Core-House: a Proposal for Re-Inhabiting Underused Buildings

CORE-HOUSE: A PROPOSAL FOR RE-INHABITING UNDERUSED BUILDINGS

A Thesis Presented

by

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Submitted to the Graduate School of the

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ABSTRACT

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This thesis is an exploration of how small independent residential units added one at a time can offer old buildings and the cities they are in the opportunity to gradually grow and change – in a way that isn't presented by the typical double-loaded corridor build-out.

The first component of this exploration is a modular unit that can be brought into existing buildings and assembled in a flexible layout. This House acts as a 'Core' that provides basic shelter, warmth, and a place to sleep and prepare food; the density of this unit allows the surrounding square footage to be used for other activities: kids playing, welding a project, or setting up easels for painting.

The second part of this exploration is a pattern-based approach to the interaction of these units within the building: given certain rules that govern arrangement what are some possible spatial outcomes?

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RESEARCH AND THEORY

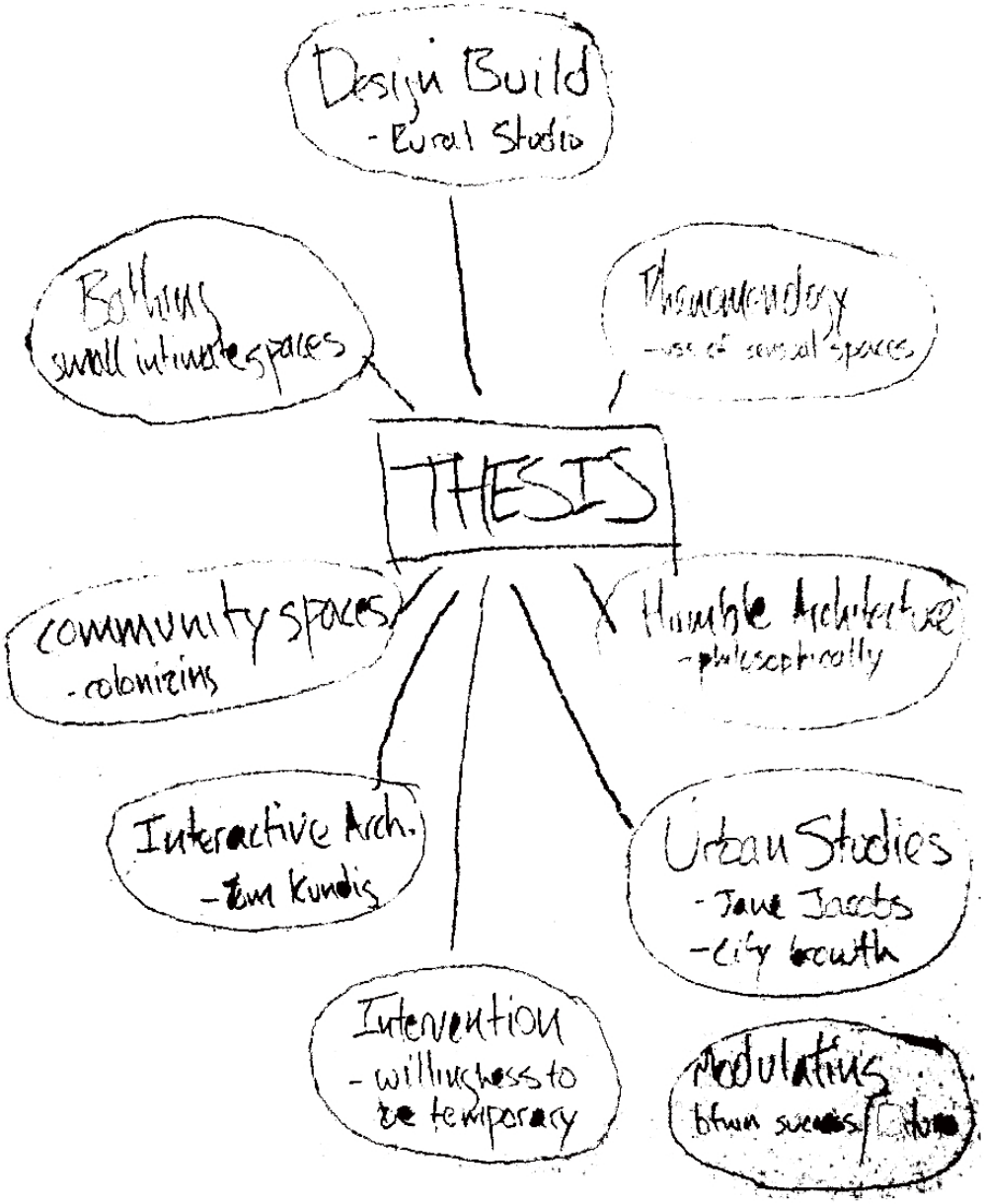


Figure 1: Idea web

1.1 Core-House – Site

Holyoke is one of thousands of cities all over the world that are in decline. The socioeconomics are clear - population is flat or decreasing, revenue is disappearing, and business and talent are fleeing. Equally clear, or so it seems, is that the physical city is outmoded and unable to change to suit contemporary needs. This fate is all too present for cities that have been back-pedaling for the past century. The choices facing these cities seem to be binary – success or failure.

This extends to the physical elements of the city as well. Buildings are either new and shiny or slowly inching towards demolition. The new buildings carry with them great hopes, the promises of renewal, jobs, a new era for the city. Buildings that have been outmoded are signals of failure (dynamic, growing cities bury them with nary a thought as they churn towards the future: Penn Station). For cities struggling to make ends meet they are a burden and a visible sign that a city is declining. They become blight – feeding the downward cycle that these cities are trapped in.

A front-end solution to this problem has been explored – adaptable buildings. And the situation is not entirely bleak – the wisdom of the past to build buildings that could house families, businesses, and industry and to situate all of these within close proximity means that these cities still have a stock of infrastructure that can carry them into the future. In fact, this is the context in which we find those certain buildings that, whether because of scale, specifics of location, or tectonics, are in steep decline. They stick out. This is why these buildings are searching for an architectural intervention: they add disproportionally to the perception that a city is in trouble.

This exploration is germane to the contemporary task of architecture because more and more often clients are not simply looking for a building – they are instead towns and cities looking to manage their future growth. These clients are searching for large-scale plans that address, not only their shiny new buildings, but also their vacant spaces, their under-used infrastructure, and the perception of stagnation. These clients need a sensitive and well-rounded plan that builds upon existing conditions. These plans must eschew being deeply prescriptive, instead they ought to focus on giving clients a 'toolbox' of options to approach various places of conflict in the built world. This thesis will aim to illustrate a 'toolbox' approach to problem solving, which is to say that this project will seek to find broader rules and applications even as it remains rooted in a site-specific task.

1.2 Jane Jacobs and City Growth

Jane Jacobs was the first to write widely on the emerging phenomena of deeply dynamic creative cities. She came to understand them as entities which she described as 'organized complexity'. She used this description to counter the modernist influence, championed by Le Corbusier, which saw cities as chaotic, dirty problems that needed to be solved. Jane Jacobs moved directly to block this view by pointing out that while cities may be massively complicated and we may be unable to see completely all of the elements that are at work within them at any moment we can look at larger patterns and begin to discern some general rules that are important to keep healthy cities thriving or to bring a declining city back to health.

One of the rules that she saw very clearly was the necessity for old buildings. Vitally important to a healthy city eco-system is a back stock of buildings that are waiting for a second (or third or ninth) use. These buildings have essentially paid off the overhead associated with a new facility and provide new occupants the ability to leverage the benefits of a specific location without carrying all of the associated costs.

This rule is obvious in places like New York or San Francisco whose revitalizations have as symbols warehouse lofts, brownstones, painted-ladies, and converted industrial space. Older buildings have played a critical role in a renewed interest in urban life in these places and have been a part of perceived turn-arounds. But equally visible are hundreds of cities where older buildings are symbols of decay. They are not being re-inhabited and their broken windows and crumbling facades are obvious signs that these cities are in steep decline and in desperate need of help.

This fact does not disprove Jacobs' point – these old buildings are still critical to the health of these cities and must still be seen as assets – but what it illustrates is the difficulty that smaller cities have in finding the new functions to fill these empty buildings.

Large buildings present the physical difficulties of heavy utility needs, large maintenance costs, and large spaces that need to be filled. Typically, even in towns or cities that are not in steep decline, these buildings require a large-scale commitment and investment. Particularly in residential construction projects economies of scale necessitate that a large number of units be built at one time – usually at least enough to build out an entire floor – regardless of whether that many residents can be found to fill

that many units. In other words, a single unit can't be built for a single perspective resident, even if that perspective resident has money in hand to pay a market-rate rent.

So we discover a strange Catch-22: housing should be really affordable because demand is so low, but housing is unavailable because demand is low.

1.3 Intervention and Modulation

The Core-House project will try to address this problem with two theoretical approaches: intervention and modulation.

Intervention in this project will be the willingness to be temporary. While it is perfectly reasonable for civic officials, building owners, and residents to try to craft long-term solutions to the use of uninhabited space this approach leaves too large of a gap between best wishes and what is actually attainable with the result that nothing happens at all. This project asks 'what if we assume that the structure we are building is temporary and that this phase of this buildings' life is temporary? Might some new solutions arise?

Modulation is the step-wise motion from empty buildings and cities to growing, full buildings that are being put to their highest use. If the empty, decaying building is zero and the building full and put to its highest use is 1, modulation is the approach that if counting by whole numbers isn't getting you from 0 to 1, then maybe we could count by tenths? If we subdivide a larger problem we might be able to find solutions that weren't available when we confronted the whole problem.

1.4 Interactive Architecture/Design-Build

1.4.1 Tom Kundig and the Delta Shelter – Precedent Study

Figure 2: Delta Shelter

I love bicycles. I always have. I used to just ride around the yard for hours. I knew without thinking about it that I wanted to be a bike mechanic as soon as I could; I spent five years in a shop learning how to use my hands and the basic rules of how bicycles work.

My father was into antique cars and he owned quite a few, I spent a lot of time around them, but they hardly ever ran. For a whole host of reasons, some of which are pretty deeply rooted in family psychology and others that are experiential or based on philosophical points, I am deeply skeptical about cars: I don't like them. I appreciate the style of many cars, and I love long car trips – seeing the world – but when I find myself

lusting after a car I feel as if I'm indulging a bad habit, luckily, it is one that I find very easy to break.

So what does this have to do with architecture? (That's a question that I often ask myself, too) I've been searching for a while for the link that will let me transfer my love of bicycles to my work as an architect and I think I've come closer to understanding it.

Firstly, bicycles *want to work*. When you see that dude on the bike from Wal-Mart, it's all rusted, the fork is bent backwards and the rear wheel wobbles, there's a loud creak sound from the drive train – but he still rolls right by you on the sidewalk. It takes a lot to fine tune a bike to race in the Tour de France, the technology is closely related to F1 and NASA, but the basic elements of a bicycle can sit outside for years on end, receive no maintenance -- and a fair amount of abuse – and it will still propel its rider along at a fair clip. Compare that to cars: we all know that that small sound in the engine signals an eminent bill of staggering proportions that we will have to pay because whatever that little widget is that is squealing, if not repaired, will render the vehicle *inoperable*. Anyone unfortunate enough not to be able to constantly re-up to a late model vehicle knows the feeling that their car is conspiring against them – cars don't want to keep working. Roll by any junk-yard and notice not only the number of cars, in general, rotting away, but notice how many of them are less than ten years old. Ten years! A capital investment that starts to deteriorate in ten years! Bicycles *want* to work. Cars do not.

Secondly, bicycles are mechanical, this is an aesthetic, but it is not simply a style. Le Corbusier's love of automobile engineering and his famous image of cars in the

1920's is a little peculiar: the change that he points out in automobile fairing is a change in skin – it is a smoothing that signals (to dip into Venturi) speed, but really says very little about the workings of the car itself. Cars are certainly mechanical but they spend a lot of energy covering it up – not unreasonably, if you don't cover it it'll fall apart *tres rapide* – whereas bicycles are always exposed. Cars are always trying to include more; bicycles less. It's a fine line I'm trying to uncover, but I think that there is break between the two types of mechanical devices. This is directly applicable to architecture; we hear it in Le Corbusier's call for the home to be 'a machine for living'. I feel that there is a difference between the bicycle and the car and I think that I would call it the difference between a tool and a machine. The bicycle feels like a tool to me, whereas the auto is a machine. With a tool you are the engine, with a machine you are only the operator. I can trace this difference through to a feeling that tools are empowering, machines just leave us as operators. I think Le Corbusier and his whole generation loved the idea of pushing buttons and getting results – to the extent that they started to fetishize the smooth exterior and the single button; this aesthetic reached its purest articulation in the art deco. I don't like automation.

To reiterate, I don't think this is a hard and fast line: I use the most highly technical machine around – my laptop – all the time and I like to think of it as a tool, to a skilled computer programmer it is most certainly a tool. We are each empowered in our own knowledge. But if I can speak of a vibe – a mood – that I would like my architecture to convey it would be of the building as a tool.

I think that this demands a certain transparency about systems and the feeling that the building wants to work. I don't like the feeling that there is something in the wall that

could fail and then demand a whole bunch of demolition, and that that something could make the house inoperable. I like the feeling of exposure, and the house as a frame or platform for components and systems that change through time. It makes for a building that wants to work. I think of Jane Jacobs, how she points out that old buildings are vital for a city because they drastically reduce the overhead for new ventures, this is only possible if the buildings want to keep working – they can't rely on lots of maintenance to stay habitable.

All of this brings me to Tom Kundig and the Delta Shelter. I love this building. I totally geek out about it – I think it's beautiful.

Figure 3: The Mechanics of Delta Shelter

This building is overtly mechanical, even its material palette is bicycle-ish. I love the way that Kundig uses materials, like in a tool, where every material must be

employed for its individual qualities. Wood – soft to the touch, Steel – durable/ springy, concrete – heavy/foundational. This quality is common to all great architecture, but I think that Kundig focuses more on using materials and emphasizing them instead of 'space' or 'light'. Kundig's buildings speak about his relationship with craftsmen, not just product lines and corporations, and his buildings suggest that the architect and inhabitants are patrons of craft-work.

I'm not a fanboy, sometimes he verges into a kind of post-modern steam-punk. For instance, the *Brain Studio*, where large motors hang from the ceiling only to lift a few bare light bulbs – blech. But overall I value that Kundig is intimately involved with the conception and construction of the details of his buildings. I find myself drawn to materials and the way that they read in small scales and Kundig is an exemplar of the material detail. His current monograph has more images of construction details than grand outdoor shots. His work meets me as a craftsman and values the fact that I care about the way that screw-head sits on a surface. His buildings don't just inspire some kind of Tadao Ando-esque calm, they make me want to explore, touch, and then *work* them: just like a bicycle.

I'll be keeping Kundig in mind as I work on the Core-House. I'll be focused on joints and the way that small details can set the tone for a project. Our minds settle on details that we can grasp, literally, (like Zumthor's aunt's garden handle that inspires in him an intoxicating architectural reverie) Kundig's details do the same. My goal will be for my project to *want to work*.

1.4.2 Supershed and Pods at Rural Studio – Precedent Study

As a Carpenter and remodeler I have a particular affinity for architecture that is created by the hand that designed it. I know that projects change as the work is carried out and that a deeply responsive designer will be awake to possibilities that arise during construction. Inhabiting a site or a space as it is built-out will reveal things that are simply not sensible earlier in the design process.

This is why I am drawn to the possibilities of a design-build model. I appreciate a model that is closer to the inhabitants of the building and that can incorporate their input along the way – empowering them to be a part of the building process.

A Precedent for this type of process that is, like the Core-House, small in scale, residential, and that integrates a social element, all the while being only semi-permanent, is the *Supershed and Pods* by Rural Studio in Hale County, Alabama. This is a group of buildings that have been designed and built by the students who will inhabit them. They are individual sleeping cells that are arranged along a covered gallery. Each cell is unique and represents each student's attempt to address the general architectural opportunity while also addressing his own specific needs. Each cell 'plugs-in' to the gallery, allowing it a public-private dynamic and equality with the other cells, but, if for some reason a unit should need to be removed, it can easily be replaced.

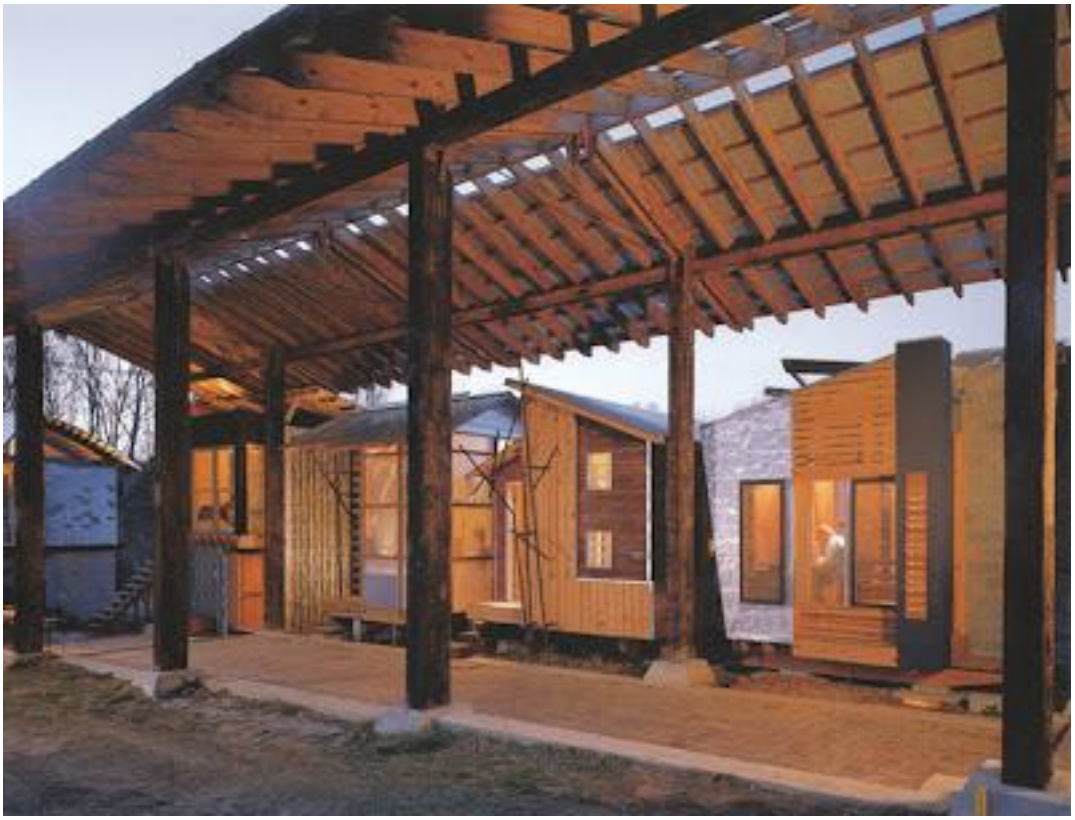


Figure 4: Supershed and Pods, Rural Studio, Hale County, Alabama

This simple layout allows for experimentation and personalization. Simplicity becomes the springboard for dynamism and open-ended possibility. At the same time these buildings have a certain kind of humility due to using primarily reclaimed materials and their simple function.

Core-House will strive to find this balance between pre-fabricated modularity and on-site flexibility. It will be bare bones enough that design input from the inhabitants will be a necessity. It will be humble in its functionality and allow the life of those who dwell within it and the structure of the building surrounding it to be its decoration.

1.5 Bathing and Tiny Houses

My research for the Core-House project began by looking at two typological precedents: bathing spaces and tiny houses.

Bathing Spaces like saunas and hot tubs may initially seem to have little to do with this undertaking – but they have in common with the Core-House that they are small spaces that are very intimate and are very intensely serviced. When one is designing a sauna or hot tub space – which might simply seem to be a place to sit in warm water or air – one also has to address how energy is supplied, sometimes multiple kinds of energy, how the materials respond to the heat and water, how they respond to the cooling afterwards, how they deal with condensation, how do the materials interact with the unprotected human body, how is visibility handled – are there clear views out but none in? The list goes on. The point is that square footage is by no means the best indicator for the size of an architectural problem.

Tiny houses share this same small-but-intense scale and are very similar in program to the program of the Core-House. They differ in that the typical 'tiny house' is made to withstand open exposure to the weather and that it is completely self-contained – there is, generally, no sheltered yard like there would be with the Core-House. Perhaps the most important resemblance to note is the philosophical approach.

The people drawn to tiny-houses are a small and self-selecting group and they are drawn to tiny-houses as much by the desire to down-size as by any specific architectural aesthetic. There is an interest these days in an intentional reduction in the amount of stuff that the typical person owns and the large space used to store it – or even more, the large

amount of stuff purchased to fill unused space in large homes. There are many people who are looking for some kind of flexibility in their space – whether it be a space that can be moved, like a tiny house on wheels, or a space that can offer a live/work arrangement. The Core-House will appeal directly to these types of people. Core-House isn't for everyone, but if it's for you – you'll know it.

1.6 Phenomenology

Building upon the exploration in sensuality and construction that began with a study of bathing led this project towards a study of phenomenology and its intersection with architecture.

Phenomenology is a philosophical exploration that takes as a starting point a rejection of pure objectivism and instead tries to investigate what it means if the many inputs that we receive through our senses and our minds are all of equal reality. In other words, a Euclidean proof, a stone dropped on my toe, and the joy of a bike ride are all real to me – they all exist in my life as phenomena – and parsing out which ones are more 'true' may not be possible or productive. Thus, phenomenology provides a level playing field for the phenomena of our lives and speaks to the value of subjective experience in shaping our realities. This is the place where it begins to meet architecture.

This conversation between architecture begins with Heidegger and his student Norberg-Schulz and then moves towards contemporary architects like Steven Holl and Peter Zumthor. It has proved to be fertile ground for contemporary design because it ennobles architectural creations without depending upon the sweeping social manifestos

of the arch-modernists. In the phenomenological scheme effects of color and light are explicitly valued as much as having some social agenda.

Figure 5: A floor in the Open Square Building in Holyoke, Massachusetts

The influence of the phenomenological approach upon the Core-House project is that it allows a schema by which to value these large underused buildings as they are today. Typically, an owner or developer will approach these buildings as square footage and then apply a standard, time-tested method to the build out. A number and size of unit is arrived at according to the space available and the market and then the space is divided by that number in some straightforward way and with as little variation as possible to maximize efficiency. The problem is that not only does this approach require a healthy market for units to begin with, it also results in a build out that in one fell swoop completely alters the feeling of the building.

Older buildings are valued by prospective tenants not simply because they are old but because of the materials used and the quality of the spaces within them. Oftentimes the materials are now unavailable and the types of space structurally inefficient or ruled out by code. These buildings have a quality that is unobtainable in new construction – phenomenology gives us a language to give that quality value. Once that quality has a value that we can speak of we begin to be able to search for ways to preserve and protect it.

To put it plainly, when one walks in to an empty mill or an empty warehouse there is brick and timber and concrete, there are large openings covered with thin glass, there are exposed columns, there is a high ceiling in a narrow space – or maybe a low ceiling in a wide space, and there are many other elements that contribute to the quality of the space. These qualities, in sum, are what make the space unique. When someone walks into one of these buildings and says that they like it or are intrigued by it these are the qualities that they are liking and intrigued by.

The typical build-out scenario is heavy-handed, at best, with these qualities. Most often, they are completely obliterated. A mill building with a typical double loaded corridor and sheetrock build-out has more in common, qualitatively, with a speculative hotel than with the mill in its empty state. The building then competes simply on the basis of location and rent price because the qualities that distinguish it have been lost.

This Core-House project will attempt to offer an alternative approach that values the existing qualities of the building and seeks to preserve them.

CHAPTER 2

DESIGN

2.1 Goals for the Design of Core-House

The research and theory suggests a few things about the design of the Core-House. In order to provide a novel approach to re-inhabiting existing large buildings, it ought to be a modular unit that is only semi-permanent so that it acts as an intervention. Its size should as small as possible, both to facilitate a modulated approach and also to have the least impact upon the existing qualities that define the building. The structure of the Core-House ought to be minimal in order to encourage a personalized Design-Build approach and also so that the functioning of the Core-House is readily adaptable by its occupants.

2.2 The modular unit and how it assembles

In keeping with the necessity for transparent function the materials that make up the Core-House are straight-forward and minimal, but also maximized for their functional potential.

Let's walk through a typical assembly procedure to observe the components.

Figure 6: Components of the Core-House, ready-to-ship

The Core-House arrives to the building as a flat-packed unit with pre-manufactured panels and aluminum components. All of these pieces are sized so that they can easily be brought into a building, whether by service elevator or by boom truck. Pieces range in size from 4'x8'x1' to 4'x10'x6" with some 4"x4" standards being as long as about 12'. Once in the building the construction begins with the screw jacks that meet the floor. They are mounted to the long steel beams and then adjusted so that they are level. The screws allow them to adapt to uneven and out of level floors and also distribute the weight of the Core-House evenly. Both steel beams are leveled in this way and then floor SIPs are installed between them.

The floor SIPs are 4'x8'x1'. They are stress-skin panels that are faced, on the interior, with oriented-strand board and, on the bottom exterior, with metal for durability. They have Cam-locks embedded in the interior foam so that they lock together with the turn of an allen wrench – this quick connection also allows them to be taken apart quickly and without demolition.

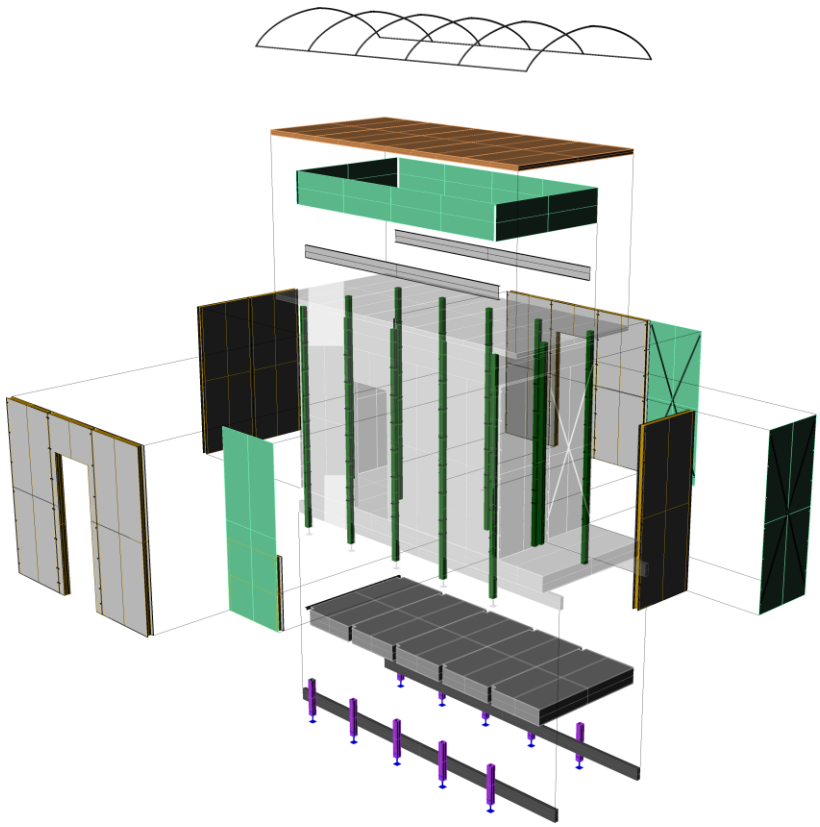


Figure 7: Core-House exploded axon

The screw-jacks are ¼” aluminum sleeves that sit flush with the top of the floor SIPs creating a floor platform. Into these sleeves slide the aluminum standards that will tie the walls together. This type of connection allows for an expandable floor platform but also, since the standards slide tightly into the screw-jack sleeves and there is not a hinge point at the floor plane, it creates a joint that resists lateral loads without bracing.

Onto these standards are attached the SIPs that form the walls. These SIPs are faced with oriented-strand board on the interior face and metal on the exterior. These SIP panels have flanges that extend beyond the interior foam and these flanges are bolted to the aluminum standards. These panels are insulative and when bolted provide bracing between the standards.

Every space between standards is an opportunity to choose between the opaque and insulative SIP panel and a translucent acrylic panel. They are interchangeable and offer massive flexibility to the Core-House inhabitant. Different host buildings will present different opportunities as far as layout of the wall panels- even within the same building the position of a particular Core-House might dictate a totally different choice of wall panels from its neighbor. Proximity, sound transmission, light needs, and the need for insulation will all need to be taken into account when choosing which panels to install.

The roof is also SIP panels with Cam-locks and it sits upon lightweight steel beams that are attached to the top of the aluminum standards. An optional framework can be attached to the roof that can be wrapped with tarp or discarded billboard material to form a water-shedding barrier above the roof SIPs.

In taller buildings that are fairly temperate a 1-2' strip of acrylic can be placed above the wall panels to allow in ambient light and to increase head height on the interior.

2.3 How the unit is serviced

Core-House is like a seed that is planted within the larger host building and, like a seed, it relies upon a system that provides it with the nutrients – services – that it needs to survive.

How does it breathe? Core-House is supplied by ducts that access fresh air at the windows of the building. An in-line fan pulls air through the duct from one side of the

building to another and Core-House can tap into this stream of fresh air. An exhaust fan pulls stale air out of the Core-House and 'downstream' in the duct. Likewise, there can be other exhaust fans in the field of the host building that can tap into the duct. When orienting Core-House it is important to keep in mind that there is a gradient from clean to dirty air in the duct. The fresh air supplied to Core-House must come from 'upstream' – this will determine the placement of the in-line fan.

How does it deal with wastewater? Firstly, by not making too much of it. A composting toilet is an essential piece of the Core-House puzzle. Powered by a small amount of electricity an active composting toilet removes a significant amount of waste from the waste-stream. Beyond that the Core-House finds the existing roof drains and waste-outs ad taps into those, typically by going straight through the floor below the unit and then sloping to the existing drains. (This is a good moment to point out the interesting perspective that, although these buildings are often considered obsolete, even ones that are all but abandoned often still have services and utilities, like city sewer and electrical hook-ups, that were seen on only the most advanced buildings only 100-125 years ago).

How is it powered? Core-House can be considered a quest in the host-building and, as such, it musn't endanger the host-building. Combustibility must be kept to a minimum whenever possible – and nowhere is that more easily addressed than by supplying the Core-House with electricity for fuel instead of gas or any other inflammable fuel. Most host-buildings will have existing electric meters and electricity can be run from the meter to the Core-House with conduit. An option is for the electrical conduit (and the cold water supply) to be mounted on a freestanding panel – similar to the

type that one would find in an RV park – so that a Core-House unit can simply hook-up to the electrical and cold water supply.

How does it heat water? Since cold water and electricity are supplied to the unit, a small on-demand hot water heater can handle the domestic hot-water needs of the unit. These units are small enough to be wall mounted or can be hidden under the sink.

How is it heated? Since the unit is so small, few BTU's are necessary to keep the Core-House temperate. The unit could probably be heated with as little as a powerful hair-dryer, but something like a radiant towel-rack might offer the most predictable and useful type of heat.

2.4 How the unit interacts with the larger building field

Core-House has a unique relationship with it's host-building: it is designed to be close to self-sufficient but it is still shaped by its surroundings. It can be built to different heights to accommodate different host-building scales and different levels of insulativeness to deal with a wide range of interior conditioning. The floor panels can be expanded to build around column or posts in the field. These are tectonic issues that each single unit must address. An additional layer of adaptability arises when multiple Core-Houses inhabit a building. The shape of this habitation is determined by the size and physical condition of the building. Different types of habitation will be possible in different buildings.

Simply put, a small building that is open to the elements, with windows missing and birds nesting in the rafters will lend itself most to a single Core-House and the

inhabitants of that unit will most likely be folks willing to live on the fringe – this type of habitation could be considered guerilla. On the other extreme a large building that is well sealed and conditioned, perhaps just waiting for a large business tenant that always seems to be on the horizon, could be the site for a structured community, with families that value a measure of stability.

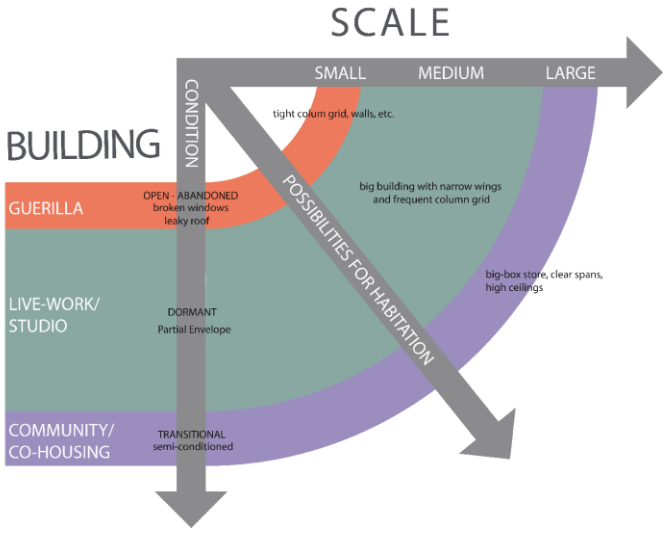


Figure 8: Condition and Scale determine habitation parameters

2.5 Rules and performative patterns

The interaction between the host-building site and a Core-House begins to be very complex once all of the variations of different buildings and patterns for habitation are considered. Managing the complexity of these interactions is a task in and of itself and here the Core-House project moves from the modular design of a small tiny residential unit to a much larger task more on the scale of urban planning. The size of the task precludes a thorough explication here – in fact the complexity of the problem precludes any kind of science of known quantities. Instead, the approach employed here, similar to urban planning, is to move forward with a set of guiding principles that will suggest how Core-Houses should be distributed throughout a host-building.

Rules from Code are the first layer of principles that have to be considered when inhabiting a building. The major code issues that face Core-House regard combustibility and egress requirements. The Core-House is designed to act as an interior partition with the required fire-resistance rating, the host-building itself is considered to be protected from fire as required by the code – usually this means sprinklered. Egress requirements will dictate a maximum length of travel from a Core-House (typically 200' or 250' with sprinklers) and a maximum length for a dead end corridor – 20'. These are basic rules that a Core-House intervention must adhere to.

A Second level of guidance is provided by rules from function: these are rules determined by the systems at work in the Core-House and while not required by code they are required for the Core-House to function properly. An example of the type of rule generated in this fashion is that a Core-House must have its own bay so that its fresh-

air ducting is independent so that upstream fresh air doesn't mix with stale downstream air.

Rules from Cohabitation begin to address how the units will interact and use the space. These rules may take code and function as a starting point but they also begin to anticipate how the space will be used and what we might like that space to look and feel like. An example would be to take the code requirement that each occupant have 200 gross square feet and to realize that we want these places to remain spacious, we don't want Core-Houses crowded on top of one another – that ends up looking feeling and performing like a double loaded corridor. So a rule from Cohabitation might suggest that each occupant be required to have 300 square feet gross – 100 more than code - and that these be in addition to the square footage of the unit itself.

Beyond rules for Cohabitation there lies the realm of performative patterns. These are guidelines that greatly effect the feel and performance of a Core-House intervention without having strict necessity as their only foundation. Instead, these are patterns that can be developed by the inhabitants who, while keeping an eye on safety and function, will begin to think about how they want their particular intervention site to feel and function. A performative pattern might be something like: the enclosed portion of a Core-House is four panels but it may expand out to connect to two more units. This would facilitate a kind of democracy on a site because no one Core-House could expand to take over an entire floor. It might also appeal to couples that think they might become a family soon and need more space than simply one unit.

Figure 9: Perspective of a Core-House Community

All of these layers must be considered to generate a kind of zoning for the field of a host-building. The management and generation of this kind of zoning leads to questions about what role the architect plays in a Core-House intervention.

2.6 The architects' role

The Core-House is a discreet, modular, built object. Construction of the unit as an aesthetic and functional unit is a task that should see multiple iterations through design and then prototyping but it is ultimately a discreet task; on the other hand, zoning for the Core-House and anticipating its use in any number of possible buildings is an endless task. So where does an architect figure in a Core-House intervention? Does he guide every step of the way or does he simply provide a product and offer no further assistance?

In this design process I explored options at both extremes – even going so far as to theorize an algorithmic approach that would allow an architect to try to guide Core-

House development so that it met multiple requirements at every step of its development. What I learned from that exploration was that, even if it would be possible to describe the needs of inhabitants in mathematical terms and then gather the computing potential to deal with every possible outcome of every possible move at every moment of change, that would be an unsatisfactory way of handling a Core-House intervention.

The power of a Core-House intervention might be that it would allow some parameters for a community to be able to discuss how they want their space to look, feel, and act. In a certain sense, people are the best computers that we've got – in the market that is a floor in a host-building the inhabitants themselves would be the best way to access all of the information available and create an efficient market. Ultimately, this might be the power of a Core-House intervention – allowing a community to deeply interact with these buildings and to inhabit them physically and spiritually.

2.7 Future Development

After wrestling with what role the architect should play in the development of the Core-House intervention I've come to the conclusion that I think that this project would best progress as a kind of catalog – first of the kit of parts that make up the units and then secondly as options for what different build-outs might look and feel like. Prospective inhabitants could get a sense of what they might want in their own Core-House intervention and be able to come up with their own patterns that would guide their development.

The Core-House unit itself is a pretty exciting construction. I think that the next step would be some further material exploration – to explore further the proper sizing of all the elements. After that, I believe that the unit could be moved to the prototype stage.

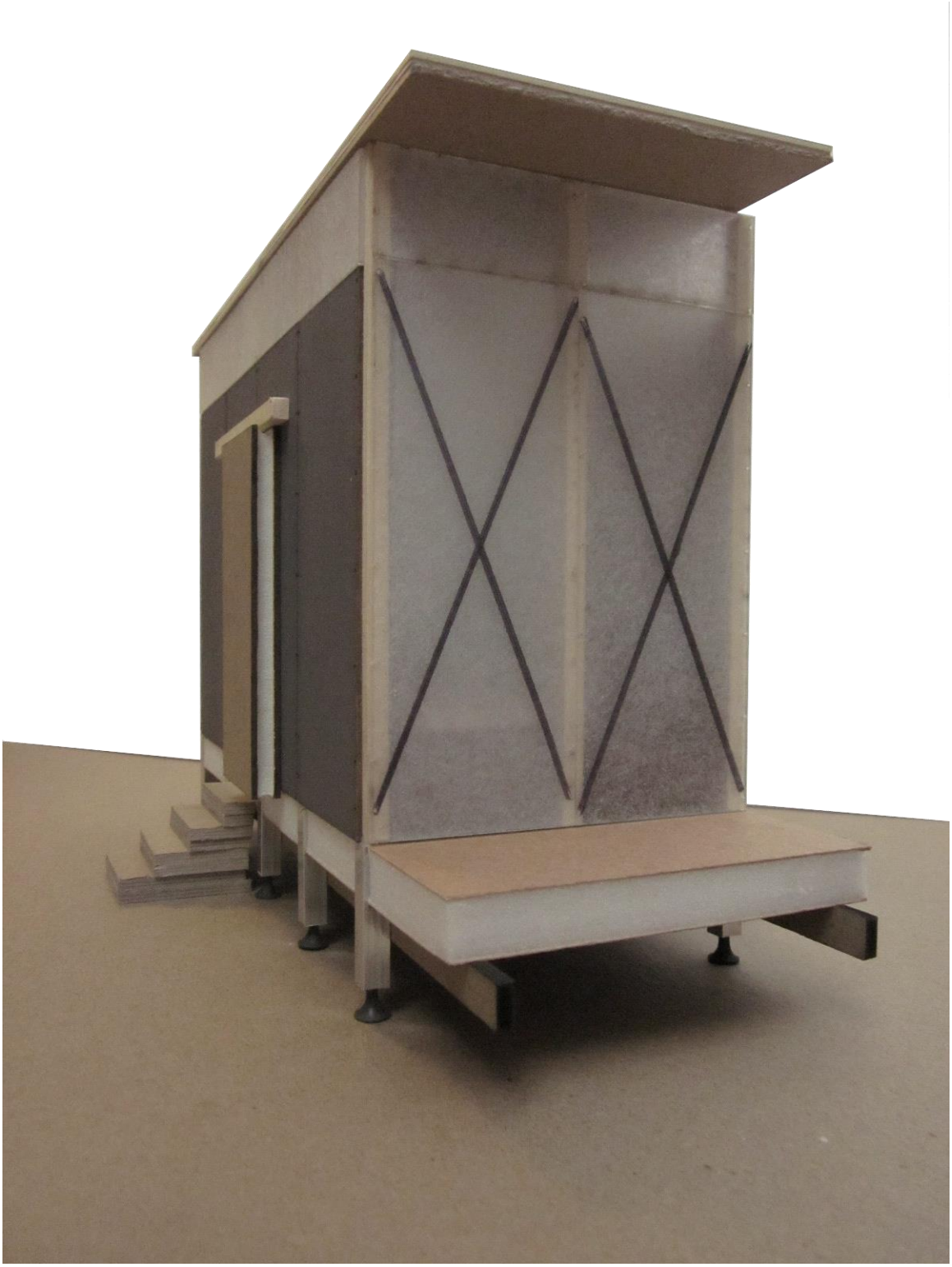


Figure 10: Model Perspective

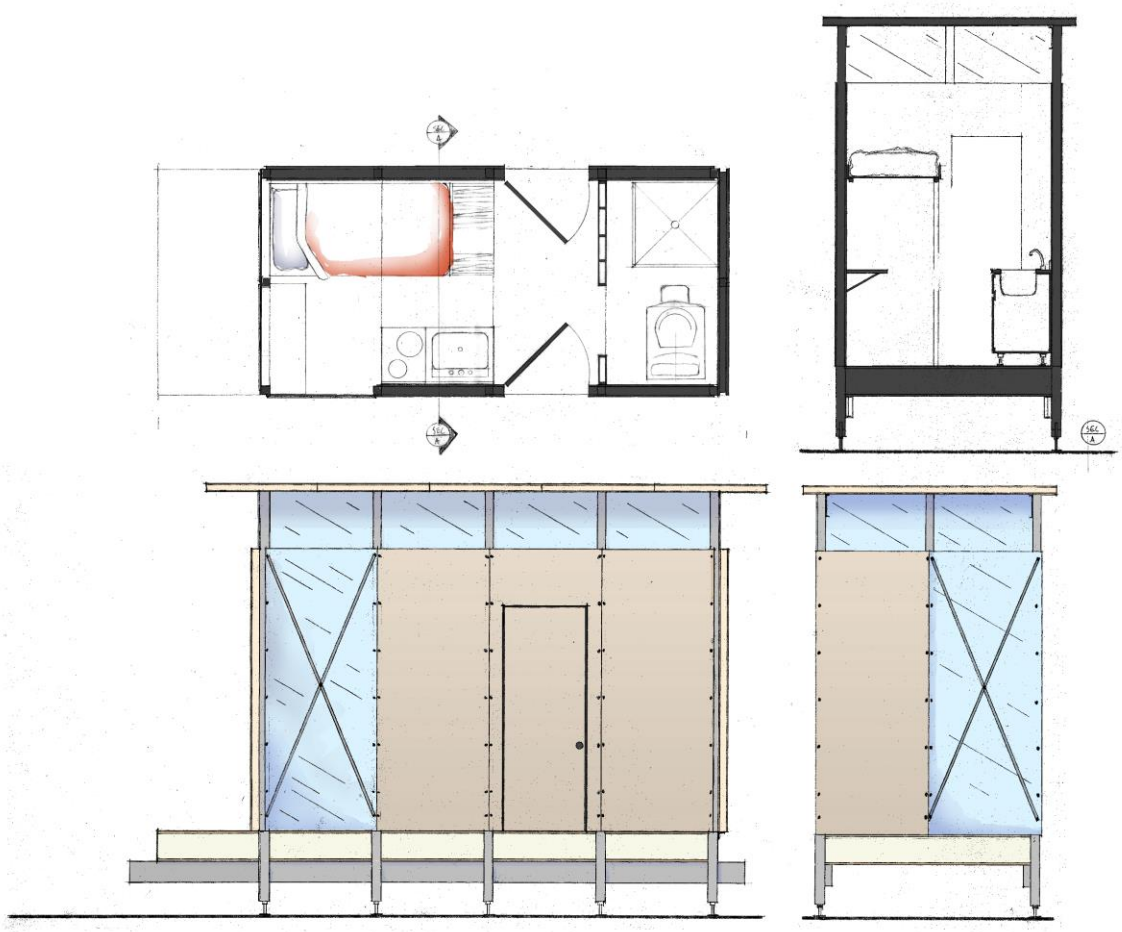


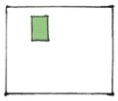
Figure 11: Plans and Elevations

APPENDIX

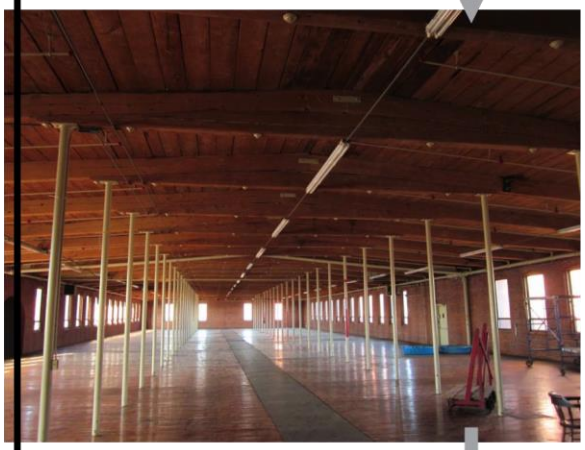
PRESENTATION BOARDS

CORE-HOUSE

Re-Inhabiting Vacant Space



You want to be HERE



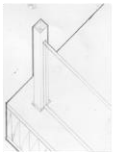
Existing Conditions: Too often large buildings that were once the throbbing hearts of industrial cities become liabilities once businesses leave or downsize. Building codes and construction techniques are focused on the creation of new buildings and they often fail to account for senescence. A gap opens between successful buildings - fully occupied and operating well, and failing buildings - vacant and expensive to condition properly. This gulf begins to damage the entire city by increasing the perception of degradation, lost opportunity, and vacancy. This problem is particularly acute with respect to residential construction and codes - what shrinking cities need most are creative and productive people to LIVE in them. These kinds of people are looking for exactly the kind of spaces that these buildings offer - flexible and robust - but residential codes are the most restrictive - and so the people and the buildings don't connect. This project explores an architectural intervention focused on modulating between success and failure.

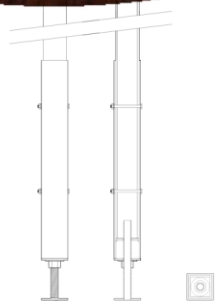
Project Proposal: Large buildings are expensive and difficult to heat; a typical double-loaded corridor build-out requires substantial investment that depends upon economies of scale to succeed. So what if we saw these difficulties and weaknesses as assets? What if development was piecemeal and instead of conditioning the entire building we viewed the existing envelope as mostly-weatherproof? This would allow a new approach to inhabiting these buildings: firstly, if the duties of weather-proofing and insulating are separated then each assembly can be simple and more efficient. Secondly, the phenomenological experience of the building would remain intact - to put it simply, the things that we love about these old buildings - large windows, an exposed column grid, the feeling of expanse, could be kept instead of hidden behind sheetrock.

(not here)

Assests that these buildings have: light, water, sewer, electric meters

Development Sketches:





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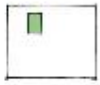
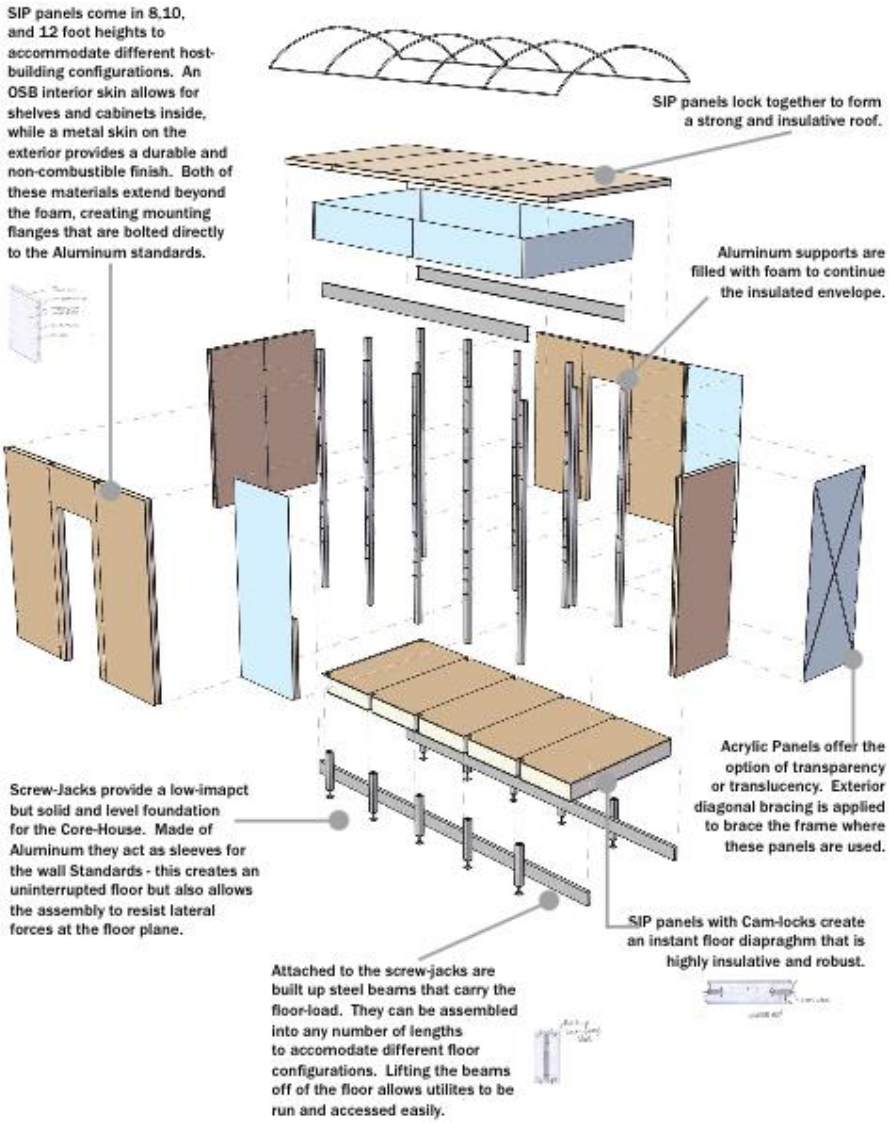
Re-Inhabiting Vacant Space





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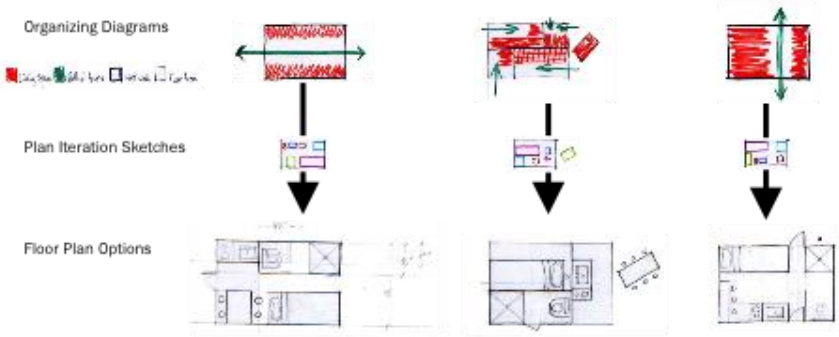
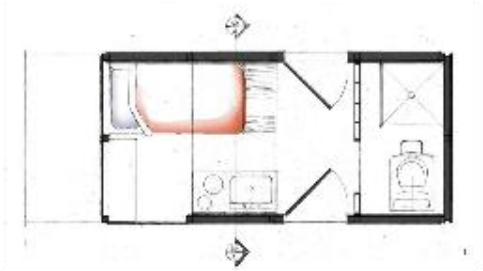
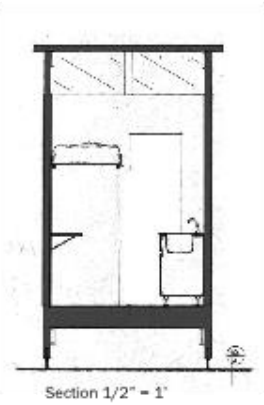
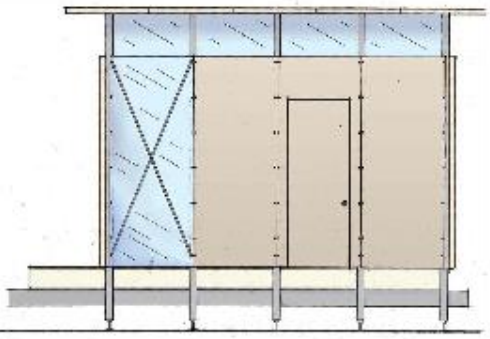




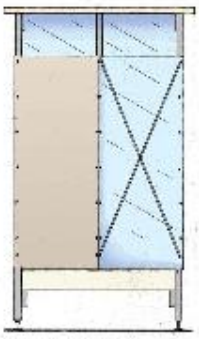
Plan 1/2" = 1'



Section 1/2" = 1'



Elevation 1/2" = 1'



Elevation 1/2" = 1'

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CORE-HOUSE

Re-Inhabiting Vacant Space

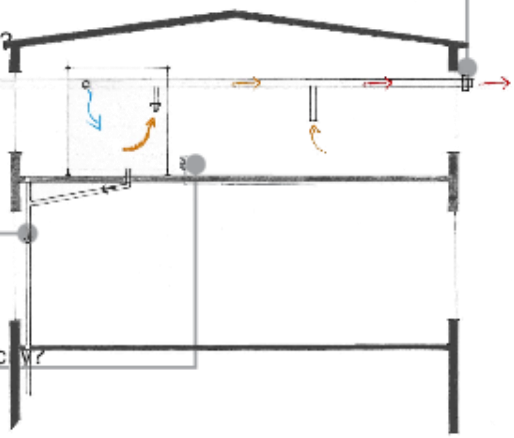
How does it breathe?

Ducts can be run from one window to another. In-line fans will pull fresh air into the Core-House and exhaust stale air out. Inlets can be installed in the field to exhaust air from work tasks as well.

How does it deal with wastewater?

First and foremost, Core-House eliminates the bulk of its waste from entering the waste-stream in the first place. A Composting toilet is an essential part of the Core-House.

For the remaining grey-water the Core-House takes advantage of the fact that the overwhelming majority of buildings have operable sewer connections, a simple penetration through the floor deck allows it to tap into this system.



How is it powered?

The Core-House needs only to be supplied with cold water and electricity. Minimal services mean that it is simple to place and eliminate the fire-hazards of fuels like natural gas.

How does it get water and electricity?

RV parks provide hookups so that energy and water are easily available and easily monitored. A Panel can either be stubbed up out of the floor and the Core-House can be 'plugged-in'.

How is it heated?

Electric Radiant Heaters, even towel warmers, are more than adequate to heat a Core-House.

How does it heat water?

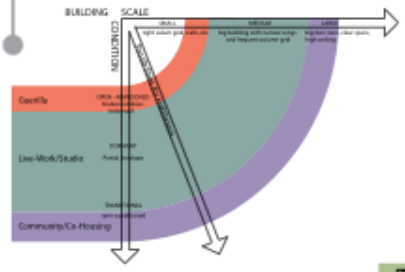
Electric on-demand hot water heaters are compact and more than powerful enough to supply all the hot water for the Core-House. They can disappear under the sink.

How does it interact with the Code?

A Sanctioned Core-House community will grow inside a building that already meets code for fire-suppression, the Core-Houses are treated as interior partitions. Otherwise, Code acts as a parameter that governs the distribution of Core-Houses within a given building.

How does it interact with different building scales and conditions?

Core-House is designed to adapt to a very wide array of building scales and conditions. The question is not so much whether a Core-House can be used in any particular building as it is what shape and kind of habitation that particular building can support.



Distributing Core-Houses inside the building within the parameters of Code:

d must be at least half of D

Maximum travel for R-uses --> 200 feet (250' with sprinklers)

What will qualify as a corridor?

Largest room or Area that may have only one means of egress --> 10 Occupants

R-uses --> 200 square feet gross per occupant

Dead-end Corridor maximum --> 20 feet

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