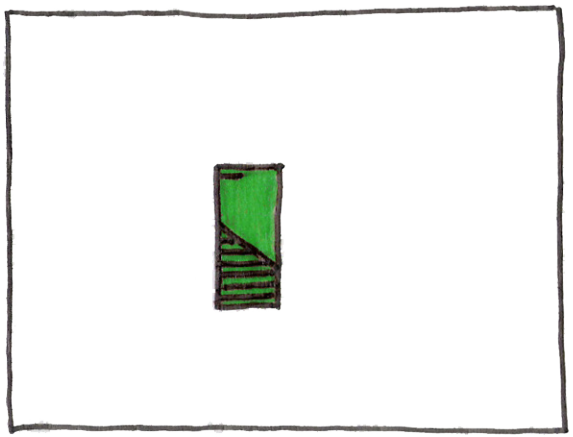


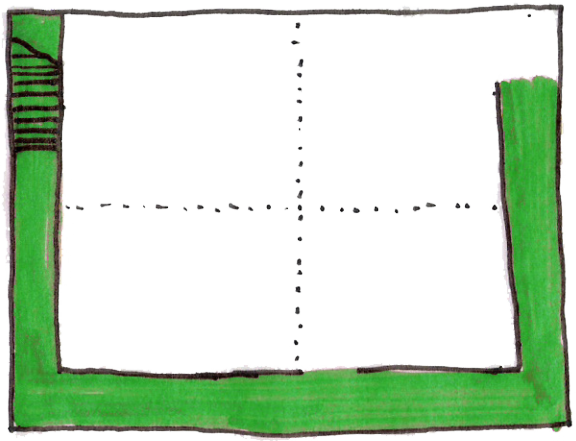
Part of the intention for a basement is to provide a sturdy foundation on which the home can rest. This, however, restricts the potential for expansion and contraction on this floor. A more flexible solution would remain above ground level.



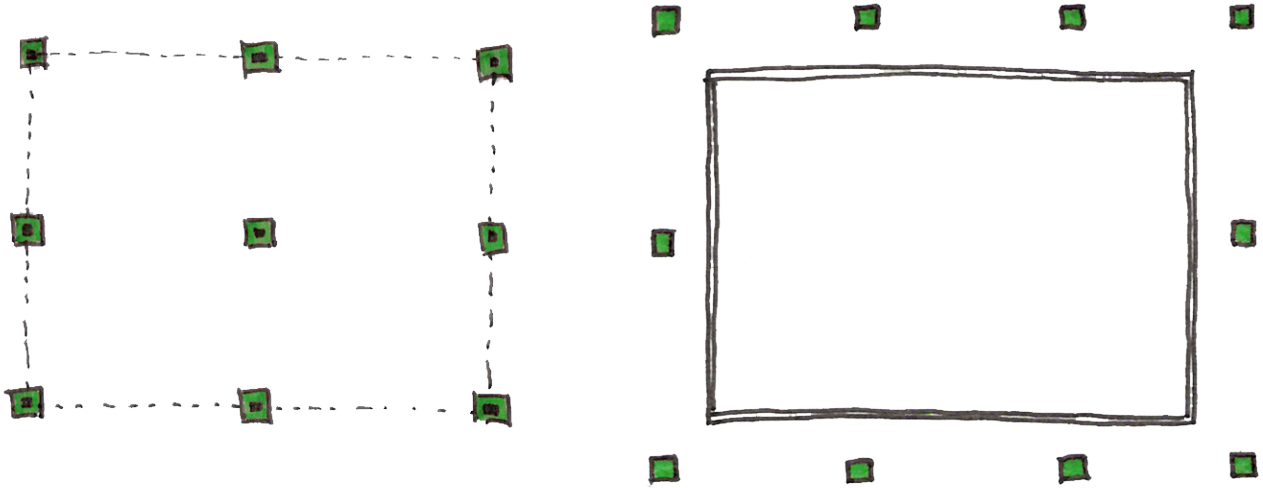


The green space that exists as a front yard gets used less and less as society spends more time indoors. When spending time outside, the more likely location is the back yard. The elimination of this front yard can provide a larger, more active, back yard. It also can provide more private space.

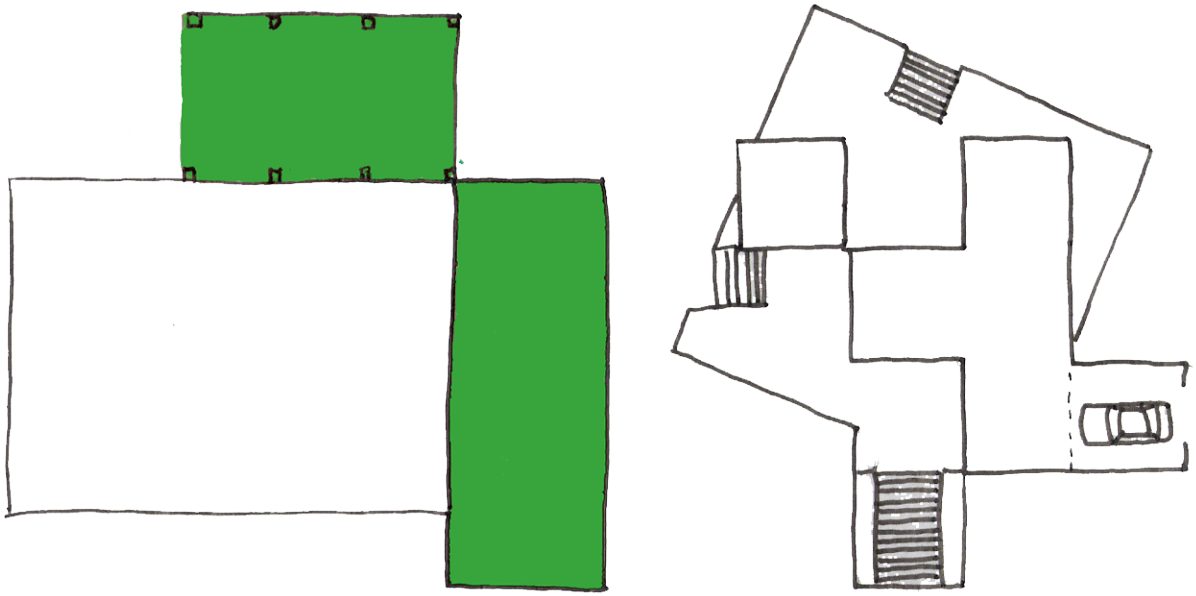




Typical homes often have centralized circulation spaces because it requires less square footage than decentralized circulation. However, there is the potential for some circulation to occur outside the home walls.

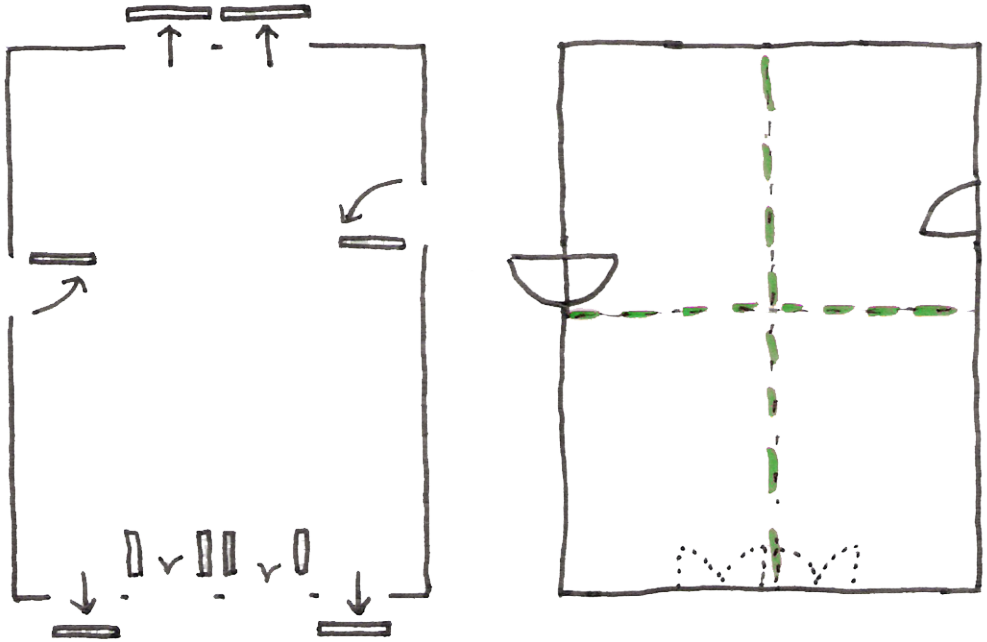


The structural system is nearly always encased within the walls of a home. This prevent the ability to manipulate the true form of the home without significant structural change, which is expensive.

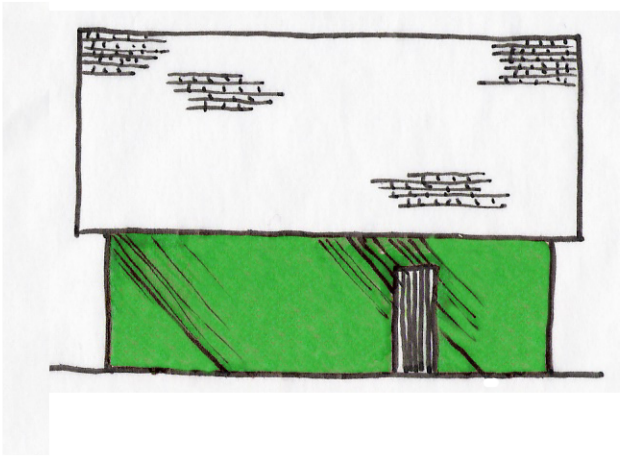


Despite the importance that is placed on the automobile, the architecture that is designed to house it is often neglected. Garages are commonly an extension off the main form of the home. A lot of architectural value is lost in suburban environments where the garage has become the dominant feature of the house.

Housing Analysis



The most basic layout for residential design breaks a simple rectangle into four quadrants. The spaces that exist within these quadrants are the driving force for the location of the punched openings that are the windows. This leads to a random appearance of windows on the exterior of the home.

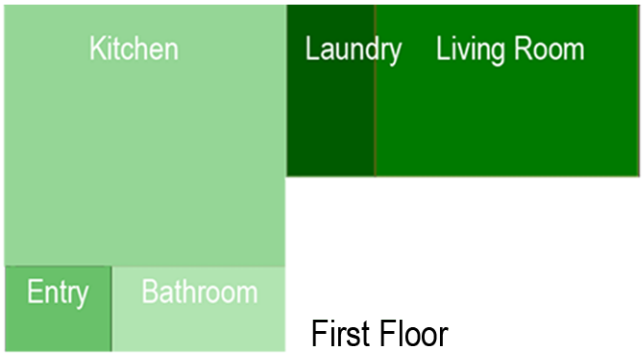


Many suburban environments have covenants which limit the architectural development of its' homes. These rules are often restricting of color use and material selection. By allowing more choice, owners begin to have the ability to design with materials selected from a local supplier.

Traditionally, a lot is occupied by a single house residing in the middle of its space, breaking the potential green space into two fragments. If the house is shifted to the back, then the green space becomes larger. If the program of the house is stacked, it allows the footprint to become smaller. If house footprints become smaller, then perhaps the lot size and/or arrangement needs to be reconsidered. Perhaps two houses could exist within one lot. This was a study to see how these shifts would effect a lot and the house model.

Housing Analysis

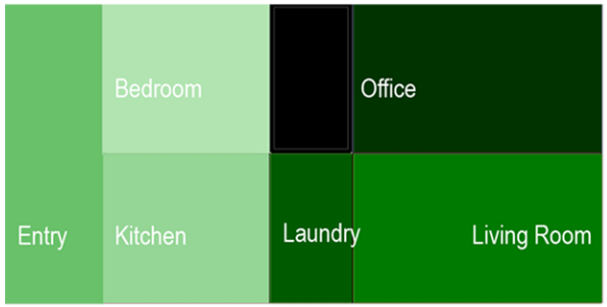
Spacial Plan



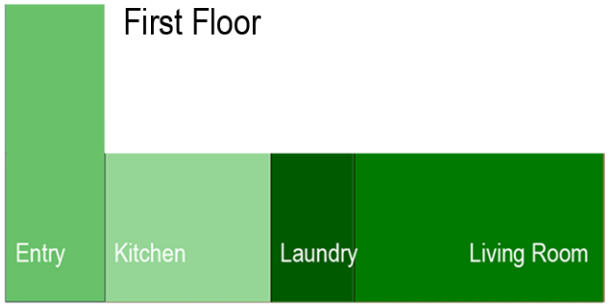
First Floor

Second Floor

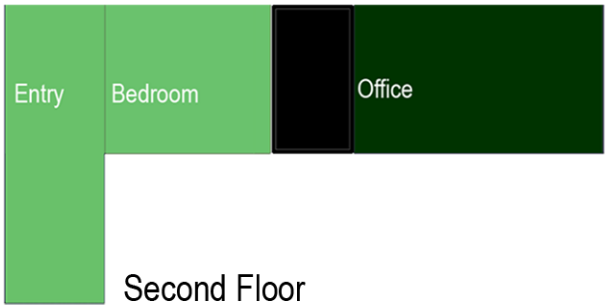
Spacial Section



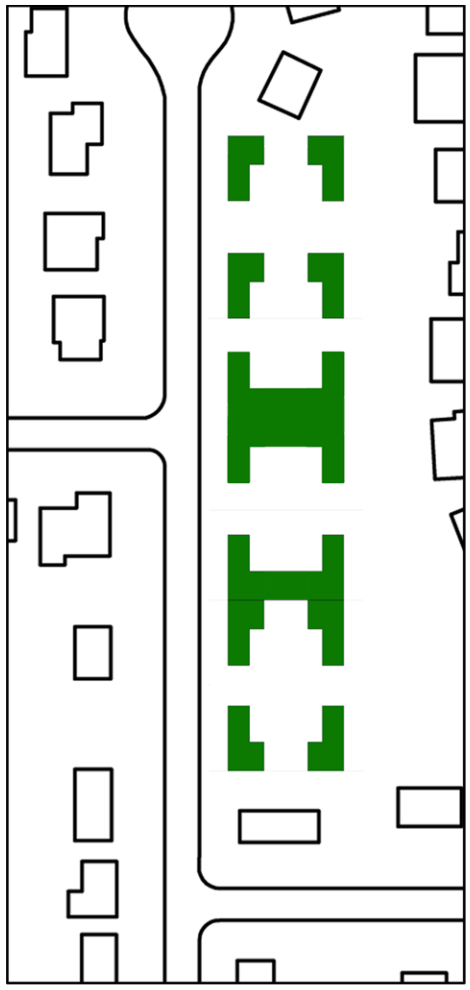
The program of the “house” is: bedroom, office, laundry, kitchen, entry, living room, bathroom, bathroom. The main floor of the house should be the public spaces while the upstairs floor would be the more private spaces. Having a bathroom on each floor is fairly necessary.

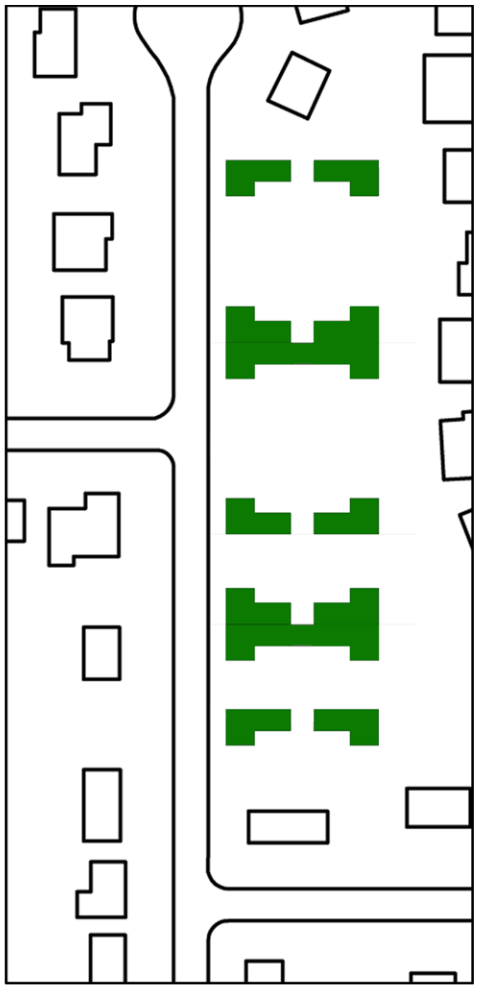


First Floor

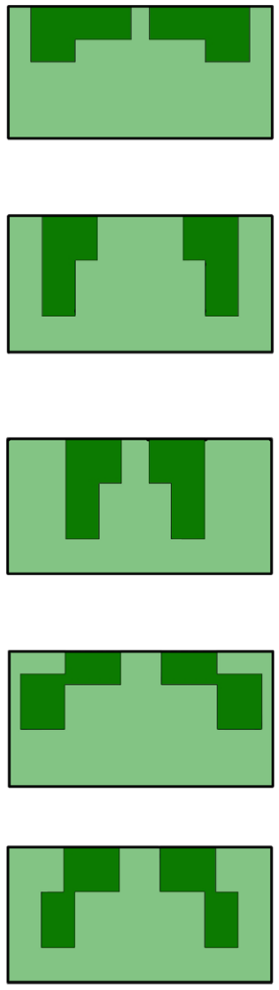


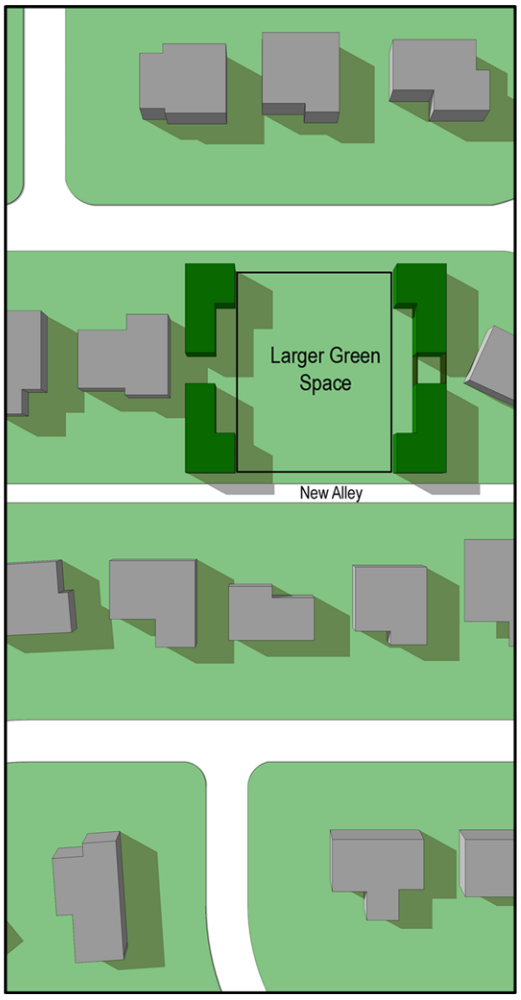
Second Floor





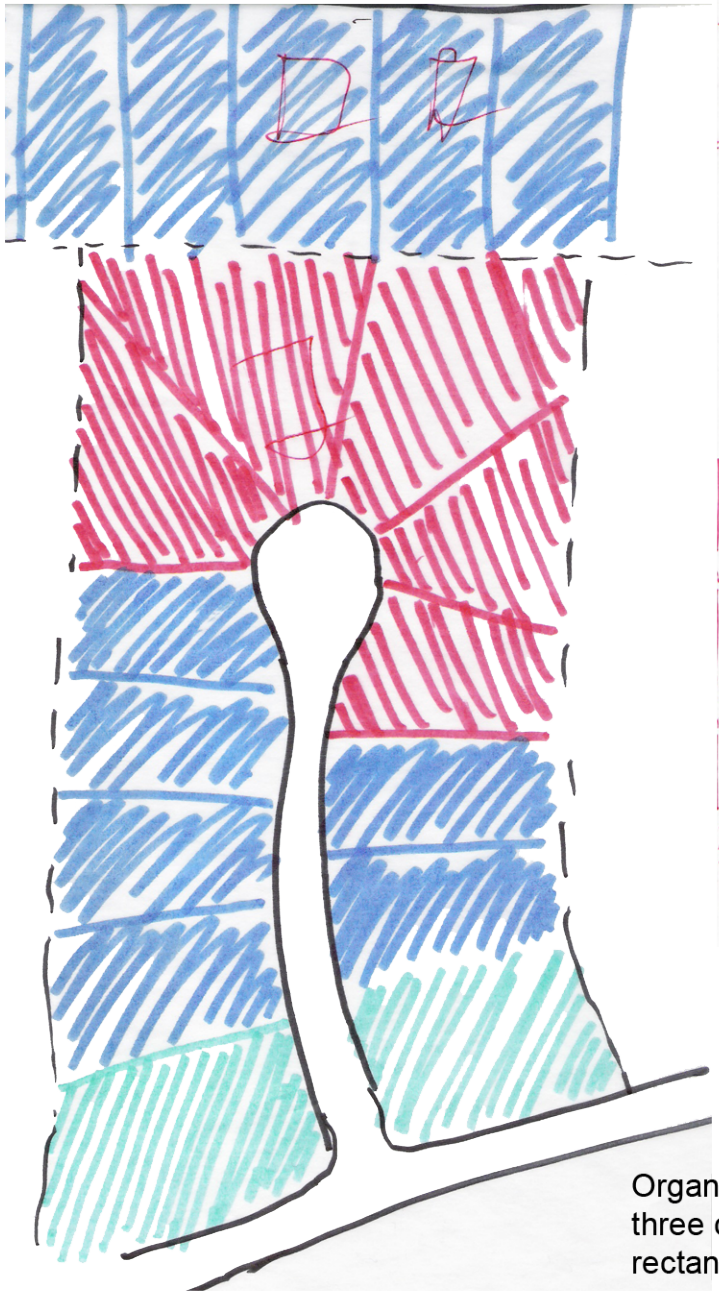
Possible Layouts



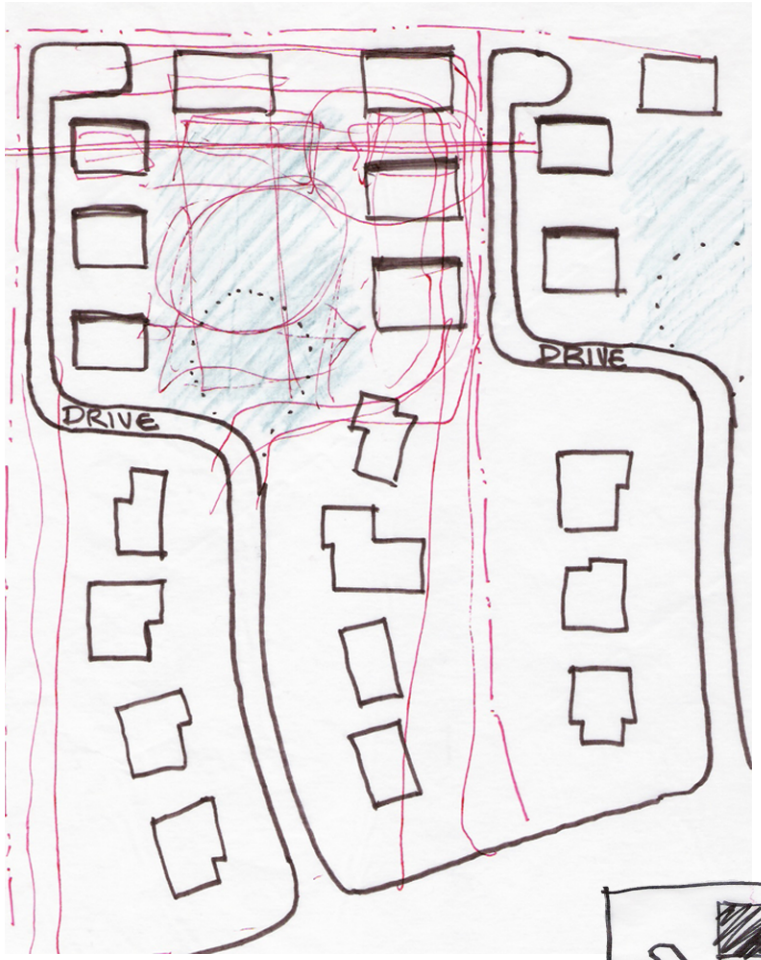


Alternative Suggestions

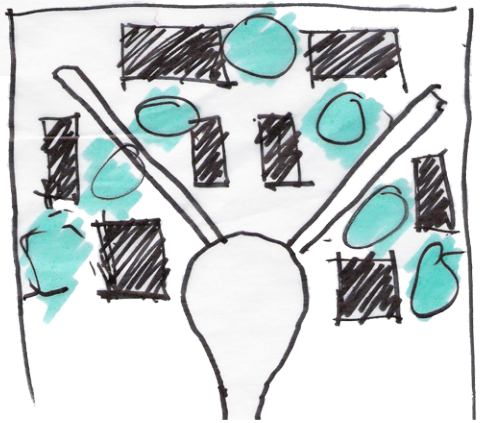
Housing Analysis



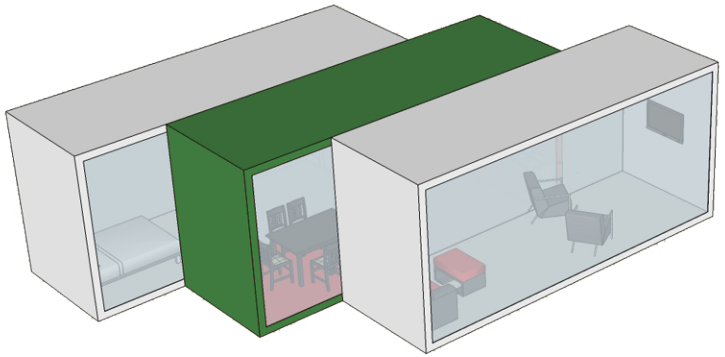
Organizing suburban lots into three categories: cul-de-sac, rectangle, and corner lots.



Reorganizing the typical suburban cul-de-sac into a new arrangement

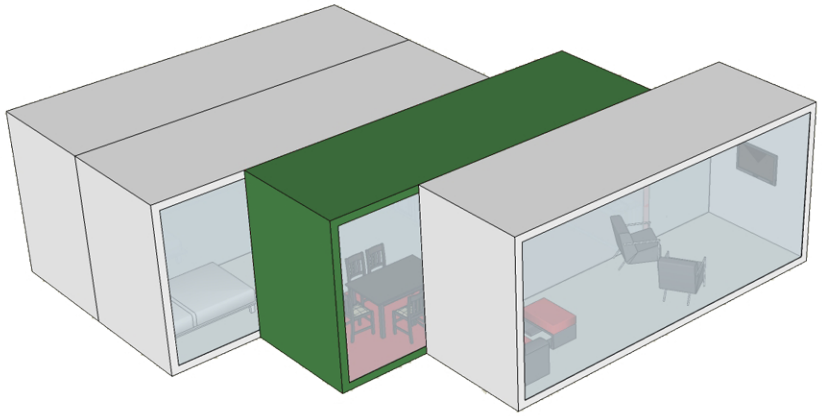


A central core for utilities is necessary for a permanent lifestyle



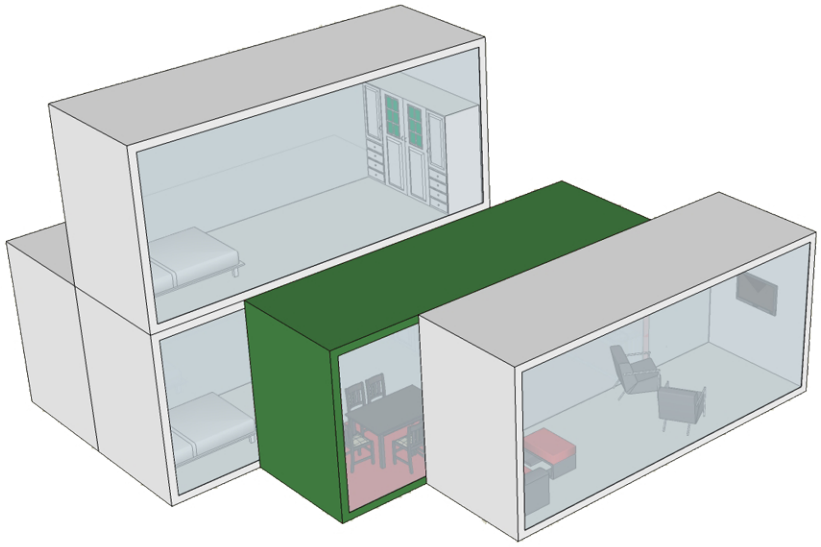
Year 0

A young person or couple move into a house



Year 5

The couple has a child and needs an additional bedroom

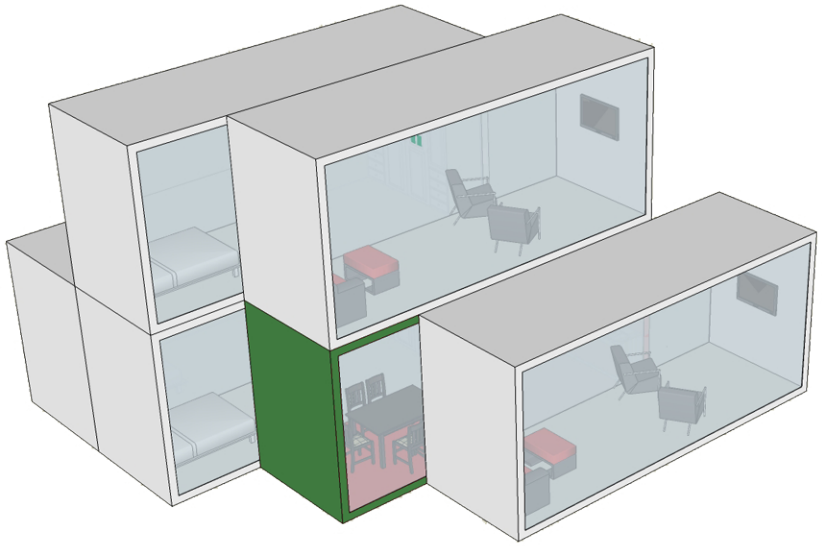


Year 12

The couple has a child and needs a 2nd addition

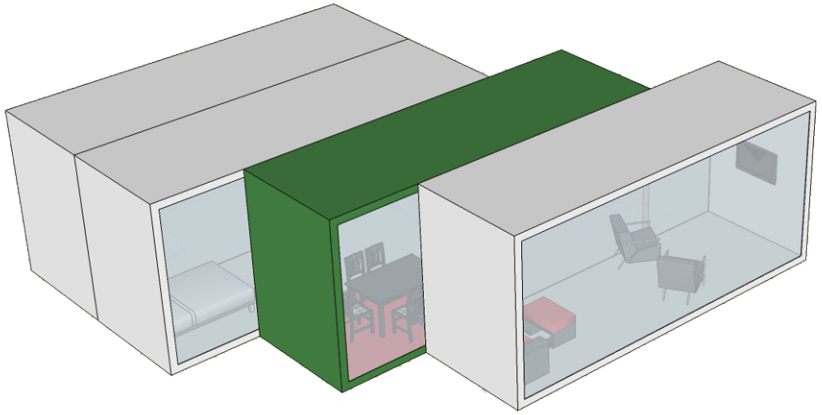
Conceptual Design

This concept is about the suggestion of a new trend of housing. One where instead of moving locations as the size of the fa miles grows and shrinks, the house is instead altered to reflect these changing demands. This page illustrates the time frame and changes that often occur within the typical American family. The goal of this design is to create a truly adaptable house.



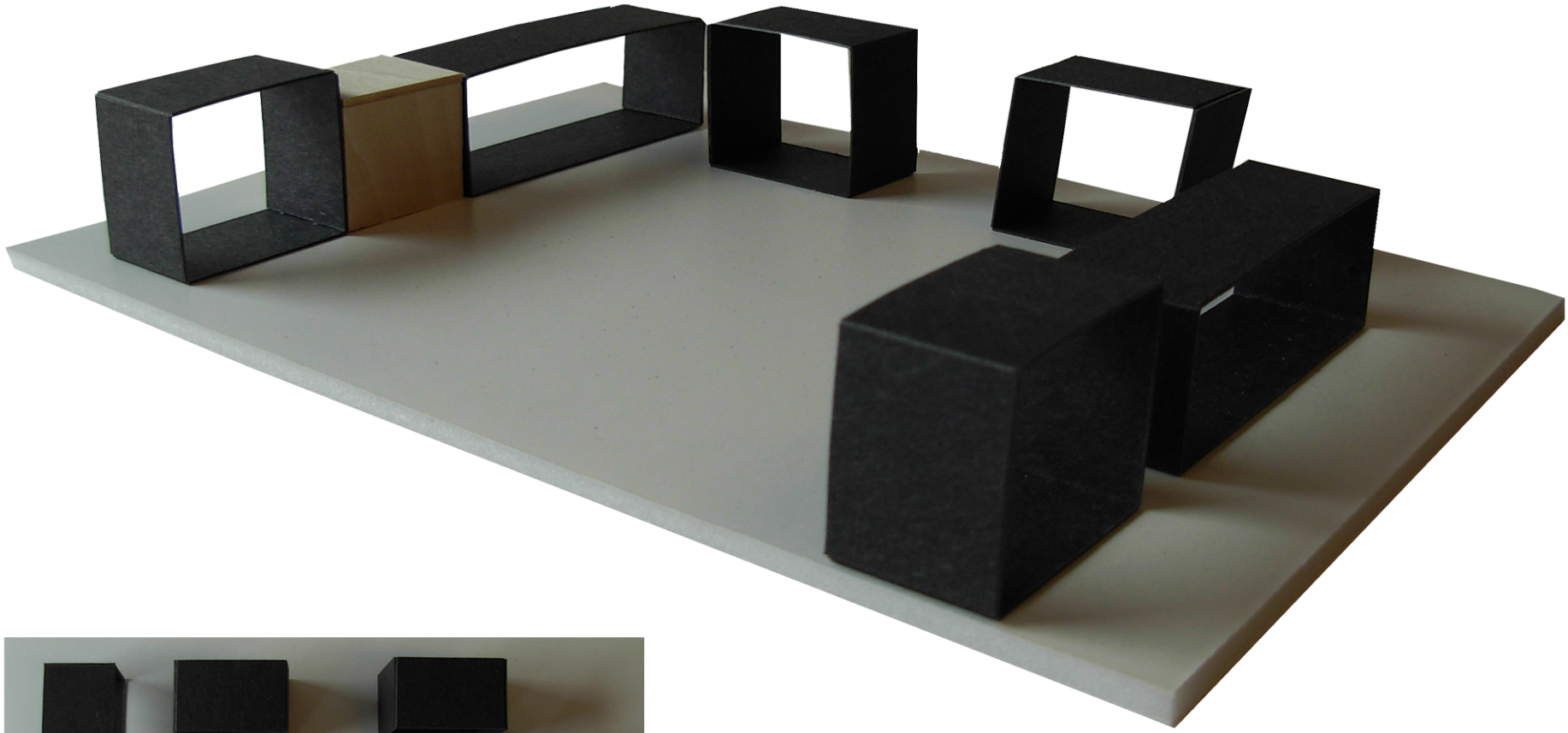
Year 18

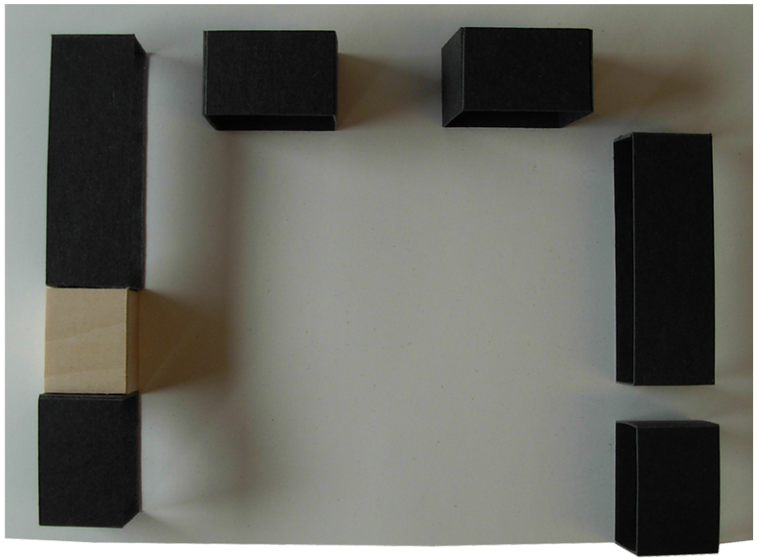
The children are growing and need additional living space



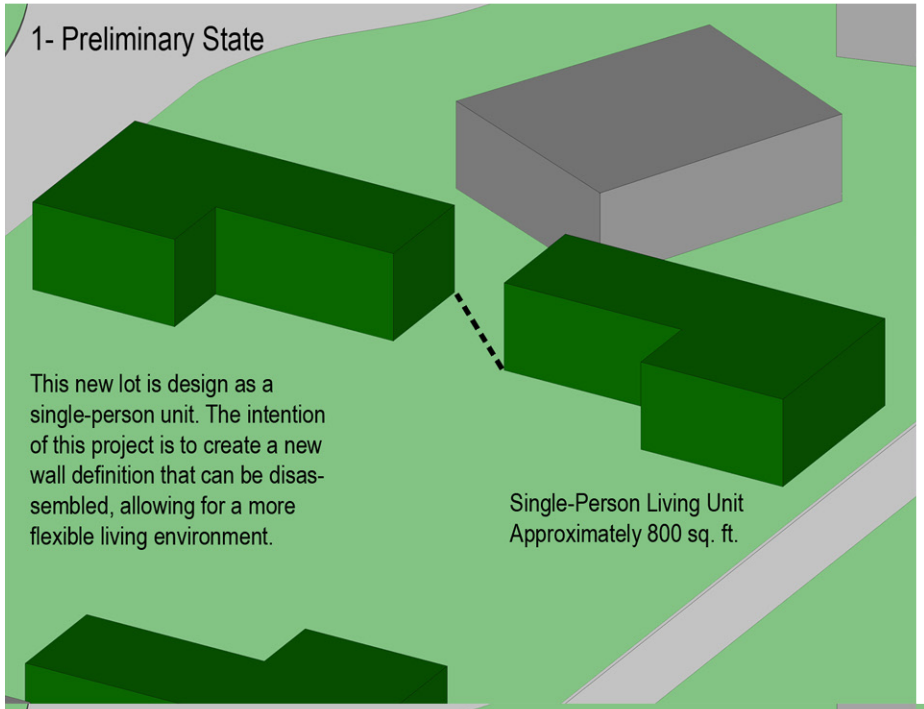
Year 25

The children are grown up and move out on their own

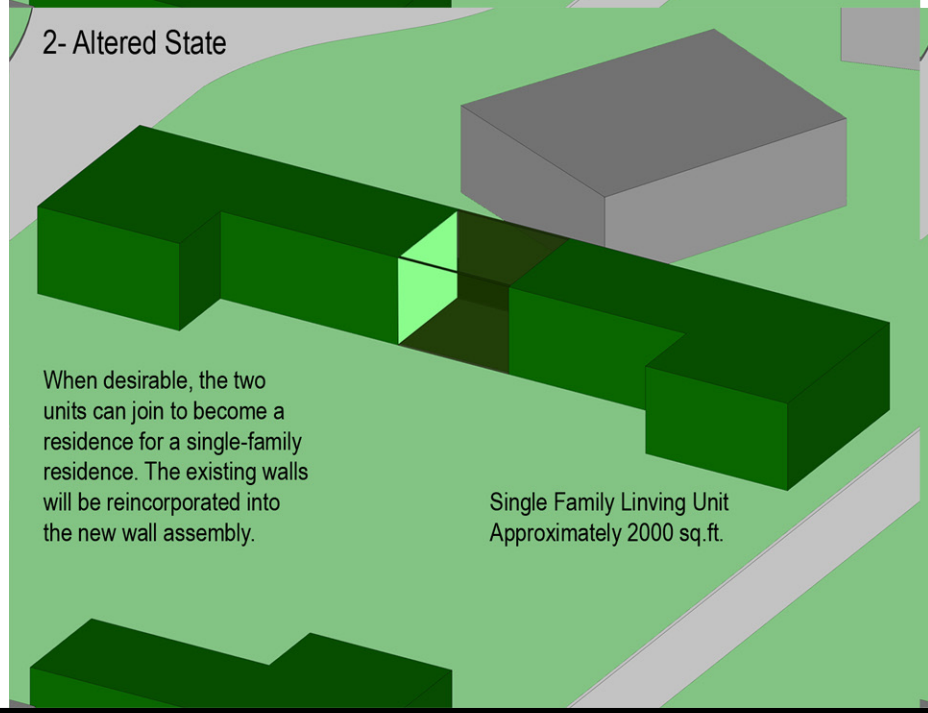


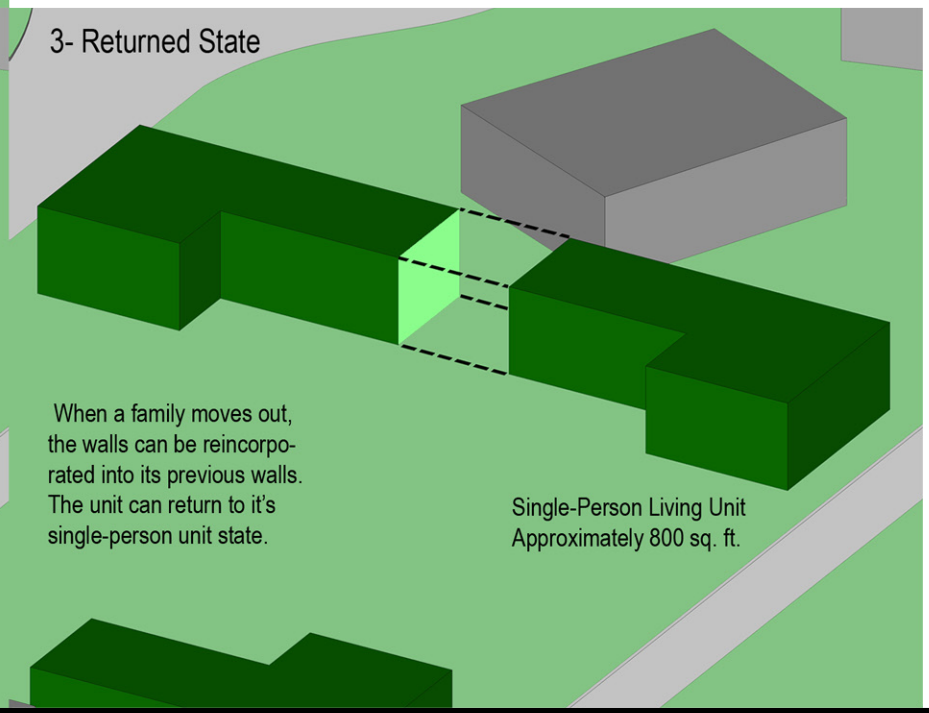


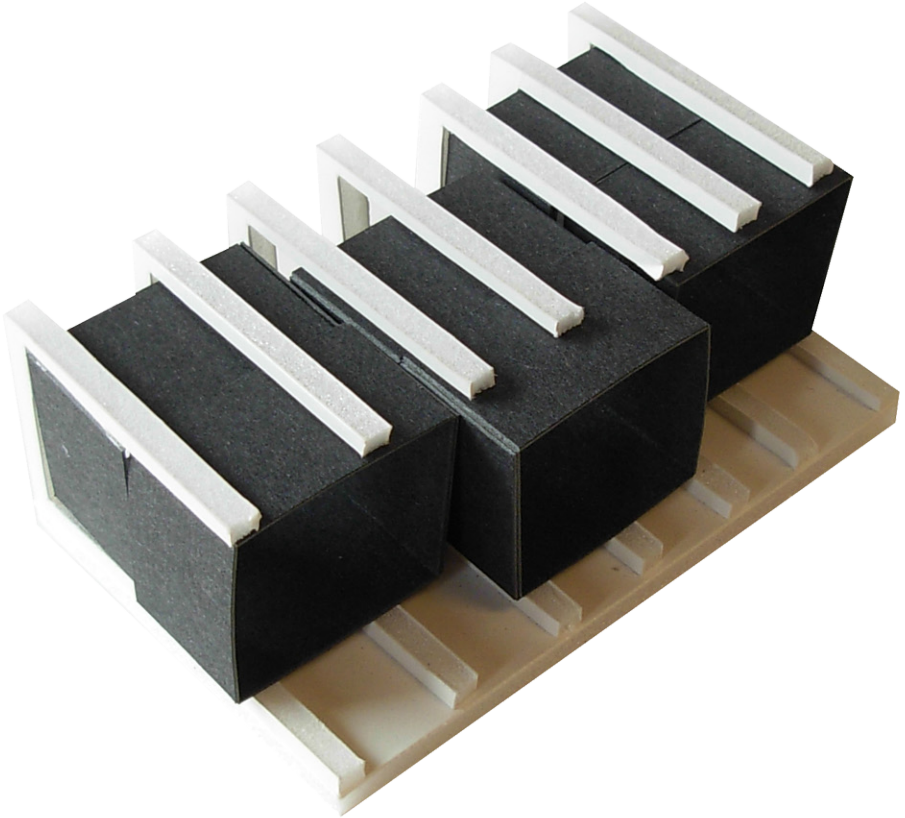
Conceptual Design

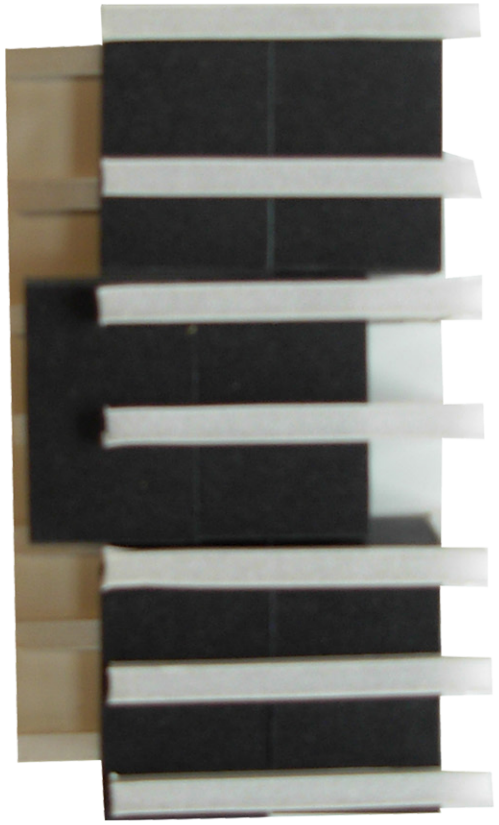


The series takes the addition of another house to the next level, showing how the two houses can then be manipulated to create a new single house when the demand for extra space occurs.

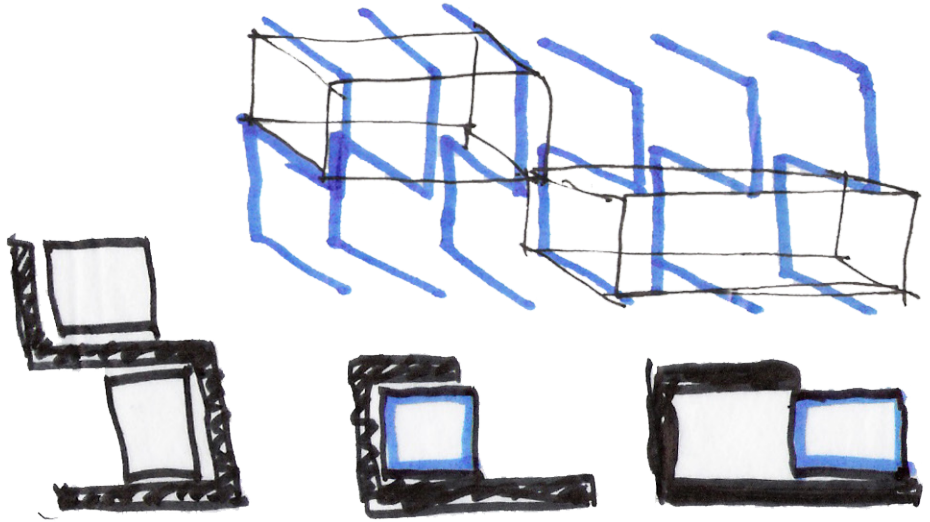




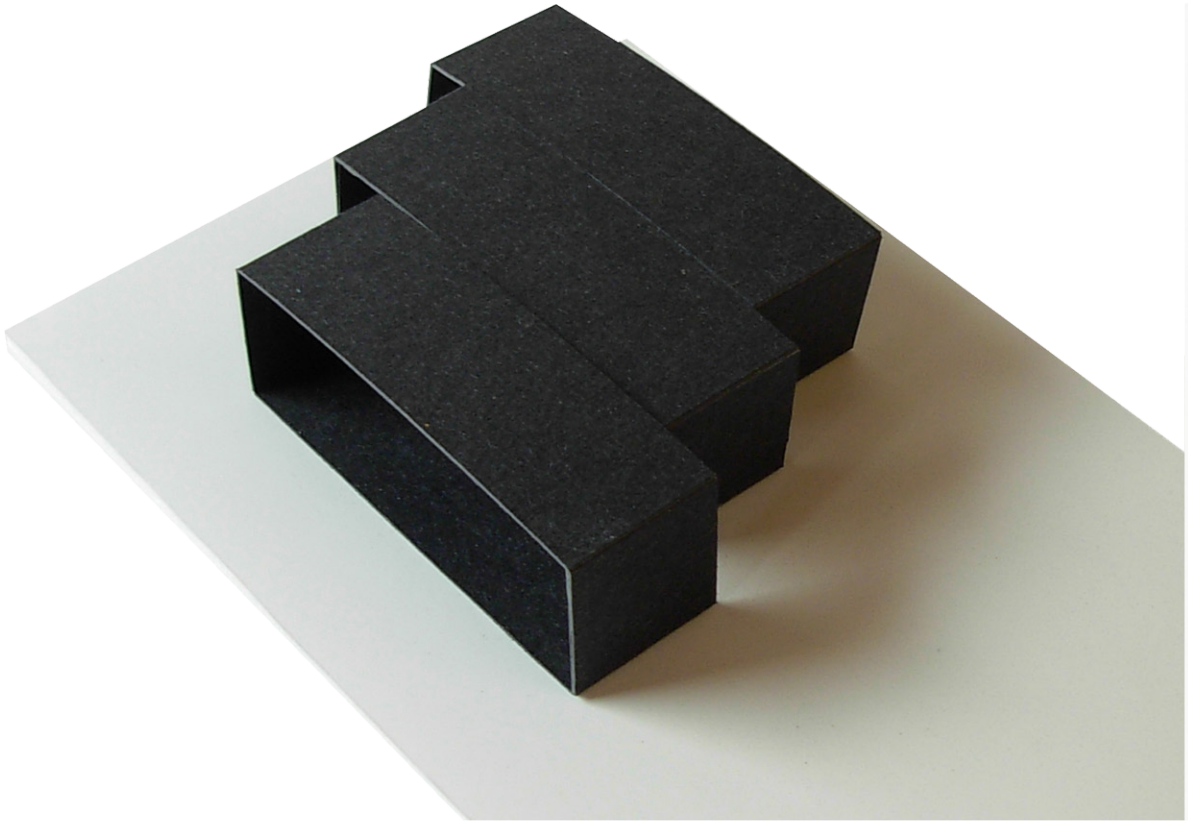


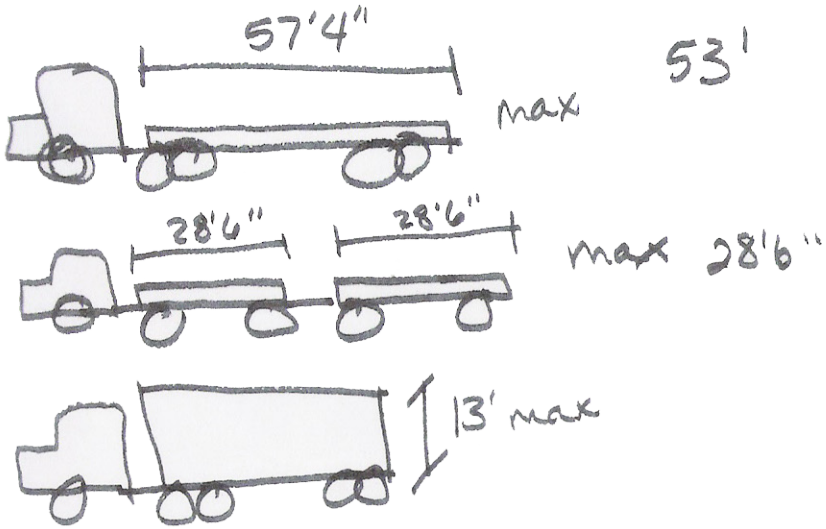


The concept behind this design is to create a inter-changeable system that allows for flexibility of room arrangements. Here is a ‘C’ shaped frame that allows a standard box to be moved with in. The purpose is to give the house a certain adaptability towards the user’s needs.



Conceptual Design

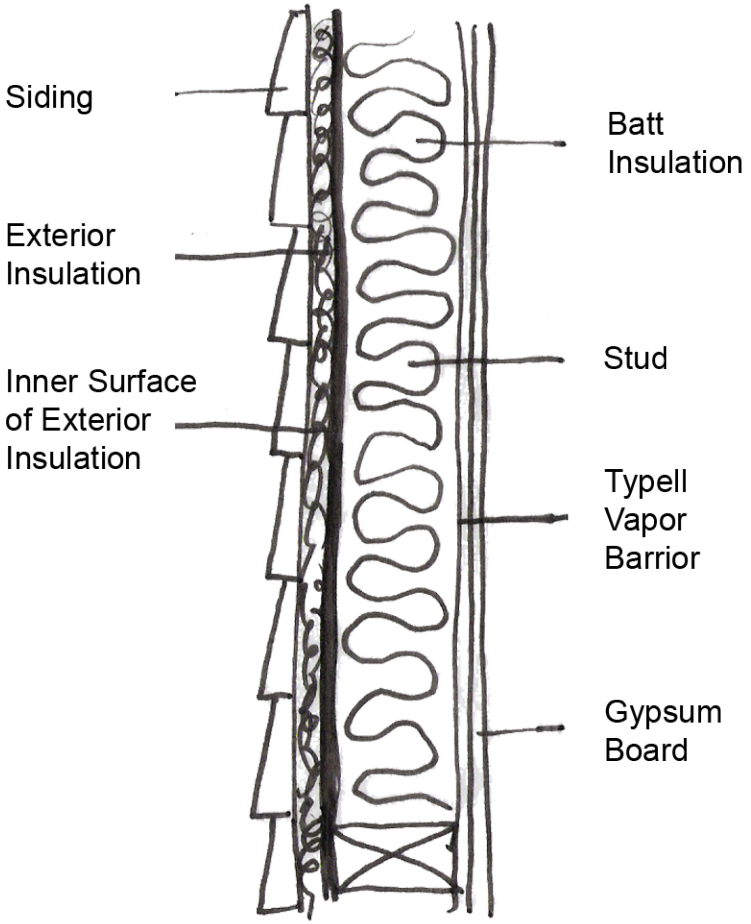


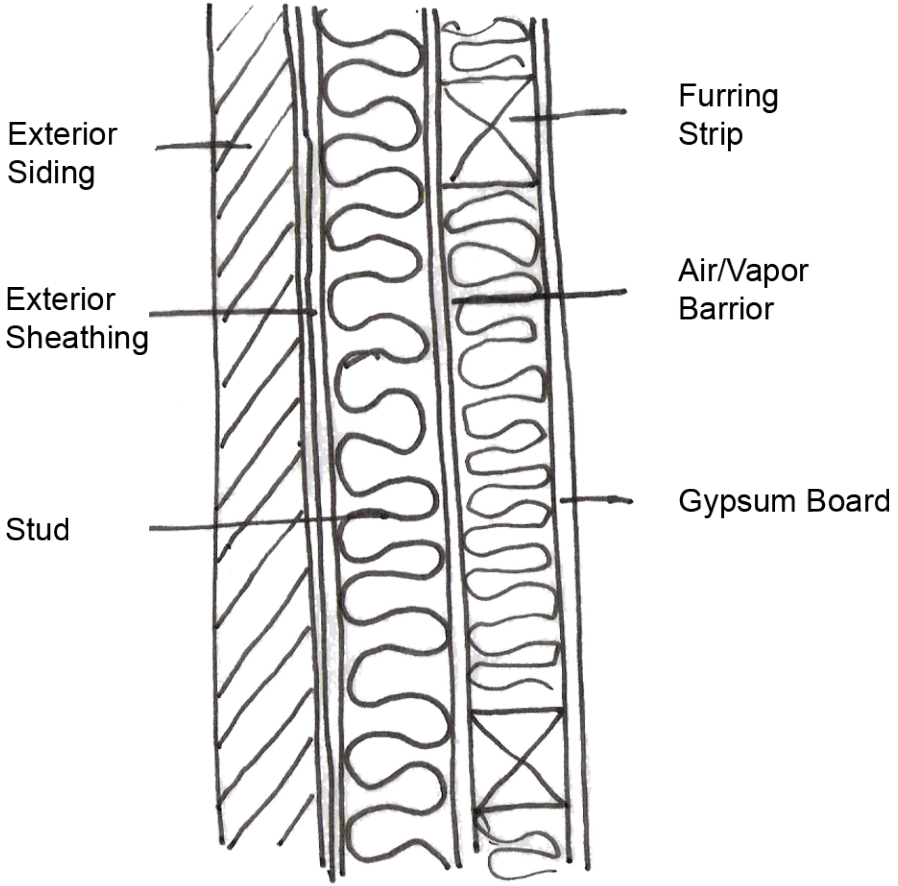


The idea behind this design is modular adaptability. Again, going with theme that the house no longer becomes a stationary object, but rather it can be manipulated by the user's demands. The size of the separate pieces of modules is determined by the size of a semi-trailer. In this way,the individual units can be prefabricated off-site, allowing for a reduction in construction waste.

Technical Details

Traditional



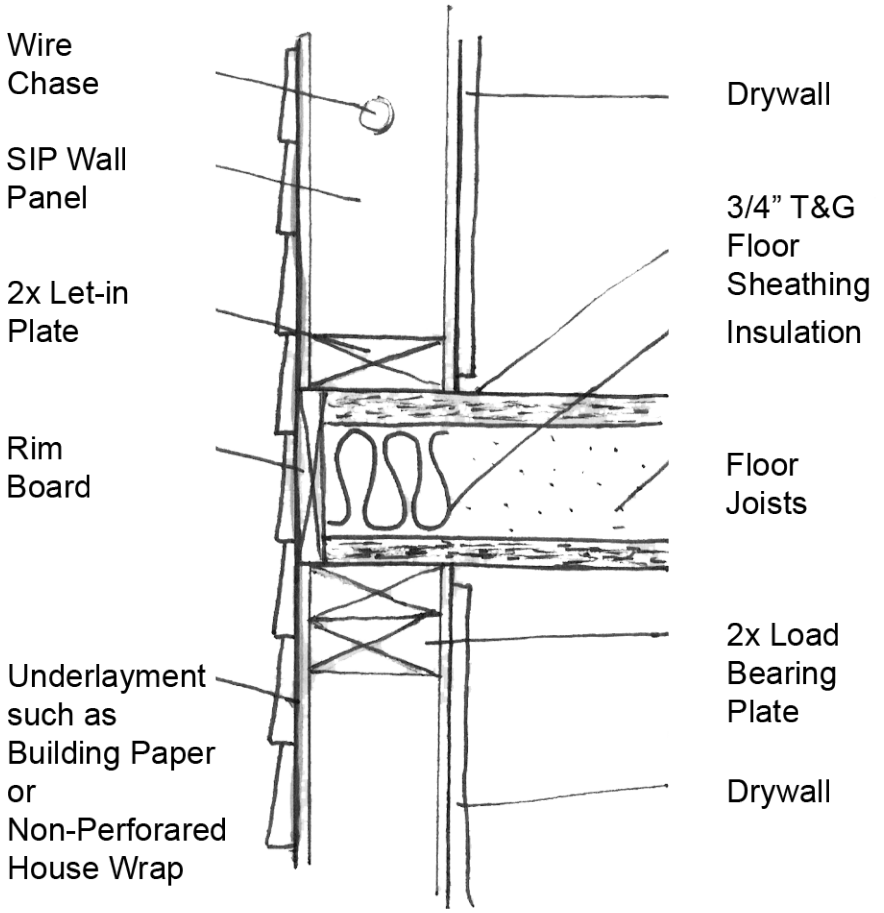


Conceptual Design

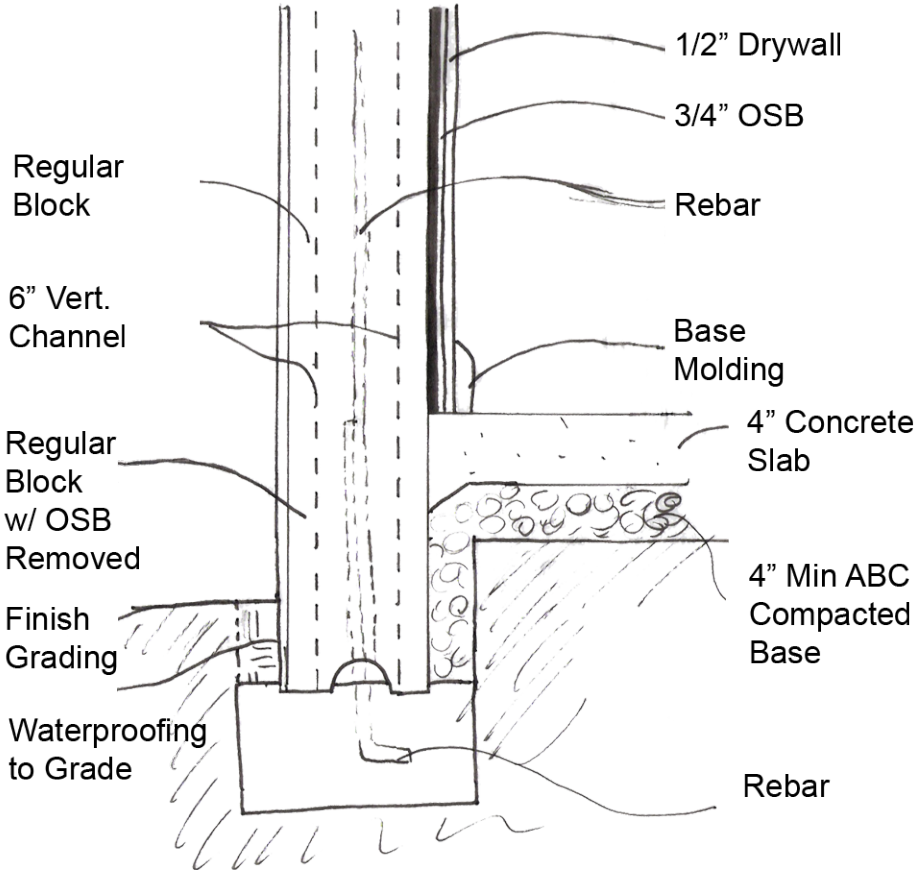
Technical Details

Prefabricated

SIPS



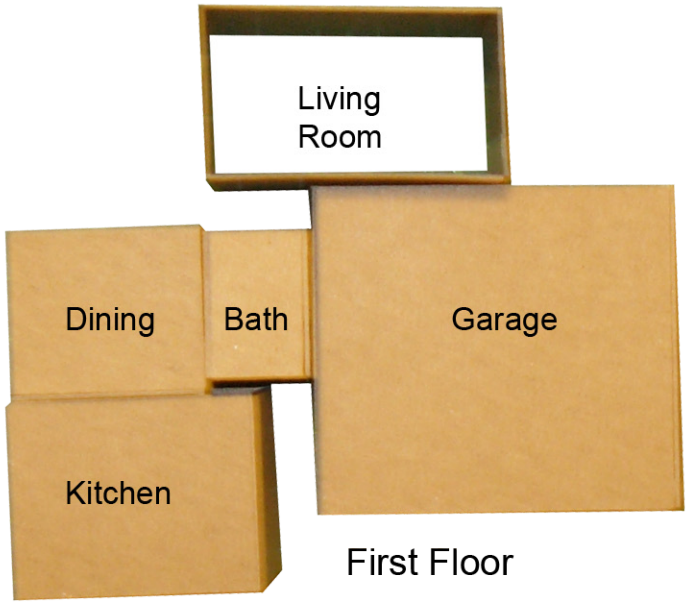
Tech Block



First Floor

Second Floor

Process Documentation

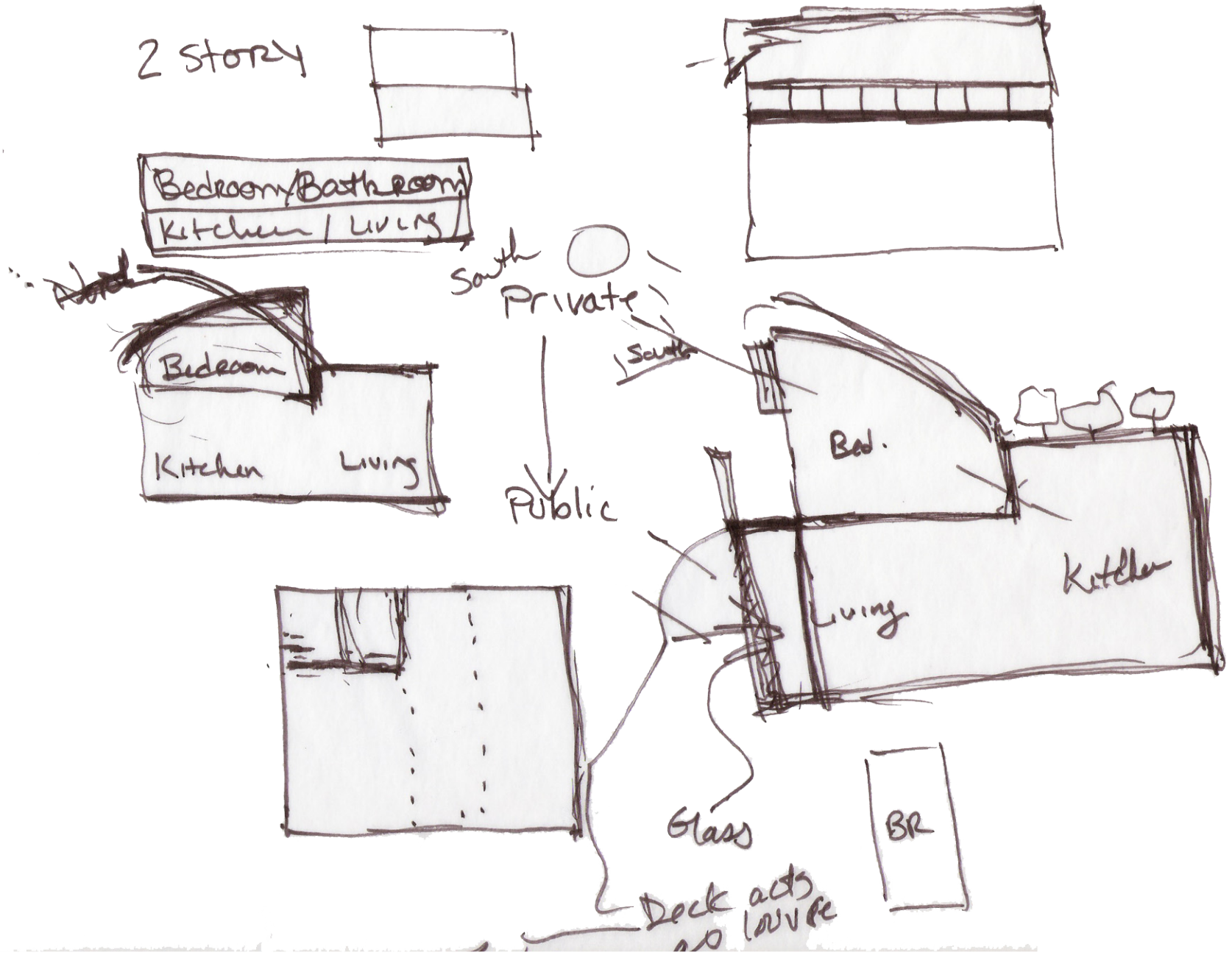


First Floor

Second Floor

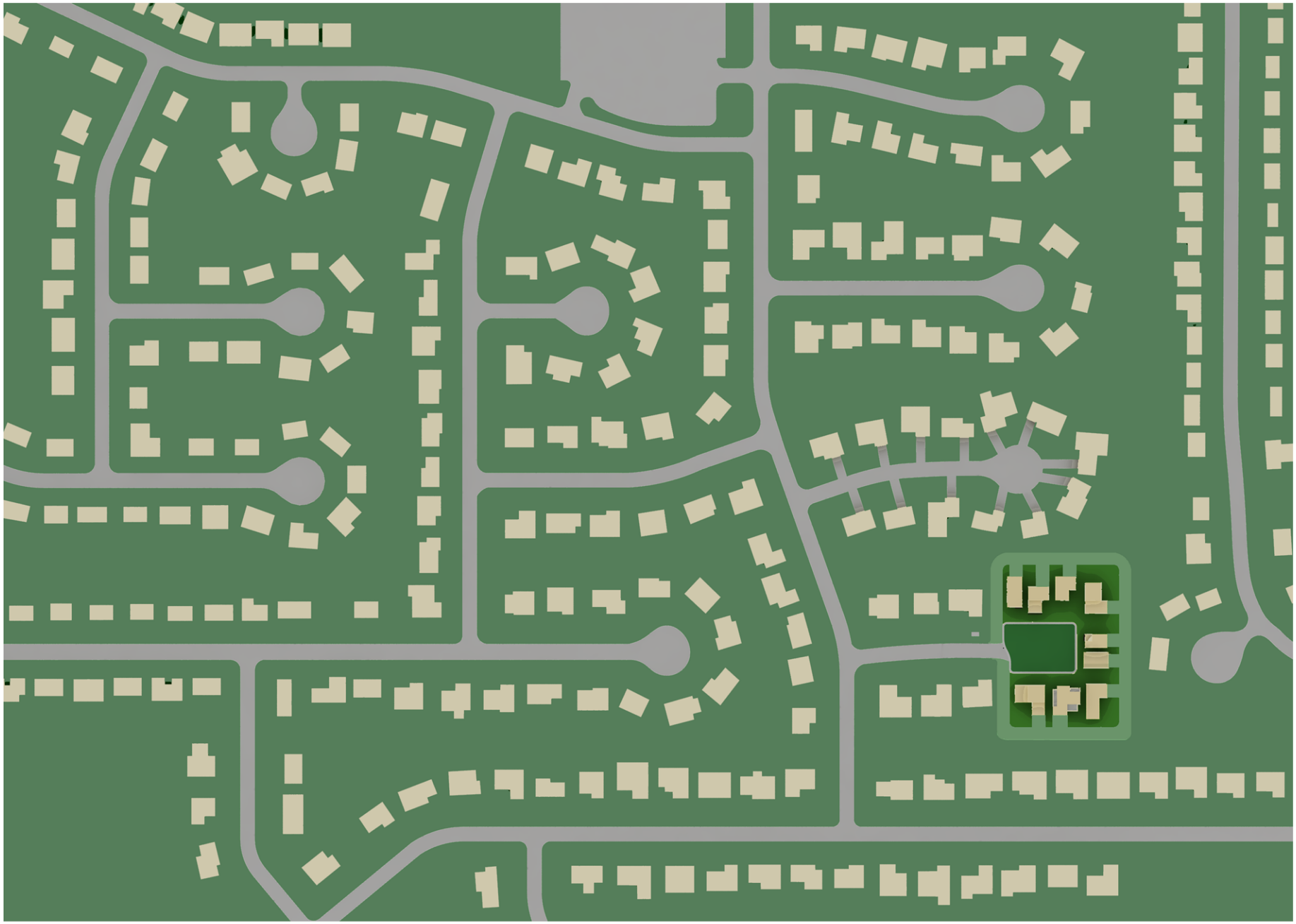
Process Documentation

Process Documentation


2 story
Bedroom/Bathroom
Kitchen / Living
South
Private
Public
Bedroom
Kitchen
Living
South
Bed.
Kitchen
Living
Glass
BR
Deck acts

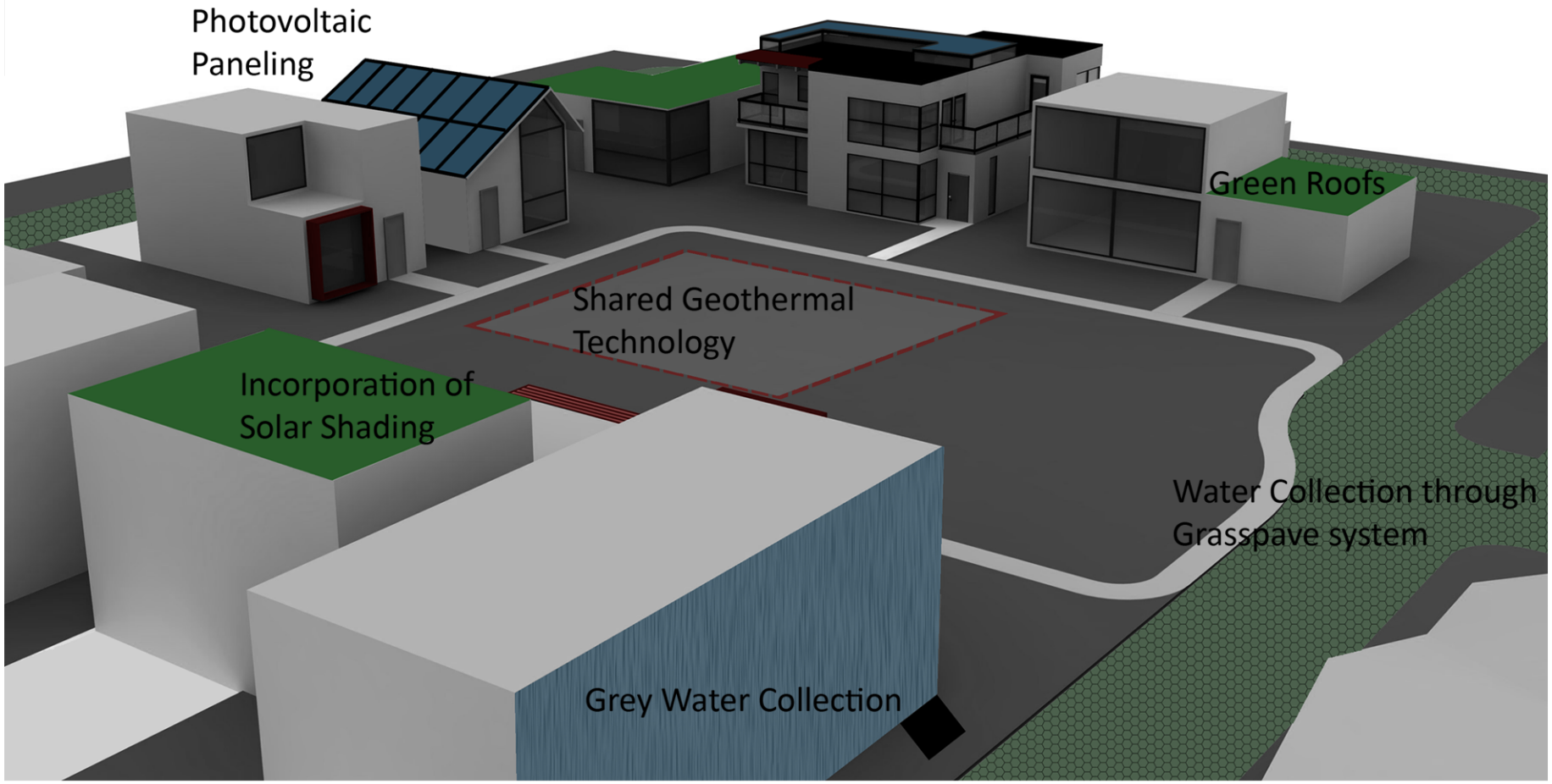
Existing Site Plan

Final Design



Proposed Site Plan

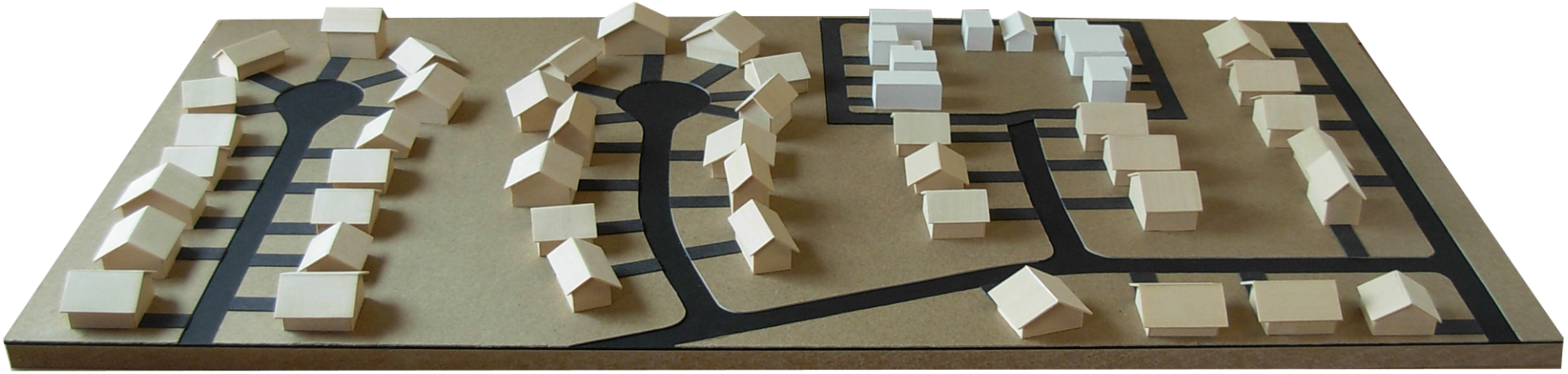
Environmental Positive Movement for the Community



Final Design

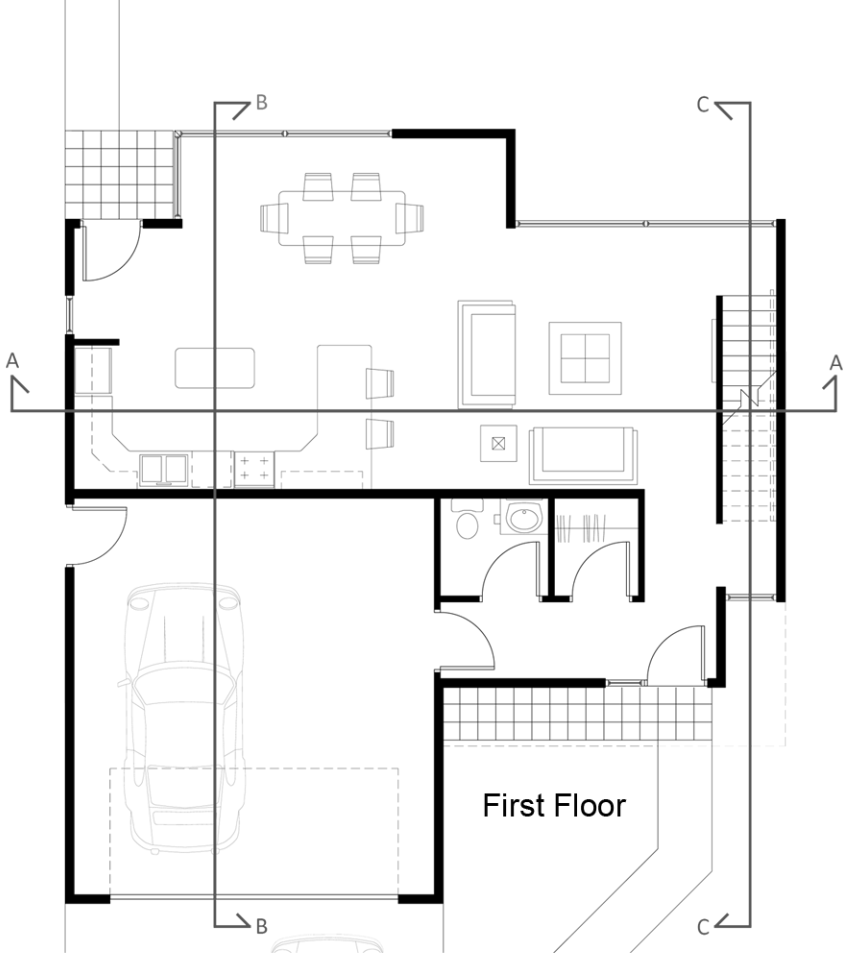
E

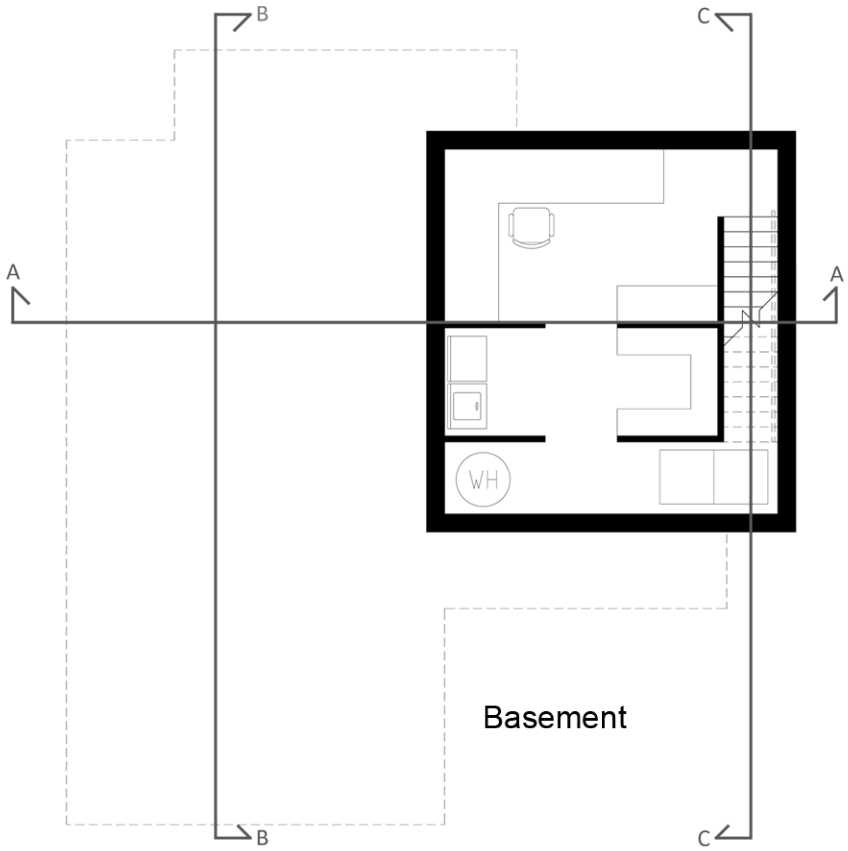
Final Design

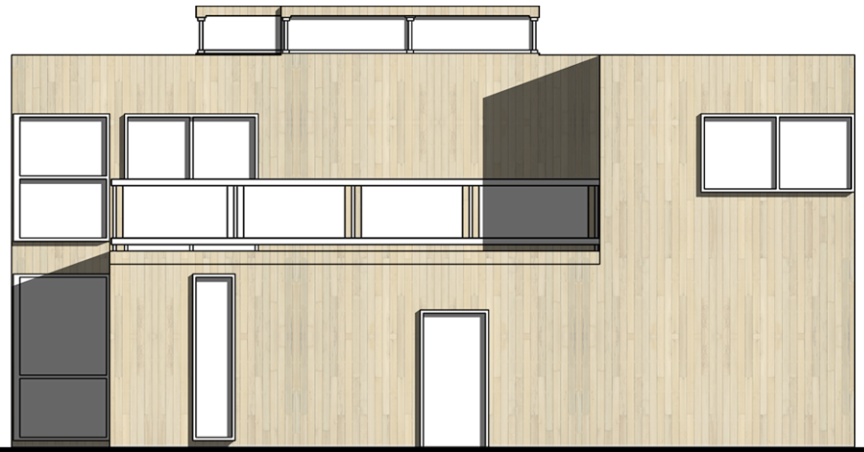


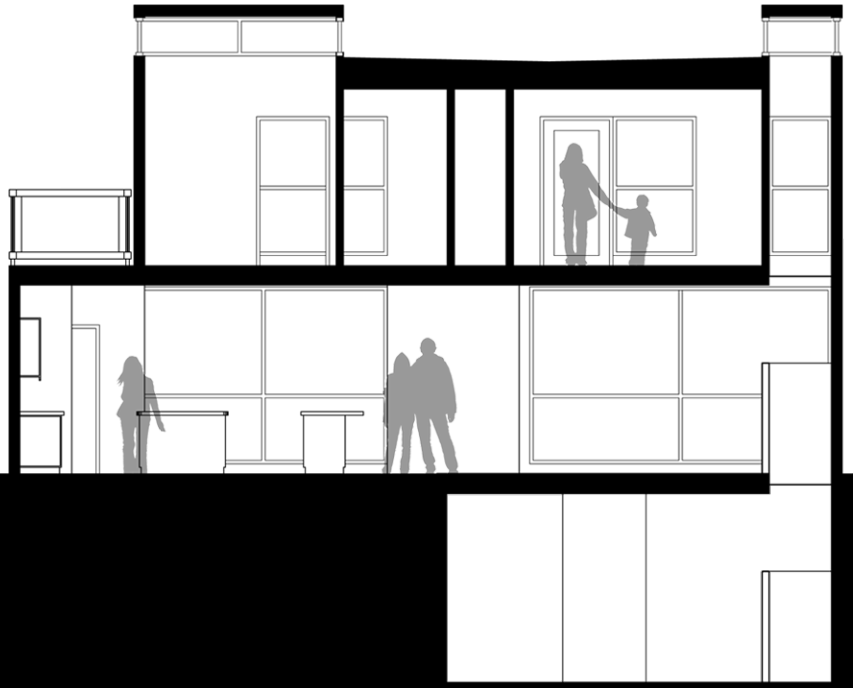
Final Model

Final Design

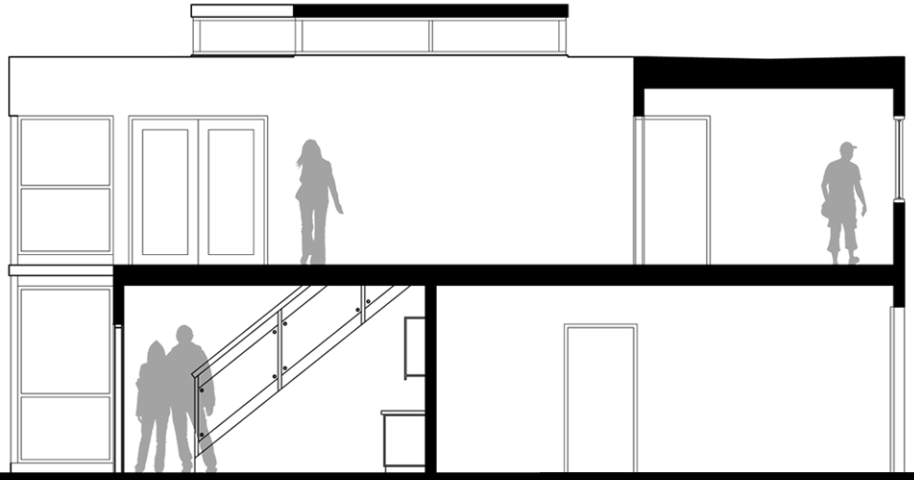

B
C
A
A
B
C
First Floor

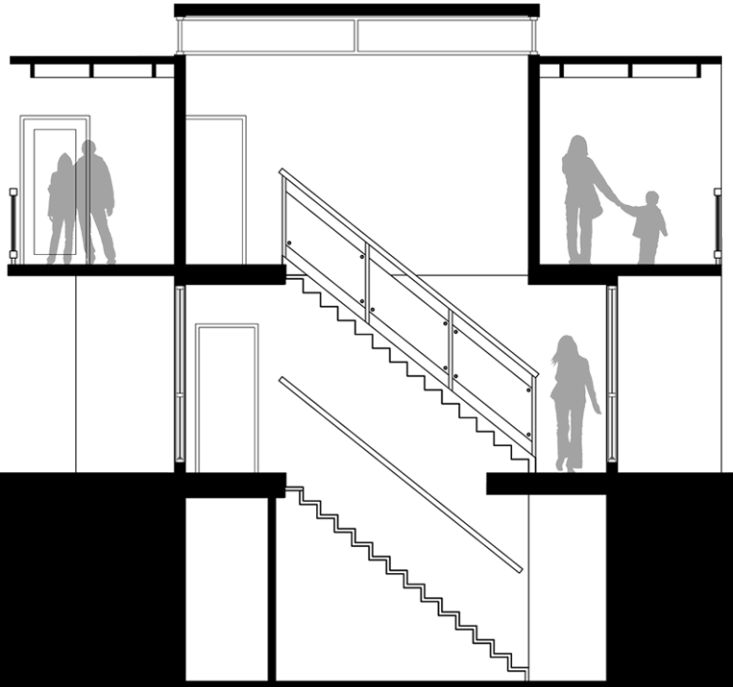

B
C
A
A
WH
B
C
Basement





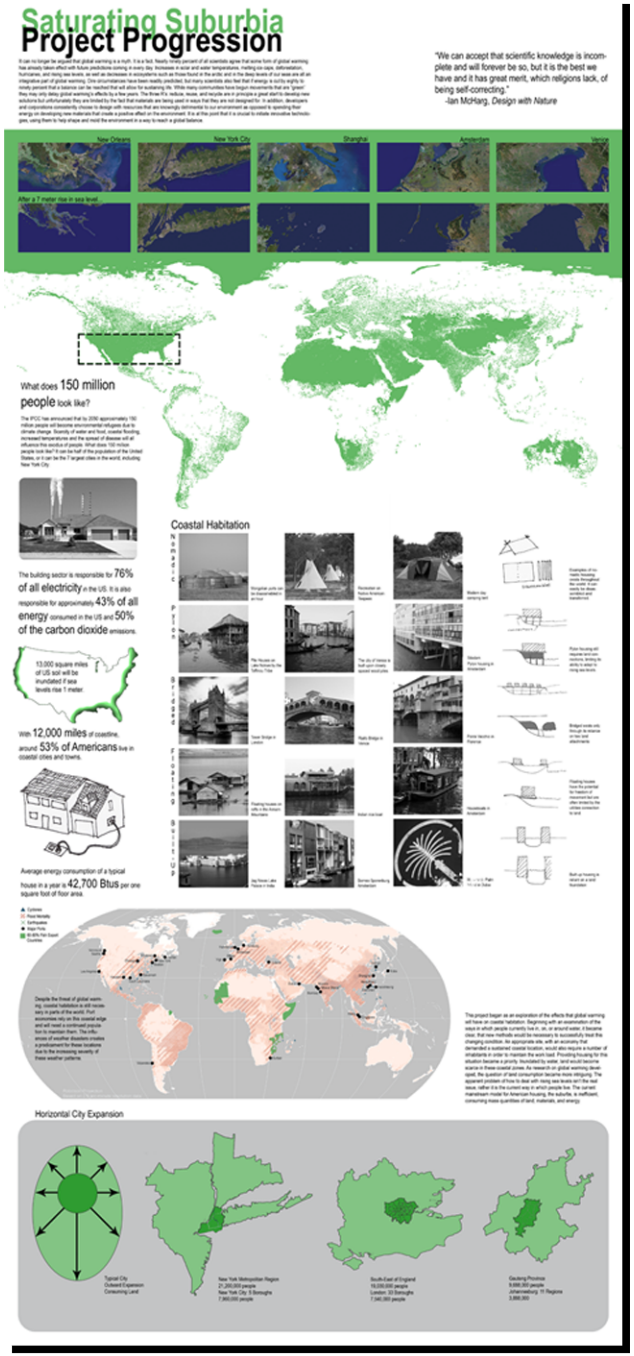
Final Design

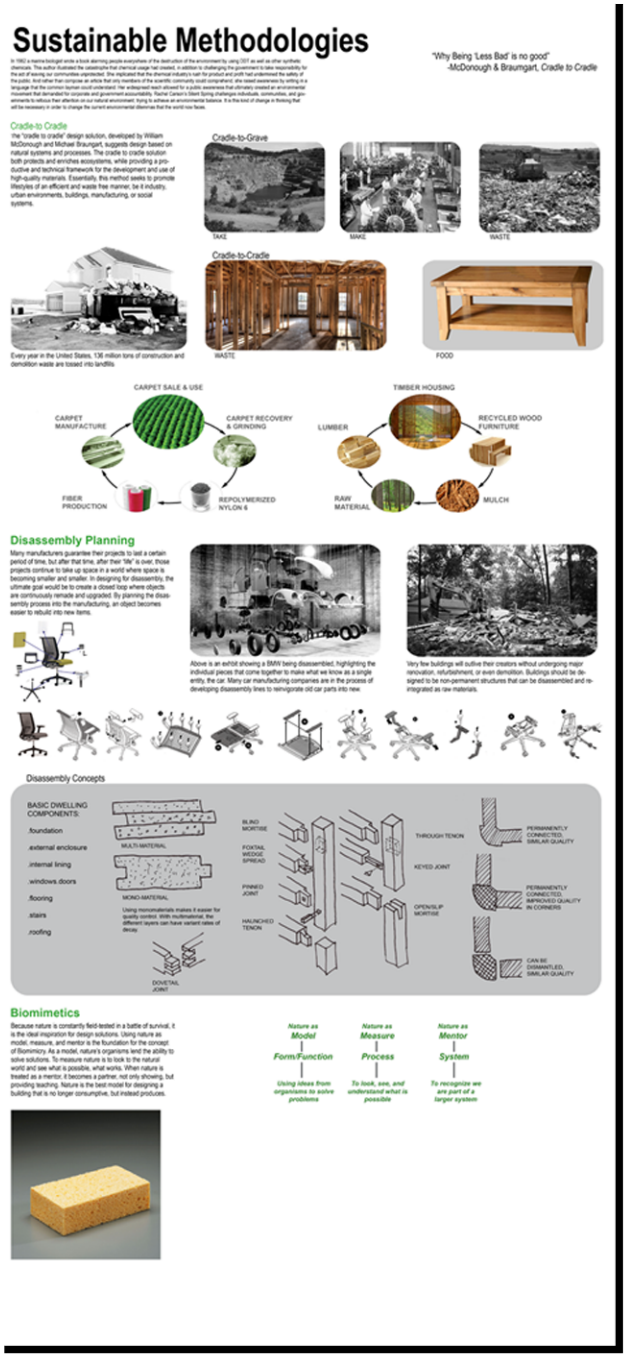




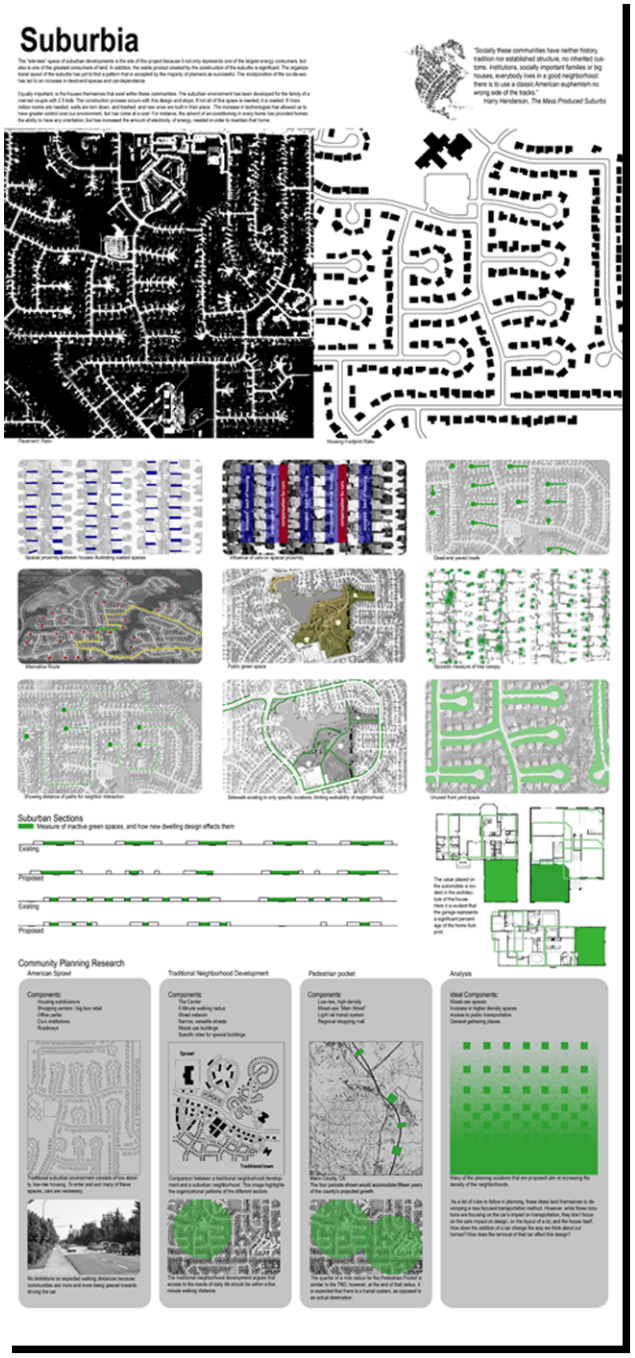
Final Design

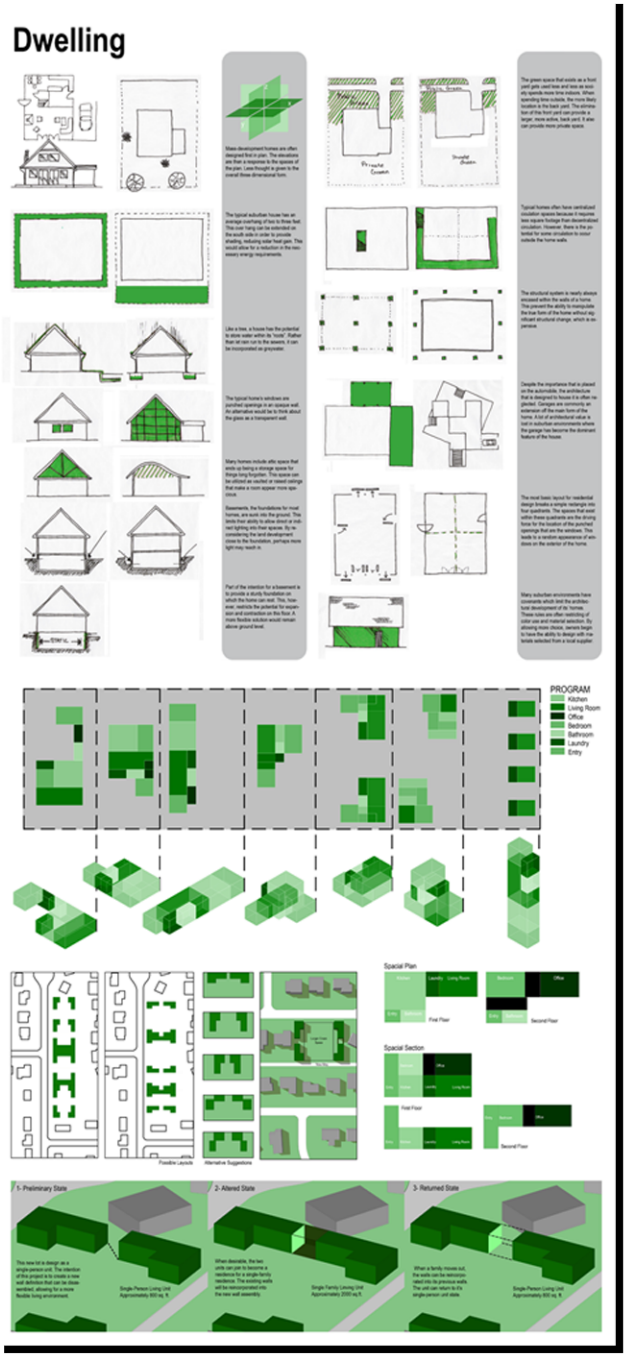
Final Design





Final Boards - December


Suburbia
Suburban Sections
Measure of inactive green spaces, and how new dwelling design effects them
Existing
Proposed
Existing
Proposed
Community Planning Research
American Sprawl
Components:
Traditional Neighborhood Development
Components:
Pedestrian pocket
Components:
Analysis
Ideal Components:


Dwelling
PROGRAM
Kitchen
Living Room
Office
Bedroom
Bathroom
Laundry
Entry
Spacial Plan
First Floor
Second Floor
Spacial Section
1- Preliminary State
2- Altered State
3- Returned State

Final Boards - April


Second Floor
Scale: 1/4"-1'0"
First Floor
Scale: 1/4"-1'0"
Basement
Scale: 1/4"-1'0"
South Elevation
Scale: 1/4"-1'0"
East Elevation
Scale: 1/4"-1'0"
North Elevation
Scale: 1/4"-1'0"
West Elevation
Scale: 1/4"-1'0"
Section_A
Scale: 1/4"-1'0"
Section_B
Scale: 1/4"-1'0"
Section_C
Scale: 1/4"-1'0"

Saturating Suburbia began as an interest in exploring how the potential outcomes of climate change will effect the ways in which humans shelter themselves. Knowing that climate change has undefinable possibilities, it was important to come in with an open mind and free direction. Considering that, this project became a search for a solution to one of the potential situations that may arise with global warming- the rise in sea levels. The question became, “How do we continue living in the coastal environment?”.

However, it was soon apparent that dealing with the unknowns was not the way to approach this project. The direction shifted. There will be a change in sea level. How will that change effect the way in which many of us live now? The suburban environment became the focus of this investigation because it is one of the most common developments in which people chose to inhabit. Furthermore, in today’s age of green design, it is the one landscape that doesn’t consider the land.

The intention of this project was to develop a way in which we can densify the current spaces already in use by the suburbs and create a landscape that is more sensitive to the land. In this project, the densification of the space was successful. But there were issues of cultural and social impact that were left undetermined. Furthermore, the technical issues that come with community planning were not conclusive.

The project then evolved into a question of how an individual house would respond to existing within this new suburban environment. While the ideas posed by cradle to cradle and disassembly design where researched, their influence on this dwelling were not apparent in the final design. Developing a wall system that responds to this new densification and the changing demands of society would be vitally important to the ultimate success of this project potential real-world application.

Conclusion

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