

**DELEVERAGING DOMESTICITY:  
Incremental Design Forays on Middle Income Housing**

by

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Bachelor of Fine Arts  
School of the Art Institute of Chicago, 2005

Submitted to the  
Department of Architecture  
in Partial Fulfillment of the Requirements for the Degree of

Master of Architecture  
at the  
Massachusetts Institute of Technology

February 2013

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### **ABSTRACT**

Housing today has little do with architecture. Design is a currency of services, while housing today is intensively packaged as a consumer good. It is packaged with land as speculative real-estate, and bundled abstractly into mortgage-backed securities for trade in global investment markets. Both strategies allow people of ordinary means to assume it's monumental cost. Because so very few can buy housing outright, it is built by debt and for debt.

This thesis proposes an alternative, in which the critical role of mortgage-financing is directly supplanted by a new set of incremental residential design services. It proposes that middle and low income housing can be not only paid for, but also designed and built during occupancy. Proposed as the centerpiece of a new mode of professional architectural practice, this flexible timeline facilitates reconsideration of housing's materials, labor logistics, and constructional methodologies. The same timeline can accommodate its individual owners' changing needs throughout a progressively tailored and domestically integrated process.

Though rental markets may fluctuate, credit scores plummet, mortgage qualifications creep, and income-inequality may intensify, incremental design services can pin the production of housing to that irrespectively distributed and far more egalitarian commodity of time. Given more or less time, these can serve both middle and low income households at equal and unsubsidized standards.

The structure of this thesis first elaborates and quantifies the underlying need and argument for designed incremental housing in the United States. It then explores the enabling strategies, attitudes, and issues that arise surrounding three distinct design exercises. These each comprise an approximately eighty thousand dollar magnitude of cash expense, but diverge in value by articulating design logistics as a parallel currency. They are respectively urban, suburban, and rural in setting. They are tailored to a plausibly fictitious clientele of respectively high, middle, and low incomes, and so adopting HUD's definition of affordable housing costs as 30% or less of household income, are conducted in the course of three, six, and twelve years respectively. Their single and central commonality is a complete prohibition of paper debt.

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# ACKNOWLEDGMENTS:

To the following people, many thanks and much gratitude.

To my wife Marine, for being so incredibly and unfailingly supportive throughout all of this. Wherever we go and whatever we do, I know our life together will be really, really, great.

To my parents for their love and support, and for the good life that they built for our family on cocktail of hope, faith, wisdom, courage, and perseverance all their own.

To my brother Dan for his love and support, and also for my first tool-belt.

To my thesis committee: Brandon Clifford, John Ochsendorf, and Mark Jarzombek - Thank you all for your guidance and the great honor of engaging this project- for sharing your time, insight, and knowledge. Thanks as well to Ana Miljacki for all of that in a rigorous preparation.

To Ted Lowitz, for being the owner of my first incremental building project and most tenacious of all homeowners. Thanks as well for being a great mentor, inspiration, and friend.

To Adam and Anna Gaffey, Denise & James Otremba, Cameron Crawford, Dave Snyder, Vanessa Smith, Tia Kramer, Sam French, and Jacob and Melissa Ristau - for being great friends, peerless company, and fearless travelers on the winding paths we share. I LOVE YOU GUYS!

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## FOREWORD

The entirety of this work was shaped first and foremost by MIT's strong cultural bent towards innovative entrepreneurship. While all of its architecture students have been subject to that tantalizing institutional pressure, the department of architecture (like the profession it serves) presently cultivates few and usually somewhat rarefied outlets for either "nuts and bolts" innovation or in consequence, for direct professional entrepreneurship. While technological innovations regularly come out of MIT architecture's building technology program and the department's alliance with the media lab facilitates some additional exposure to social entrepreneurship, MIT architecture's central design pedagogy remains aloof. Here or anywhere else, few congruencies and alternative paths have been drawn between such entrepreneurial endeavors and traditional models of civic, cultural, and corporate architectural patronage.

Those entrepreneurial design projects to have come out of either the academy or profession in recent years tend to align themselves with generalized assumptions of prefabrication, or to a troublingly deterministic sub-set of rapid-prototyping technologies. Among many other critical voices, my thesis reader and distinguished architectural theorist Mark Jarzombek refers to these often and disparagingly as "techno-fixes". Undoubtedly our discipline's sublime underpinnings can be stifled and flattened when designers seek to emulate neighboring science and engineering fields by packaging their endeavors as intellectual property. Neither in the rare event of a need, would many designers seem to have the skill sets, resources, or connections to protect or capitalize on any such intellectual property. Architects are trained to maintain a fluid, iterative relationship with their ideas, while intellectual property is protected through tedious, contentious, and often endless litigation. Commerce in that intellectual property might for architects seem not only an unhappy distraction, but in certain lights even a little crass. At least when architects build, their ideas are means more than ends.

This thesis began with intensive research of the splendors and horrors of pre-fabricated building. I learned a great deal about that paradigm's many seemingly prohibitive pitfalls and its 20th century litany of commercial failure, but also of its disproportionate ability to captivate the popular imagination. In sum total, the resulting project has little to do with that specific paradigm. Its initial investigation brought to light a larger discussion around which "prefab" truly revolves, but over the past century has also unduly eclipsed: Design's role in the building industry.



Simply stated, architectural design is subservient to building. It shouldn't however, be subservient to *any* particular industry. Today and certainly in the United States, the building industry is too big, comfortable in its habits, and too decentralized to effectively keep pace with rapidly proliferating information and technology. It's few proprietary systems and stubborn standard modules will only take design so far, and design today is moving fast. Architects deserve more and better ways of building, and should take a hand in getting them. This calls for anything but traditional practice.

What I know of traditional architectural practice comes mostly from the focus of my last few years' design education. Most of our design exercises focused on variously large, urban, civic, institutional, and corporate scale projects, and reflect an architectural profession that has evolved to rely often on fewer and larger commissions. Such gargantuan undertakings can be initiated years in advance of an architect's direct involvement by groups of financiers and fund-raisers. Their construction can last years or even decades after design is more or less complete. The architect's burial in the deep middle of such project time lines would seem to have ironically marginalized the profession's ability to shape that process at a fundamental level. Designers don't often truly initiate building projects, don't always directly see them finished, and their professional services can be relegated even to the point of mere aesthetic consultancy. It would seem unlikely for architects in that role to systematically question the fundamentals of prevailing building practices, let alone to effectively propose alternatives.

So In counterpoint to that bread and butter of my education, presuming patronage as an unaddressably variable and complex hypothetical, I've chosen to propose a model of patronage so historically rare, so direct, and diagrammatically simple as to probably sound naive. This thesis proposes a plausibly incentivised, personal working relationship between an architectural designer and a client-homeowner of ordinary means.

The first segment of the following project extrapolates the need for and the diagrammatic business plan of a generalist residential design practitioner. It favors percentages, but includes numbers which will quickly fall out of date. Where those quantified costs and statistics are unavoidable, they're generally rounded off and can be easily enough extrapolated into their own proportional relationships. The proposed model of practice they delineate could be as variable as those personalities who might inhabit it, but it can be summarized as follows:

Having identified complete reliance on debt as the central and defining characteristic of new housing production in the United States today, The exercise of this thesis seeks to define a set of design strategies that might incentivise themselves by directly supplanting debt's current role in housing delivery.

Central among these is the logistic coup of an incremental, yet continuously occupiable construction process. Rather than presuming completion before occupancy, this model of housing delivery borrows the federal government's definition of affordable housing costs as the variable-flow budgets of each client's and project's unique delivery process. As the monthly and annual incomes of prospective clients vary, so too do the start-to-finish time lines of their respective projects. This practice might occupy a single designer or small office full time, but might also scale down to weekend and side-projects for both the designer and his or her few clients.

The resulting strategies can be summarized as a new paradigm of "designed incremental housing". It is not proposed as an organized franchise, but as a free and open model of professional practice. It's no intellectual property, but a straight-forward and unfettered suggestion. To try and copyright any part of it would seem not only futile, but also antithetical.

In flushing out the prospects of a direct interface between professional architectural design services and the general population, This thesis aspires to cultivate nothing less than "Access to Tools". As the Whole Earth Catalog's ingeniously concise sub-title, that phrase also aptly describes the catalog's divided legacy in the present day. It's banner of "Access" was taken up by a visionary cybernetics contingency, and eventually helped to inspire the internet. Though sprawling in scope, the catalog was an editorial project. The internet in contrast resists any such hierarchical oversight. It provides access to truth alongside lies, and effectively buries most of both in its inconceivable magnitude. Many of the Whole Earth Catalog's "tools" on the other hand, proved more-or-less irrelevant. Its alliance to 1960's American counter-culture proved similarly limiting, and the "Back to the Land Movement" that it championed was too nostalgic and culturally partisan to last. The Whole Earth Catalog's "tools" were proposed by and for a youth culture that simply grew out of them, along with bell-bottoms, head-bands, and braids. Without quite synthesizing a durable relationship between "access" and "tools", the Whole Earth Catalog still managed to embody an unimpeachably thrilling impulse. It sounded the clarion call of a brash, fearlessly innovative, and fiercely productive material individualism. Its self and alone, the internet may be too ungainly and disorganized to refocus that ethos on a truly contemporary building culture. This thesis proposes to focus it instead on an intimate, purpose-driven, accessible, and face-to-face professional constituency. It strives to align that model of architectural practice and patronage

with access to new global information networks and a powerfully democratized and updated kit of tools. The late Apple CEO Steve Jobs was fond of ending his lectures with a quote from the back cover of the last issue of the Whole Earth Catalog. Those same words are apt enough instructions to the reader of this thesis. Here they are:

“Stay Hungry, Stay Foolish”.



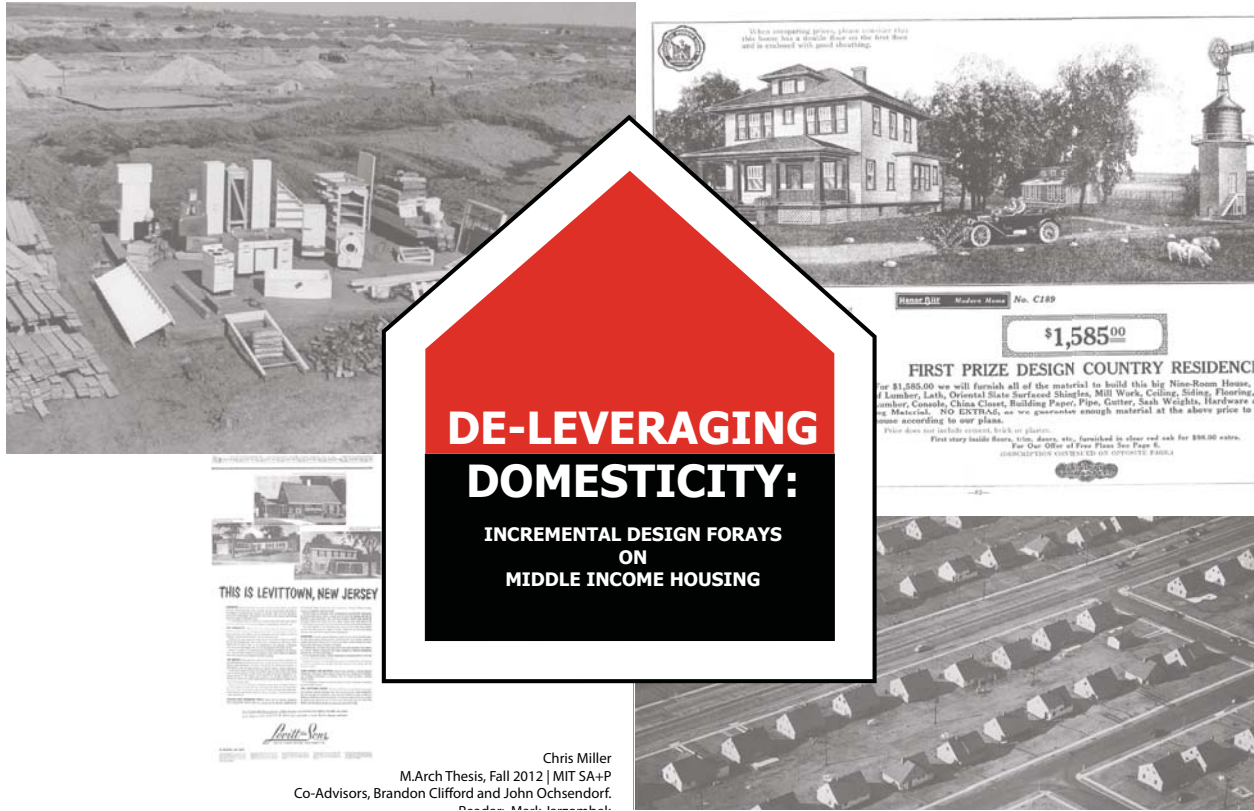
# **PART 1**

THE CASE FOR:

**DESIGNED**

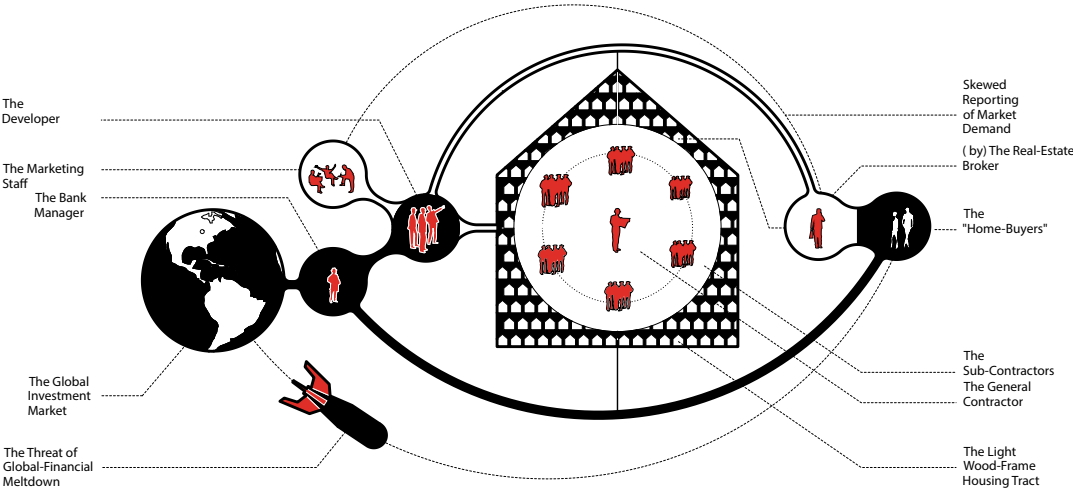
**INCREMENTAL**

**HOUSING**



Housing today has nothing of great consequence to do with architecture, because architecture is delivered in services, and housing is very intensively packaged as a consumer good.

# CONVENTIONAL HOUSING DELIVERY TODAY

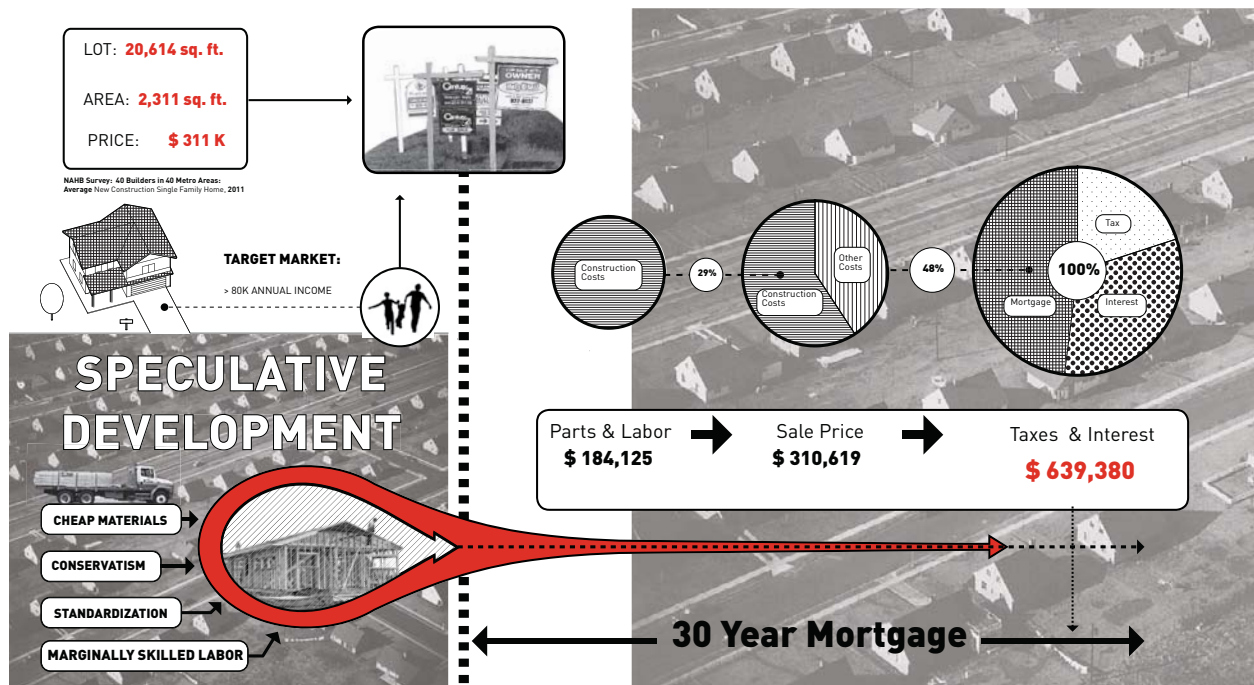


It is distinguished among consumer goods, in that nobody can afford it without convoluted mechanisms of long-term debt.

Global investment markets currently inject capital into a decentralized substrate of tangled and entrenched multi-partisan systems that determine what to build, how big, and where for maximum profit.

The eventual consumer's inevitable debt is funneled back into these same investment markets, where it is repackaged, traded, and gambled on to allow an endless repetition of the process - barring some unforeseen failure of confidence that might again incur global financial meltdown.

# THE NAHB'S AVERAGE SINGLE FAMILY HOME, 2011



Which is to say that today's housing is built like yesterday's, for debt.

The above diagram shows last year's average single family home according to the National Association of Home Builders. It certainly differs most from yesterday's housing in size. It has tripled in size since 1950.

Its costs are many, indirect, and often hidden. After thirty years of mortgage interest, property tax, and utility bills, it might cost its owners three times what it actually cost to build, and nearly double the posted sales price.

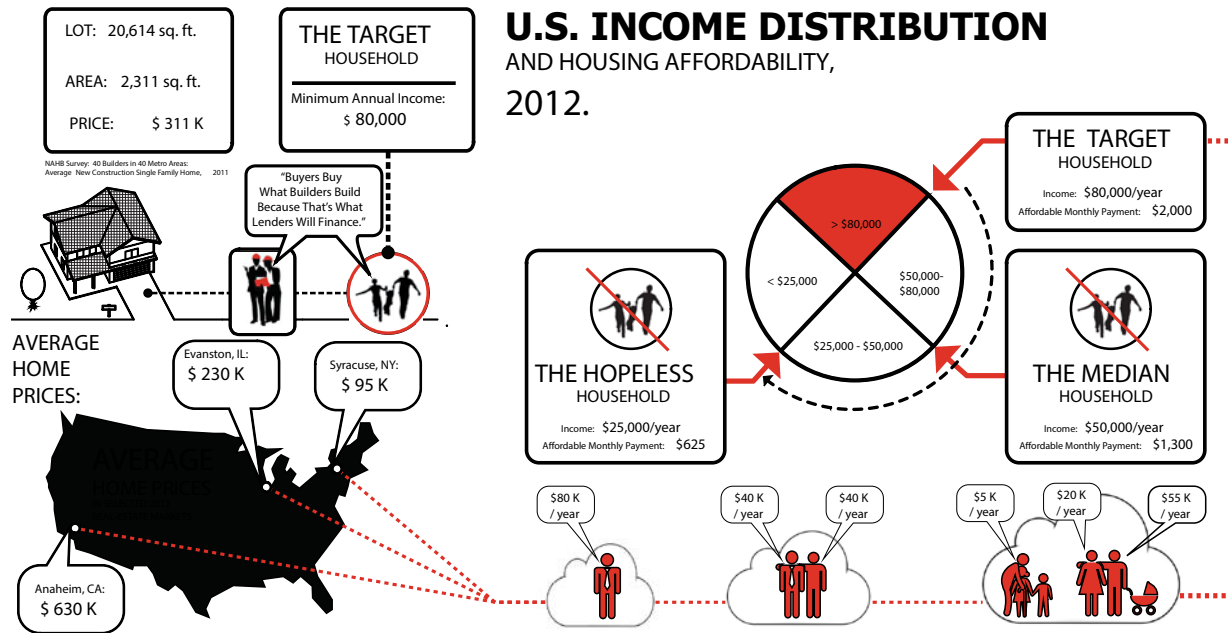
Emrath, Paul, Ph.D. Breaking Down House Price and Construction Costs. Housing Economics.com, National Association of Home Builders. <http://www.nahb.org/generic.aspx?sectionID=734&genericContentID=134543&channelID=311>. Accessed September 7th, 2012.

State-by-State Property-Tax rates. New York Times, Published April 10, 2007. <http://www.nytimes.com/2007/04/10/business/11leonhardt-avgproptaxrates.html>. Accessed September 7th, 2012.

Taylor, Heather. "New Construction Cost Breakdown: Economics and Housing Policy" National Association of Home Builders. November 1st, 2011. <http://www.nahb.org/generic.aspx?genericContentID=169974>. Accessed November 5th, 2012.



# THE MYTH OF AN AVERAGE HOUSEHOLD: LOCAL HOUSING MARKETS AND AFFORDABILITY



According to HUD's definition of affordable housing, only a quarter of American households can afford this version of the average new home. Even that fortunate quarter can either live like kings, or struggle to find affordable housing in their varied local markets.

Though the least affluent quarter of American Households will probably rely on public subsidies to rent or own, our current system also fails plenty of the great unquantified middle class.

Anaheim Market Trends. Trulia. [http://www.trulia.com/real\\_estate/Anaheim-California/market-trends/](http://www.trulia.com/real_estate/Anaheim-California/market-trends/). Accessed September 9th, 2012.

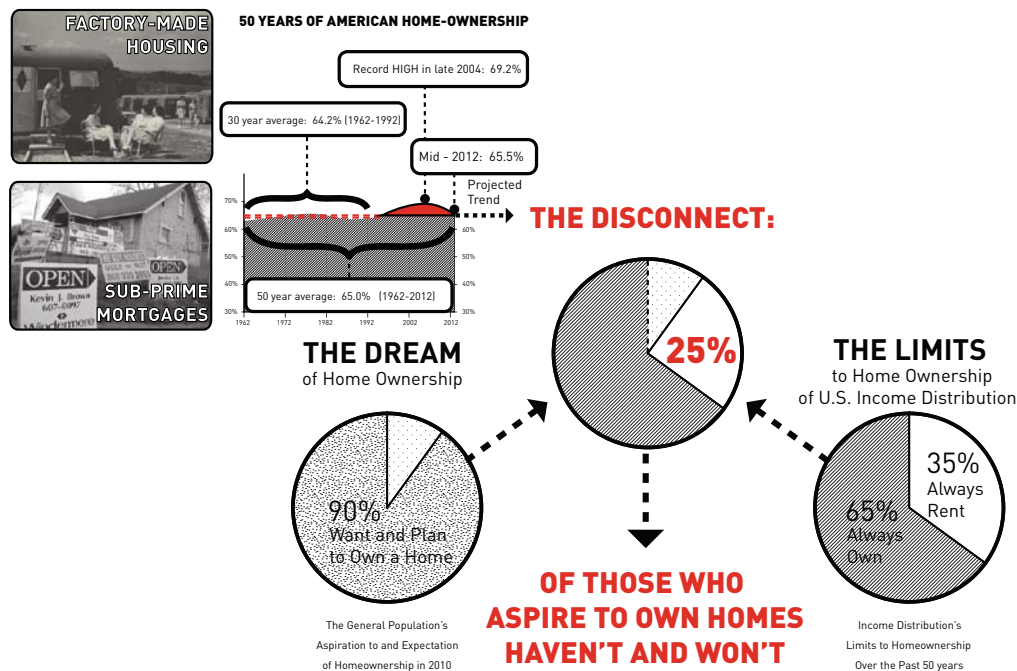
Evanston Market Trends. Trulia. [http://www.trulia.com/real\\_estate/Evanston-Illinois/market-trends/](http://www.trulia.com/real_estate/Evanston-Illinois/market-trends/). Accessed September 9th, 2012.

Historical Census of Housing Tables: Homeownership. United States Census Bureau. <http://www.census.gov/hhes/www/housing/census/historic/owner.html>. Accessed September 8th, 2012.

Income, Poverty, and Health Insurance Coverage in the United States: 2011. U.S. Census Bureau. <http://www.census.gov/hhes/www/income/>. Accessed September 7th, 2012.

Syracuse Market Trends. Trulia. [http://www.trulia.com/real\\_estate/Syracuse-New\\_York/](http://www.trulia.com/real_estate/Syracuse-New_York/). Accessed September 9th, 2012.

# THE DREAM, SUPPRESSED: INCOME DISTRIBUTION AND THE SUB-PRIME MORTGAGE CRISIS



The net result is this: The United States' homeownership rate is now firmly capped at 65%, as it has been for the past 50 years.

When that same rate approached 70% eight years ago, absolute disaster ensued. Around five percent of American households bought homes that they simply couldn't afford, and lost them in 2008's sub-prime mortgage crisis. They and many others lost their credit, livelihoods, seemingly secure futures, and plenty of trust in our economy's underlying mechanisms.

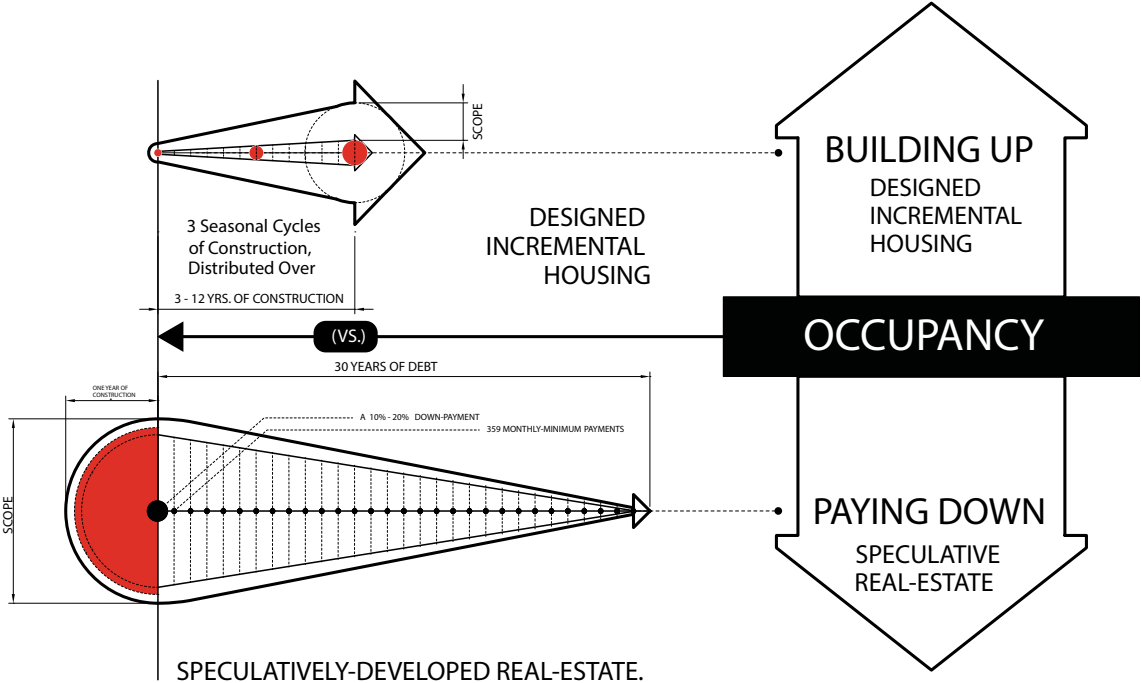
However else that dramatic turn of events may have shaped popular attitudes, there remains one striking and pervasive disconnect. According to the U.S. Census Bureau, around 90% of us still wanted and expected to someday own a home, even at the height of the sub-prime mortgage crisis in 2010. For those capable, homeownership is still less expensive than a lifetime of rent. It offers a modicum of security, comfort, and even a mark of status all its own. For better or worse and unless something really big changes, a full quarter of American households will fail in their aspirations to own a home, and will be denied its many unquestionable advantages.

American Housing Survey (AHS). <http://www.census.gov/housing/ahs/>. Accessed September 9th, 2012.

Christie, Les. "Homeownership falls to lowest rate in 15 years." [http://money.cnn.com/2012/04/30/real\\_estate/home-ownership/index.htm](http://money.cnn.com/2012/04/30/real_estate/home-ownership/index.htm). CNNMoney. Published May 2, 2012. Accessed September 9th, 2012.

Historical Census of Housing Tables: Homeownership. United States Census Bureau. <http://www.census.gov/hhes/www/housing/census/historic/owner.html>. Accessed September 8th, 2012.

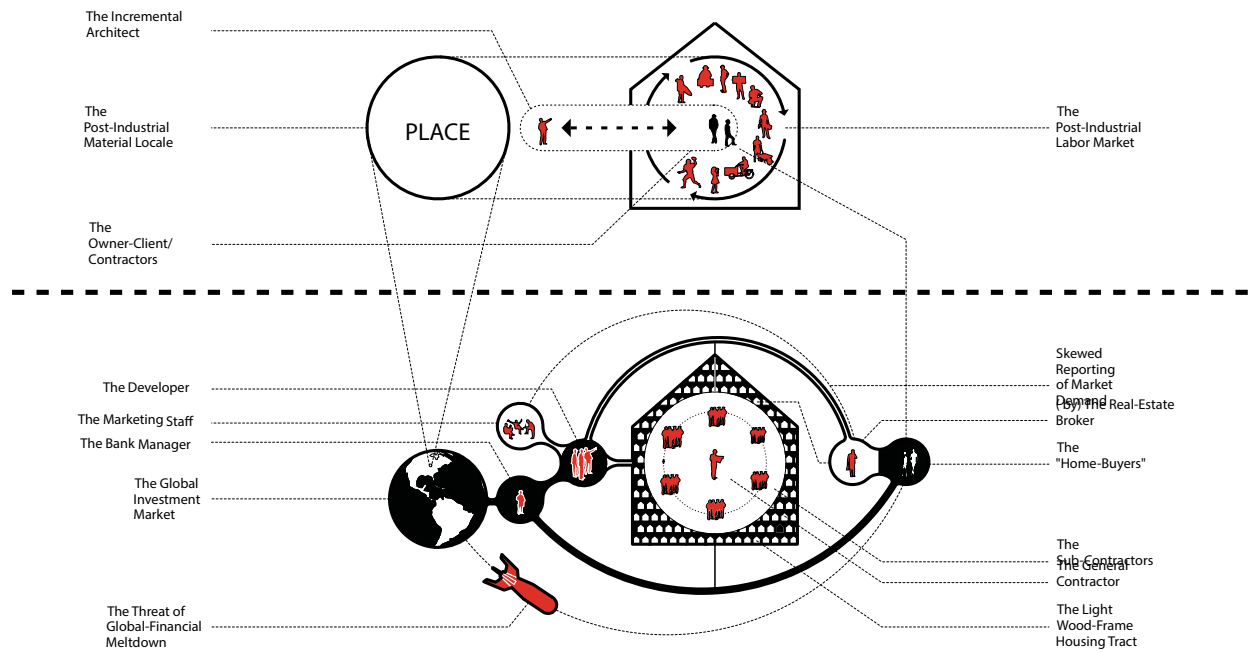
# DESIGN, NOT DEBT



This thesis states, that a new set of professional design services can extricate housing from reliance on debt. Design can directly supplant debt’s role in the open housing market, and help to break up its fundamental monopoly.

Rather than a single transaction paid down over decades, Middle-market Housing can be built up to accommodate its owners’ individual and changing needs through a progressively tailored and domestically integrated process. This calls for a new set of design services, a new generalist mode of architectural practice, and an popularly accessible model of direct design patronage.

# A PRODUCTION METHODOLOGY FOR DESIGNED INCREMENTAL HOUSING

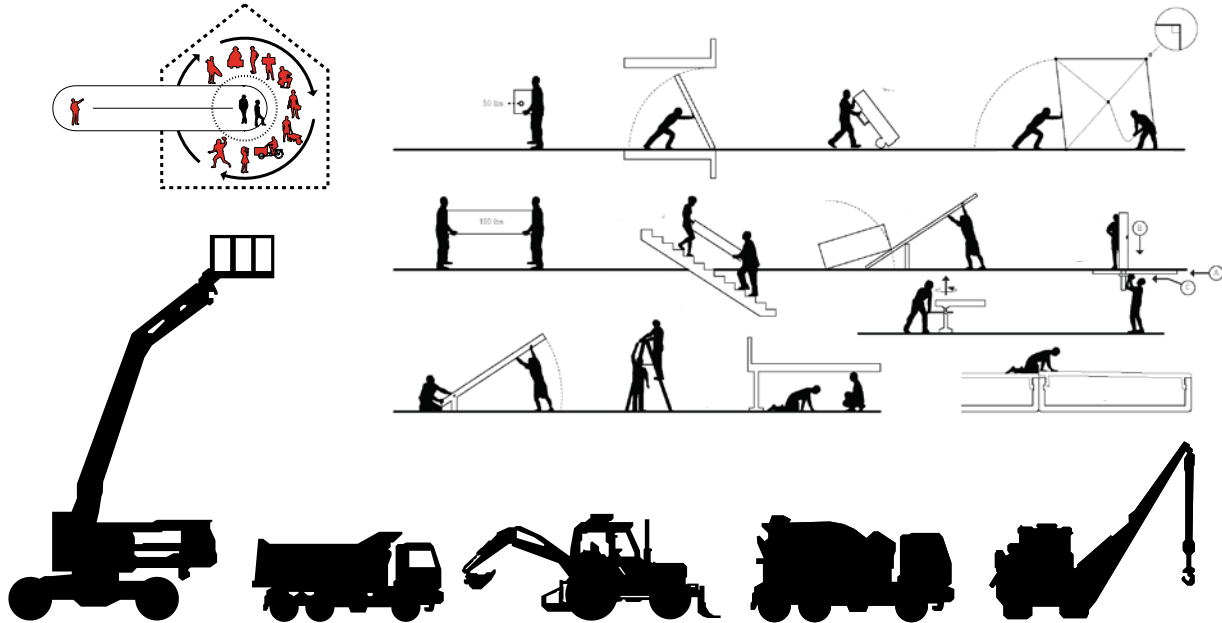


It also opens the delivery system for wholesale reconsideration.

It isn't to double-cast the architect as a contractor or developer, but to situate a new general design practitioner in regular consultation with clients acting as their own personal contractors in their own local communities.

Global information networks and relaxed time constraints can allow the designer to tap deeper into what distributed knowledge is currently buried in those subtly yet infinitely varied local labor markets, matching the general or rarefied capabilities of a revolving cast of producers to discrete jobs within the greater scheme.

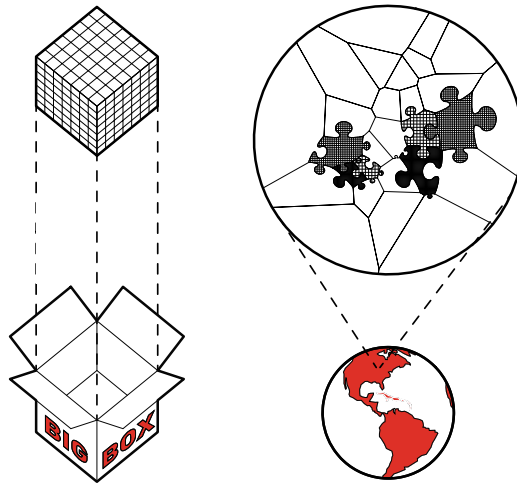
# INCREMENTAL LABOR AND TECHNOLOGY



Available skill-sets can as such be re-appropriated and stretched to fit new or unconventional tasks. Discretized projects can be better delegated to accommodate amateur, D.I.Y. seasonal, part time, or occasional labor, alongside skilled professional work.

The tools and infrastructure of this undertaking similarly favor human and individual scale. Tablets fit this description as well as shovels, and human-scale tectonics can be further communicate design into construction as stay-in-place formwork, integral staging, or self-sequencing assemblies.

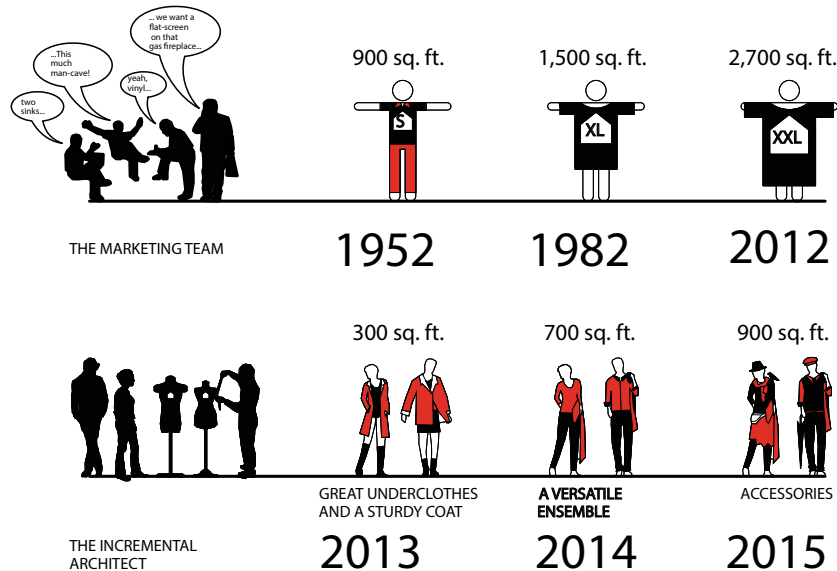
## **BUILD SMART, BUILD LOCAL: A LOGISTICALLY EXPANDED MATERIAL PALETTE**



Similar strategies are pre-determined in the standard modules and components of conventional construction. For speculative housing, construction is after all a race to resale. Where that critical time-constraint requires the expedience of a few tacitly universal material component systems, a new incremental designer can again exploit prolonged delivery time lines to better mine local and unconventional material palettes.

Such material palettes might include but would also greatly exceed the inventories of lumberyards and home improvement stores. Not solely manufactured, these are also raw and made, found, salvaged, commissioned, repurposed, bartered and even borrowed. They can be permanent, temporary, and even in-between.

# OFF THE RACK HOUSING AND TAILORED RESIDENTIAL DESIGN



Housing must still of course meet rigorous standards for health, safety, security, and comfort. An architect must of course weave those necessities into something even more - something at least a little bit sublime.

The logistic constraints of this incremental building process as such, call for a very strategic initial tailoring. This begins in most locales, with a race to the first frost. Rather than a cheap, fast, and complete metaphorical winter wardrobe, the first increments of design must provide for a robust standard of bare necessity capable of later expansion, elaboration, and refinement.

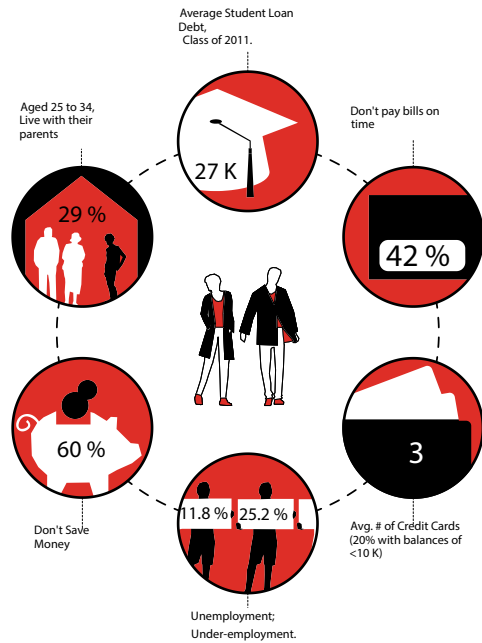
Speculative developers have always built the biggest homes that markets will bear, and have always pushed the envelope. In contrast to the tailoring process of a mass-market monopoly, individual, incremental design services can determine size as a tailored best fit. Standardization is the great enabler of speculative housing development. What's proposed is in antithesis of speculation, and so of standardization too.

Median and Average Square Feet of Floor Area in New Single-Family Houses Completed by Location. United States Census Bureau. <http://www.census.gov/const/C25Ann/sfttotalmedavgsqft.pdf>. Accessed September 8th, 2012.

# HOME GENERATION: TOMORROW'S NEW HOUSEHOLDS

**"GENERATION Y"**  
 Born 1980 - 1994 -  
 (Age 18 - 32)  
**POPULATION: 50 MILLION**

- IF NOT SEVERELY DEBT-AVERSE,
- SEVERELY CREDIT CHALLENGED.
- LACKING OR LATE-TO "CAREERS,"
- AND PROVEN DOMESTIC RULE-BREAKERS



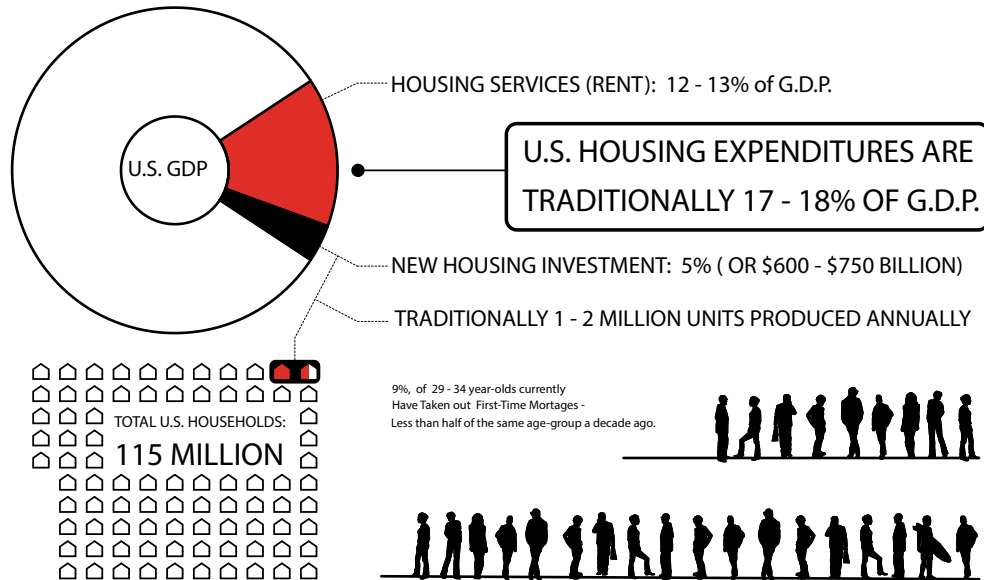
Tomorrow's new households have no great collective love for standardization, and they are the proposed clientele of designed incremental housing. Interchangeably known as "Generation Y" and "The Millenials", they also have an intimate, unique, and terrible relationship with debt.

The class of 2011 has more student loan debt on average than any previous. More young adults, and many approaching middle age live with their parents than have any recent American generation. Fewer of them are currently building savings, and high rates of youth unemployment are compounded by epidemic under-employment. They have credit cards with high balances, and trouble paying their bills on time. At present best, they seem destined to be a generation of renters. Those eventually capable of buying homes might be understandably reluctant to sign a mortgage.

Their great grandparents grew up rowhouses, farmhouses and tenements. Though today's young adults were raised mostly like their parents and grandparents in suburban sub-divisions, walk-up city apartments, and public housing projects, they have compelling reasons to reconsider that cycle. Many of tomorrow's new households are wary and resentful of debt; they have excellent cause to break its rusty mold.



# THE STATE OF THE HOUSING MARKET: TODAY AND TOMORROW

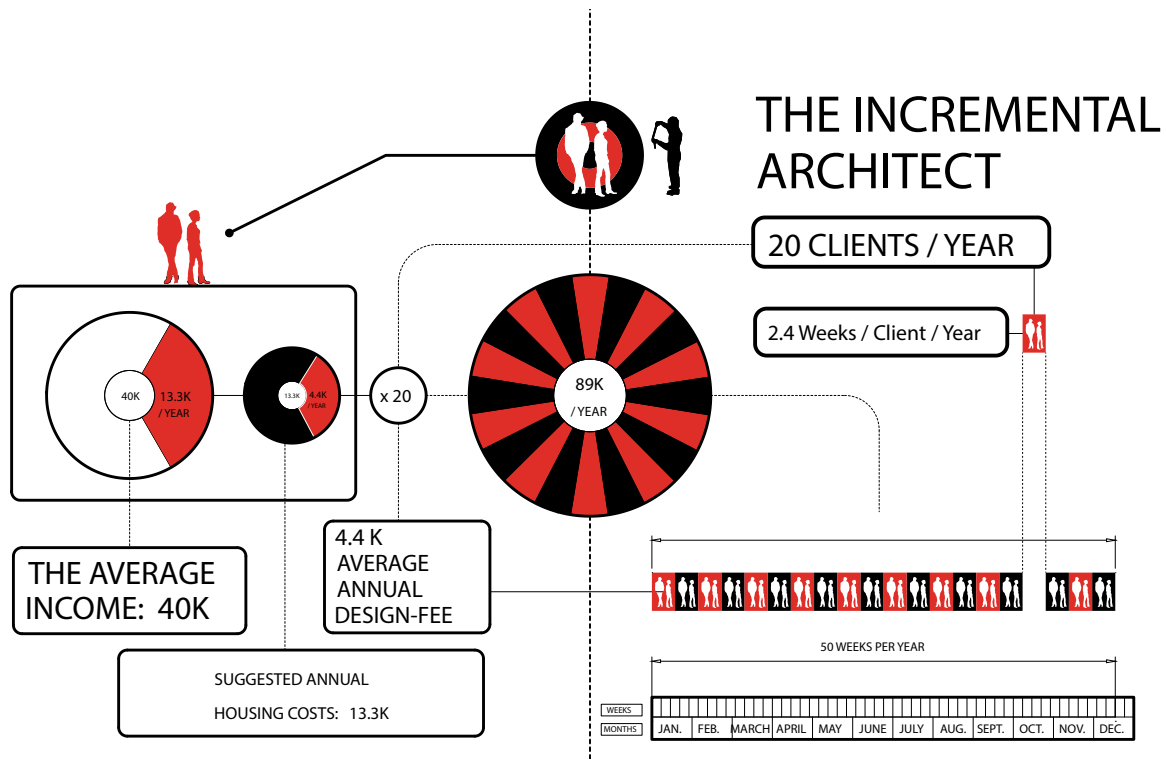


It wouldn't take a revolution, and it wouldn't even take long. Housing is durable but hardly permanent. There are currently around 115 million households in the United States and one or two million new houses have been built in most recent years. These accommodate population growth, but also replace inevitable convalescence. Though an epic endeavor costing hundreds of billions of dollars each year, it still comprises only around five percent of the United States' gross domestic product. Rents and peripheral housing services comprise far more.

Whether you choose to call it objectively gargantuan and subjectively small, the new housing market throttled the rest of our economy when it collapsed in 2008. It collapsed then not only because of faulty speculation and un-sound lending practices, but lacking the resilience that only diversity can lend to large systems. Those millions of unsound mortgage loans and hundreds of thousands of speculative development projects underway in 2008 all had the same few default mechanisms. They were all triggered simultaneously, there were waves of mass eviction, and all building ground to a halt. Construction jobs evaporated, and those many entwined and related supporting services suffered accordingly.

Even on the seeming brink of its recovery today in 2013, new homeowners are being minted in greatly reduced numbers. New young homeowners are particularly scarce. Some will eventually be well enough served by our current housing delivery system, but many will need other options.

# DESIGNED INCREMENTAL HOUSING: A PORTRAIT OF PRACTICE



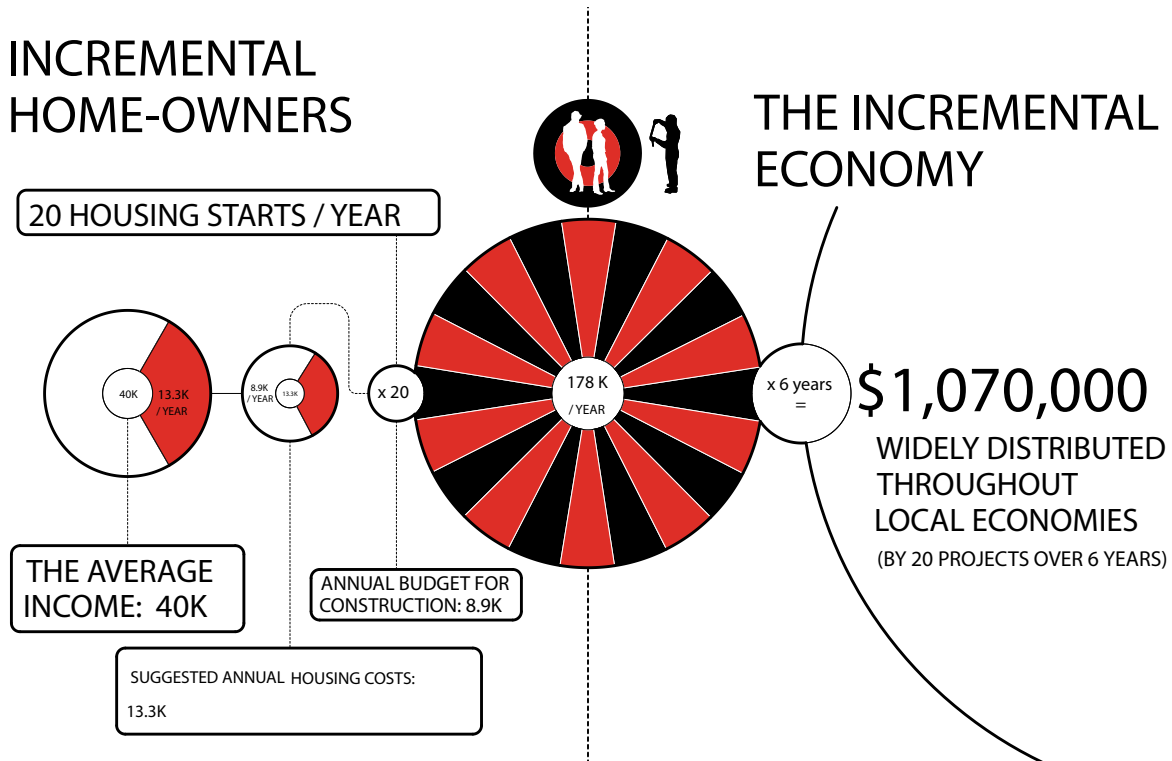
This thesis proposes one such alternative. Without ordaining a set franchise, it also speculates at a diagrammatic business model.

Weather independent or employed, a full docket for one incremental housing designer might serve up to twenty simultaneous individual clients. This designer working fifty weeks a year, could devote 12 work-days per year to each of twenty projects. If the average income of that clientele was \$40 thousand per-year, and their monthly housing-production expenses were taken as a flat 30% of income (in accordance with the federal definition of affordable housing costs), the design fee could reasonably garner 30% of each resulting housing budget. The designer after all wouldn't be performing a developer's or contractor's role for a twelve or twenty percent fee, but would be supplanting the hypothetical role of debt and so could similarly garner a fee of up closer to 30%.

In one construction increment per year, a household making \$80 thousand dollars annually could complete an \$80 thousand dollar project in around three years. By spacing those constructional increments every three years, another household making just \$20 thousand annually could complete the same project for the same cost over twelve years. Many home-loans are structured over fifteen years but most are structured over thirty. They incur interest accordingly.

Incremental Homeowners would reap comparative decades of disposable income. They might also enjoy the security of greater lifetime savings. The prospect of individual customization, the designers' material and constructional ingenuities, individually tailored size, and the complete absence of incurred interest would stretch reduced cash budgets into far better housing than it might otherwise buy in a condominium or suburban tract.

# AN INCREMENTAL HOUSING ECONOMY



With a docket of twenty projects ranging from three to twelve years in duration, an average annual design fee of \$4,400 for each of these twenty projects, this incremental architect's gross annual billings could approach a more-than respectable sum of \$90,000. Over an average of six years these twenty projects would also distribute roughly a million dollars throughout their respective local economies in exchange for local goods and services. Far more of that million dollars would as such, stay local. What might be trivial sum within tangled multi-partisan webs of developers, contractors, bankers, manufacturers, and real-estate brokers, could have a much greater impact close to home. It could essentially go farther by changing fewer and more familiar hands.

Imagined at scale, such local economies would not be composed solely of retailers' and distributors' thin profit margins, prices fixed by national and international franchises, the inflated costs of long-distance shipping, endemic corporate wage slavery, or vast quantities of incurred interest swirling back into the remote vortex of global investment markets. Instead they would foster entrepreneurship, self-employment, commissions, contracts, and generally more direct business practices. This economy would be characterized less by familiar brands than by familiar faces.

It would foster both social and technical grass roots innovations. It would help to cement and legitimize markets for salvaged, up-cycled, and unconventionally diverse building materials with their accompanying supply chains and related services.

Owners of designed incremental housing might have the greatest of all advantages within their proposed post-industrial locales. With many more decades spent in the security of owned and unleveraged housing, they would be still more free and better empowered to shape their own endeavors, careers, and lives.

## INDUSTRIAL HOUSING: INCOME DISTRIBUTION AND CLASS DISTINCTION



Conventional construction and speculative real-estate housed a middle class that was hard won. Today's middle class is however different in character, shrinking, and embattled on new fronts. Conventional housing can swell in size to accommodate the affluent, but today the rest either struggle, rely on public subsidies, or both. "The rest" is a growing demographic, and the conventional construction of speculative real-estate is frankly a failing system.

2008's sub-prime mortgage crisis should be taken as a wake-up call, and should illustrate that the old system of housing delivery was not just insufficiently equitable, but has grown fundamentally unsound. As rental markets convulse with waves of the disenfranchised, credit scores plummet, mortgage qualifications creep, and general income-inequality intensifies, incremental design services can pin the production of housing to that irrespectively distributed, and so far more egalitarian commodity of time. Given more or less time, such a paradigm could serve both middle and low income households at high, equal, and otherwise unsubsidized standards.

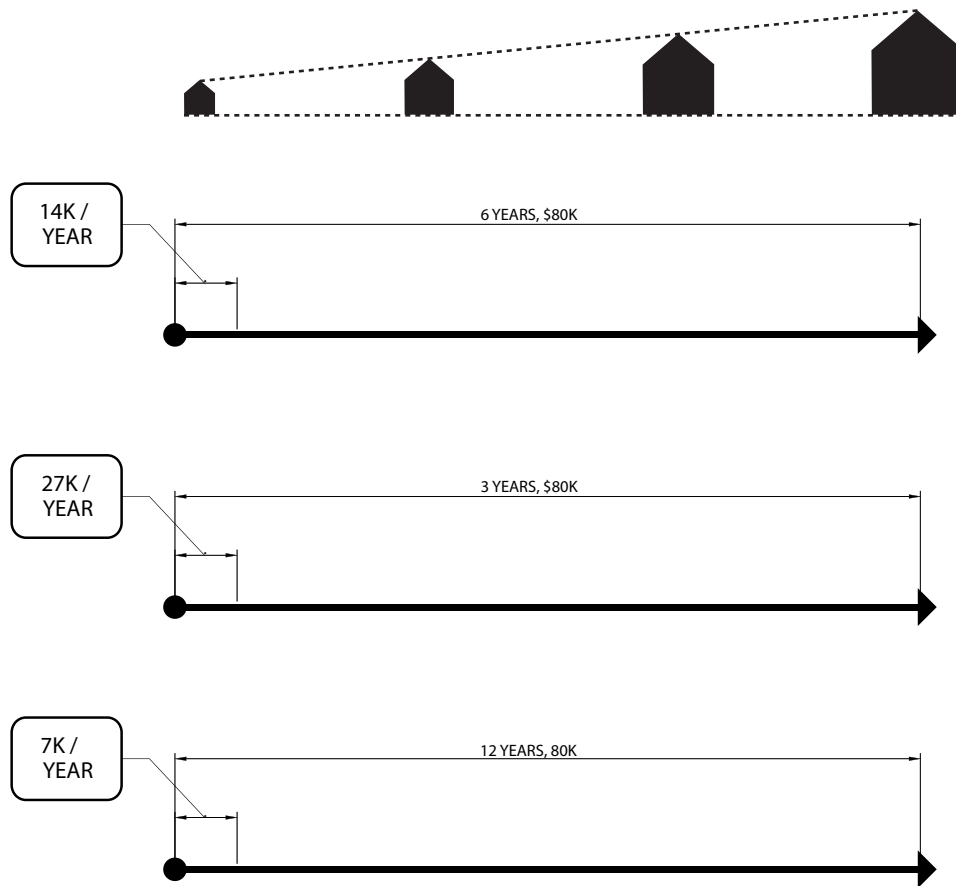
## **TOWARDS A POST-INDUSTRIAL HOUSING: FOR A POST-INDUSTRIAL ECONOMY**



Neither the “middle income” nor the “middle class” have ever been well quantified, but they are usually treated as synonyms. Designed incremental housing might call that relationship into question. By simply nullifying a banker’s narrow prerequisites for homeownership, it might extend membership in the American middle class to objectively “disadvantaged” households. It could serve those that lack job security, those without savings, those that may have lost their credit, and those who may never have had a reason or an opportunity to build credit. It could essentially absolve those conditions of their prohibitive “disadvantage” in the housing market.

Income might generally determine what households have, but class distinction refers to a more complex and ephemeral equation of how people live. Quantity of capital need not dictate quality of life for tomorrow’s households, and housing could be the wedge that delaminates them. Now and to that end, this thesis charts one possible circumnavigation of homeownership’s current rising barriers. Housing may not have such a utopian future, but it must inevitably change.

# VARIABLE-RATE CONTINUOUS OWNERSHIP: A SIMULTANEITY OF PROCESS AND PRODUCT



The following three design exercises explore three delivery time lines and frameworks to examine the strategies, attitudes, and issues that arise surrounding this proposal.

They are projects of the same 80K magnitude of cash expense, but vary beyond that in articulating the currency of design logistics. They're tailored to a plausibly fictitious clientele that is variously urban, suburban, and rural. They are of high middle and low income, and so their projects are conducted over the course of three, six, and twelve years.

What they have completely in common, is an assumed prohibition of paper debt.

## Additional References: The Case For Designed Incremental Housing

Page 24

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# **PART TWO**

DESIGN EXERCISES:

OR

**INCREMENTAL DESIGN**

FORAYS ON

**MIDDLE INCOME HOUSING**

# THE NORTH LAWNSDALE HOUSING CO-OP

## Overview

The owner-clients of this project are represented by their respective employers, and the North Lawndale Housing Co-op is an employer employee partnership. The neighborhood it takes its name from is a quintessential example of contemporary urban blight.

Employment is hard to find there, and many of its residents struggle to find it elsewhere. Notable exceptions are those few non-for-profit organizations that seek to employ the otherwise unemployable in community building endeavors. While such groups do build their employees' resumes toward more gainful eventual employment, they often fail to pay living wages in the interim.

The owner-clients Jesse and Luis each earn \$11 thousand dollars per year. Jesse dismantles abandoned and derelict homes for salvaged building material with Chicago Home Salvage, and Luis grows vegetables on vacant lots with the Urban Farming Alliance.

Recognizing the shortfall, both organizations partner with each other and an architect to help their workforce obtain owned cooperative housing as indirect but powerful compensation. In that partnership, both organizations also recognize a third and shared community building endeavor, and so seek to incorporate it into and address it within their original mandated enterprises.

As such, the Architect is tasked with incorporating general work space, salvaged materials, staging, storage, and urban agriculture facilities into the project. While it is proposed as a model of direct individual employee ownership, the employers agree to lend their skills and capabilities in return for these programmatic concessions. Being non-for-profit groups, they have particular expertise in grant-writing, politicking, and organization.

Serving a large clientele in a shrinking neighborhood, the North Lawndale Housing Co-op's incremental strategy centers on growth. Each of its three constructional increments can be characterized by a distinct nuance of that central strategy.

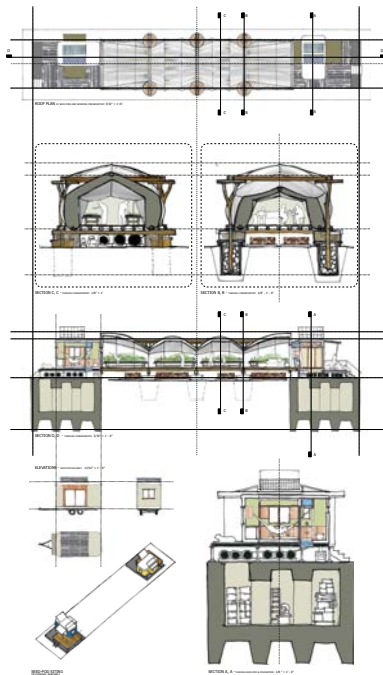
**CLIENTS:** Employees - Jesse & Luis  
Employers - Chicago Home Salvage & The Urban Farming Alliance

**LOCATION:** North Lawndale, Chicago, IL

**TOTAL COST:** \$ 80 K

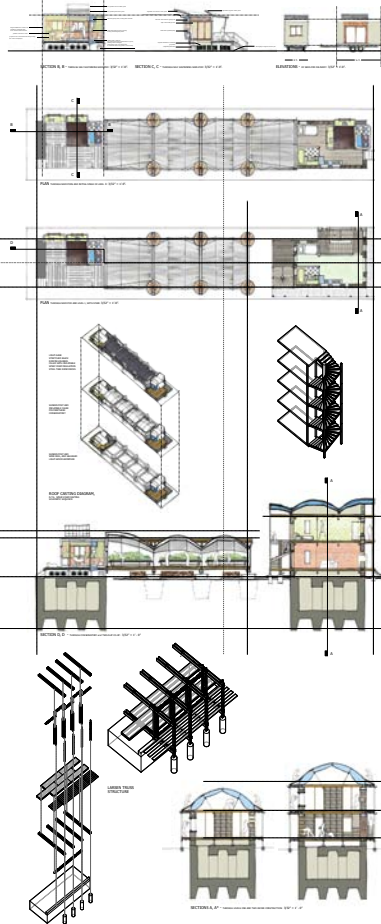
**DURATION:** 12 Years

**+ 12 MONTHS**  
**+ \$13K**



DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORMS ON MIDDLE INCOME HOUSING

**+ 72 MONTHS**  
**+ \$40K**



DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORMS ON MIDDLE INCOME HOUSING

**+ 144 MONTHS**  
**+ \$80K**



DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORMS ON MIDDLE INCOME HOUSING

# **THE NORTH LAWNSDALE HOUSING CO-OP**

## **Increment # 1**

### **Anticipated and Planned Growth**

The project's first increment lays a substantial concrete foundation that anticipates the growth of a multi-story apartment building. This occupiable basement can be used to securely store tools, water, equipment and supplies. It will eventually also house mechanical equipment connected to city utilities.

Structurally robust but small, the cost of this foundation's provision assumes outside funding or some partnership orchestrated by the project's non-for-profit organization clients. While this does amount to an initial gift or a subsidy, it also incorporates the clients' particular skill-sets into logistical design strategy. Non for profit organizations write grants, work connections, politick, and organize. Here they are asked to do what they do best.

At this point, the project's substantial concrete foundation is occupied by a light, deployable, and self-sustaining roll off camper trailer. Another early exercise of the client's capabilities, these might be renovated from tow-behind campers or built new from salvaged materials in a small business spin-off of one employer organization.

Providing basic amenities but only the most minimal living space, these trailers are situated two-per lot and spanned by a shared hothouse conservatory. This space accommodates work activities, but after business hours also accommodates rest and relaxation.

# THE NORTH LAWDALE HOUSING CO-OP

**+ 12 MONTHS**  
**+ \$13K**

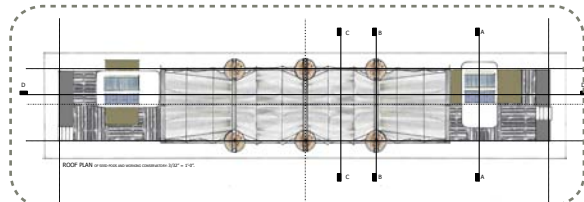
**Self Sustaining  
Seed Pod and Urban  
Considerations**

**Pages 37 - 40**



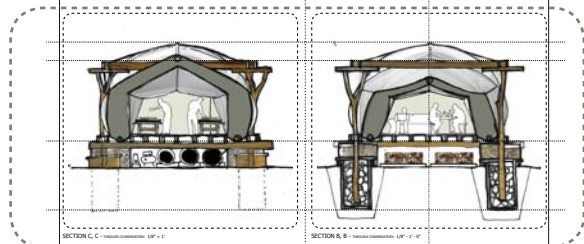
**Roof Plan of Seed  
Pod and Working  
Conservatory**

**Page 42**



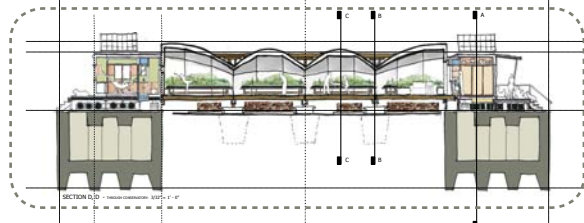
**Sections of Working  
Conservatory**

**Page 43**



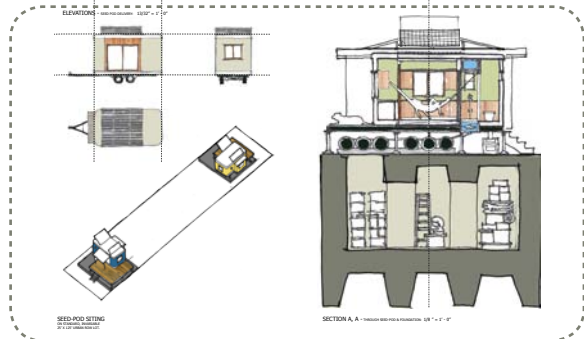
**Sections of Working  
Conservatory Shared  
Between Seed Pods**

**Page 42**



**Self Sustaining  
Seed Pod and  
Planned Growth**

**Pages 38 - 41**



DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORAYS ON MIDDLE INCOME HOUSING. CHRIS WELLS | ARCHITECTURE FOR ALL | 2019. © 2019 ARCHITECTURE FOR ALL. ALL RIGHTS RESERVED.

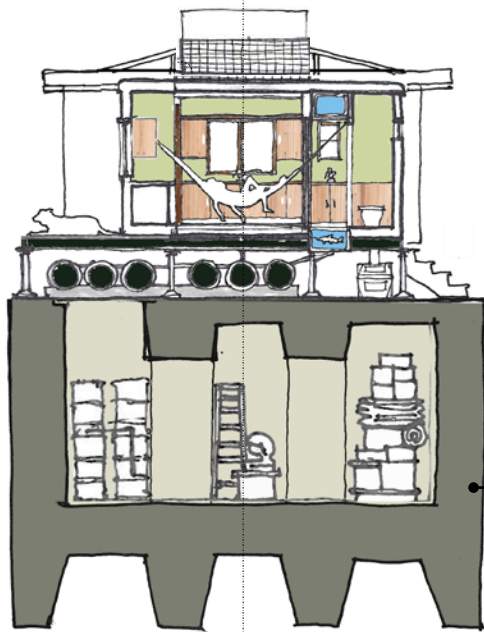


View: of Installed Seed Pod and Conservatory Frame Construction

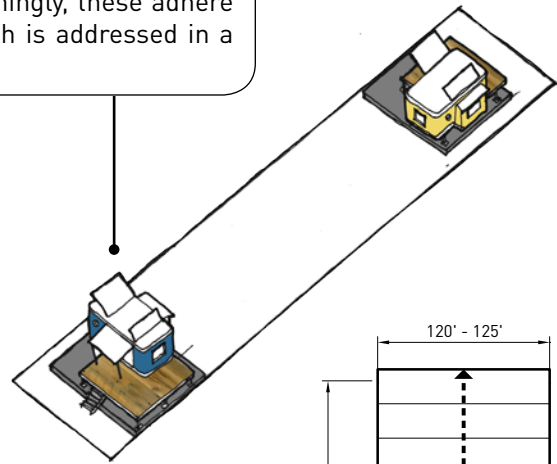


Site: Satellite Photo circa 2012, showing an abundance of vacant open space

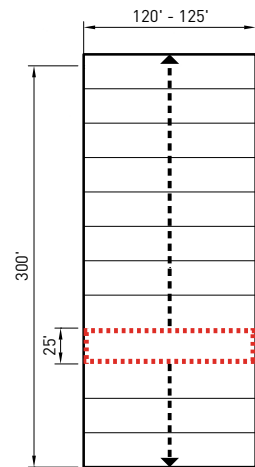
Seed Pods are Situated one each end of a long, narrow parcel characteristic of Chicago's North Lawndale neighborhood. Overwhelmingly, these adhere to a standard width of 25 feet. Their comparative depth is addressed in a strategy of doubled street and alley frontage.



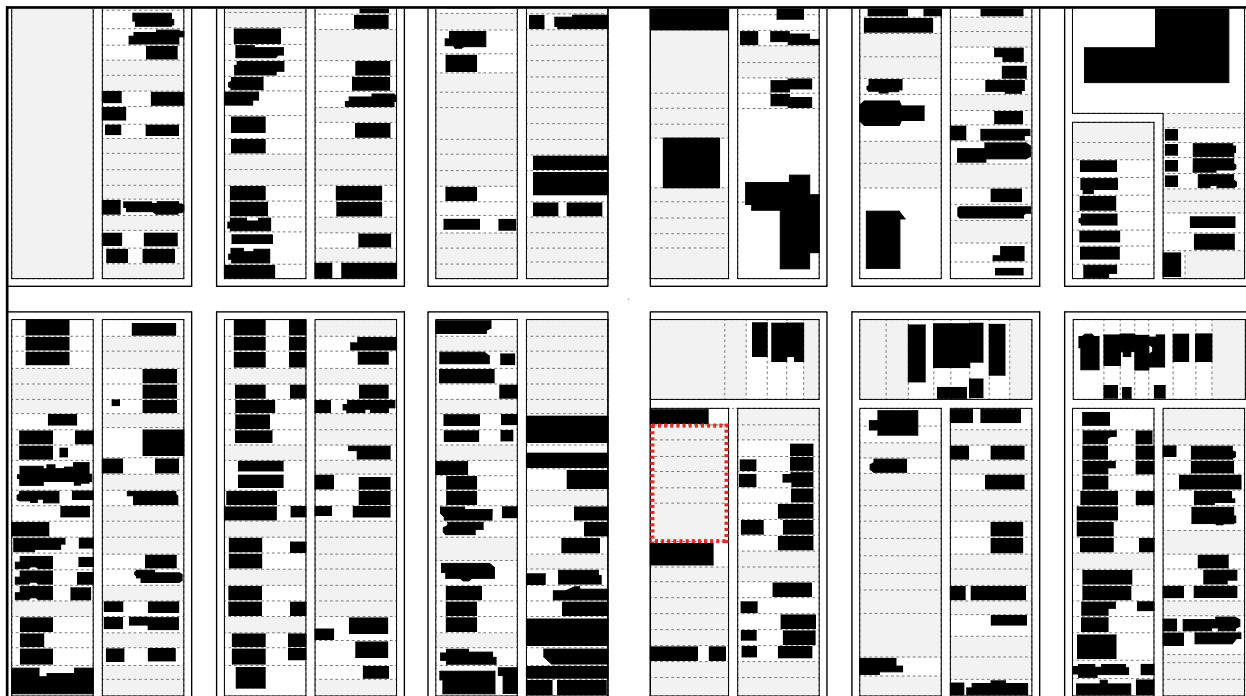
Section A, A: Through Seed Pod and Foundation



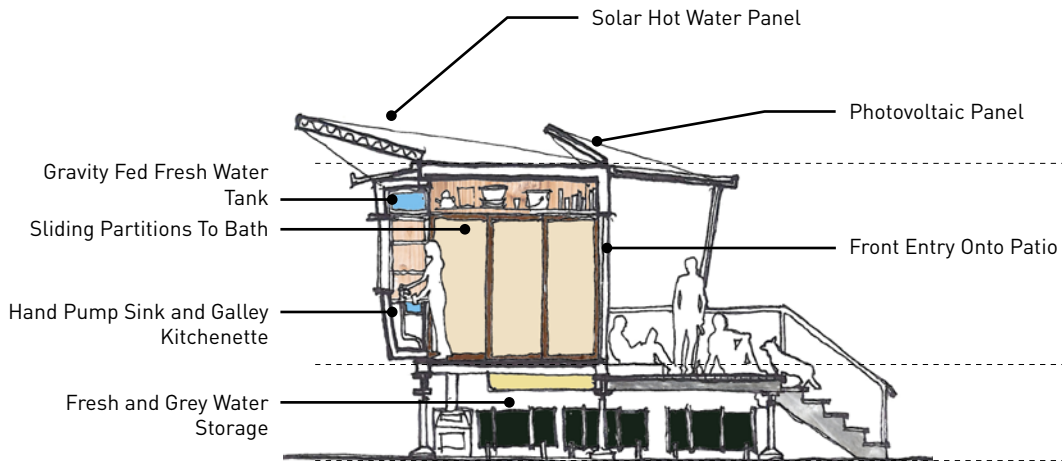
Both light-weight and deployable, the seed pod is placed on a substantial foundation that anticipates it's eventual replacement by a multi-story structure.



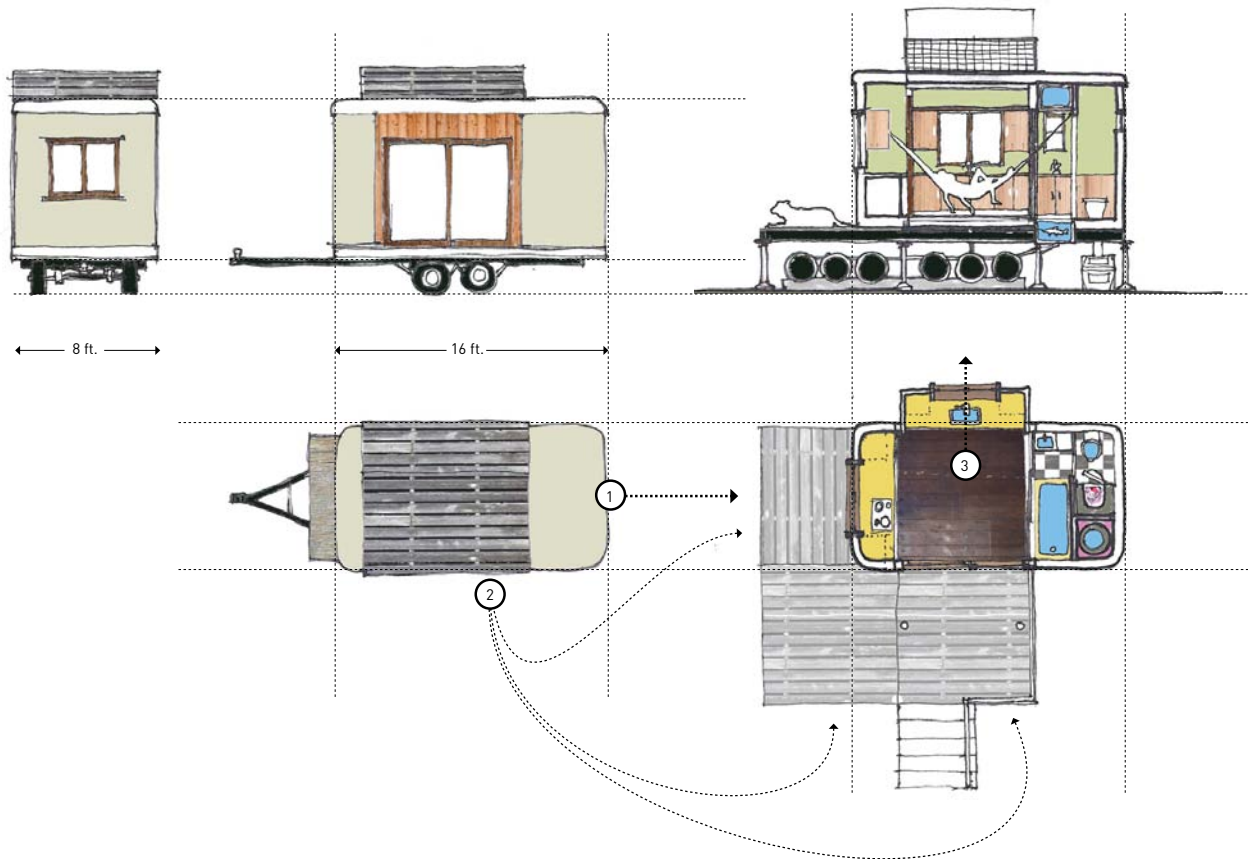
Typical Lot Size and Dual Street / Alley Frontage



Site: Figure Ground Plan, circa 2012, illustrating that North Lawndale's sprawling fields are in fact composed of many very narrow adjoining parcels

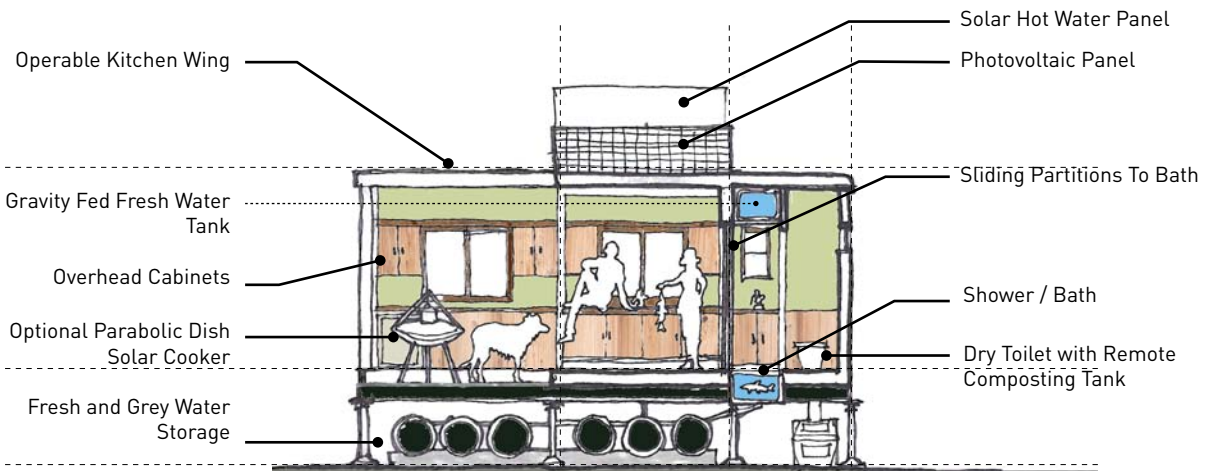


Section C, C: Transverse Through Self Sustaining Provisional Seed Pod

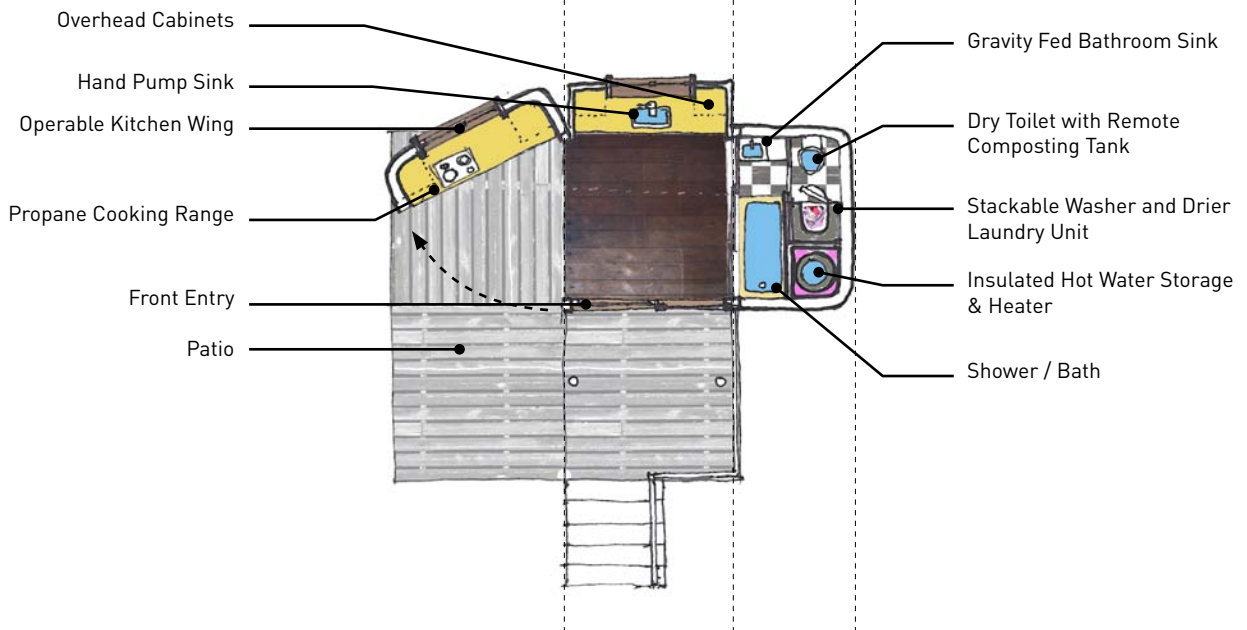


Seed Pod Deployment Sequence, Keyed to Plan and Longitudinal Section

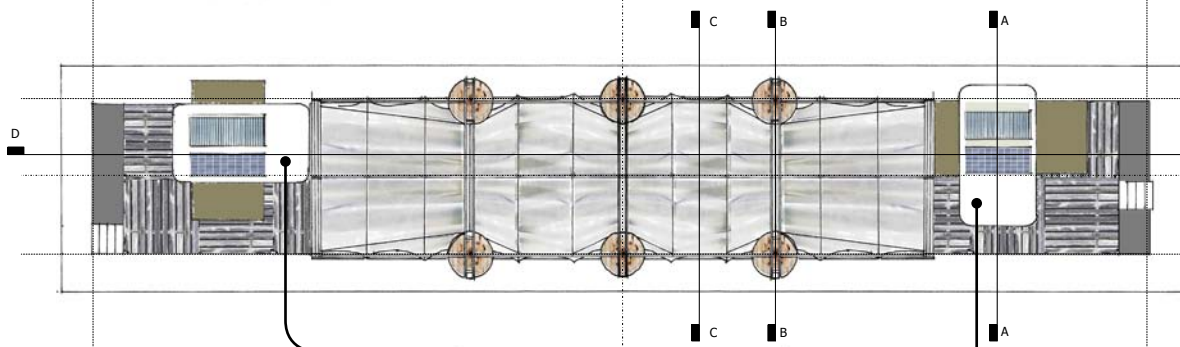




Section B, B: Longitudinal Through Self Sustaining Provisional Seed Pod



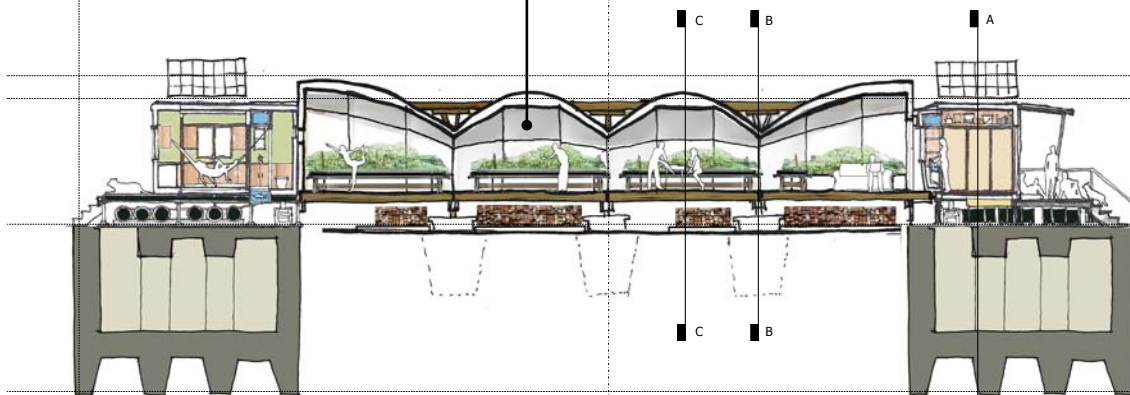
Plan: of Self Sustaining Provisional Seed Pod



Roof Plan: of Seed Pods and Working Conservatory

The inflatable plastic conservatory is shared between those two seed pods on a given parcel. It's open linear progression of rooms can accommodate both recreational and work activities, tailored in this case to the occupations defined in the project's employer employee partnership. As a hot-house, it can germinate seeds for the urban farming enterprise on one hand, and can also both store and process salvaged building materials close to their sites of origin.

Seed Pods can be re-oriented on the site's transverse or longitudinal axis, depending on the anticipated duration of their service. Orientation on the site's longitudinal axis allows for their expedient re-deployment by trailer to other sites. Orientation on the transverse axis allows the patio and front entry to directly address the street front.

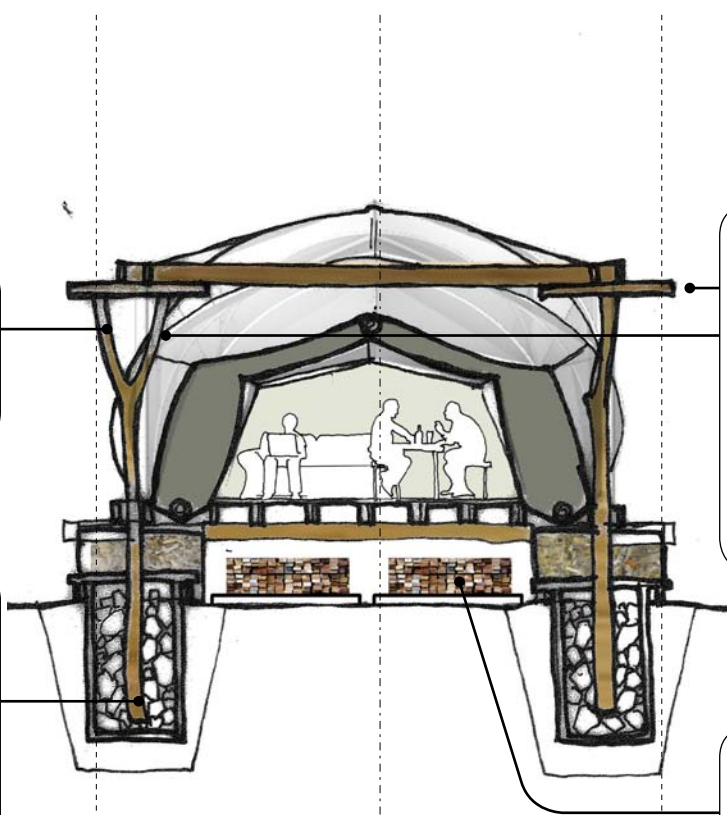


Section D, D: Through Conservatory

Affectionately known as Chicago's largest weed, the tree of heaven seeds naturally, grows quickly, and spreads prolifically over vacant lots.

Imminently replacable, these small tree trunks can be set directly in the ground to eventually rot, or backfilled with dry insulated rubble that might also serve as heat storage for the conservatory's interior. The same assembly lends both anchorage and lateral stability to the armature it supports.

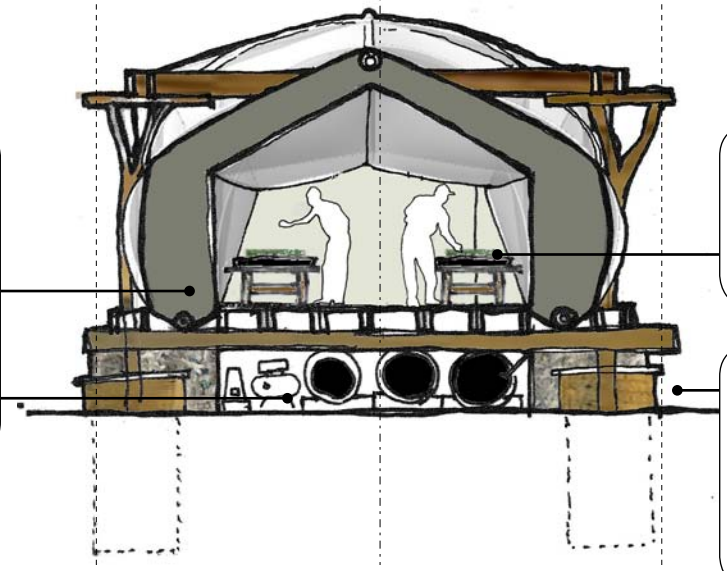
Double polyurethane walls might enclose dead air space, or in winter be inflated with a durable and translucent liquid soap foam insulation. The necessary tanks and mechanical equipment are shown here in the utility crawl space.



Section B, B: Through Conservatory

The challenge of joining variously small, crooked, and forked trees to an armature of milled dimensional lumber can be met by using salvaged wooden wire reel sides as a capitol-like column interface. These are also illustrated in the preceding page's roof plan.

Utility Space below the hot house floor can store salvaged materials before and between stages of their processing.



Section C, C: Through Conservatory

The Conservatory's linear progression of rooms can accommodate both recreation activity and function as a hot-house nursery.

Not only the sides, but also the cylindrical spools of wooden wire reels can be used. here they protect the footings, which also serve as insulated thermal mass heat reservoirs.

# **THE NORTH LAWNSDALE HOUSING CO-OP**

## **Increment # 2**

### **Tentative and Differential Growth**

In this project's second increment of construction, growth proceeds tentatively. The social and economic circumstances of North Lawnsdale are after all precarious, as are those of the project's clients. The seed pod trailers continue to provide basic amenities as more permanent walls are built around them and conventional city utilities are connected to new, though salvaged kitchen and bath appliances.

When conventional amenities are in place, the seed pod is trailered away for redeployment to another site. It is replaced by a stair that will accommodate vertical expansion.

While this has taken place on one end of the project's long narrow site, a trailer and hothouse conservatory might remain on the opposite end for years, as preferred or necessary. Even on a single site, tentative planning allows growth to proceed at differential paces.

# THE NORTH LAWDALE HOUSING CO-OP

**+ 72 MONTHS**  
**+ \$40K**

**Self Sustaining  
Seed Pod and Urban  
Considerations**

**Pages 38 - 41**

**Plans of Phased Vertical  
Expansion**

**Page 42**

**Schematic Rigid Foam  
Roof Casting Sequence**

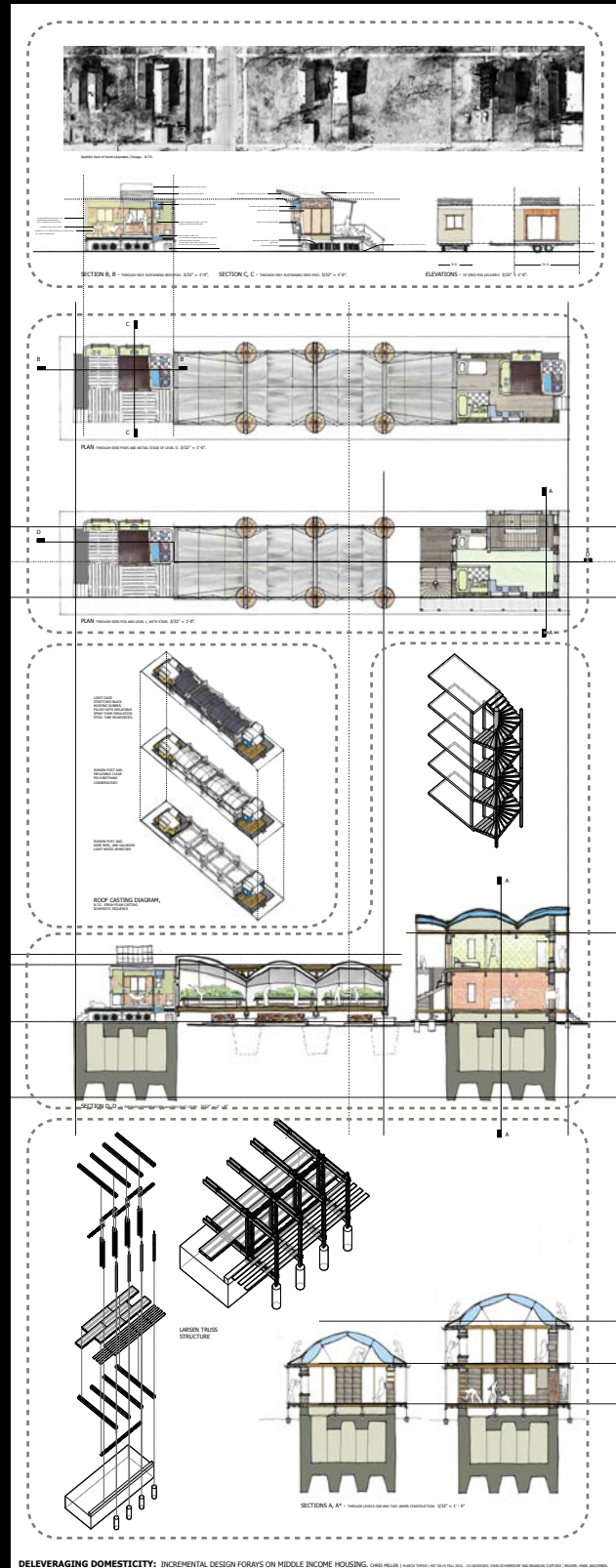
**Page 47**

**Section Showing  
Differential Growth**

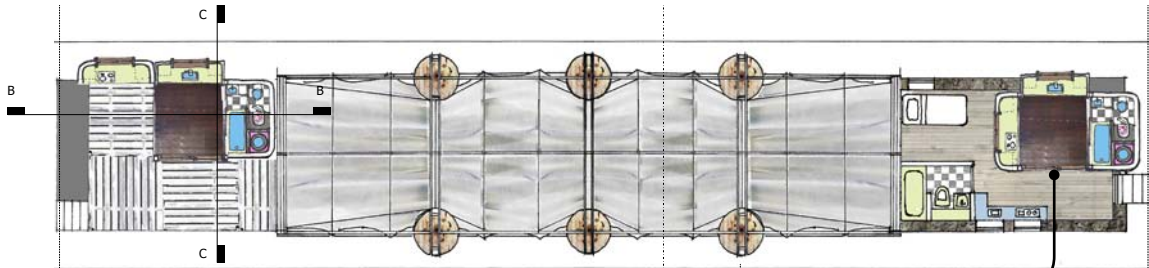
**Page 46**

**Structure and Infill,  
Procedural and  
Material Opportunism**

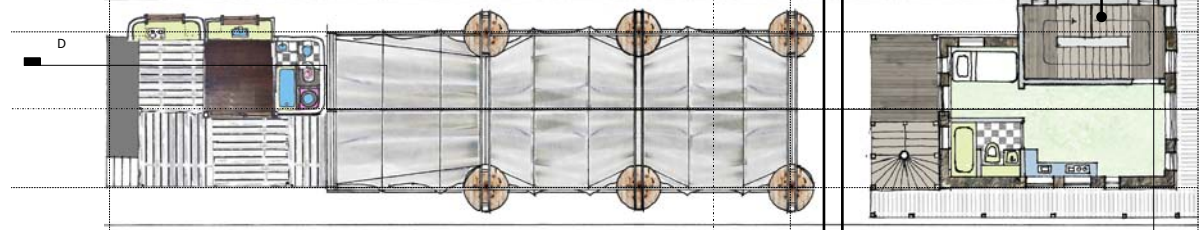
**Pages 48 - 49**



DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORAYS ON MIDDLE INCOME HOUSING. CHRIS HILLER | JASON HAYES | 107 1047 1042 | © 2015 HILLER HAYES ARCHITECTURE PARTNERS | 107 1047 1042



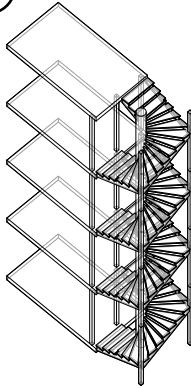
Plan : Through Seed Pods, the Right Being Partially Enclosed



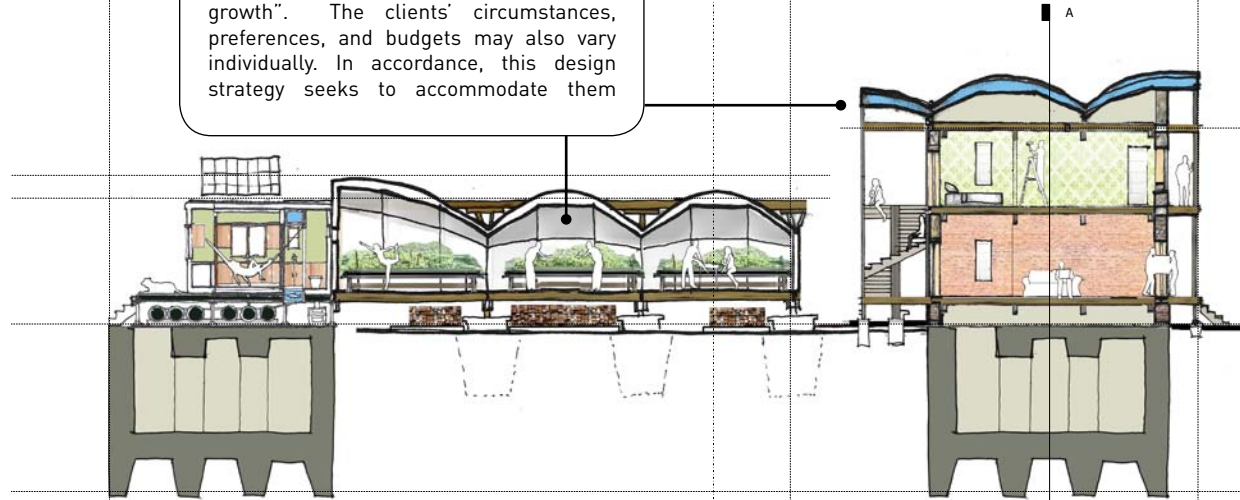
Plan: Through Seed Pod and Level 1, Fully Enclosed on the Right, and Replacing the Seed Pod with a Stair

After plumbing, electricity, and city services have been brought in, the self-sustaining seed pod can be trailered away, even after the ground floor apartment is partially enclosed. A stair can re-inhabit the trailer's footprint to complete the expanded enclosure and facilitate vertical expansion.

As vertical expansion proceeds on the right-hand side, a seed pod and working conservatory continue to inhabit the lot's opposite end. This potential for differential rates of expansion on a single site is in keeping with a larger strategy of "tentative growth". The clients' circumstances, preferences, and budgets may also vary individually. In accordance, this design strategy seeks to accommodate them



Deconstruction and salvage work is an increasingly popular means of training new carpenters. Construction of the apartment's compact and geometrically complex rear spiral stair might serve as a more advanced training exercise.

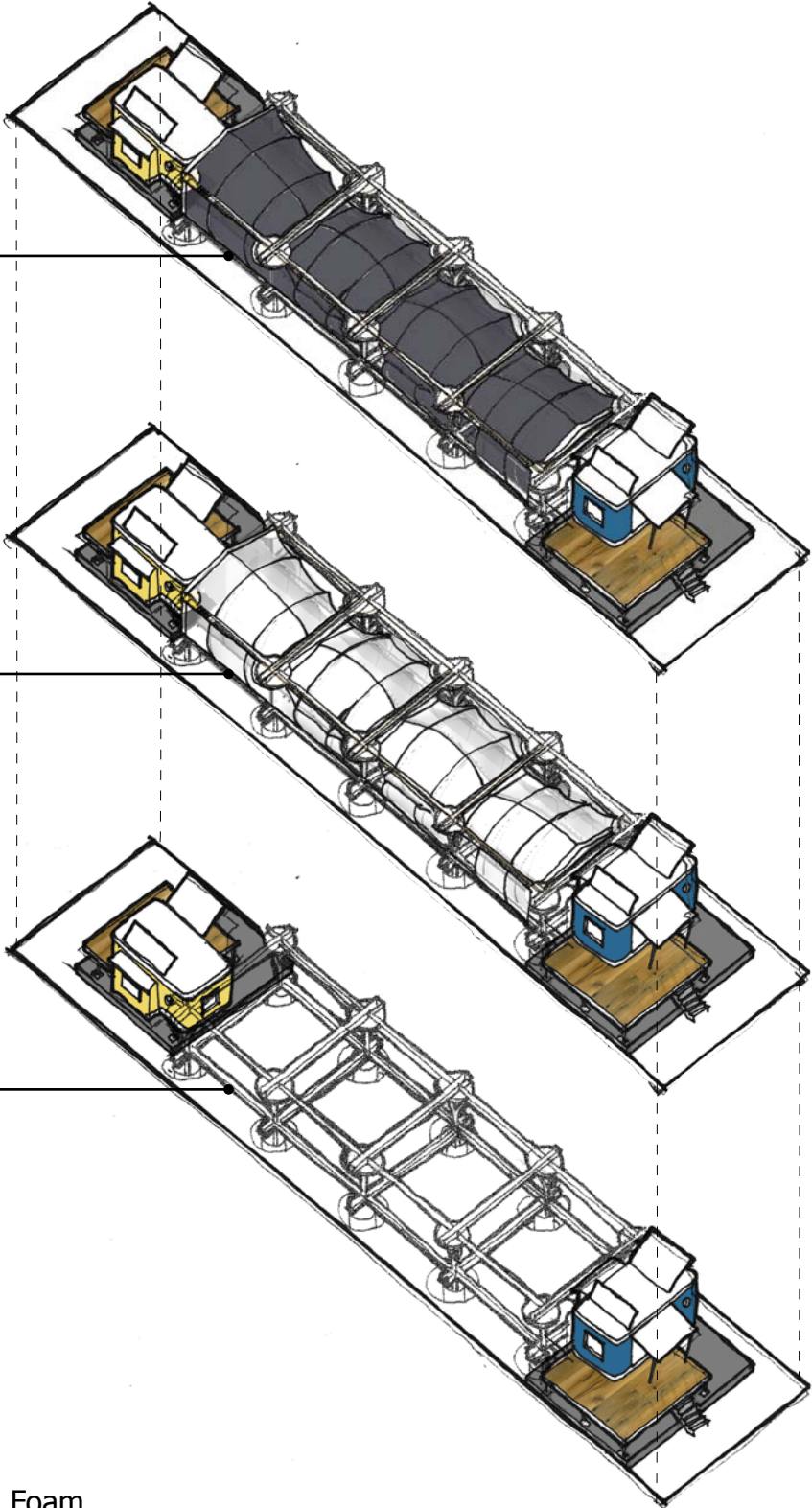


Section D, D: Through Conservatory and Two-Apartment Co-op

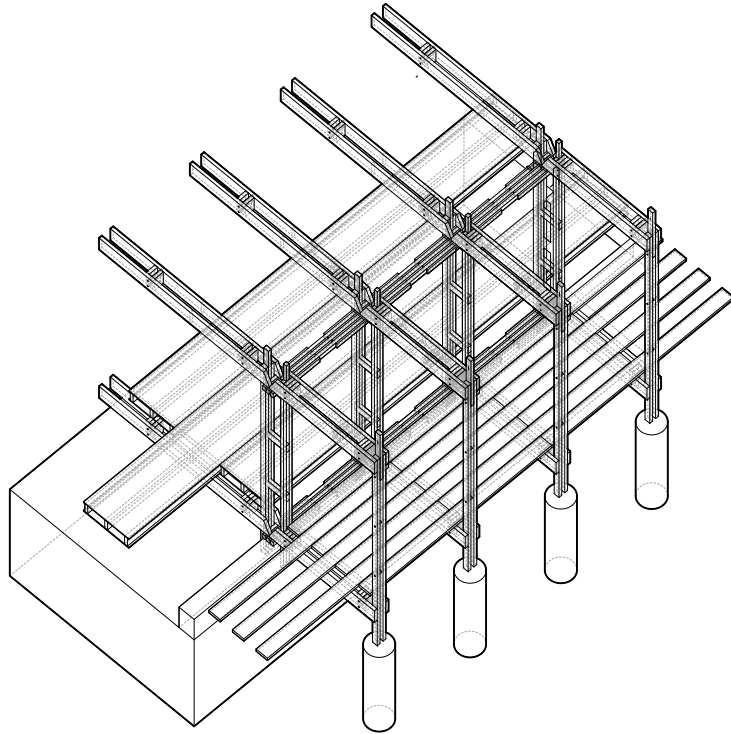
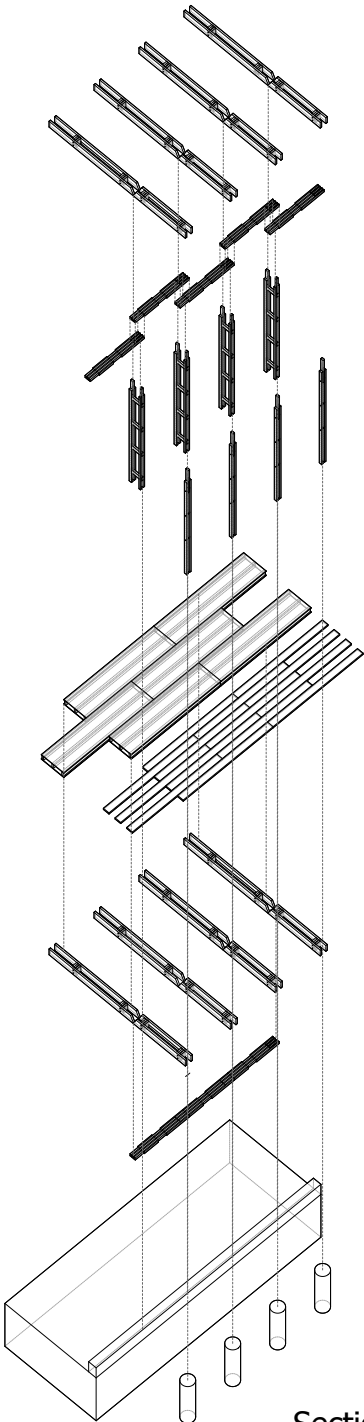
3. In spring, the conservatory armature can be repurposed as the casting framework of the co-op apartment's eventual light-weight roof. It is shown here as a double tensile membrane of light-gage stretched roofing rubber. This might be filled with expanding spray foam insulation, and internally reinforced with light gage steel tubing

2. ...as illustrated here.

1. An armature of sunken posts, salvaged wooded wire reels, and salvaged light-wood frame materials will eventually support the working conservatory's partially tensile inflated membrane...

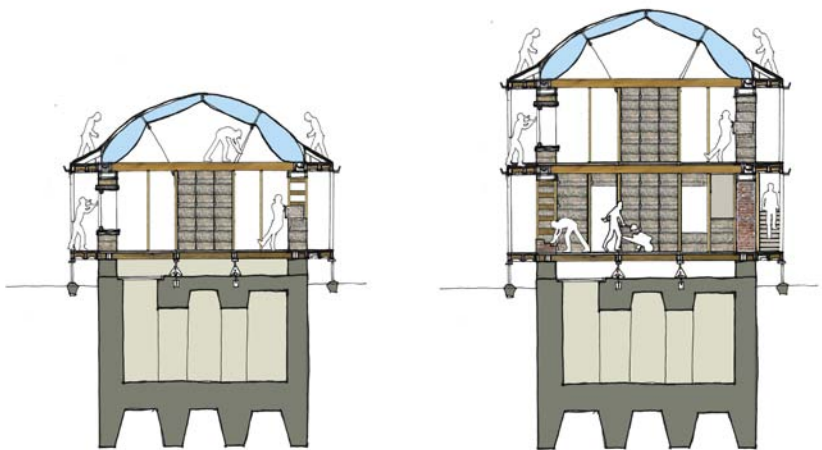


Schematic Sequence of Rigid Foam Roof Casting



**Larsen Truss Structural Armature:**

This sparse frame of ladder trusses is designed to be built from short lengths and substandard sizes of salvaged light wood framing materials. It's resulting thick walls accommodate an infill of shredded paper bales sourced from a nearby recycling center or another nearby document shredding service. As vertical expansion proceeds, lower stories can be replaced with a brick cavity wall infill.



Sections A, A: THROUGH LEVELS ONE AND TWO UNDER CONSTRUCTION



A light-weight  
cast foam roof,  
expediently raised  
in successive stories  
of enclosure

A 12-inch-thick wall  
infill of shredded  
baled paper,  
initially protected by  
an exterior wrapping of  
salvaged vinyl billboards

Window  
Frame  
Installation

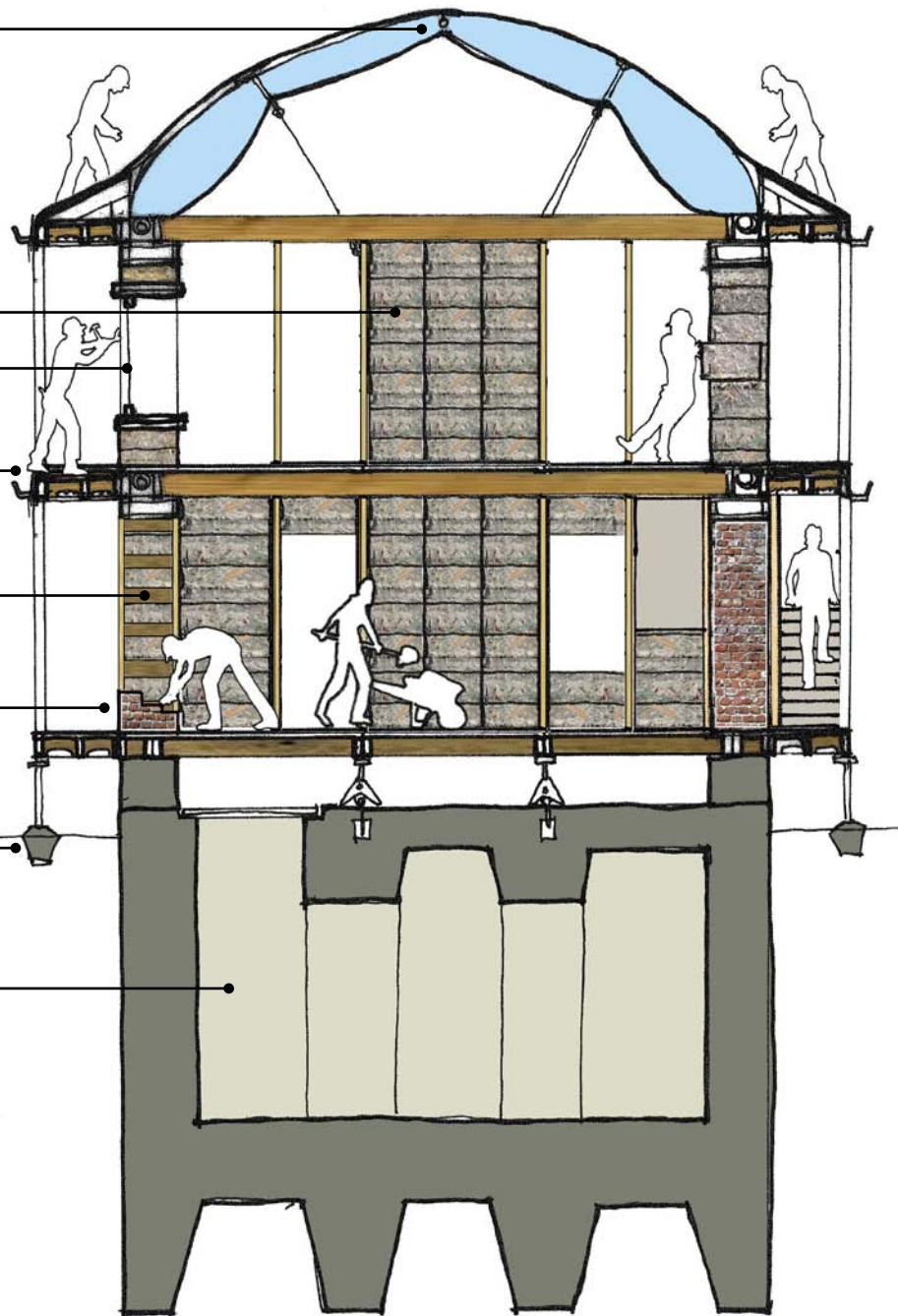
Wrap-around verandah  
serving here as an  
exterior scaffold

Ladder-like  
"Larsen"  
Trusses

Brick masonry  
replacing the  
initial infill of shredded  
paper bales

A lighter pad footing  
for the wrap-around  
verandah

A heavy foundation  
containing mechanical  
equipment and  
utility connections  
(though not pictured  
here)



Section A, A: THROUGH LEVELS ONE AND TWO UNDER CONSTRUCTION

# THE NORTH LAWNSDALE HOUSING CO-OP

## Increment # 3

### **Ammendable Growth and Retraction**

The project's plan configuration and footprint are orchestrated to allow it's mirroring across the property lines of North Lawndale's characterstically narrow and uniform twenty-five foot-wide lots. This in turn allows larger and more varied individual apartment configurations.

By virtue of a clear easy-to-disassemble structure and light-weight materials, apartments can be reconfigured very expediently, and accordingly bought, sold, and traded in whole or part. They can in consequence also accommodate larger households and families. Should a large household move elsewhere, their apartment might be sold and sub-divided between two smaller households, or vice-versa.

Again because the circumstances of North Lawndale are so precarious, the cumulative nuances of the project's central growth strategy also expedite it's reverse. The same qualities that enable easy reconfiguration can also facilitate retraction.

This excercise has called on incremental design strategy to alleviate relatively dire poverty and disadvantage. Such worthy causes are not however, it's sole focus. This project has also speculated at a more accessible design patronage, and made unusual companions of the client and architect. Just as the professional acquaintance of under-paid urban farmers and professional architects is nearly unheard of, so could be the results of their collaborations. The final "addendum" of the North Lawndale Housing Co-op project speculates at one such collaboration, in this case an outlandish and otherwise impossible monument.

# THE NORTH LAWNSDALE HOUSING CO-OP

**+ 144 MONTHS**  
**+ \$80K**

**Views of Growth and Retraction**

**Pages 59 - 61**

**Expansion Across the Property Lines of North Lawnsdales Narrow Urban Lots**

**Page 52**

**Resulting Plan and Tenural Variations**

**Pages 54 - 57**

**Sections of Tenural Variation and Ammendable Growth**

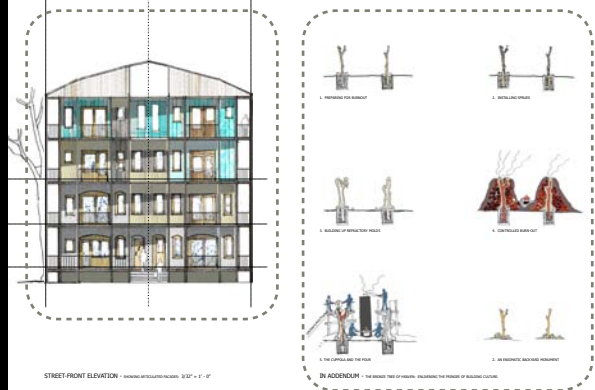
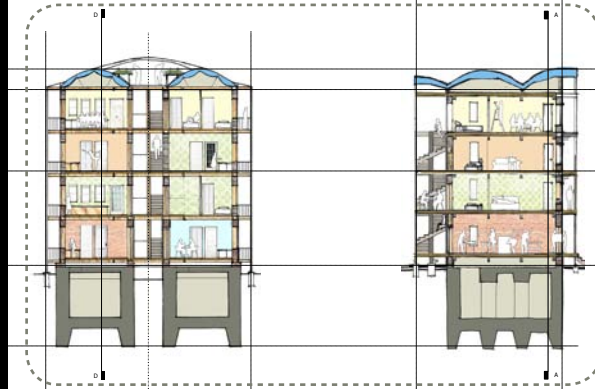
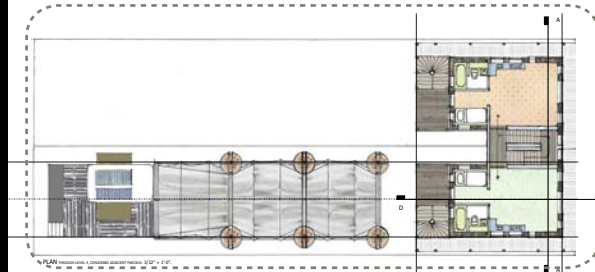
**Page 52**

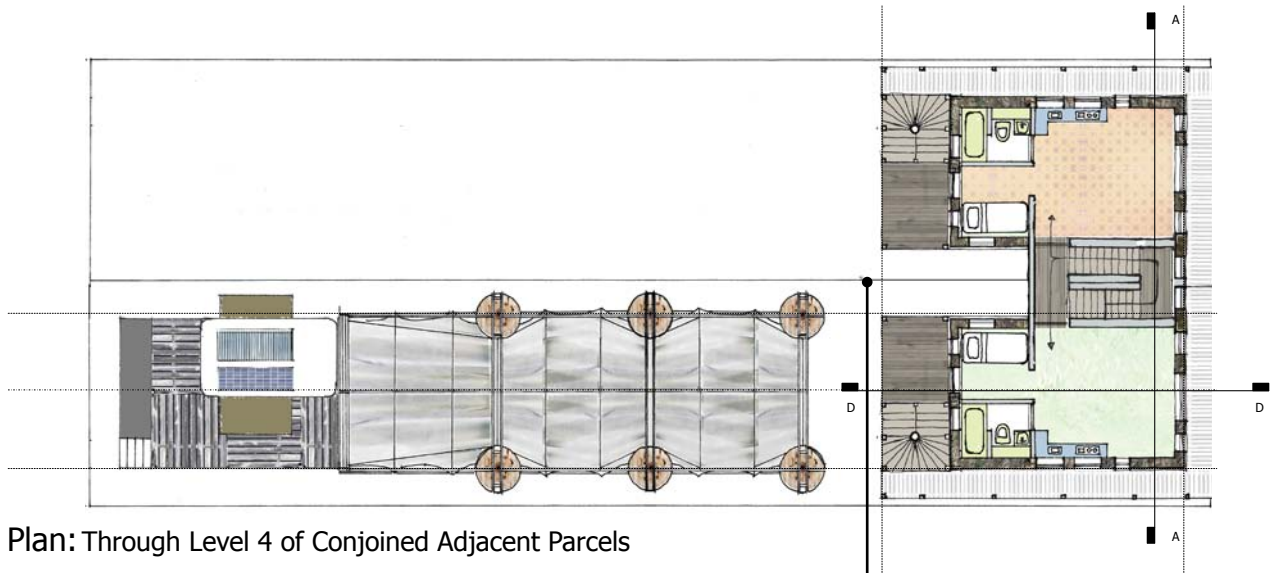
**Articulating an Incremental Urban Facade**

**Page 53**

**A Counterpoint Vignette: on the Fertile Fringe of Building Culture.**

**Page 59 - 61**





Plan: Through Level 4 of Conjoined Adjacent Parcels

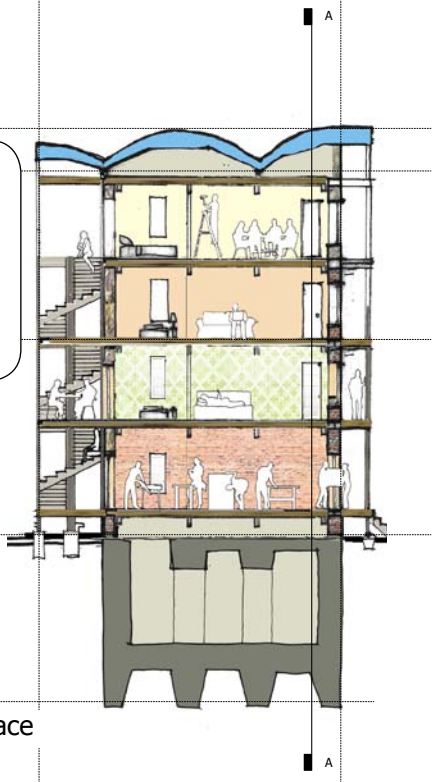
Where the vertical expansion of both conjoined buildings proceeds at an equal rate, the previously ground-level shared conservatory might be refitted to span their rooftops. Accessible from the shared central stair, its presence would also greatly simplify roof drainage.

North Lawndale's characteristically narrow and uniform twenty-five foot lots enable expansion to proceed by mirroring the building's footprint over adjoining property lines. In that eventuality, the side stair could be shifted to serve both structures while freeing up additional square footage within each.



Section A, A: Four Variable-Size Residences and One Commercial Space

Previously limited in their permutations by a small single footprint, doubled apartment plan configurations can also bridge and conjoin to allow larger spaces and higher occupancies.



Section D, D: Showing Four Story Co-op Apartments

A simple acetate can be easily made by dissolving copper pipe and wire scraps in vinegar. Painted on to the provisional vinyl weather cladding, the resulting vivid blue would vary in intensity according to its exposure to the elements. The results might inform a tectonically articulated facade.

Rather than being laboriously troweled onto a vertical surface, larger stucco panels might be pre-cast horizontally in textured molds, then tilted into place whole.

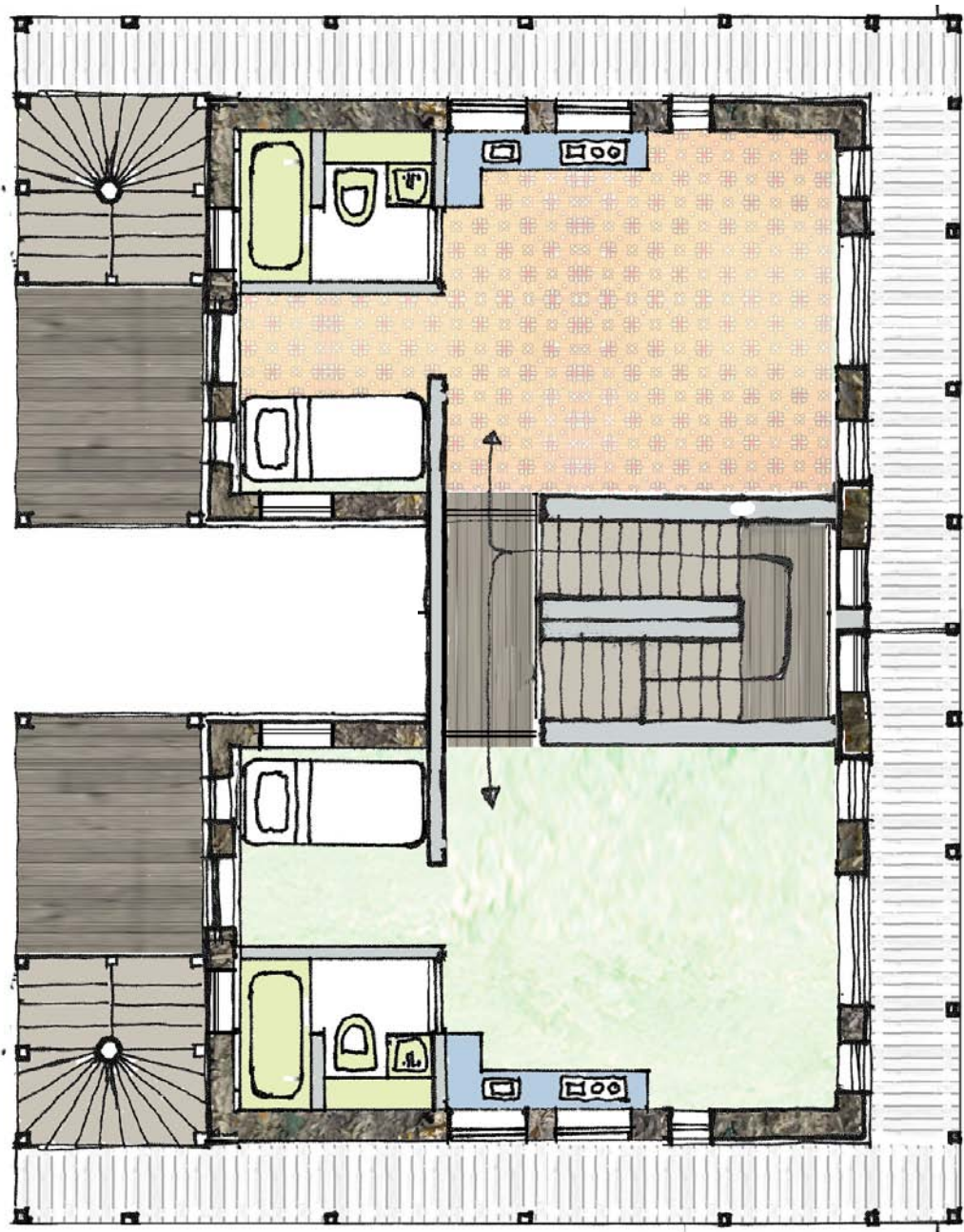
The Larsen truss structure's standard opening dimensions can be built out to accommodate salvaged windows and doors of variable dimensions.

A light coating of plaster might suffice to protect areas of the facade otherwise sheltered from the elements

A hybrid cavity and mass brick wall will eventually replace the lower and possibly even second levels' structure, in those cases also providing an integral facade.



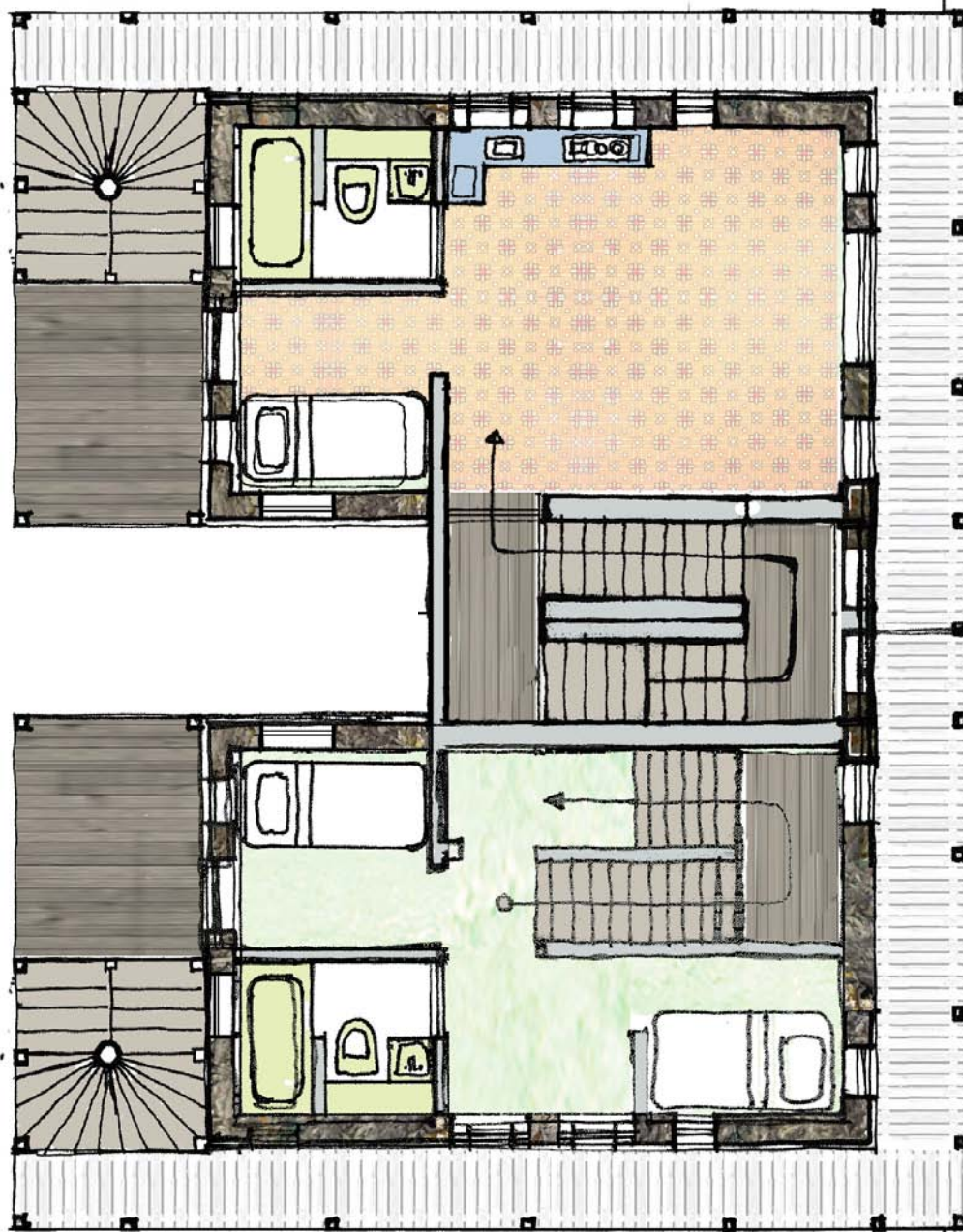
Street-Front Elevation: Conjoined Adjacent Parcels Showing Articulated Facade Under Construction



Plan Variation A: Mirrored one Bedroom Apartments

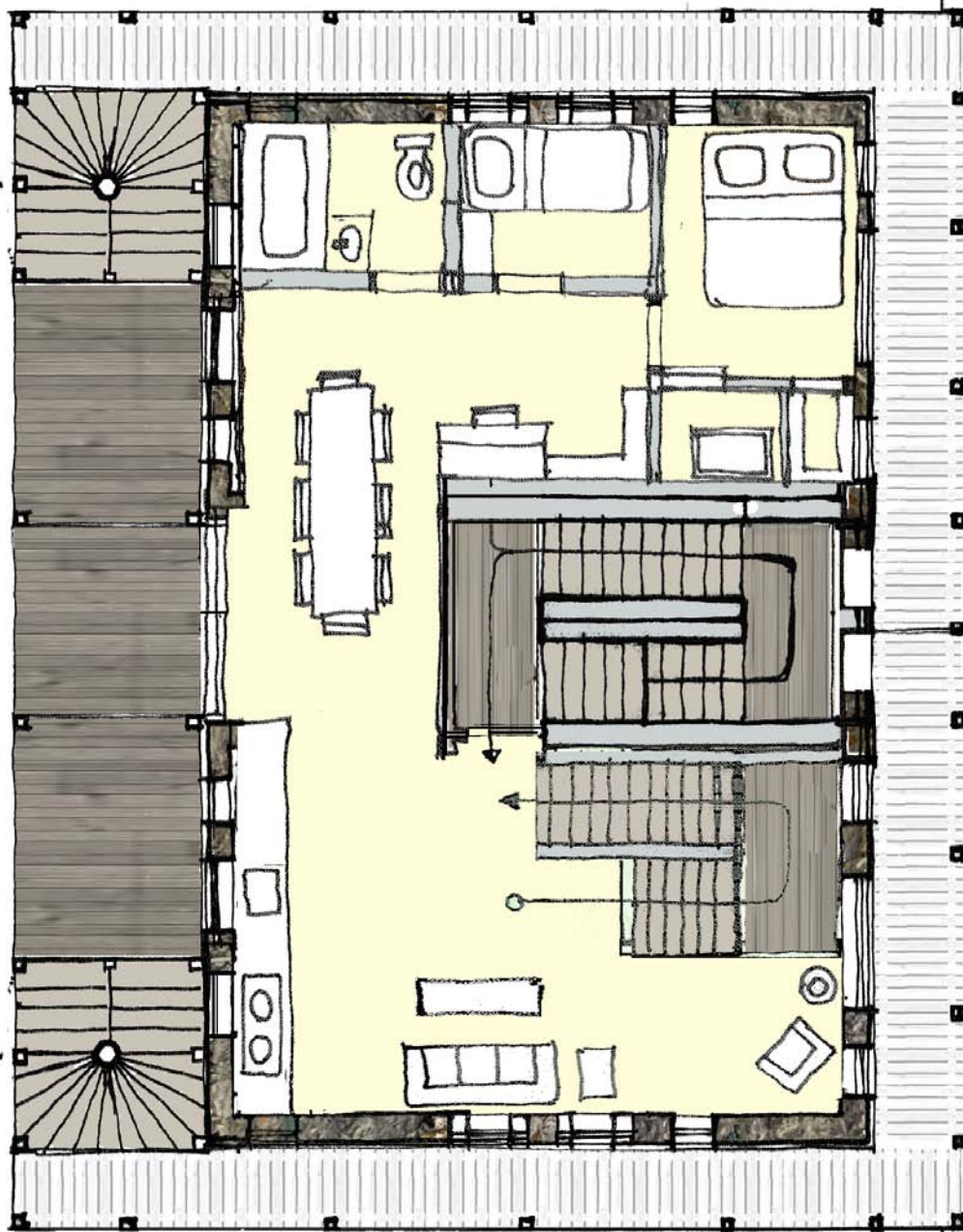


Plan Variation B: Single 2.5 Bedroom Apartment



Plan Variation C: One Bedroom Apartment and Annexed Lower Level of a 4.5 Bedroom Split Level

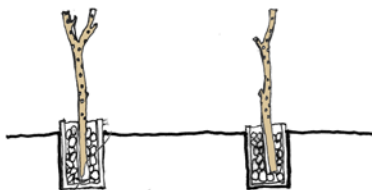




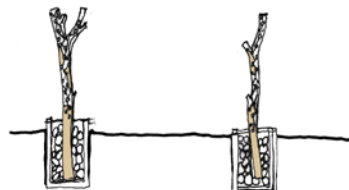
Plan Variation D: Main Upper Level of 4.5 Bedroom Apartment with Re-Activated Interior Stair

# THE NORTH LAWNSDALE N.F.P-EMPLOYEE HOUSING CO-OP:

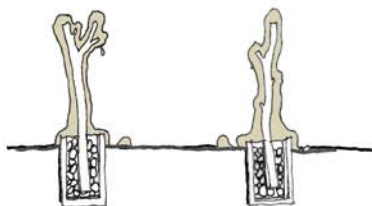
## A COUNTERPOINT VIGNETTE: ON THE FERTILE FRINGE OF BUILDING CULTURE



1. Drilling Integral Burn-Out Flues. Here the tree-columns are ventilated like swiss cheese with large diameter drill bits. The free flow of oxygen through these channels will enable the trees to completely burn out of their eventual fireproof ceramic molds.



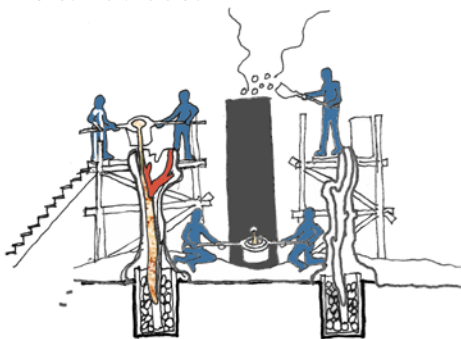
2. Installing Wax Sprues. This "plumbing" of the eventual mold will provide channels for the molten bronze and escaping air to flow through. After the fireproof mold is built up around them, their wax will burn away with the rest.



3. Building Up Refractory Ceramic Molds. A slurry paste of powdered high-temperature refractory ceramic must be built up meticulously over the object to be cast in thin layers, each allowed to dry completely before the next is applied. This process might take weeks, but any residual trapped moisture will cause the finished mold to crack.



4. Intensive and Controlled Burn-Out: Bales of shredded paper, perhaps previously used as wall infill, are stacked around the ceramic covered trees and are then covered with a thin layer of earth. This keeps the fires hot, slow, and smoldering, and over a course of days will burn away both wood and wax to leave empty, fireproof, and high fidelity negative molds of their original shape.



5. Molten Bronze: The Cupola and the Pour: Portable foundry work is a team effort. Many groups of enthusiasts regularly pour molten metals in backyards and vacant lots. The portable cupola is fed coal and small ingots of bronze, then is tapped to fill long-handled crucibles as fast as the ingots will liquefy.



6. Once cooled, the ceramic shell mold can be chipped and broken away to reveal solid bronze casts of the humble and usually much more ephemeral tree of heaven.

A process in Addendum : Bronzing the Tree of Heaven, Enlivening the Fringes of Building Culture



**View:** The North Lawndale Housing Co-op, Either Expanding or Retracting

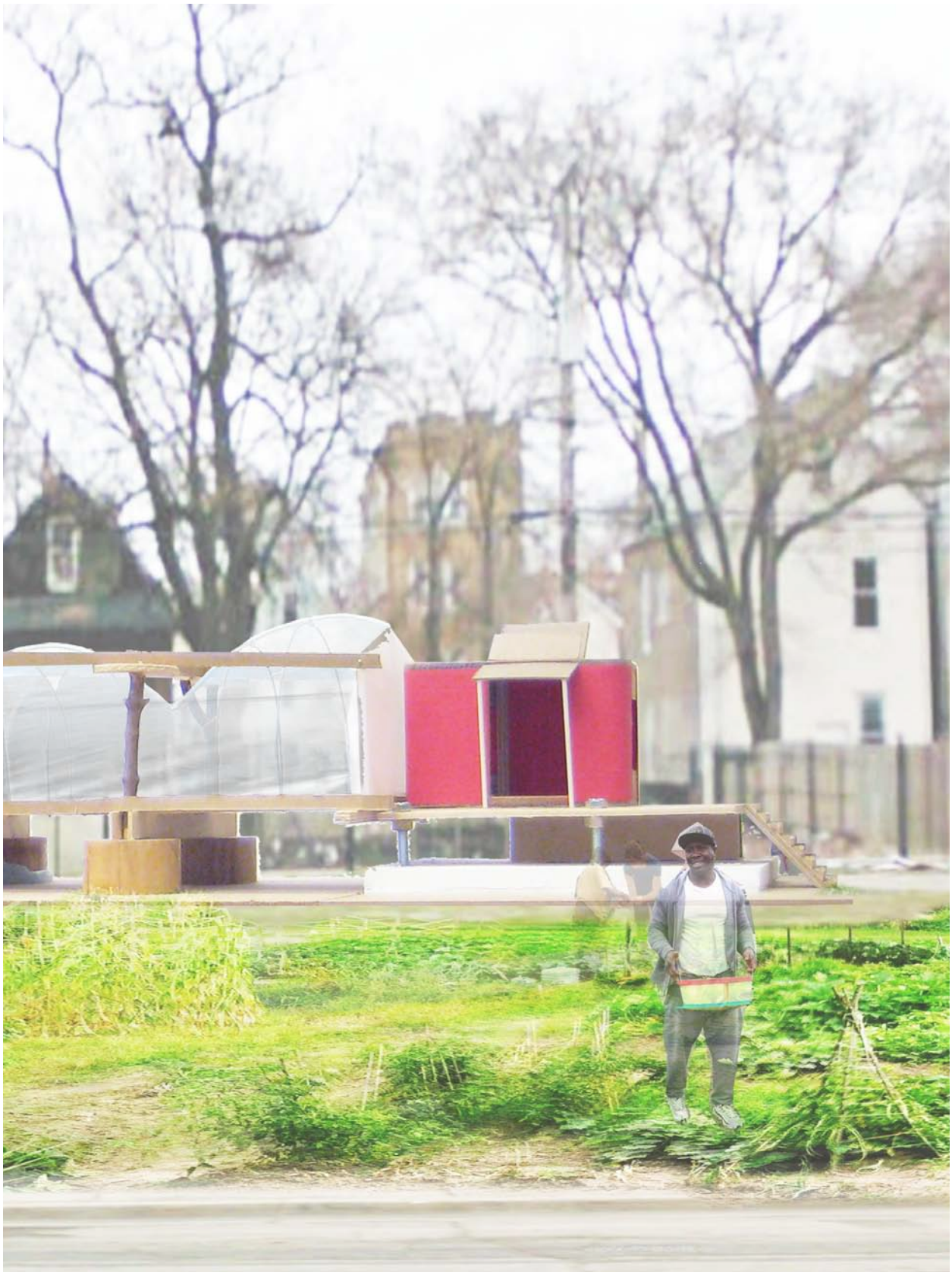
North Lawndale could gentrify at any moment, and displace its currently dwindling population all together. It could follow it's current trajectory of decline into absolute and desolate oblivion.

This project follows a central strategy for growth which as the cumulative product of its nuances (planned, tentative, and ammendable), might also facilitate it's expedient disassembly and ultimate retraction. It's structural armature is sparse and clear, the infill can be disposed of at the same recycling centers that it was sourced from, and the rest could be yet again reused, or go to the landfill having served longer and harder than most building materials.

The patron relationship between an architectural designer and such an unconventionally broadened clientele could yield still more. In the organizational aspect of their roles, architects broker knowledge. This patronage would similarly expand those services into unplumbed depths of the everyday built environment. The previous page shows one hyperbolically bizarre example of such potentials, in which the "tree of heaven" hot-house conservatory armature is laboriously cast in solid bronze. Much more than just alleviating adverse circumstances, an accessible model of architectural patronage can facilitate a broad and even extreme diversity of building enterprise.



View: The North Lawndale Housing Co-op, Either Expanding or Retracting



View: The North Lawndale Housing Co-op, Either Expanding or Retracting

# CASEWORK AND EARTHWORK:

## A SUBURBAN COACH HOUSE.

### Overview

The North Lawndale Housing Co-op served clients who could not otherwise have easily found housing in the free market, at least without substantial and continuous direct rent subsidies. They would have been very unlikely homeowners in any other circumstance. The following project instead proposes designed incremental housing in the affluent suburbs, as a viable alternative for those who might easily afford conventional homeownership. Where the previous project proposed an alleviation of desperate social and economic disadvantage, this one proposes an alleviation of comfortable banality. It proposes designed incremental housing as a direct free market competitor of speculative real estate and especially in this case, of conventional construction.

Clients Nicki and Jennifer form a relatively affluent household, marking roughly the 75th percentile of U.S. income distribution. They are both middle school teachers in a particularly wealthy and expensive school district of Evanston, IL and are each paid a modest \$40 thousand dollars per year, for a combined household income of \$80 thousand dollars. They could easily afford a modest conventional mortgage but not as it happens, anywhere near walking distance of the school where they both work. It would make little sense for them to rent in the long term, and there are no suitable rental properties in their preferred area.

It wouldn't be surprising for their presumably unconventional project to rub up against any suburb's zoning and land use ordinances, which vary widely from town to town. Anticipating this, the proposed new paradigm of designed incremental housing claims land-use and acquisition as the object of design strategy. A few state governments absolve housing projects defined as locally "affordable" from adherence to municipal zoning ordinances, and city councils might also themselves grant variances of any prohibitive statutes. Many progressive suburban municipalities go so far as to encourage higher population density and more robust tax bases by readily subdividing large single-household lots to host two or three-households.

Nicky or Jennifer might have an aging aunt or uncle who owns property in their preferred area, or might seek out an unrelated local suburban home-owner with a characteristically over-sized backyard. Their acquisition of land might be a conventional sub-division and sale of small parcel cut from that expansive property, or might modify a literal ownership model in favor of de-facto ownership through a decades-long lease. Either transaction would be heavily if not fully subsidized by a certain sort of designed, architectural land-rights barter.

This project is proposed as a primary residence and combined guest house which can be completely inhabited by Nicki and Jennifer, but also partitioned to house Fred and Mable's guests.

**CLIENTS:** Home Owners - Nicki & Jennifer  
Land Owners - Fred and Mable

**LOCATION:** Evanston, IL

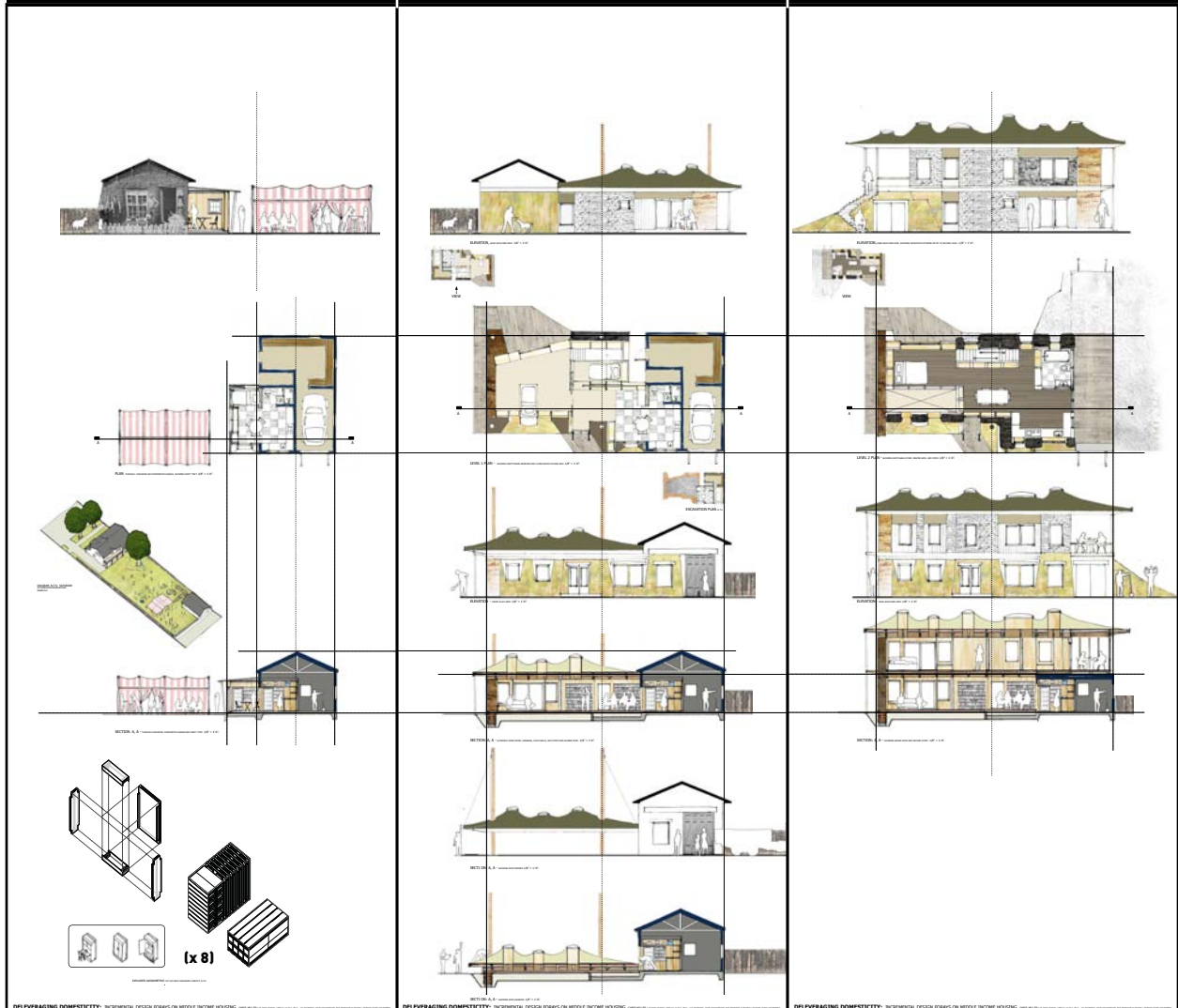
**TOTAL COST:** \$ 80 K

**DURATION:** 3 Years

**+ 12 MONTHS**  
**+ \$27K**

**+ 18 MONTHS**  
**+ \$40K**

**+ 36 MONTHS**  
**+ \$80K**



# **CASEWORK AND EARTHWORK:**

## **A SUBURBAN COACH HOUSE.**

### Increment # 1

## **Programmatic Articulation**

Where the previous North Lawndale Housing Co-op project proposed substantial amounts of D.I.Y. client labor as sweat equity, this project capitalizes on a relaxed incremental time line to consider the participation of highly skilled professional contractors, both conventional and unconventional.

The first increment begins by perforating and refurbishing an existing garage to interface with a provisional winter enclosure of shop-made casework. More or less conventional builders might perform the initial garage remodeling, and such a small job would be well suited either to unemployed carpenters, self employed ones, or as a weekend project for otherwise employed builders. All or most of casework fabrication would best be contracted to a reputable local cabinet maker, though its particular design strays somewhat from the language of conventional cabinetry and casework.

Influenced by wooden shipping crates and flat-pack furniture, this light-weight structural casework would be assembled first in individual units on the building site, then aggregate to enclose space with clips and bolts.

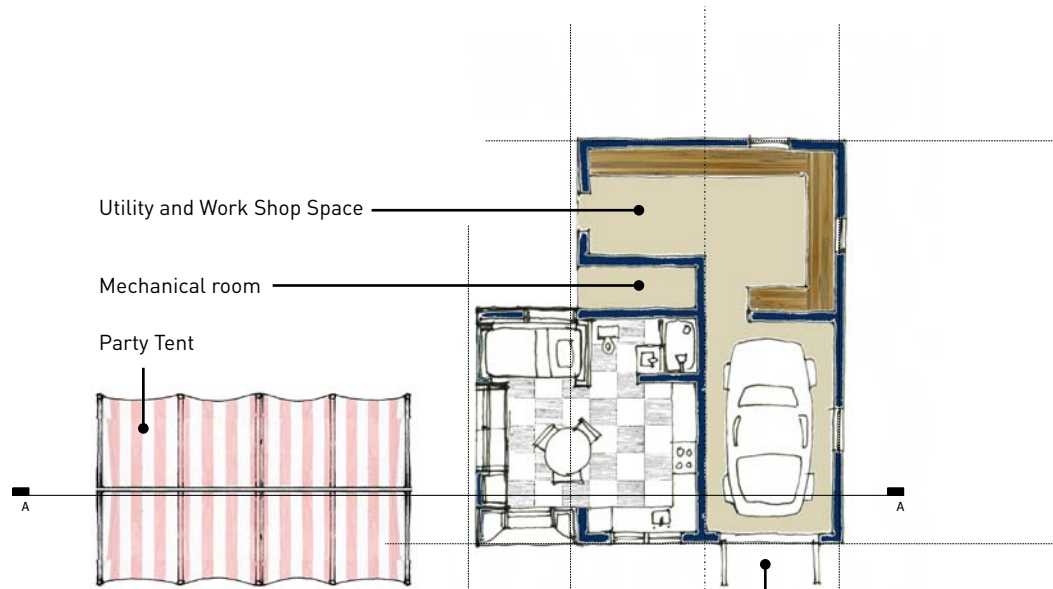
The thickness of this casework articulates architectural program by incorporating built-in furniture and storage. Critical kitchen and bath units could be shop-made and delivered whole to the site.

These casework components will also serve as weather barriers, and later interface with an articulated facade of unconventional earthen building materials sourced directly from the site.

In the meanwhile however, that big back yard can be mined for its intended recreational purpose. In the first warm summer months of the first constructional increment, the coach house's kitchen and bath provide staging for spectacular neighborhood barbecues. Aside from being a good time, these might also add potential future contractors and laborers to Nicky and Jennifer's contact lists.





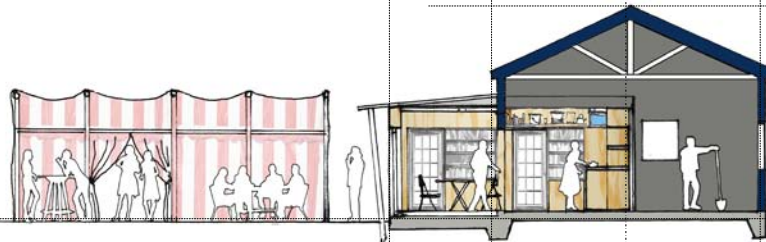


Plan: Through Casework, Perforated Garage, and Showing Party Tent

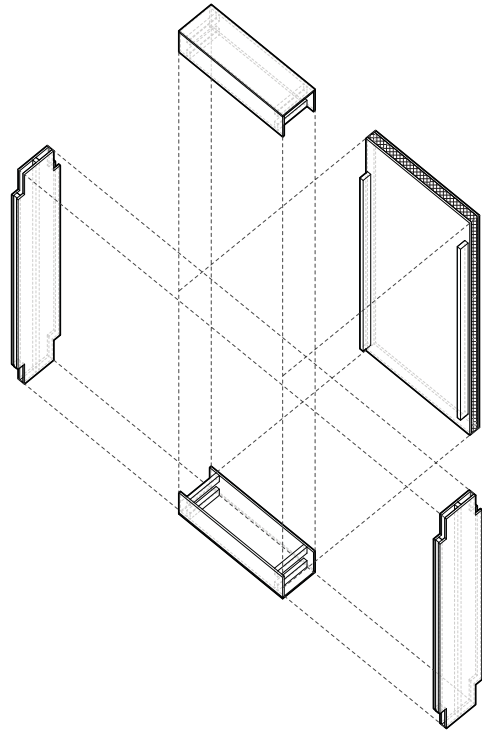


Site Axon:  
Saturday Afternoon  
Neighborhood Barbecue

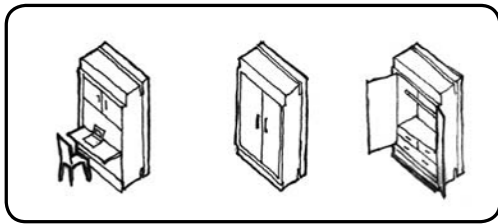
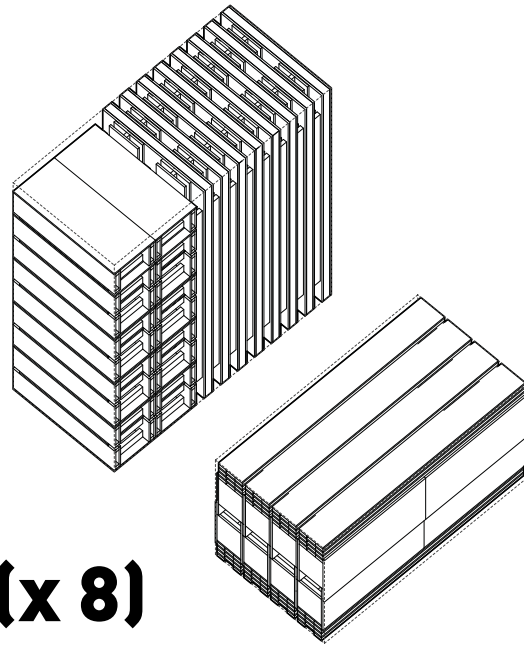
An existing two car garage on the property is perforated to accommodate basic plumbing, minimal kitchenette, bath, and sleeping area. These serve as a miniature provisional living space, but also as the infrastructure of frequent barbeques and backyard parties. The clients spend their first summer months as backyard campers. Their reading lamps are tiki torches, and they might occasionally have barbecue for breakfast.



Section A, A: Through Casework, Perforated Garage, and Party Tent



Exploded Axonometric Program and Packing:  
of Flat-Pack Casework Concept



Conceptual Elevation: Stacked Sod: Re-Packaging an Obscure American Prairie Vernacular

# **CASEWORK AND EARTHWORK:**

## **A SUBURBAN COACH HOUSE.**

### Increment # 2

## **Tectonic Articulation**

As spring expansion proceeds in the project's second increment, the central task shifts from programmatic to tectonic articulation.

Where the casework's interior side houses built-in furniture, its exterior faces are specified as substrates, panels, and assemblies that will interface with a variety of unconventional earthen facades.

In various layers and permutating assemblies of insulation, building papers, vapor retarders, water-proofing, geotextile drainage mats, and supportive lath, these can interface with banked earth, rammed earth, stacked sod, mud plaster, and wooden cladding.

As moisture and direct precipitation would degrade wooden casework and could greatly complicate earthen construction processes, a roof is the spring's first order of business. Contracted to the project's cabinetmaker, this is shop-made in segments and bolted into a torsion grid on site. Raised light wells incorporated into the grid frame also provide pitched drainage when a cloth or rubber membrane is stretched over them and affixed to the eaves. The recesses enclosed are filled with loose blown cellulose insulation, and a canvas roof would be covered in a protective layer of extremely water-proof bentonite clay.

The roof is then winched up on utility poles which have been sunken directly into the ground, and need only support its weight until walls are in place beneath. Though design anticipates a two-story building, the roof is for now raised only high enough to cover the first. Throughout the remaining second summer's months, both walls and foundation can be built beneath its shelter.

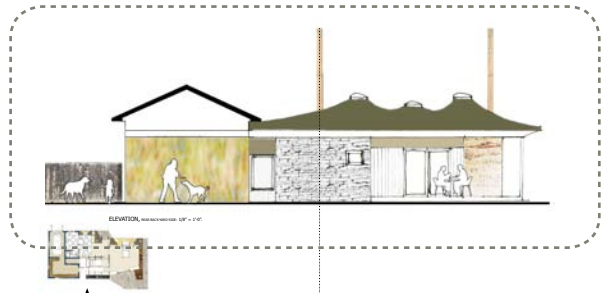
# CASEWORK AND EARTHWORK: A SUBURBAN COACH HOUSE

**+ 18 MONTHS**

**+ \$40K**

**Yard-Side Elevation of Articulated Earthwork Facade**

**Page 72**



**Plan of Second Winter's Accomodations**

**Page 71 & 76**



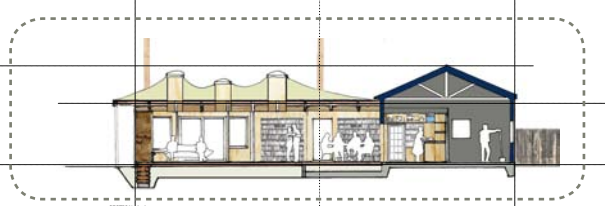
**Alley-Side Elevation of Articulated Earthwork Facade**

**Page 72**



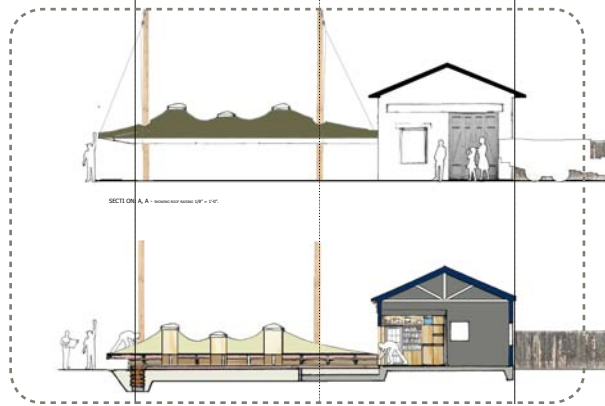
**Section of Second Winter's Accomodations**

**Page 71**

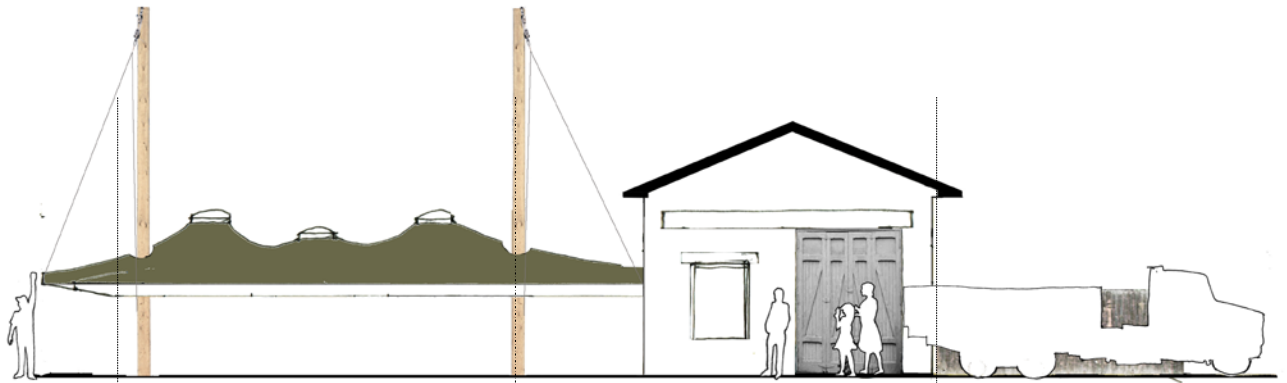


**Section and Elevation of Roof Assembly and Raising**

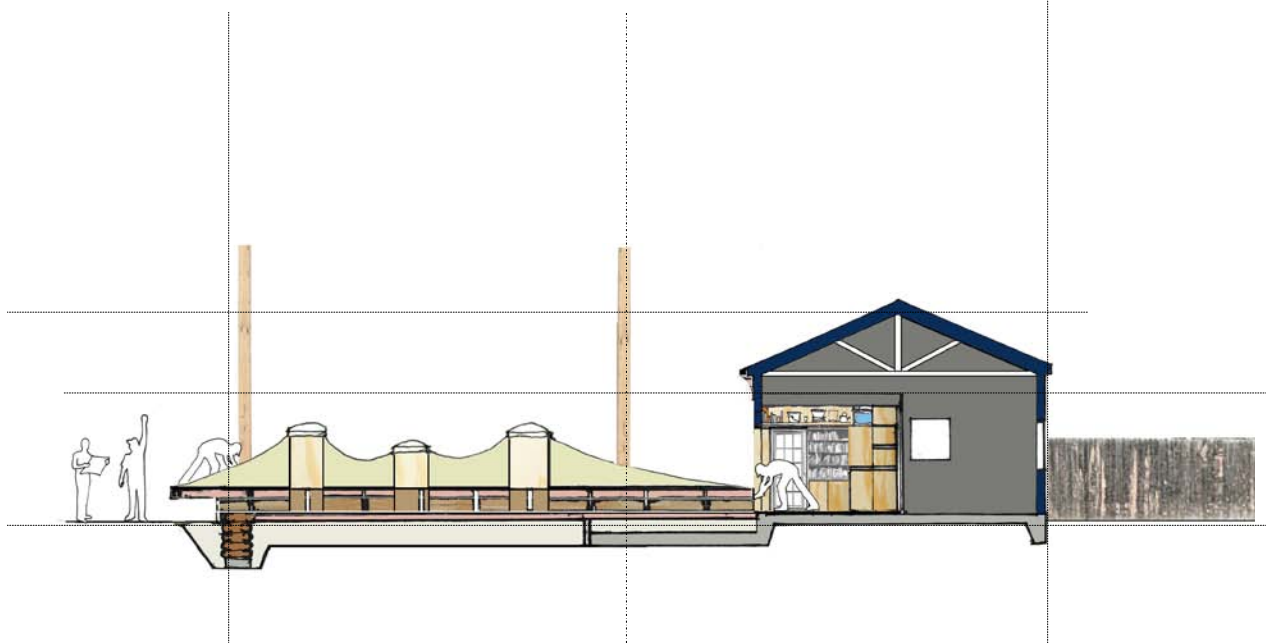
**Page 70**



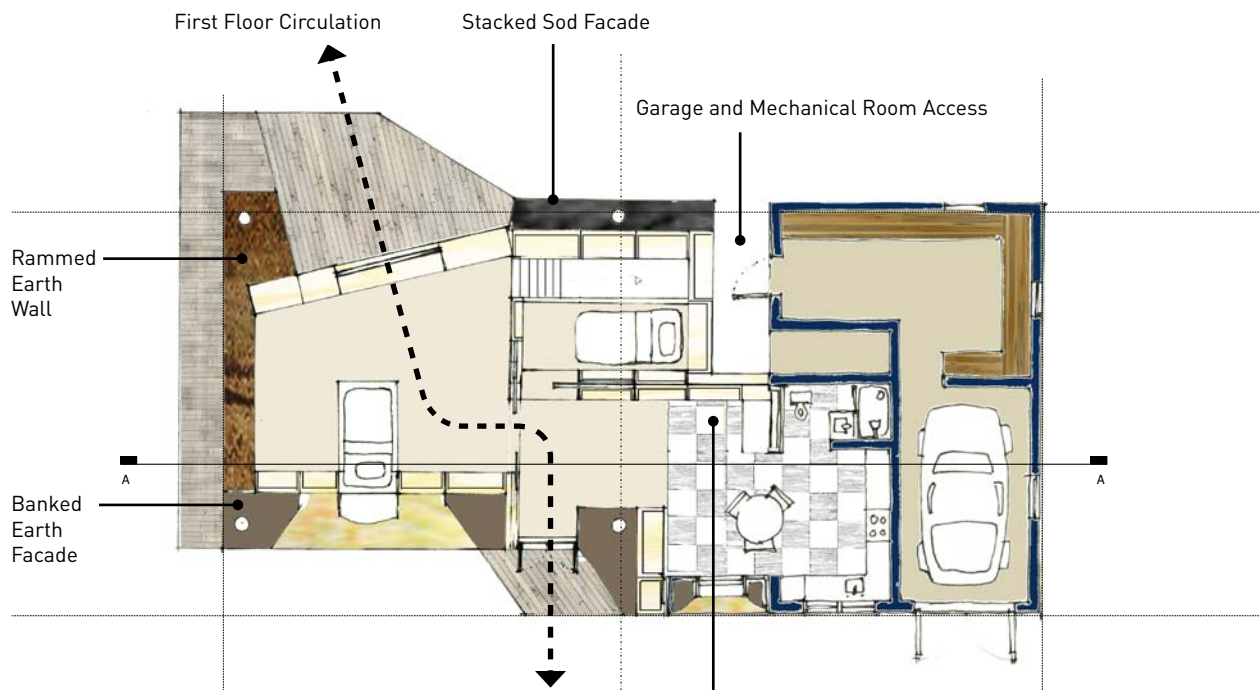
DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORAYS ON MIDDLE INCOME HOUSING. CHRIS WELLS | LARRY PEREZ | MIT OPEN HOUSE 2012 | ©2012 MIT OPEN HOUSE | MIT OPEN HOUSE 2012



Roof Assembly Elevation: of Raising in Process

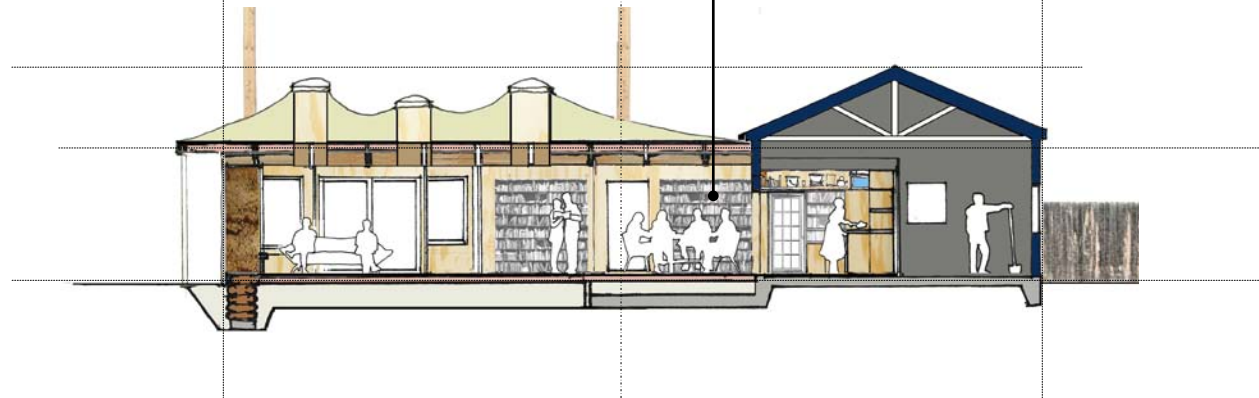


Roof Assembly Section: Showing Torsion Grid Assembly on the Ground, Light Wells, Stretched Roofing Membrane, Foundation, and Utility Poles.

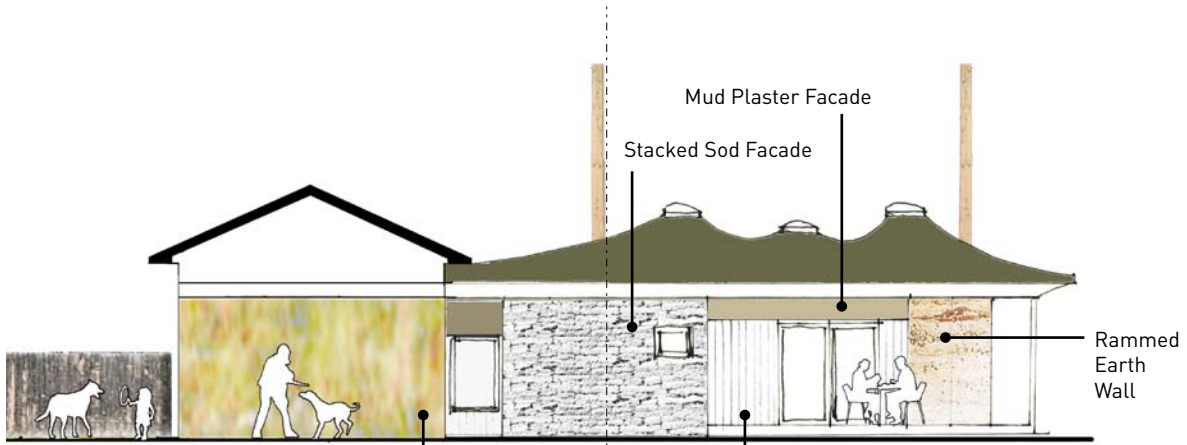


Plan: First Floor Showing Partitioned Bedroom and Folding Bed in Partitionable Sun Room

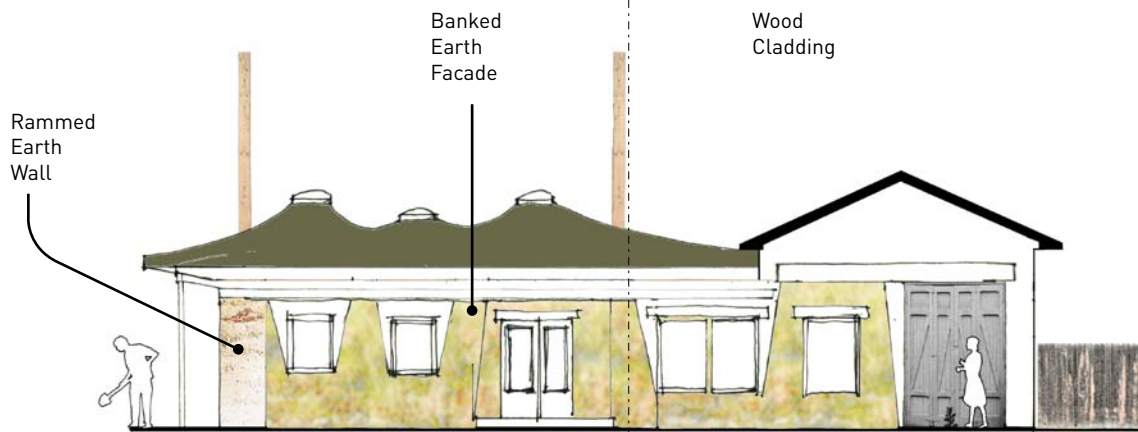
The Clients of this project are cast as bibliophiles. The project's emphasis on casework is manifest in largely as libraries. These are situated in the transition between the living and dining rooms, and also partition a sleeping area.



Section A, A: Showing Living Room, Libraries, and Light Wells



Elevation: Rear Back-Yard Side



Elevation: Front Alley Side





# **CASEWORK AND EARTHWORK:**

## **A SUBURBAN COACH HOUSE.**

### Increment # 3

## **Tenural Articulation**

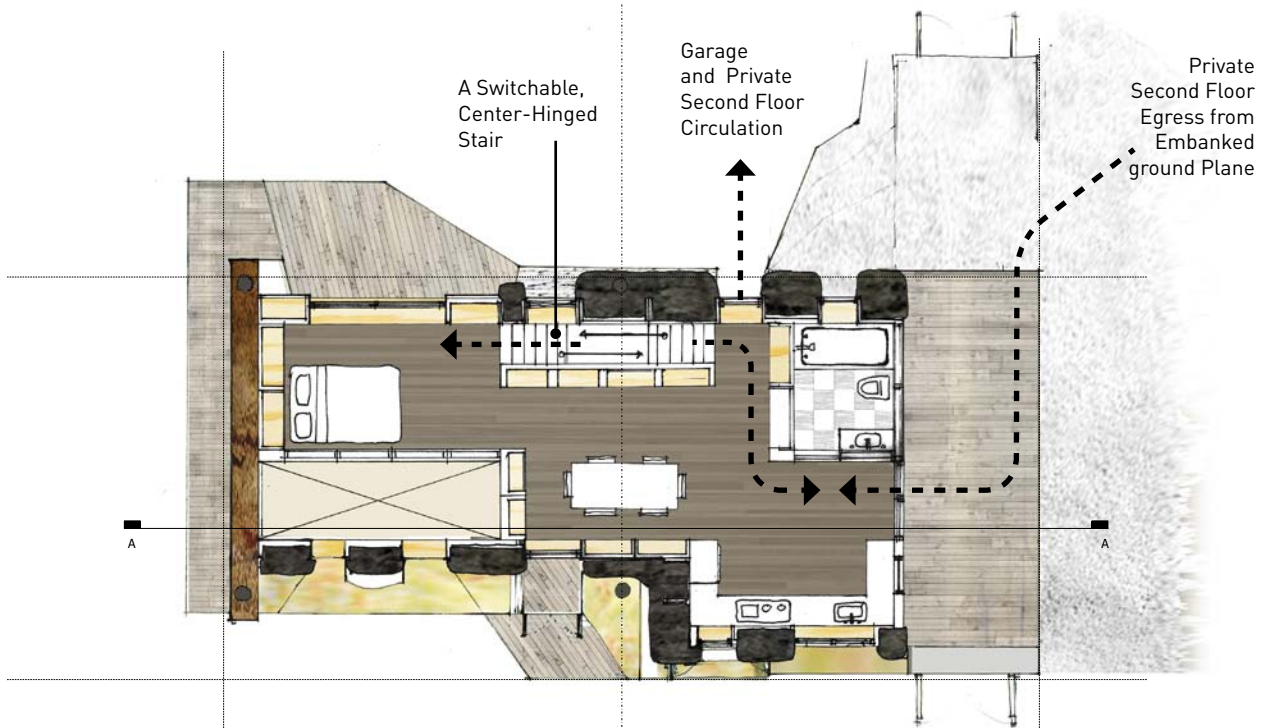
The final constructional increment begins on the project's third spring. After the roof is raised to its full two-story height, a second level floor is installed using the same method. Assembled, raised on, and suspended from the utility poles, this second floor is affixed to a perimeter that bears on and translates its weight to the walls below.

The coach-house's plan configuration has anticipated this expansion, and can now be partitioned at will. The second level can function as a separate apartment with private access, or can be annexed by the first floor with switchable interior circulation. This switch can be accomplished quite literally by a single stair rotating on a centered horizontal pivot. Though it may be slightly steeper than average to achieve the necessary symmetry, the foot of this stair can either be positioned inside the first level, or conversely in the sheltered exterior yard-side garage entry for private outdoor access.

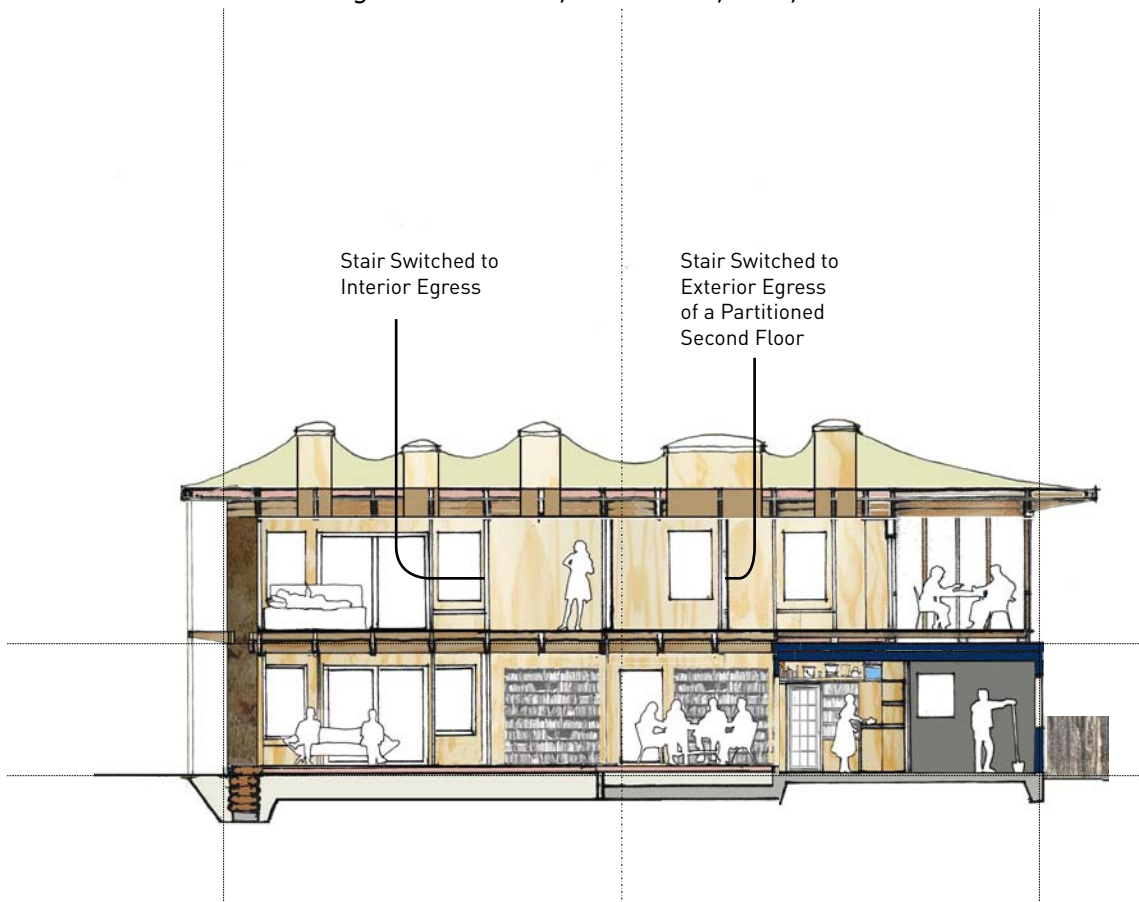
Meanwhile someone has acquired a second-hand quanset hut, of the sort that sometimes houses small-town diners or small-engine repair shops. This is positioned to extend the garage workshop space, and covered with earth and turf to ramp exterior egress up to the second-floor patio. Complete bath and kitchen amenities cement the second level's capacity to function as a guest apartment. When there are no guests, it can be re-annexed and re-inhabited by the primary ground-floor residents.

This flexible and simultaneous dual function can be compared to the North Lawndale Housing Co-op's more direct and literal, if less expedient spatial flexibility. It belongs to the same family of tenural design strategy but is tailored in this case as a potential condition of bartered land rights, and epitomizes the necessarily entwined programmatic and tectonic opportunism of designed incremental housing strategy.

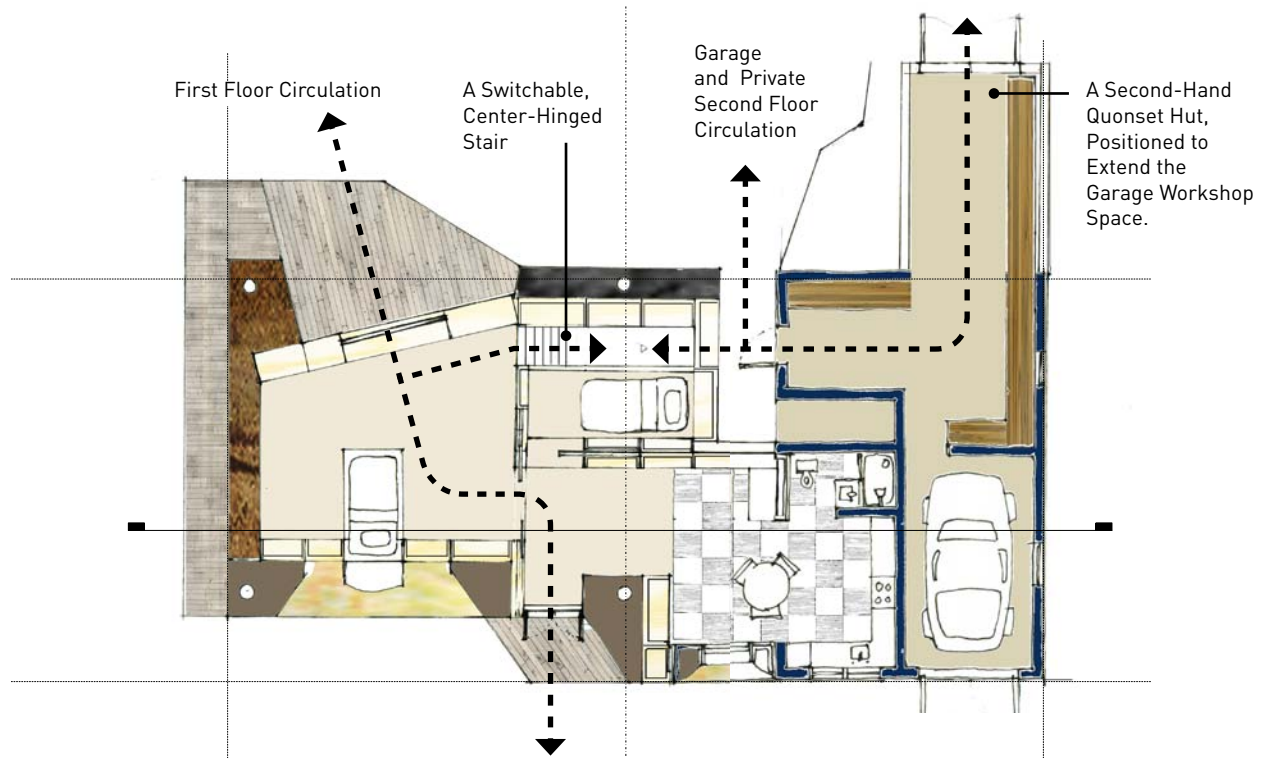




Plan: Second Floor Showing Switchable Stair, Master Bath, Patio, and Embanked Ground Plane



Section A, A: Showing Raised Roof and Second Story



Plan: First Floor Showing Extended Garage Work/Utility Space



Elevation: Rear Back-Yard Side Showing Second Story



Elevation: Rear Back-Yard Side, Showing Exterior Private Entry to Second Floor



Elevation: Rear Back-Yard Side, Showing Second-Floor Patio



# A WANDERING HEARTH:

## FOR A HOUSE IN THE REMOTE NORTH.

### Overview

Jay, the owner-client of this project is a household of one. He works conveniently but also ironically as a house carpenter, and is a free thinker happy to broaden his constructional horizons.

If he needs other justifications for an unconventional housing project, many are possible. A combination of remote location and a sluggish rural economy would otherwise conspire to make him the likely occupant of a mobile trailer home. He could otherwise have ruined his credit rating in reckless youth by crashing an uninsured new truck. He might simply have unconventional domestic wants and needs and recognize designed incremental housing's potential to serve them. He might take it on as an adventure.

Land is generally inexpensive around rural Swatara, Minnesota, for the simple reason that supply overwhelmingly exceeds demand. A large-enough parcel might be gotten for a few thousand dollars, and fall within Jay's stated housing budget. Other larger parcels of three or six hundred acres are often maintained as hunting grounds by comparatively affluent out-of-towners. A few acres might be carved out of one such estate and bartered for maintenance and stewardship services.

While the previous suburban coach house project used relatively expensive and intensively produced cabinet-grade casework to articulate abundant and less expensive earthen materials, this project strikes a different balance of material intensity. Raw materials are abundant on this site's premises, and so the project specifies stones from a nearby creek, certain diameters and species of timber from nearby swamps and forests, and articulates more of them with similar but fewer commissioned shop fabricated formworks and guideworks.

These generally inform the construction of a hearth, and in fact a sequence of hearths. They provide plumbing, cooking and heating amenities in seeming redundancy as a strategy of expansion. The notion is that provisional first amenities can be used while their more sophisticated replacements are under construction, and that these first provisional ones can be reburbished to a distinct and dedicated purpose. When expansion is complete, the tally of these hearths include an outdoor kitchen, a steam bath, a bedroom kitchenette, a warm closet, a sleeping niche, and a central "master" kitchen. Each but the last serves some temporary duty in the project's incremental succession, and a dedicated purpose when expansion is complete.



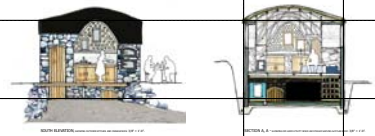
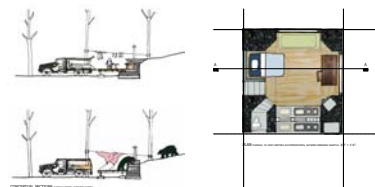
**CLIENTS:** Jay

**LOCATION:** Rural Swatara, MN

**TOTAL COST:** \$ 80 K

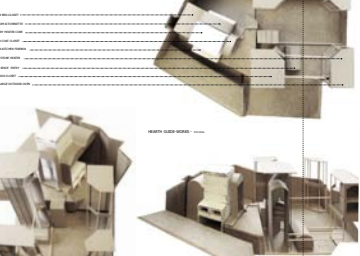
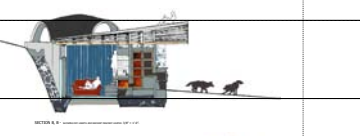
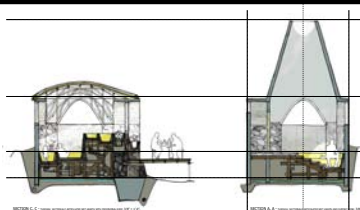
**DURATION:** 6 Years

**+ 12 MONTHS  
+ \$13K**



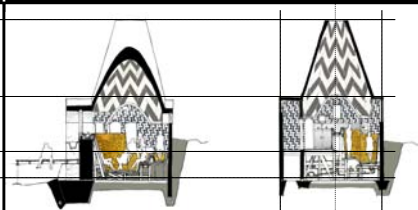
DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORMS ON MIDDLE INCOME HOUSING

**+ 36 MONTHS  
+ \$40K**



DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORMS ON MIDDLE INCOME HOUSING

**+ 72 MONTHS  
+ \$80K**



DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORMS ON MIDDLE INCOME HOUSING

# **A WANDERING HEARTH:**

## **FOR A HOUSE IN THE REMOTE NORTH.**

### Increment # 1

## **Indoor Hearth : Outdoor Hearth**

The first stage of this project's construction establishes a provisional outdoor kitchen and indoor bathroom, installed within commissioned shop-made guideworks that are later infilled with structural mortared stone and concrete on heavy foundations. These serve an outdoor patio living space raised to the height of Jay's truck tailgate. His covered pickup truck bed functions as a secure sleeping area in the first few summer weeks and months of construction. The case for designed incremental housing noted architecture's mandate to reach for something sublime beyond provision of basic human needs. Besides meeting his basic human needs a particular and ephemeral moment in time, drinking coffee on a misty summer morning beside a slow moving creek fulfills Jay's expectations of that "something" architecturally sublime.

The same first outdoor hearth will remain a dedicated summer kitchen, but is also mirror-matched with cooking facilities on it's reverse side. These will next be enclosed as the indoor kitchenette of a small and efficient first winter's provisional living space, though they will be repurposed to heat a steam bath in succeeding increments of construction.

The arched geometry of this provisional first enclosure is fitted with a two-season temporary roof to protect against the initial winters' snow and cold. The same arched geometry is similarly designed to later accommodate a heavier, more robust, and permanent conical masonry chimney, which will rise above the eventually refurbished steam bath.

For now, This project sources abundant, locally available, and mostly raw materials from the nearby forests, swamps, and streams. More than its two predecessors, it relies on quite heavy manual labor which the owner plans to subsidize by contributing direct sweat equity. The construction sequence rendered on following pages shows heavy excavation with only shovels, but the owner might choose instead to hire a small back-hoe for that gruelling task. While accomodating a flexible amount of D.I.Y. and hand labor, the formworks and guideworks that articulate that labor must certainly be contracted to skilled tradespeople. The rest might be hired out as necessary, at least in part.

# WANDERING HEARTH: A HOUSE IN THE REMOTE NORTH

**+ 12 MONTHS**  
**+ \$13K**

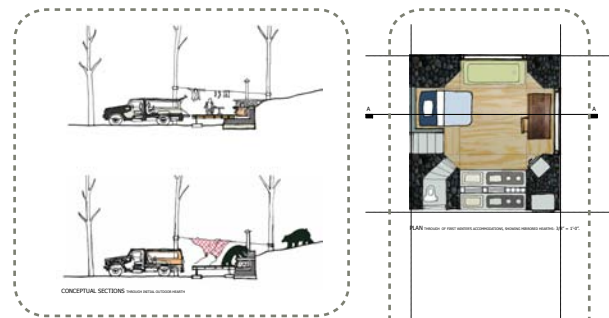
**View of First Summer's Provisional Hearth**

**Page 84**



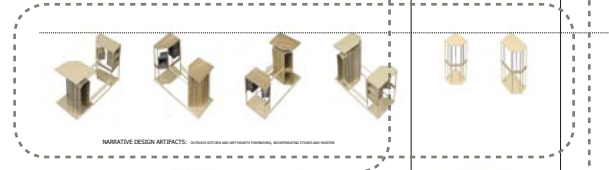
**Conceptual Sections of First Summer's Provisional Hearth**

**Pages 84 - 85**



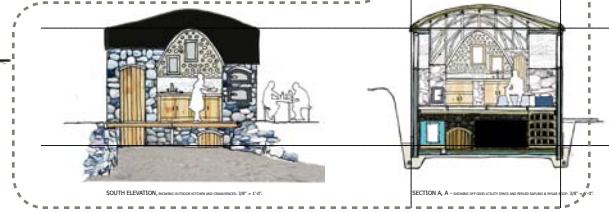
**Formworks and Guideworks, or Narrative Design Artifacts**

**Page 77 - 78**



**First Winter's Provisional Accommodations**

**Page 90 - 93**



**Model Rendered Construction Sequence of First Winter's Provisional Accommodation**

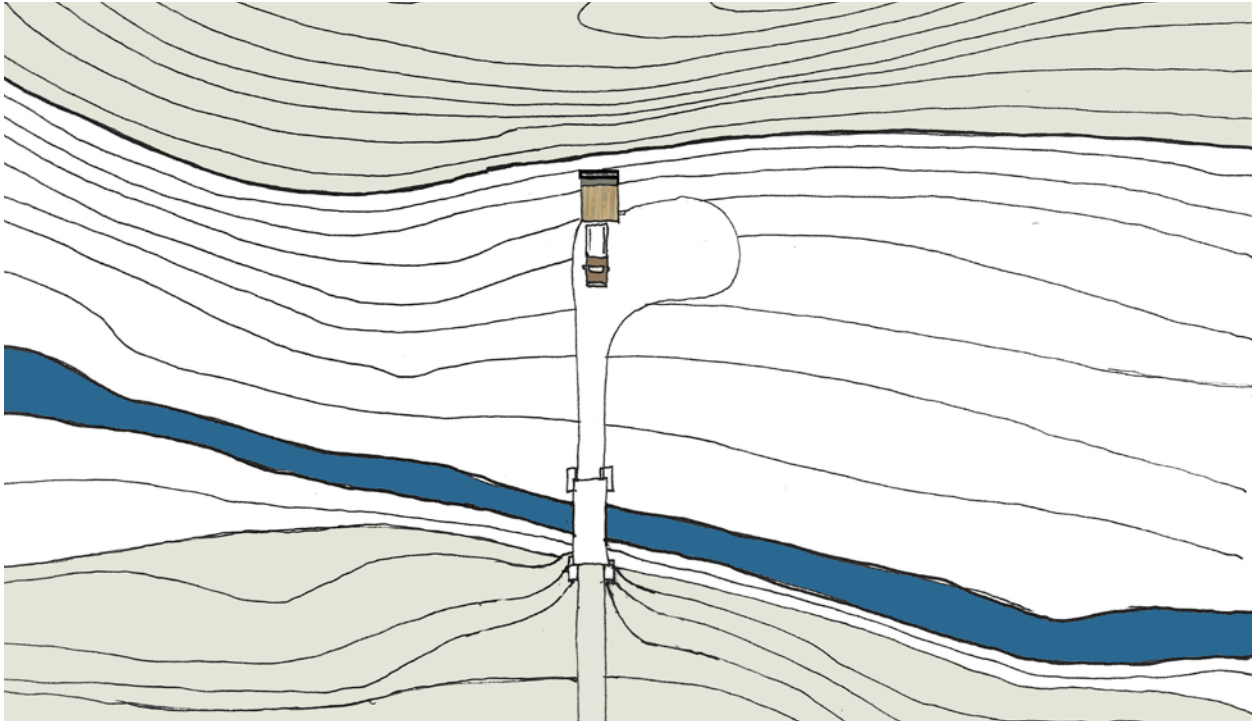
**Page 85 - 89**



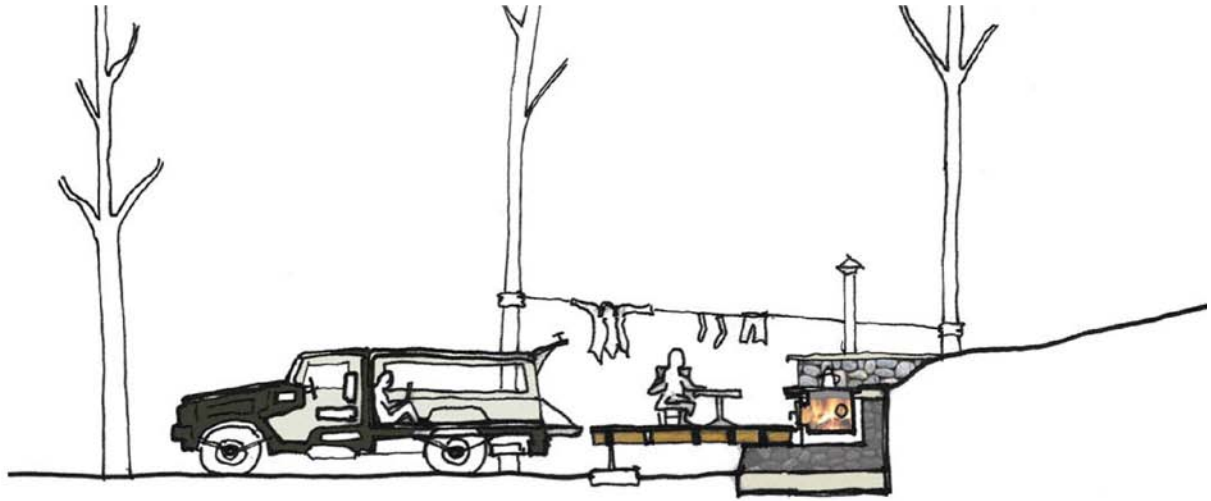
DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORAYS ON MIDDLE INCOME HOUSING. CHRIS WELLS | ARCHITECTURE | 10/10/2013 | 10/10/2013 | 10/10/2013 | 10/10/2013 | 10/10/2013 | 10/10/2013 | 10/10/2013 | 10/10/2013 | 10/10/2013



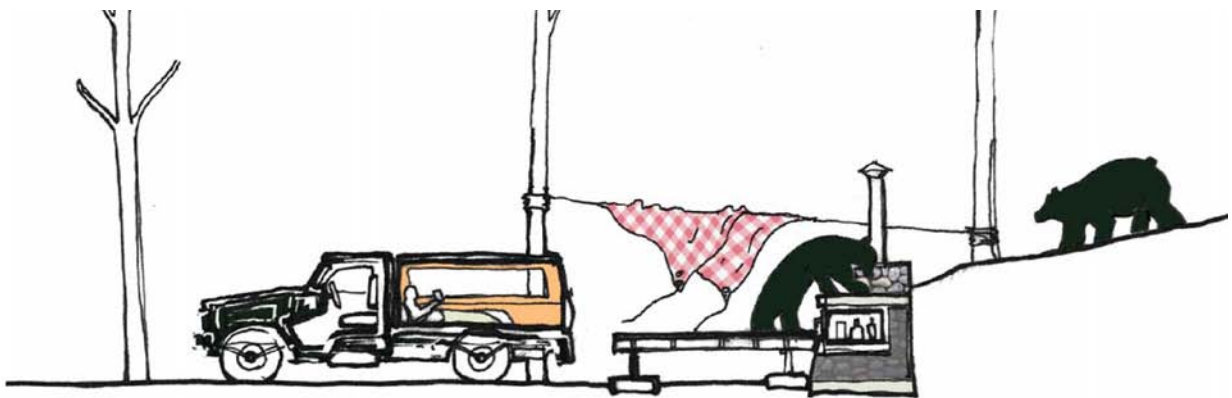
View: Showing First Summer's Provisional Outdoor Hearth



Site Plan: Showing First Summer's Provisional Outdoor Hearth



Conceptual Section: Through Covered Pick-Up Truck and Initial Outdoor Hearth, Morning



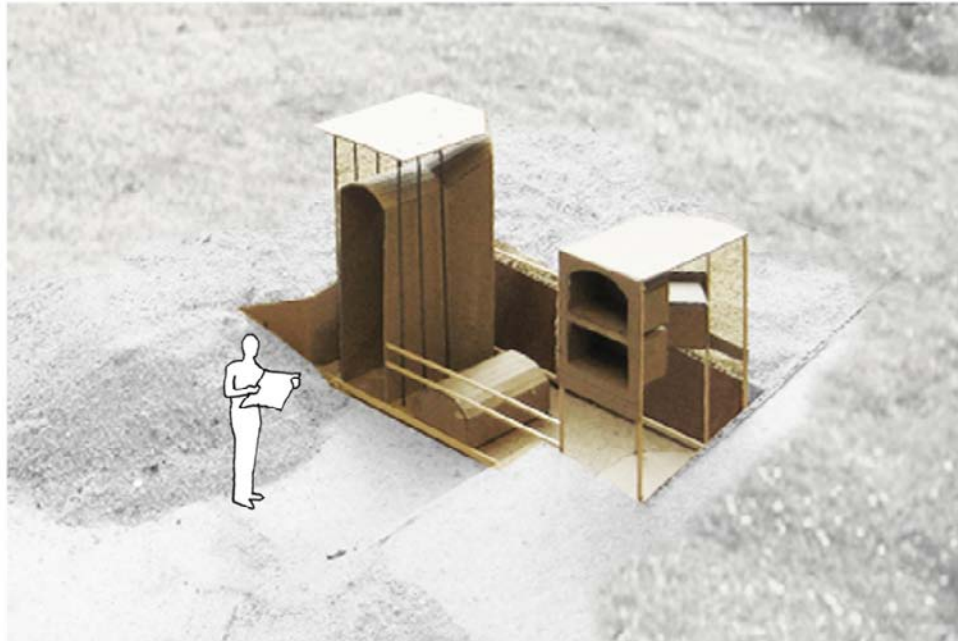
Conceptual Section: Through Covered Pick-Up Truck and Initial Outdoor Hearth, Evening



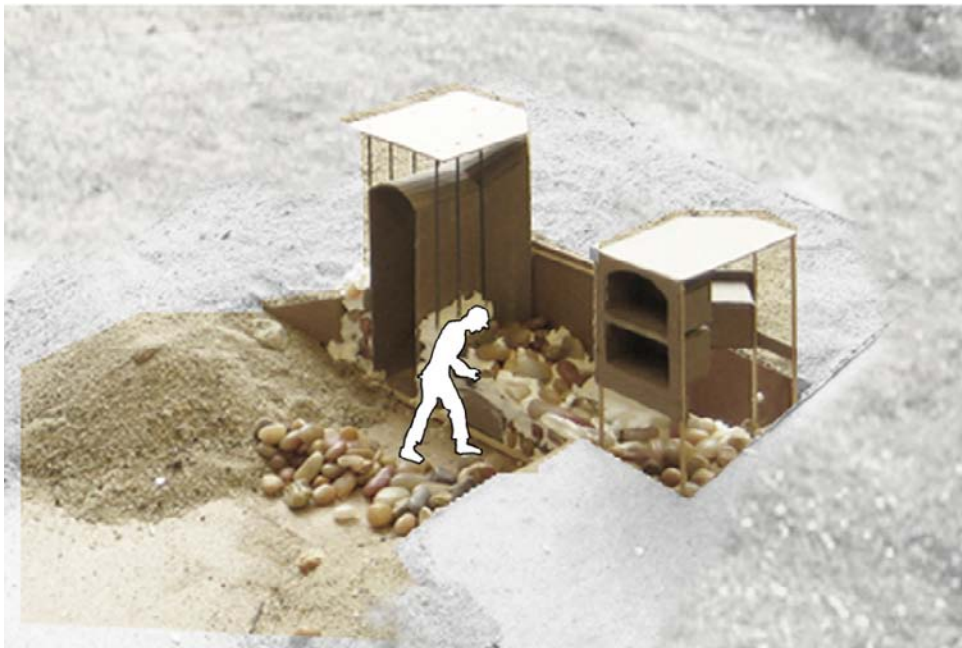
1. Excavation for the Outdoor Hearth



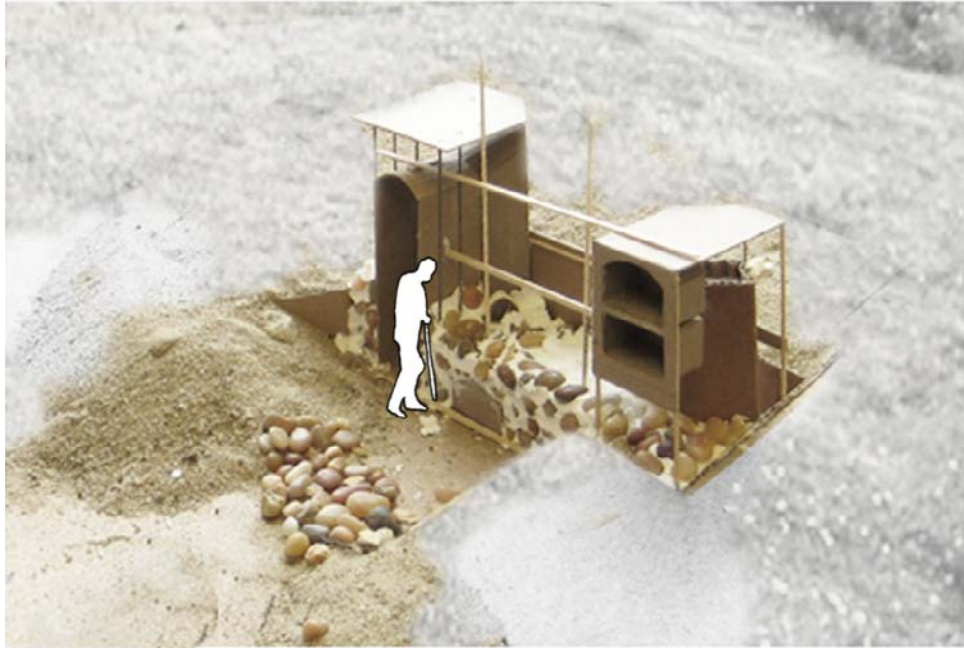
2. Pouring of Concrete Footings



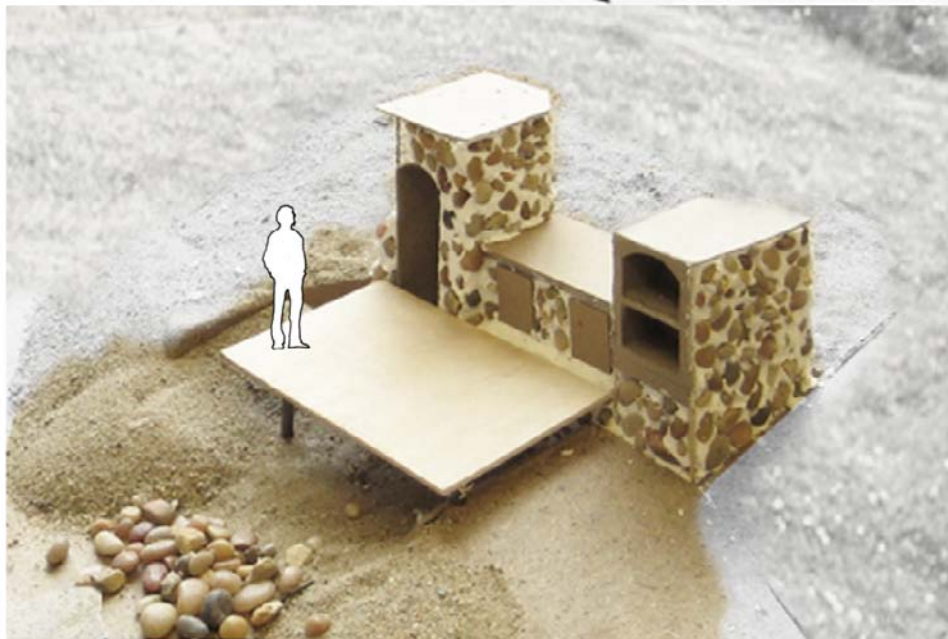
3. Placement and Leveling of Shop Fabricated Guideworks with Integral Heating Components



4. First Courses of Mortared Stone Masonry Infill

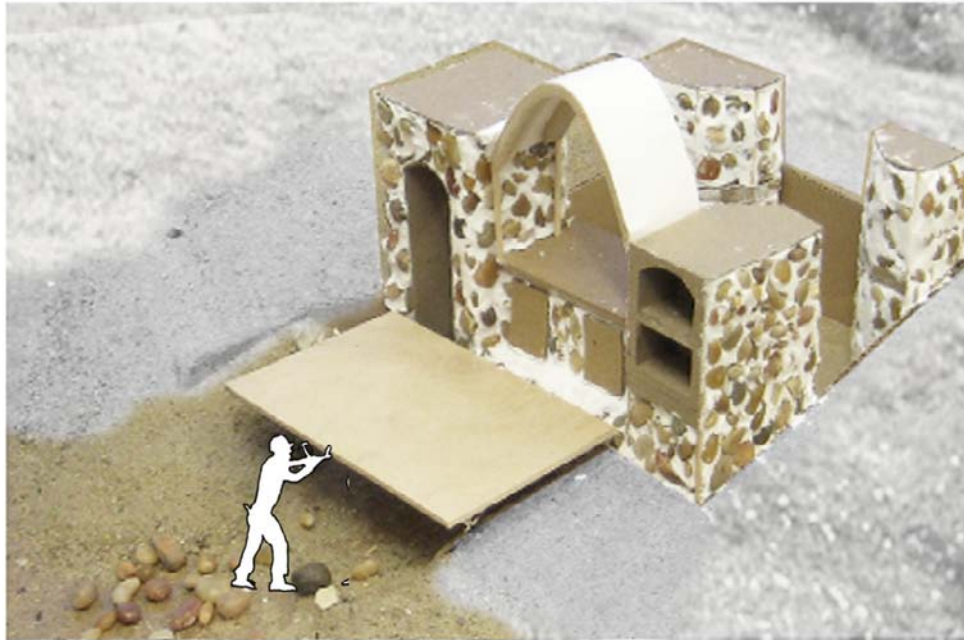


5. Installation of Secondary Guideworks

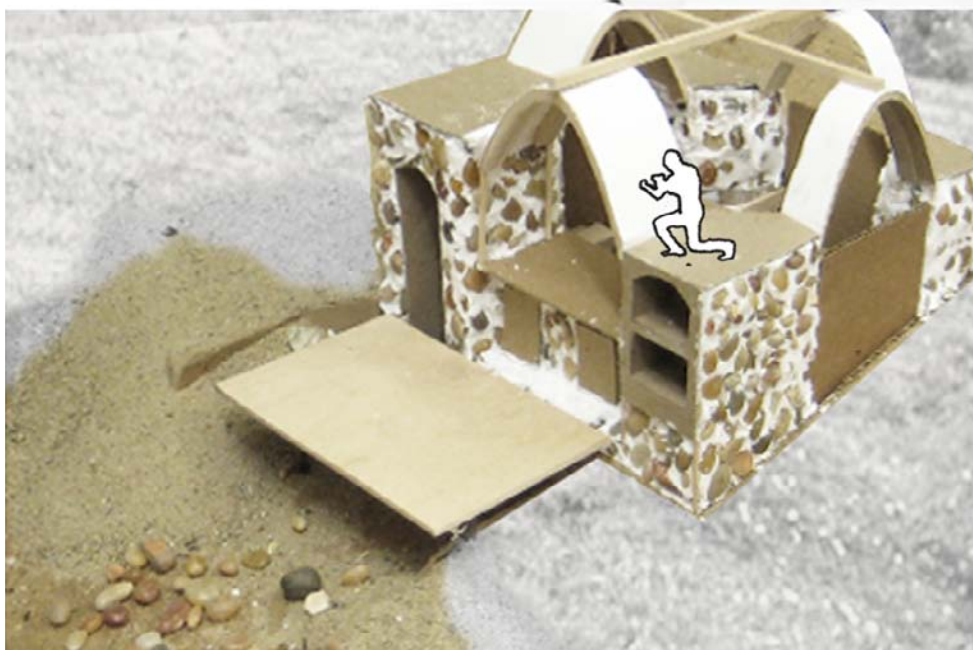


6. Finished Outdoor Kitchen and Installed Patio





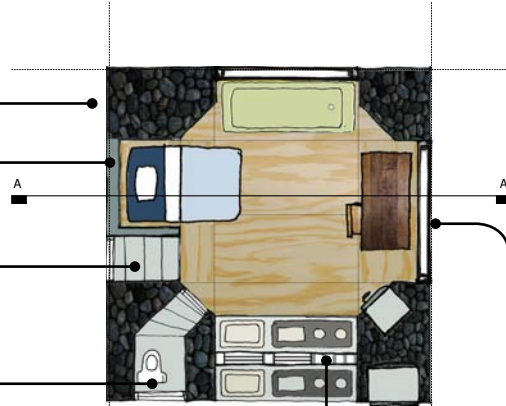
7. Excavation of Winter Accomodations and Installation of Back Piers



8. Installed Masonry Arches and Partition Walls, Ready for Roof Enclosure.

Heavy and either solid or steel-reinforced corner piers will eventually support funicular structural arches. The Enclosure between them can be less substantial, in this case shown as an insulated brick partition.

Primary entry of the first winter's provisional enclosure is from the side. A secondary means of egress can be closed off from the outside or inside, and holds a provisional composting toilet. After this provisional bath is replaced in later expansion, it will be converted to an outdoor firewood hatch and storage closet.



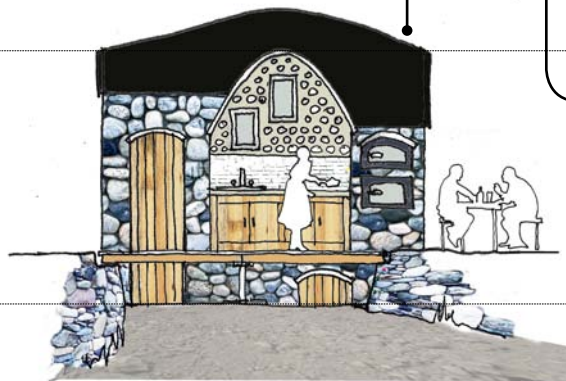
Plan: Through First Winter's Provisional Enclosure, Showing Mirrored Hearths

While this space will eventually be covered by a conical masonry chimney, The same structural arch geometry that will eventually support it will also accommodate a doubly curved vault geometry.

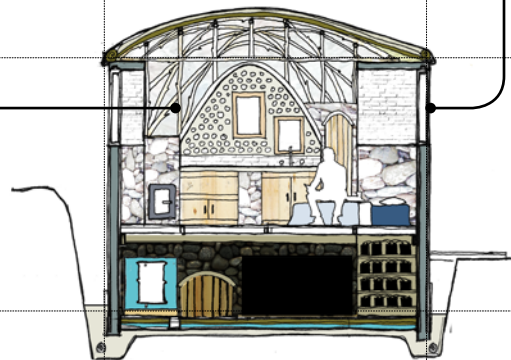
The first winter's provisional enclosure as such, can have a one-season provisional roof. A continuous rubber sheet or tarpaulin pictured here covers moving blankets or other ad-hoc insulation. These cover a sheet of reflective mylar, which slows radiant heat loss. The structure is dense grid of locally available, and relatively thin bent saplings, tightly lashed together with zip ties. With eye-hooks selectively embedded in the masonry, these are also lashed to the outer edges of the enclosure's arches and piers. While ill-advised both structurally and thermally as a "permanent" roof, it's materials are either disposable or re-deployable enough to serve for two seasons.

After the installation of an outdoor kitchen, it is mirrored nearly verbatim into the first winter's provisional enclosure. When this enclosure is repurposed into a steam bath, the kitchenette will be repurposed accordingly to heat it. The outdoor kitchen will eventually serve as a hot weather auxiliary, "summer kitchen", and yet a third kitchen will eventually become the primary indoor or "master kitchen".

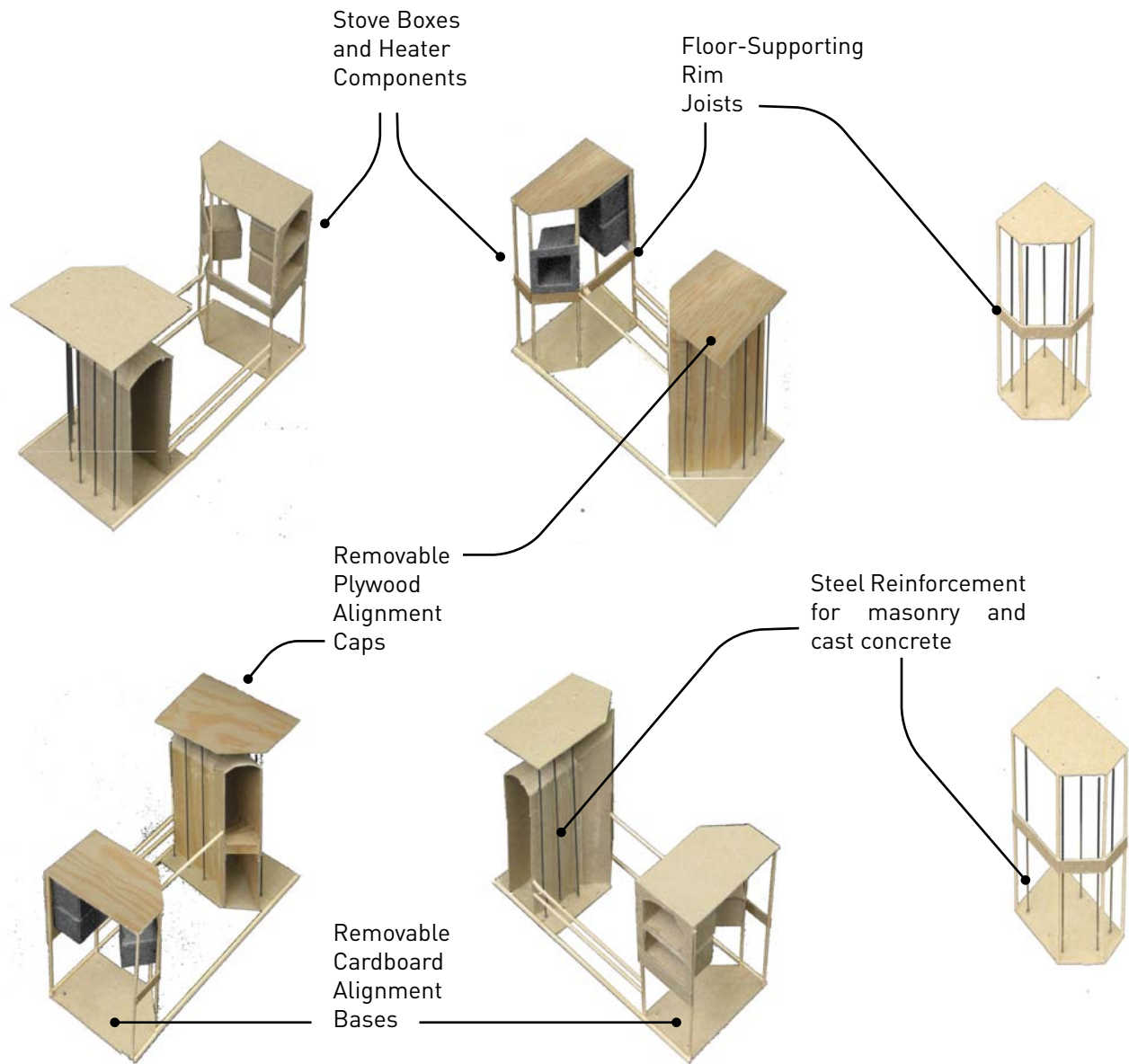
Rather than custom cut glass panes, the arched side windows might be cast from thin honeycombs of translucent paraffin wax. They might be cast from a similar but transparent mineral oil based substitute for paraffin. Both are objectively better insulators than window glass and are sturdy enough to double as formwork for their accompanying brick arches.



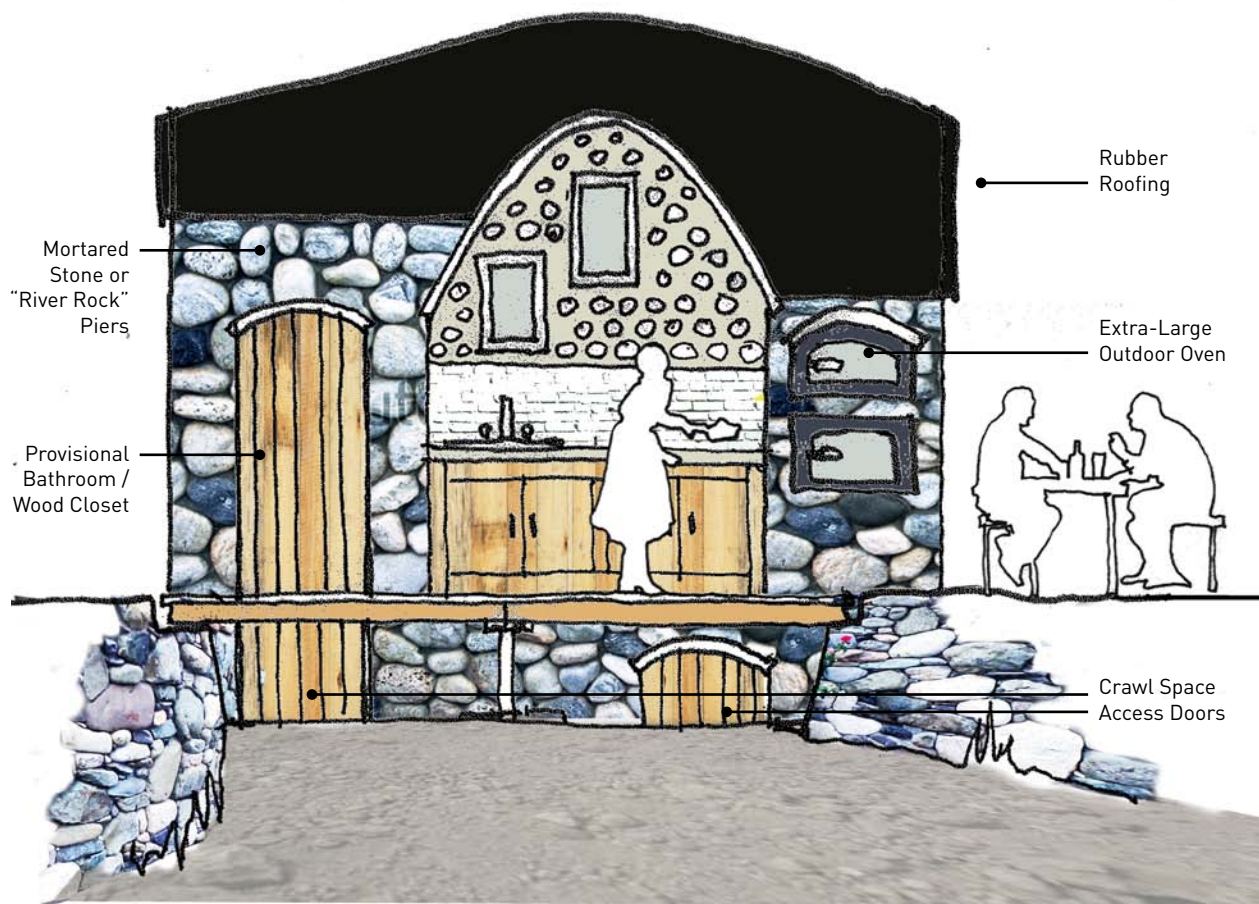
Elevation: Finished Outdoor Kitchen, Installed Roof and Patio



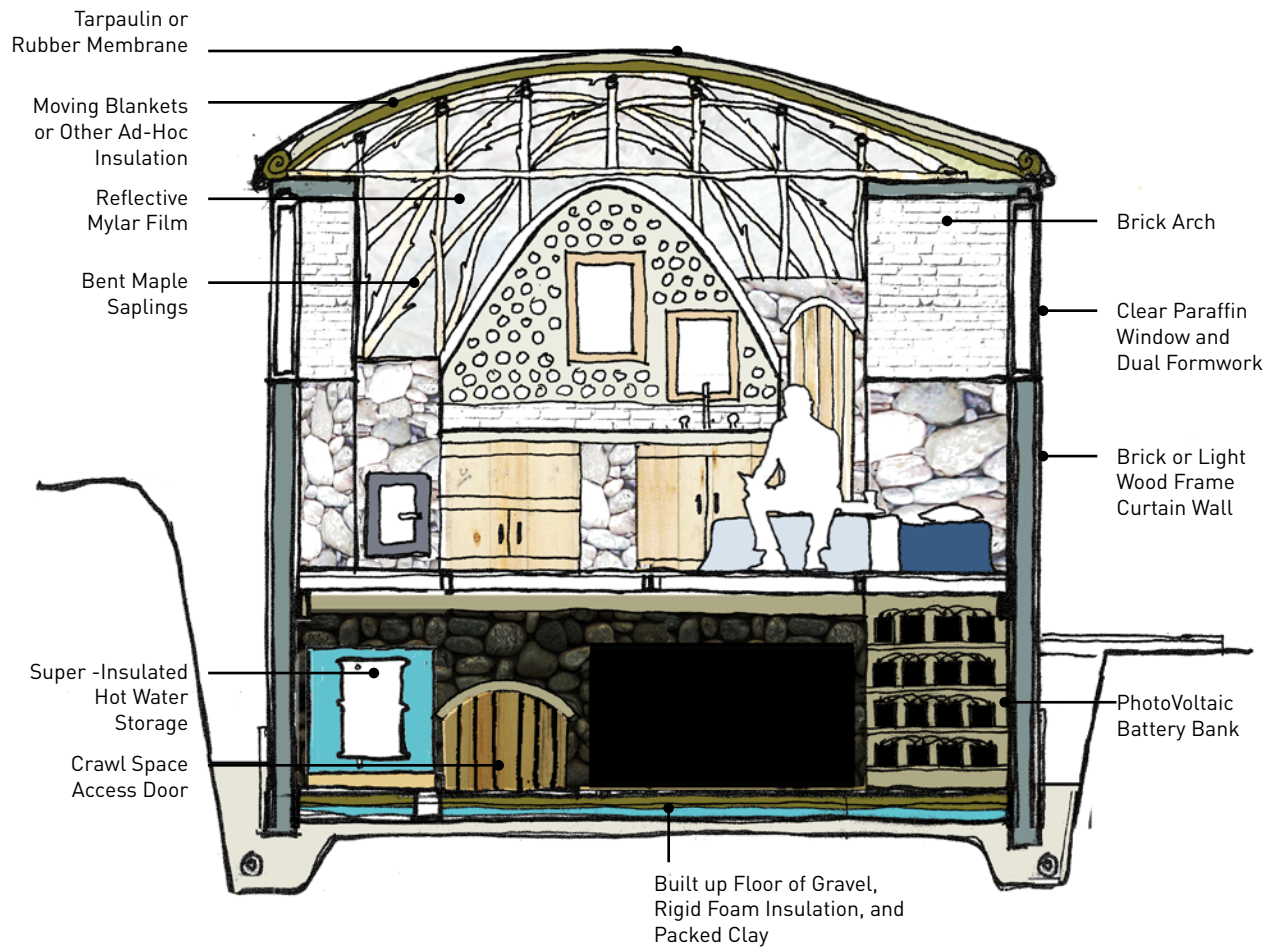
Section A, A: Through First Winter's Provisional Enclosure, Showing Utility Crawl Space



Formworks and Guideworks / Narrative Design Artifacts: Outdoor Kitchen and Wet Hearth Formworks, Incorporating Stoves and Heater Components - to Establish Plan Layout and Aight Structural Mortared Stone Infill.



Elevation: Finished Outdoor Kitchen, Installed Roof and Patio



Section A, A: Through First Winter's Provisional Enclosure, Showing Utility Crawl Space

# A WANDERING HEARTH:

**FOR A HOUSE IN THE REMOTE NORTH.**

## Increment # 2

### **Dry Hearth : Wet Hearth**

The second year of construction begins with another mirrored hearth, this one establishing a more substantial radiant masonry heater core. It is a wood fired heater of loosely traditional Scandinavian design, engineered to consume small amounts of fuel at high combustion temperatures and to divert flue-gasses through a labyrinthine chimney to better store heat in the surrounding masonry's mass. Once stored, this mass slowly and evenly heats it's served space for many hours longer.

This room will be the sleeping quarters and warm winter retreat of the finished scheme, and for that purpose also incorporates a kitchenette. One of the central heating core's side walls warms a bed "closet" that can be closed off with a hinged door to conserve heating energy at night, and the other side wall is buffered by a coat closet near the main entry that is also warmed by radiant heat loss.

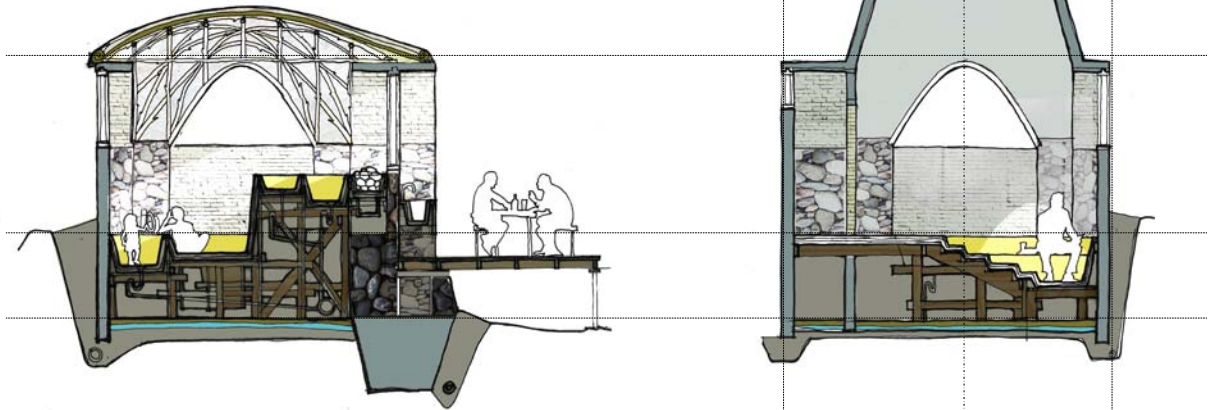
With few and small windows, this second winter's provisional sleeping enclosure is a close cozy space, and the outdoor patio continues to serve as a day-time living room throughout the second increment of construction.

The sleeping quarters are enclosed and it's interior is completed by fall. Having been replaced, the previous winter's bedroom and heating equipment can be repurposed throughout that winter as a lavish, sectionally articulated steam bath, while continuing to serve as a basic bath and washroom in the process. These two rooms are connected by an tight knot of interior circulation that opens to a combined main entry threshold and dressing room.

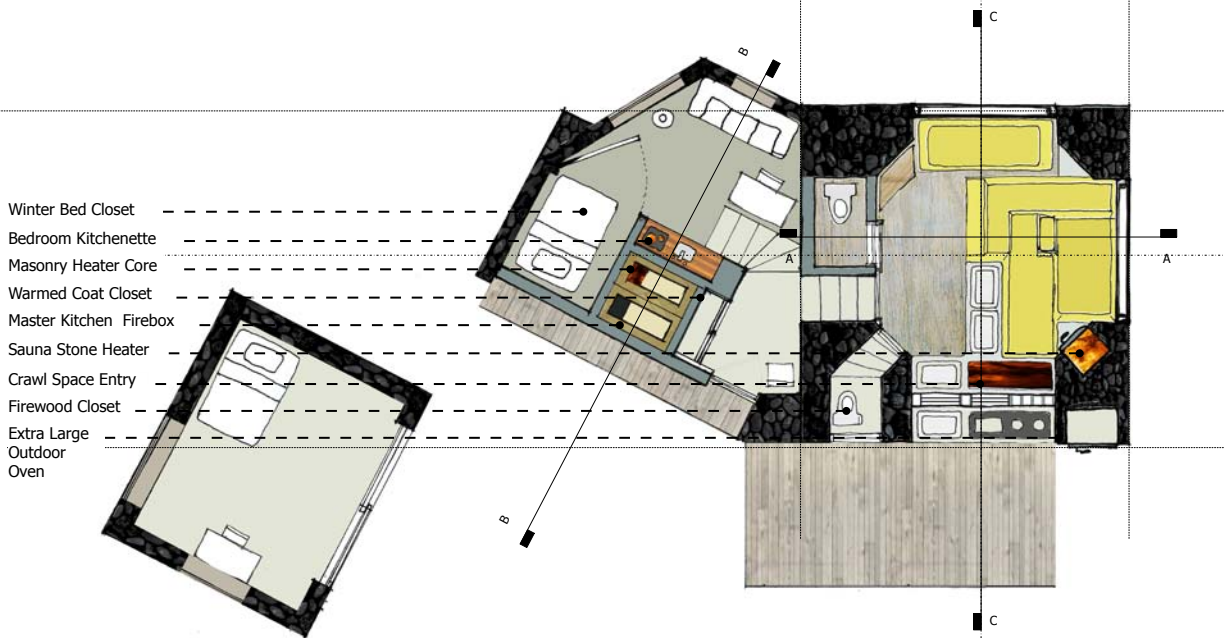
When Spring arrives yet again, the new steam bath's provisional roof can be replaced at a liesurely pace with it's heavy conical masonry chimney. Because this space's user would generally be immersed in a warm bath, the air need not be aggressively heated. This "wet hearth" is designed to revel in a "commercially unavailable" domestic thermal and atmospheric eclectecism. The project's resulting dichotomy of a wet hearth steam bath, and a dry hearth sleeping chamber, sets up a potentially even sublime contrast between chill, damp, warm, and dry, sensation - even raining indoors at times when hot steam from the bath condenses on the chimney cone's cool interior face.



Section C, C: Through Sectionally Articulated "Wet Hearth" or Steam Bath With Provisional One-Season Roof



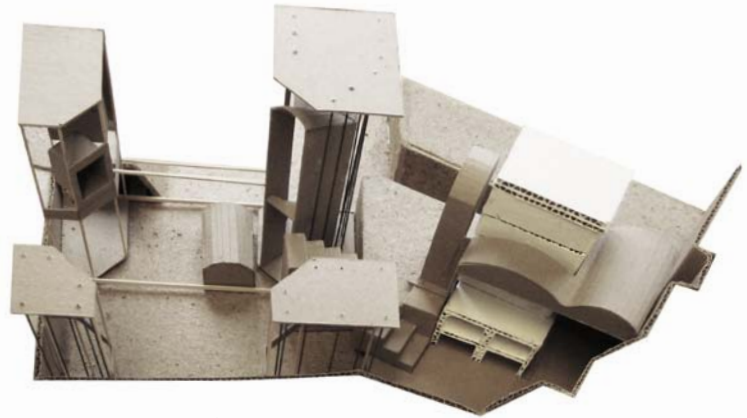
Section A, A: Through Sectionally Articulated "Wet Hearth" or Steam Bath With Masonry Chimney Roof



PLAN SHOWING SECTIONALLY ARTICULATED WET HEARTH, DRY HEARTH, AND OUTBUILDING: 3/8" = 1'-0".

Plan: Through Refurbished and Repurposed Steam Bath, Enclosed Dry Hearth, and Detached Second Bedroom / Workshop Space

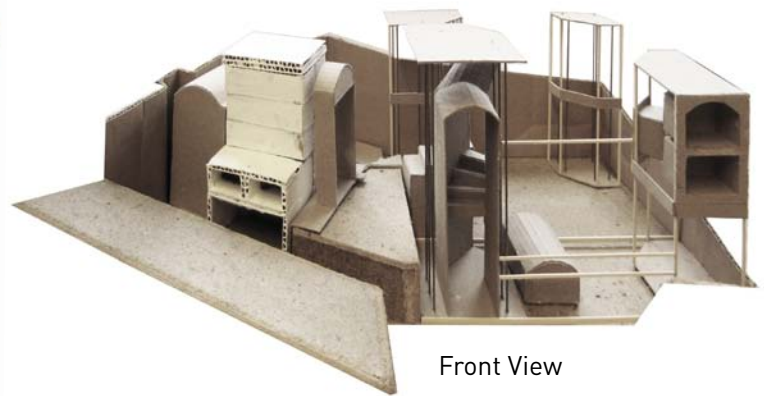




Rear View

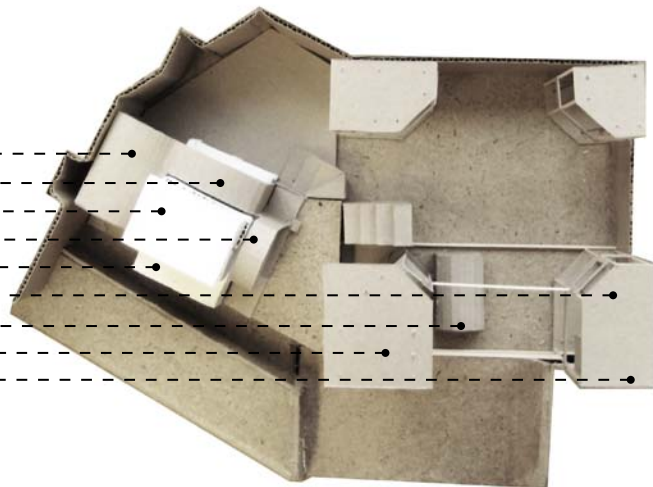


Side View



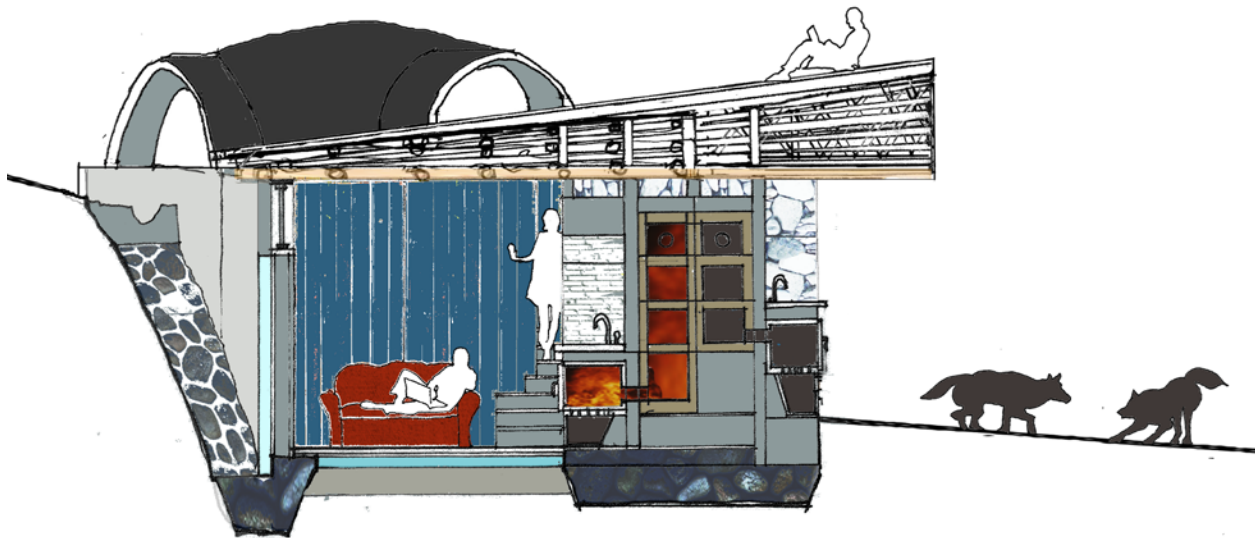
Front View

- Winter Bed Closet
- Bedroom Kitchenette
- Masonry Heater Core
- Warmed Coat Closet
- Master Kitchen Firebox
- Sauna Stone Heater
- Crawl Space Entry
- Firewood Closet
- Extra Large Outdoor Oven



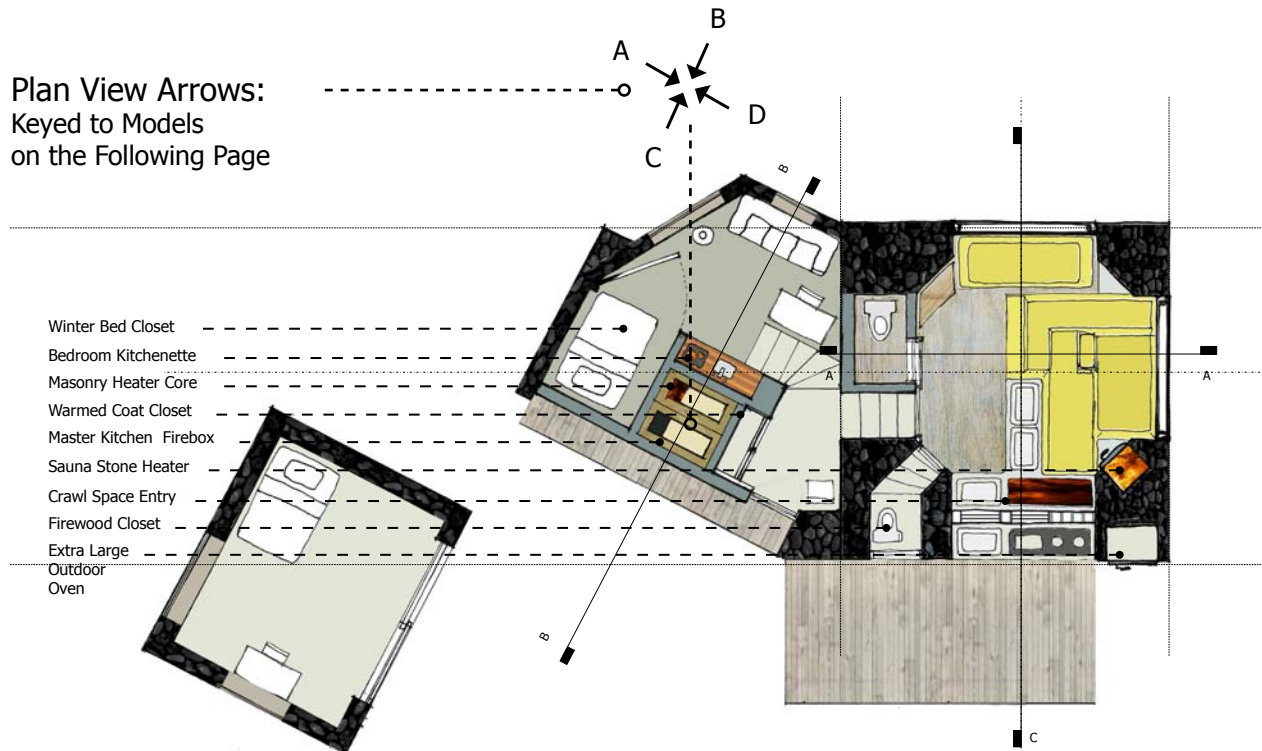
Top View

**Model of In-Situ Narrative Design Artifacts: Hearth Guideworks, Incorporating Stoves and Masonry Heater Components**



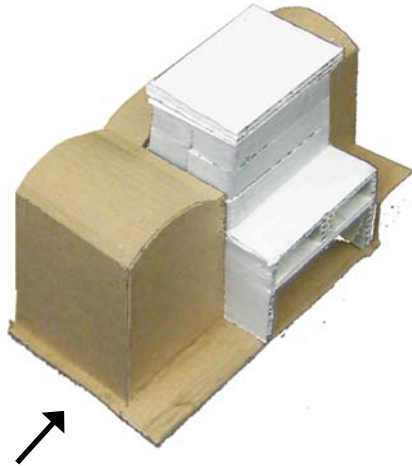
Section B, B: Showing Dry Hearth and Radiant Masonry Heater

Plan View Arrows:  
Keyed to Models  
on the Following Page

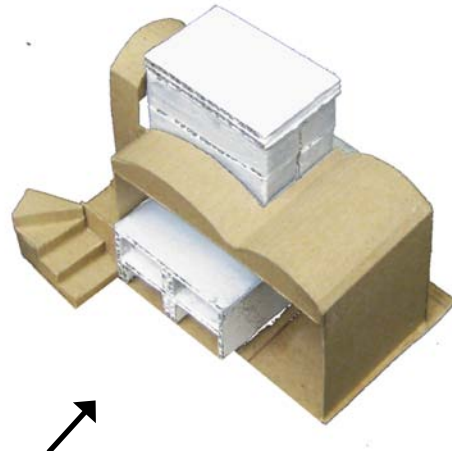


PLAN SHOWING SECTIONALLY ARTICULATED WET HEARTH, DRY HEARTH, AND OUTBUILDING: 3/8" = 1'-0".

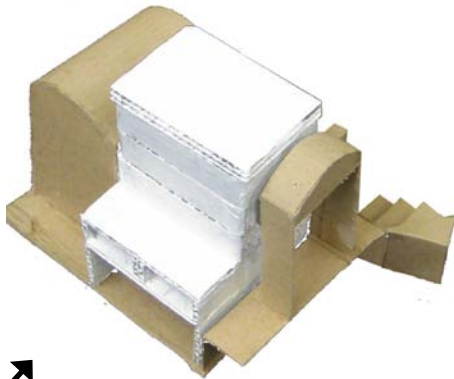
Plan: Through Refurbished and Repurposed Steam Bath, Enclosed Dry Hearth, and Detached Second Bedroom / Workshop Space



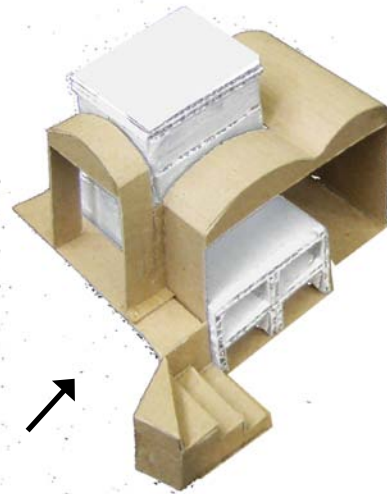
View A



View B

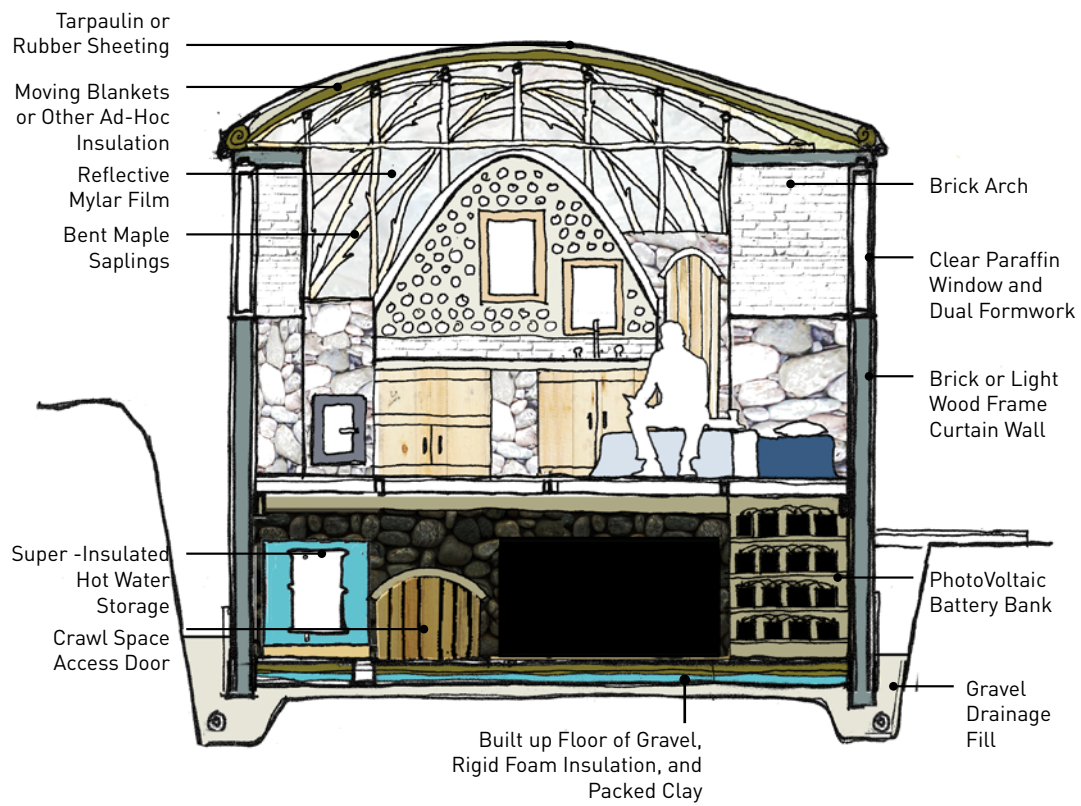


View C

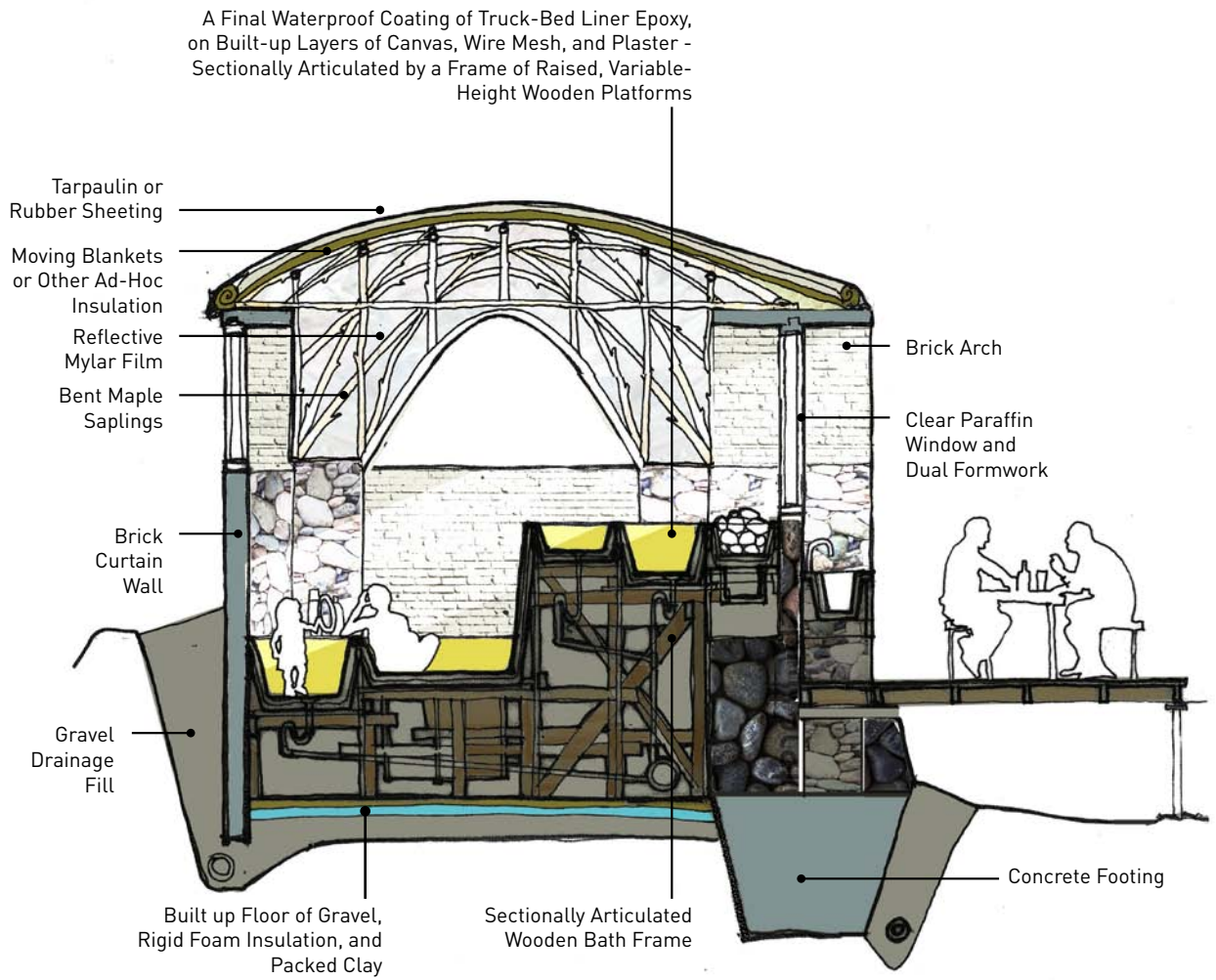


View D

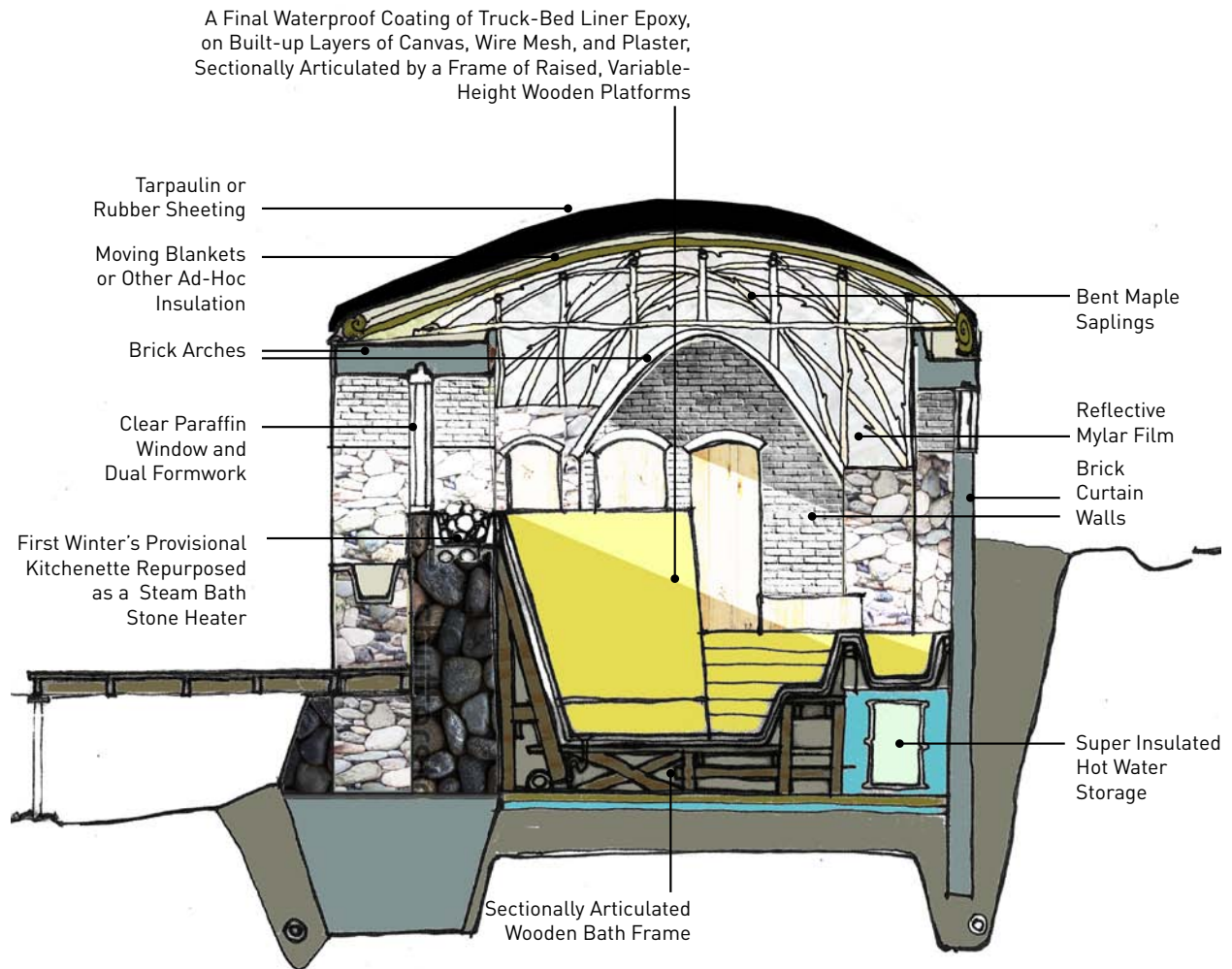
Model of Narrative Design Artifacts: "Dry Hearth" Structural Vault Formworks and Remotely Fabricated Masonry Heater Core (Keyed to Plan View Arrows on Previous Page)



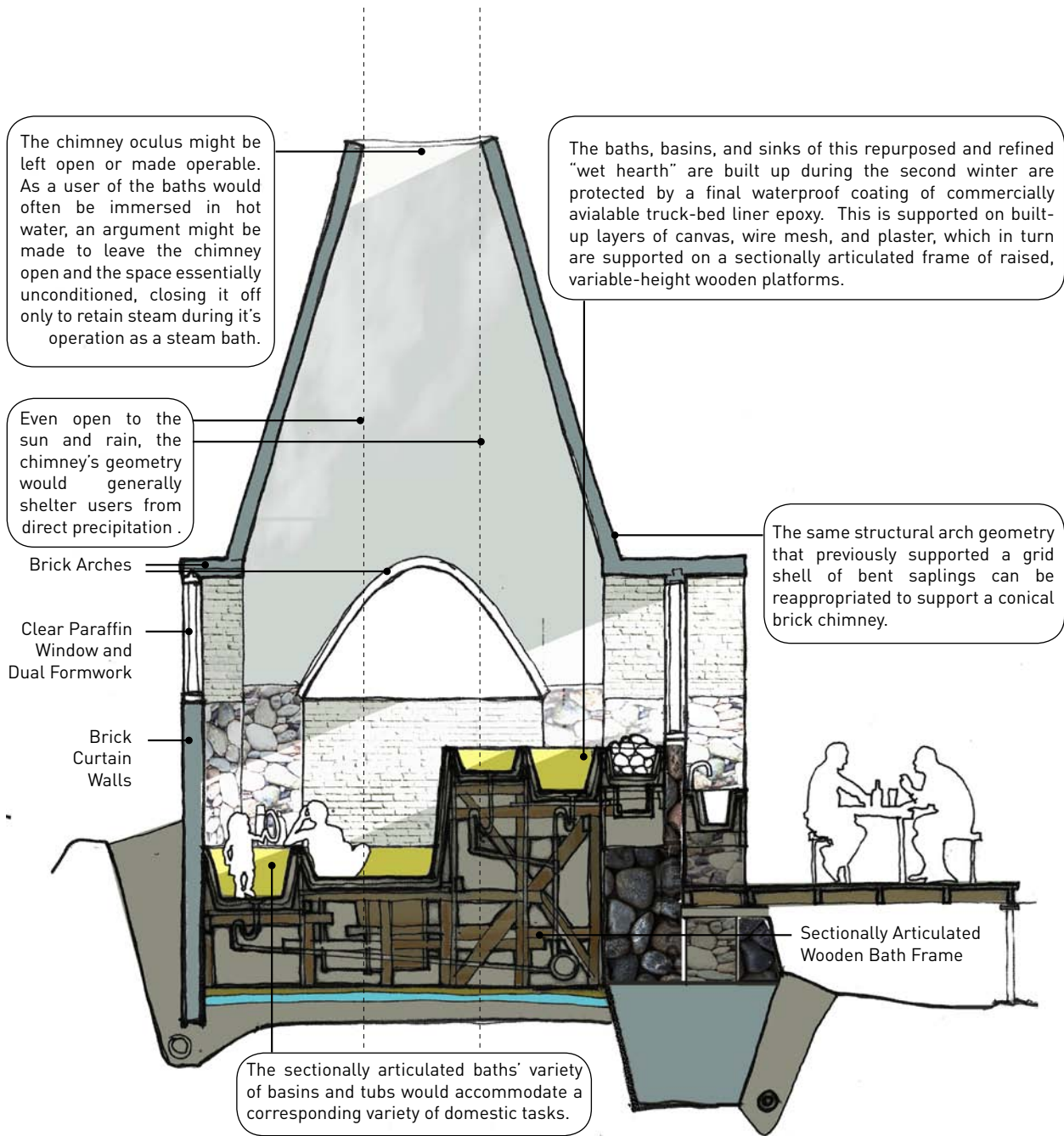
Section A, A: Through First Winter's Provisional Enclosure, Showing Utility Crawl Space (Keyed to Plan on Page 88)



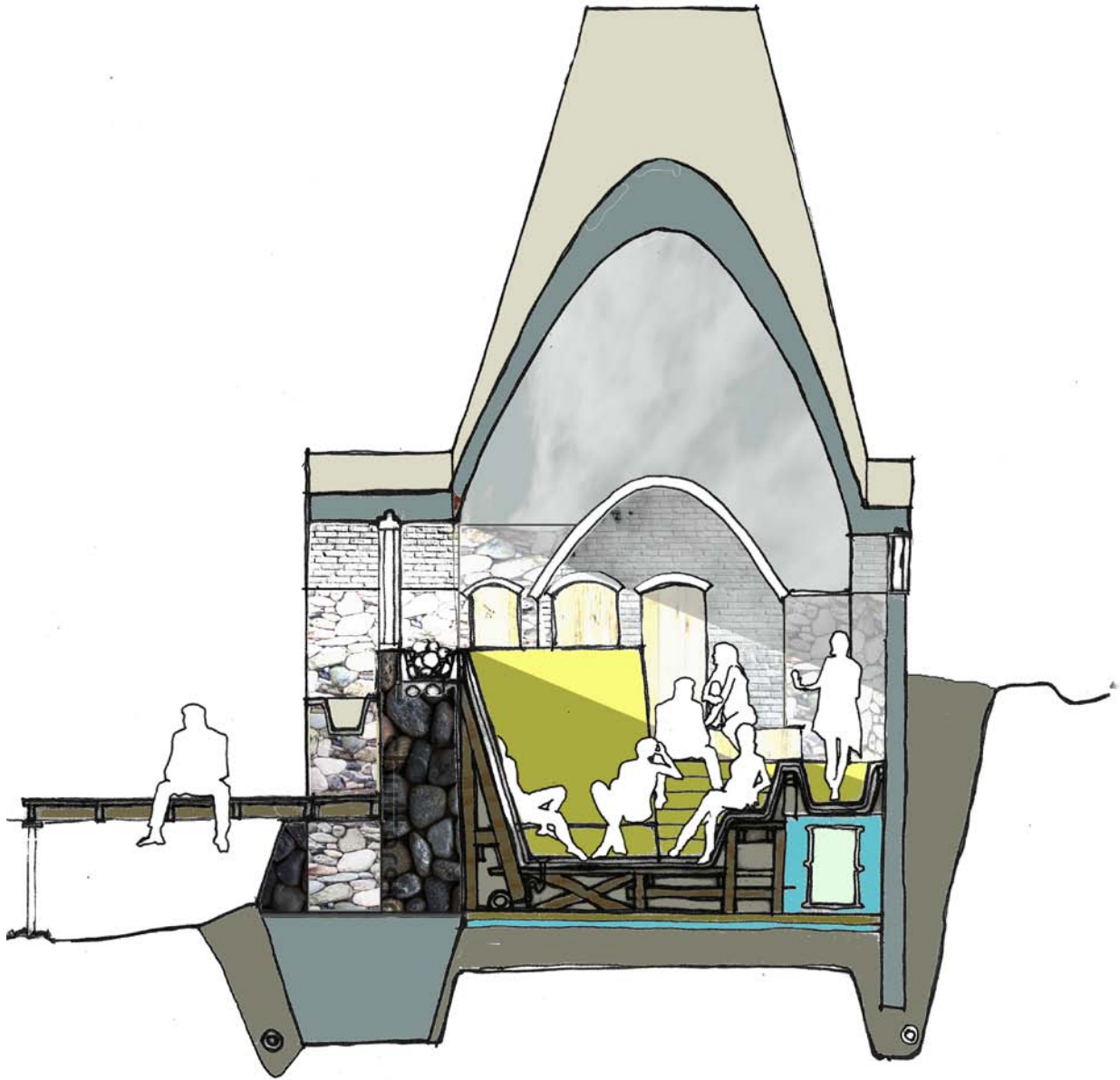
Section C, C: Through Sectionally Articulated "Wet Hearth" or Steam Bath With Provisional One-Season Roof



Section C, C: (Keyed to Plan on Page 106) Through First Winter's Provisional Enclosure, Showing Sectionally Articulated Bath with Provisional One Season Roof

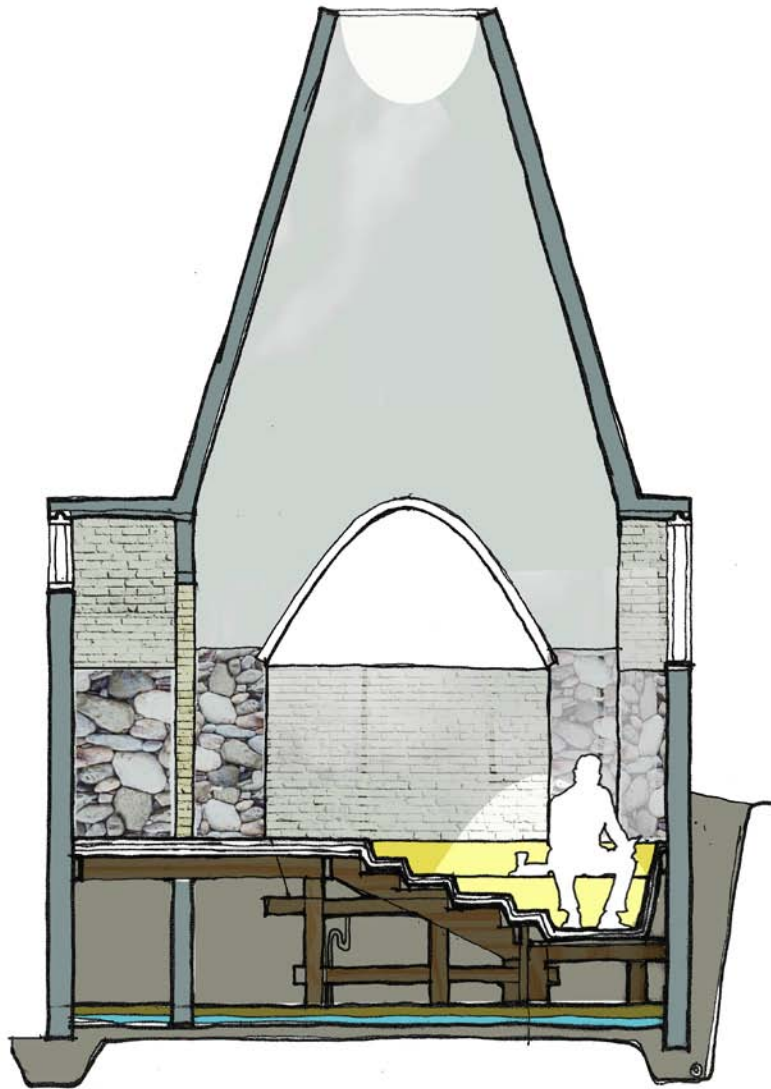


Section C, C: (Keyed to plan on page 96) Through Sectionally Articulated "Wet Hearth" or Steam Bath With Masonry Chimney Roof



Section C, C: (Keyed to Plan on Page 106) Through Steam Bath During Second Winter: Sauna Party





Section A, A: (Keyed to plan on page 96) Through Bath During Second Winter.

# A WANDERING HEARTH:

## FOR A HOUSE IN THE REMOTE NORTH.

### Increment # 3

## Expansion : Refinement

The third and final increment of this project's design and construction extends a large open sun space from the central radiant heating core. This core's exterior face is fitted with the appliances of a primary indoor or "master kitchen", which opens onto a living and dining space that further annexes what was previously a detached utility room into an interior second bedroom or office. The indoor "master kitchen" extends laterally through the main entry's sliding doors onto its outdoor summer equivalent, and the patio entry also functions as an open air summer dining room.

Where the previous two design exercises fitted a strategy of tenural articulation to the evolving and dynamic needs of their client constituents, this project's client is only one person. He does however live in a place characterized not only by by pristine wild surroundings, but also by violent seasonal climate variation. Temperatures in the area might exceed 100 degrees fahrenheit in summer, and reach -40 degrees below in winter. Jay can make the most of his small space by extending it into the outdoors in moderate weather, and conserve vast amounts of heating energy by retreating into smaller partitioned space throughout the frigid winter. His tenural requirements suggest a seasonal cycle of spatial annexation and retreat.

The project now enables those strategies. It's expansion has proceeded by a wandering succession of strategically redundant hearths, which partition it both spacially and climatically. Their amenities were provided in redundancy for continuous service during their construction. Having proceeded simultaneously and parallel to the process of expansion, this distinct process of infusion, refurbishing, and refinement might continue beyond expansion and indefinitely. Any of three kitchens can serve while another is being tinkered with or replaced, one basin or bath tub might be casually retiled while another remains intact for morning showers. Similarly any of this small house's four sinks can soak laundry, soak dried lentils, or bathe a baby while one remains free for dishes. These diversities and flexibilities of purpose come with an invested homeowner who has been deeply involved in their advent. This owner / occupant is comfortable in the processes of a vibrantly productive and richly experiential built domesticity, weather constructional, otherwise, or something in-between.

# WANDERING HEARTH: A HOUSE IN THE REMOTE NORTH

**+ 72 MONTHS**  
**+ \$80K**

**The Sunroom: a Complete Process of Expansion and Indefinite Process of Repurposing and Refinement**

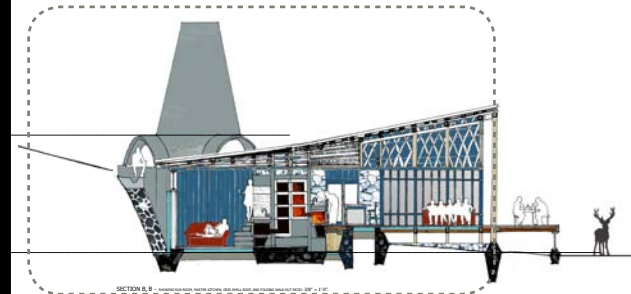
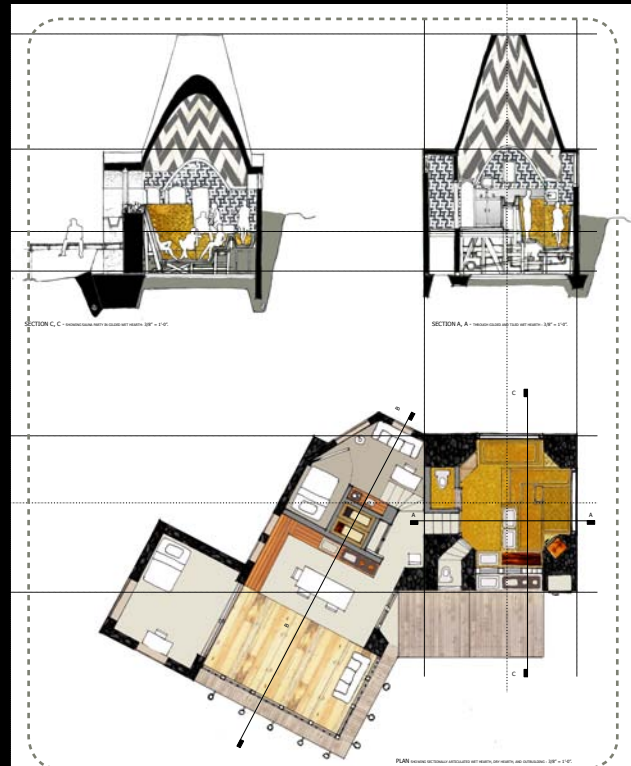
**Pages 108 & 112-111**

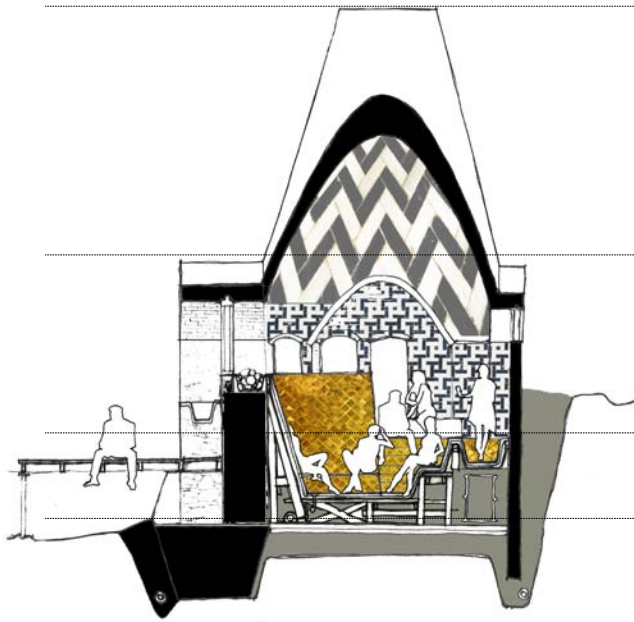
**Section of the Grid Shell Sunroom and Final "Master Kitchen"**

**Page 109 - 111**

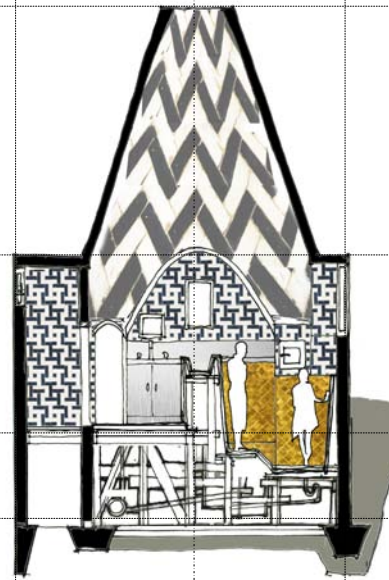
**Model of In-Situ Hearth Formworks, Guideworks, and Narrative Design Artifacts**

**Page 97**

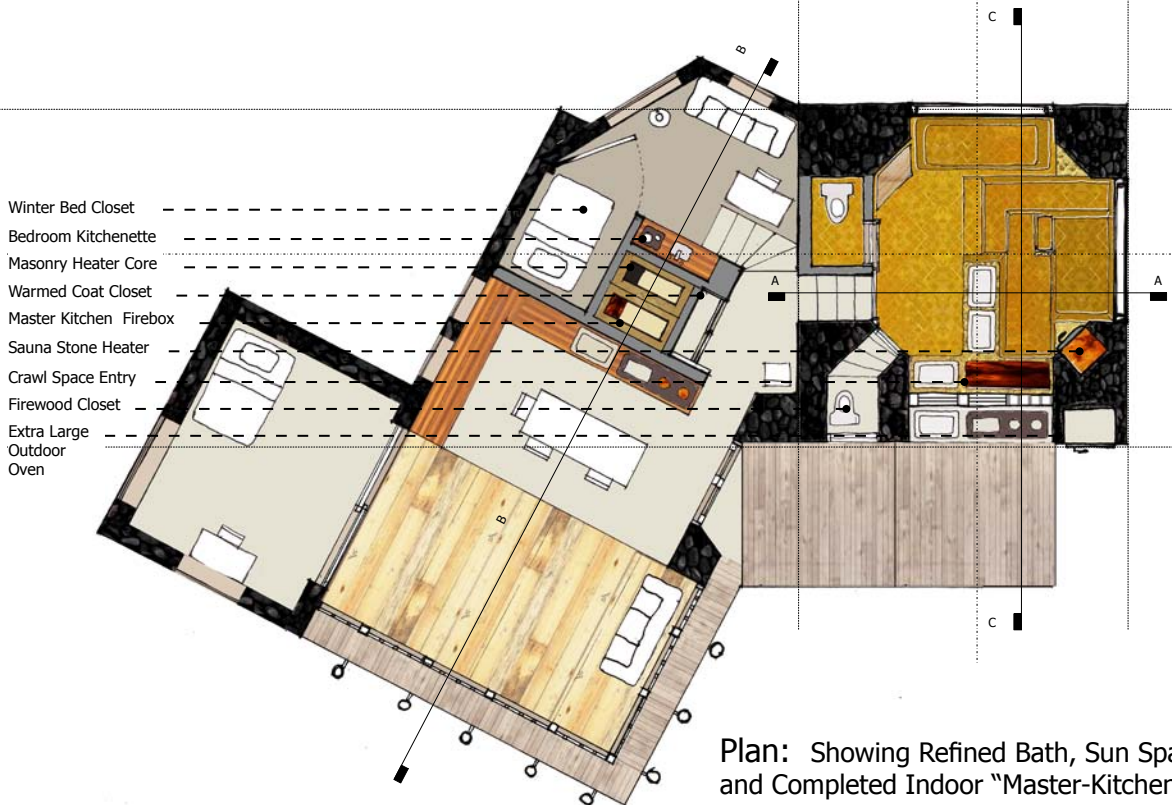




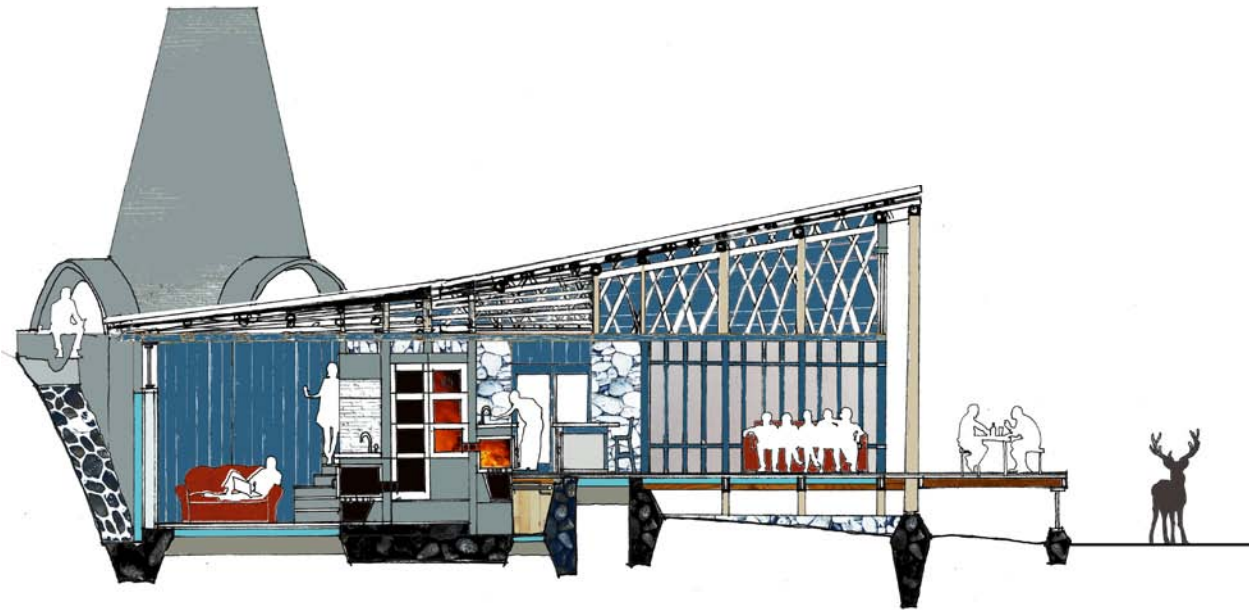
Section C, C: Through Refined Bath



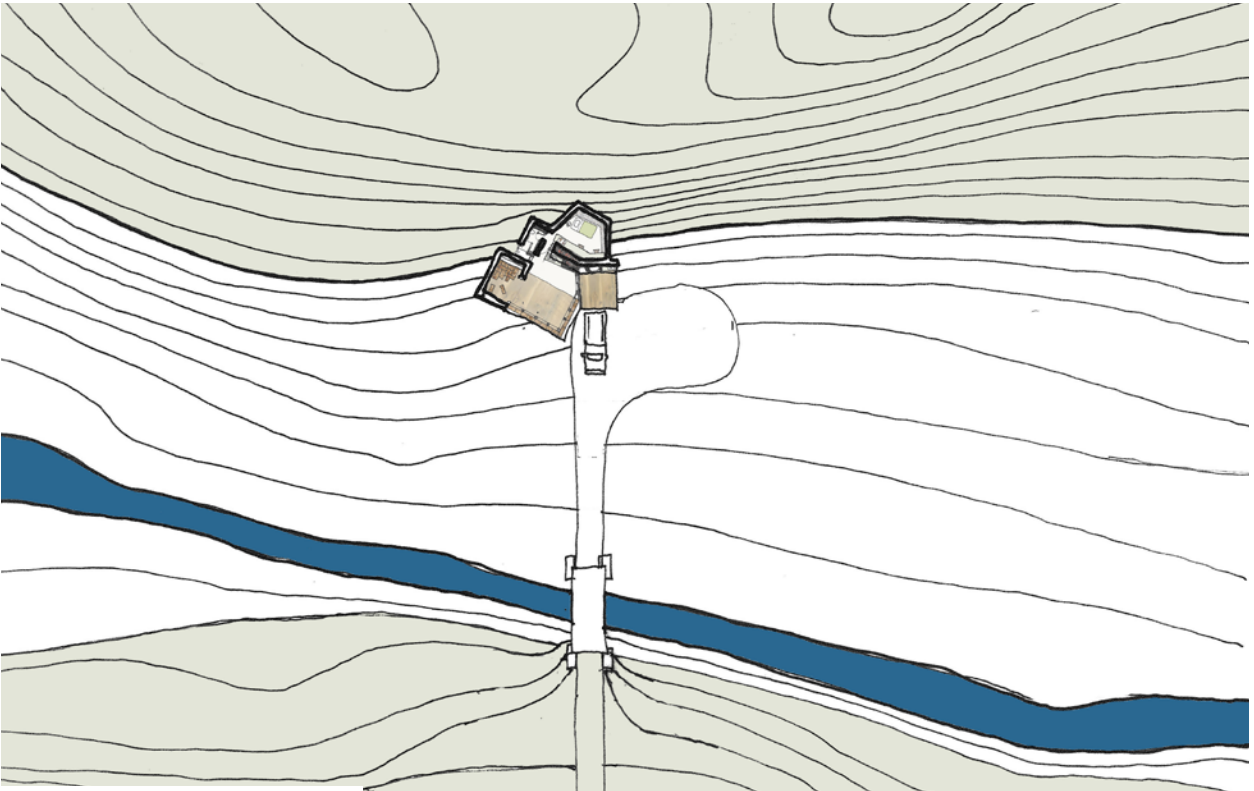
Section A, A: Through Refined Bath



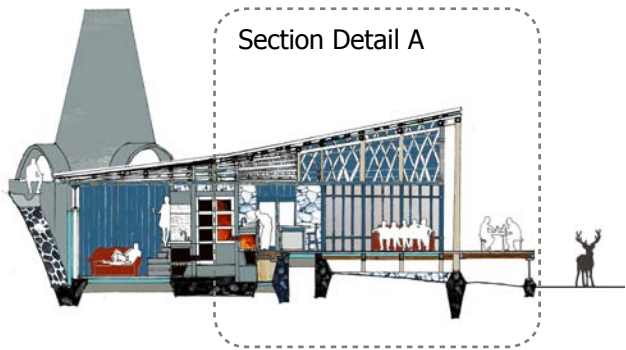
Plan: Showing Refined Bath, Sun Space, and Completed Indoor "Master-Kitchen"



Section B, B: Showing Dry Hearth and Radiant Masonry Heater, Grid-Shell Roofed Sun Space, and Bath Chimney Elevation



ed Expansion and Topography

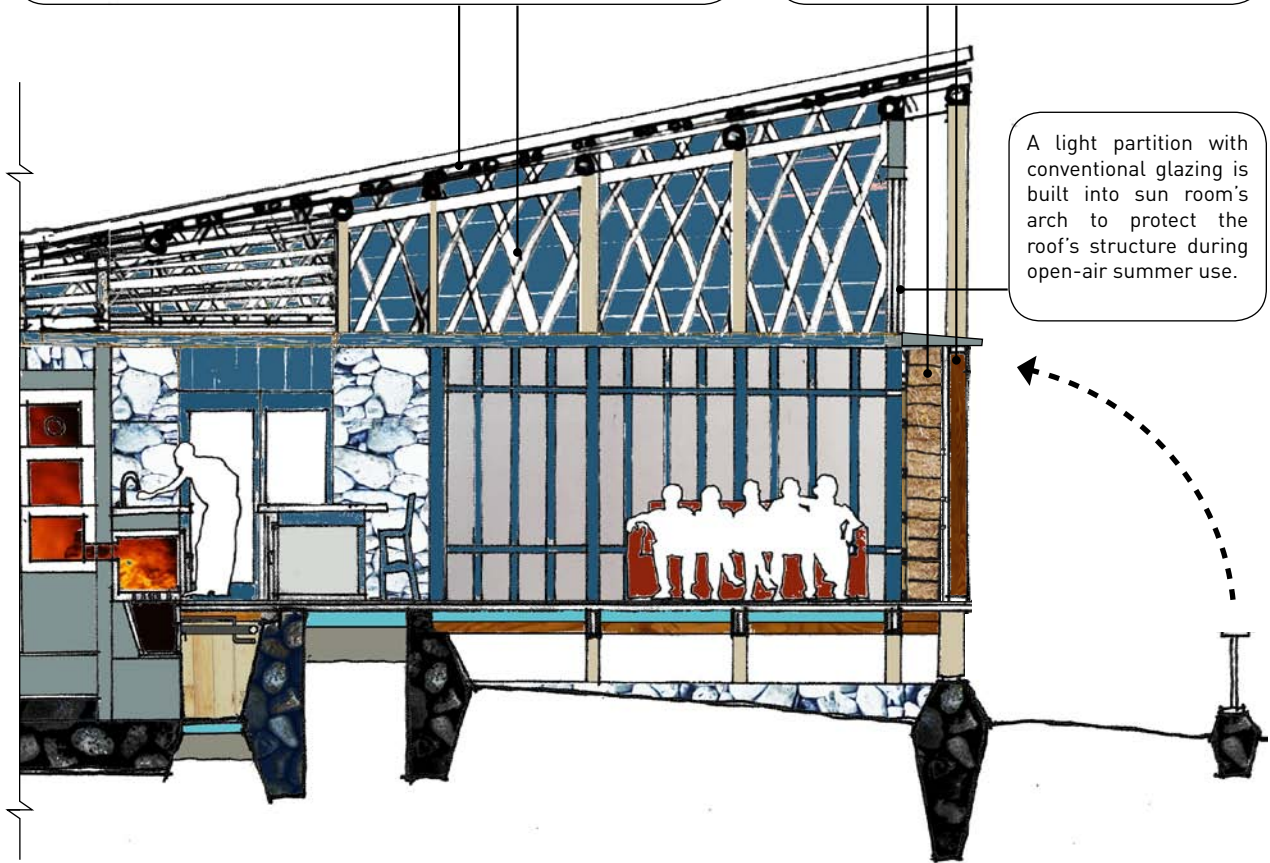


Section Detail A

Section B, B: Showing Sun Room as Covered Screen Porch and Primary Summer Living Space

The sun room's bent lattice roof is made from tall, thin, and straight ash trees from a nearby swamp. Though their wood will be extremely hard when dry, they are relatively flexible when fresh cut. Sheathed in planks, smaller dimensions of milled pine or oak can be bent over the cladding to fur out space for the necessary insulation and ventilation. The same furring can provide nailing for a drainage plane.

Straw bales wrapped in vinyl beneath a protective gable provide deployable seasonal insulation. The front patio can also be raised on hinges for a more substantial wind barrier. During the cold months, the sun room can function as conditioned space some or all of the time. It's upper windows allow the low-angle rays of a mid-winter sun to reach the hearth's stonework, and to store additional heat in it's thermal mass. This larger living space can be abandoned in the coldest months as a semi-conditioned indoor buffer space, in favor of the smaller and more easily heated dry hearth bedroom, with its separate kitchenette and partitioned access to the bath.



A light partition with conventional glazing is built into sun room's arch to protect the roof's structure during open-air summer use.

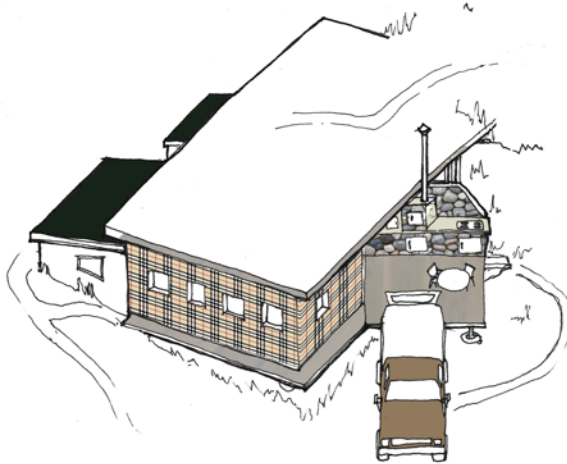
Section Detail A: Showing Sun-Room's Winter Annexation of Conditioned Indoor Space



1. In the warm summer months, the sun room's primary living space might be enclosed by a bear-proof wood frame and insect screen.



2. As winter approaches, straw bales acquired from a nearby farm are stacked against the exterior screened wall. While these might only serve for a few seasons...



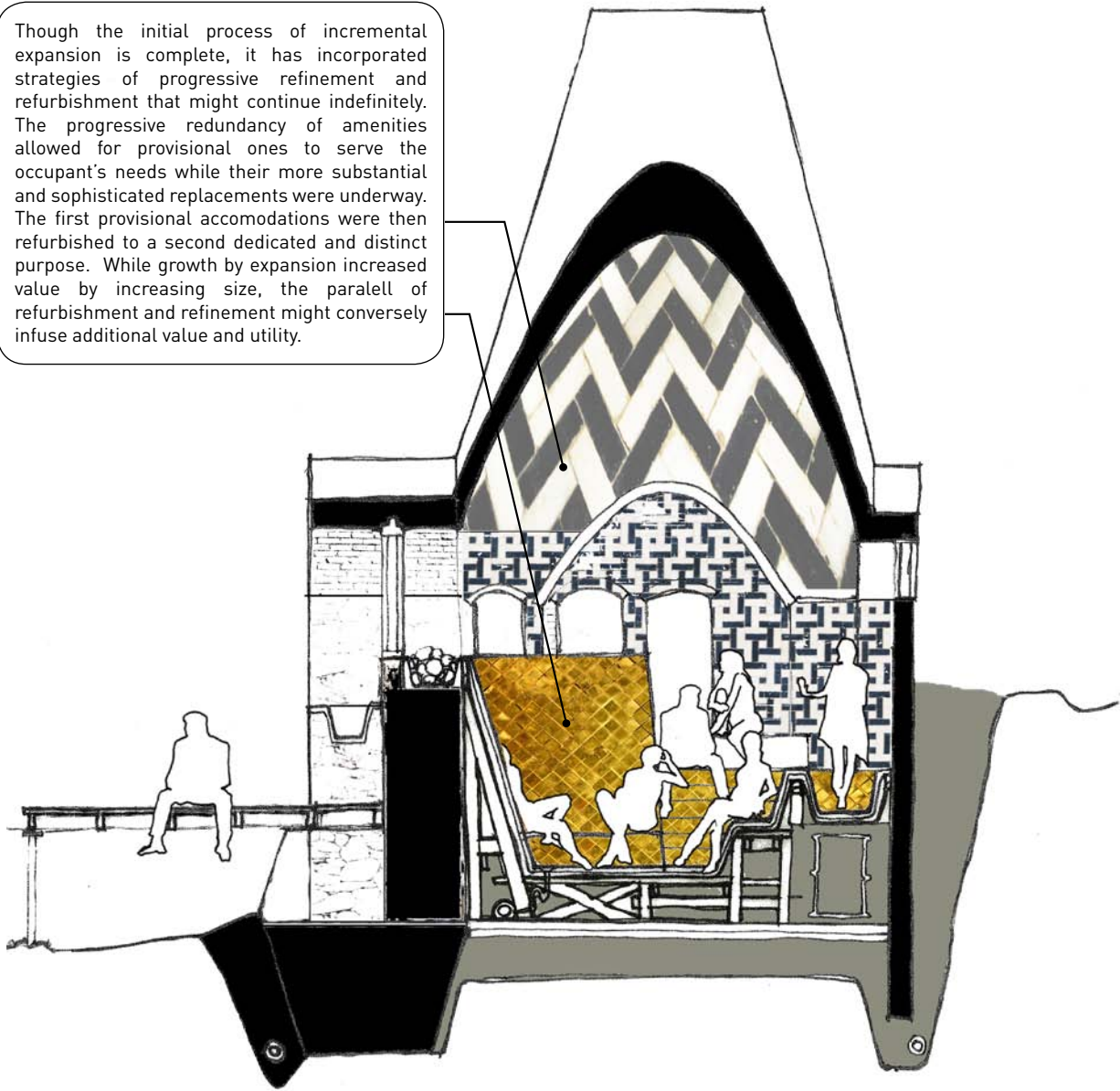
3. ...their more durable weather-barrier enclosure could be contracted to a vinyl billboard printer. It could show a map of the world, polka-dots, camouflage, a Burberry print...



... or a lumberjack's flannel plaid print. Such sheeting could be packed away in summer, or rolled up in place. As a retractable awning, it could be quickly deployed to enclose the sun room on cool nights or against summer storms.

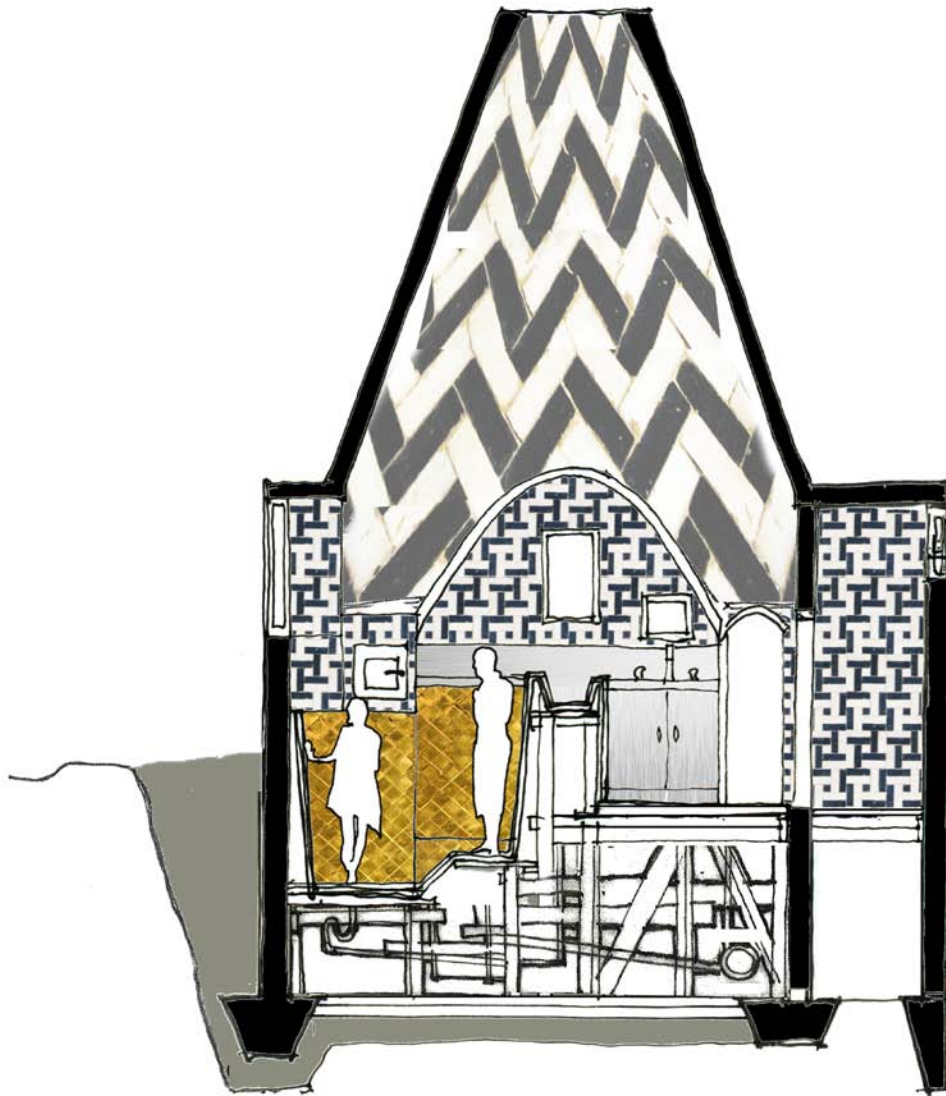
Conceptual Axons: Showing Winter Annexation of Conditioned Indoor Space (and an Earlier Low-Slope Roof Design)

Though the initial process of incremental expansion is complete, it has incorporated strategies of progressive refinement and refurbishment that might continue indefinitely. The progressive redundancy of amenities allowed for provisional ones to serve the occupant's needs while their more substantial and sophisticated replacements were underway. The first provisional accommodations were then refurbished to a second dedicated and distinct purpose. While growth by expansion increased value by increasing size, the parallel of refurbishment and refinement might conversely infuse additional value and utility.



Section C, C: (Keyed to Plan on Page 106) Through Refined and Refinished Steam Bath: Sauna Party





Section A, A: (Keyed to plan on page 106) Through Refined and Refinished Steam Bath: Weekday Morning Showers

## AFTERWORD

The design strategies that have been outlined in these three exercises are possible because each project is continuously client-owned, throughout. Beyond presuming a client who is invested in and empowered within the constructional process, these strategies seek to embed building into daily domestic routines.

This proposed incremental homeowner comes in consultation with a new generalist architectural practitioner, engaged in a new mode of practice. At scale, their new model of patronage and partnership might also raise architecture's tiny voice in the forum of mass housing. In place of market-researched wants and needs, such endeavors might further infuse the popular imagination with new, more diverse, and more organically synthesized attitudes toward both building and domesticity.

Far beyond white walls and television, the domesticity advanced in this proposal strives to be richly productive and experiential. Where building is at present delineated as an industry, domesticity is among the most intimate realms of culture. Designed incremental housing proposes the hybrid of a new building culture. Its pursuits might thicken the currently anemic fringes of our building industry into something not only more equitable and democratic, but also much richer, more vital, diverse, and hospitable to innovation .

# **PART THREE**

## **ESSAYS**

**DESIGN,  
NOT DEBT**

**INCREMENTAL HOUSING  
AS A NEW MODEL  
OF ARCHITECTURAL PATRONAGE.**

The famous British statesman and notable non-architect Winston Churchill coined this often quoted nugget on the specific topic of building: “We shape our buildings; thereafter they shape us.”<sup>1</sup> He was talking about the British House of Commons, which had recently been destroyed in a WWII bombing raid and went on to say:

...we have now to consider whether we should build it up again, and how, and when... Having dwelt and served for more than forty years in the late chamber, and having derived very great pleasure and advantage therefrom, I, naturally, should like to see it restored in all essentials to its old form, convenience and dignity.  
-House of Commons (meeting in the House of Lords), 28 October 1943<sup>1</sup>

Churchill’s credentials for such a statement were absolutely ideal - not as an architect, builder, or even as a revered head-of-state, but as he named himself above, a concerned dweller. The dweller’s perspective remains undervalued not least within the United States prevailing housing delivery systems, and the proposals in this thesis are based on close examination of what Churchill left in hazy collective pronouns:

“*We* shape our buildings; thereafter they shape *us*.”

Where he wanted the house of commons to rise again in it’s old image, I intend to argue that now in the aftermath of it’s 2008 sub prime mortgage crisis, The United States’ housing delivery system should be heavily redesigned. Rather than focusing services on an embattled middle class and crudely scaling-up to serve the affluent, it should be geared to directly serve those lower and lower-middle-income households that in the past were only accommodated indirectly, through additional and often large public subsidies.

The United States’ current housing stock was legitimately shaped by, and continues to be shaped in the mold of an industrial economy and conjoined consumer culture, though more and more erroneously. It currently has nothing of much consequence to do with design, because design is a currency of services and American housing today is a consumer good. Not unlike sausage, the underlying services of speculative new housing are processed beyond recognition and packaged for big, singular, sanitized transactions. It remains nonetheless, a vernacular project. Acting as Churchill’s collective *we*, Americans shaped and perfected a brilliant industrial/consumer vernacular throughout the 19th and 20th centuries. In so called “conventional construction”, we have a unanimous constructional logic that lives in the public domain, and so tacitly focuses the efforts of a vast and otherwise decentralized private residential building sector. We know this

modular pseudo-system by many names. A few are outmoded or describe sub-sets, but are as follows: Balloon, platform, stick, stressed-skin, panel, and most precisely, the light-wood frame. It isn't the only residential building system, but is by far the dominant one. It isn't faceless but countless constituents. It also has an obscure story which bears telling for later contrast.

Though its foggy precursors were first noted in the 1830s<sup>2</sup>, the light-wood frame's present ubiquity wasn't insured until at least half a century later. While small towns sprang up instantly along new rail lines, their commercial infrastructure took decades to mature. Like other consumer goods towards the end of that interim, small houses were often purchased from mail-order catalogs. The numbered parts of light, cheap, and complete manufactured cottages were delivered and assembled throughout the sprawling young hinterlands by Sears Roebuck<sup>3</sup> and a dozen other companies, preempting any threat of vernacular ingenuity and setting a universal precedent for "good-enough" housing. The constructional diagram of American housing was complete then, and its logistics were mature by 1946. William Leavitt added back-yards to the package-deal that year. He pre-assembled his "5 architectural styles" on 6,000 square foot parcels of former Long Island potato-field<sup>4</sup> and suburbia, or high-volume speculative real-estate, was born.

Those many great industrialists and designers who tilted after a viable factory-made housing in the 20th century could not have realized the full extent of the light-wood frame system's quintessentially industrial perfection. Its modular components approach a fabric of extreme transcontinental homogeneity, and so the value of a light-wood frame house is defined almost exclusively by its two most external variables: size and location. The rest is just veneer, easily and frequently replaced. Each successive generation of this veneer increases in industrial intensity, as to a lesser degree does the structure beneath. Wood-grain textures are pressed into fiberboard, stamped into aluminum, cast into fiber-reinforced lightweight concrete, vinyl, and increasingly exotic polymers; timbers are engineered into lower and lower wood-to-adhesive ratios or replaced by punched, folded, and zinc-coated tin. Occupancy is delayed accordingly, for longer and longer periods of initial off-gassing.

Just as the light-wood frame's tacit module accommodates high volume manufacture of interchangeable fixtures and finishes by decentralized private interests, its constructional ascent to the public domain enables many tens of thousands of builders to independently deliver nearly identical products from coast to coast. The light-wood-frame's pseudo-proprietary systematization is the simple, unattributable, and dispassionately self-perpetuating signal of a hive mind. Given a

corporate face, it would certainly have been broken-up with anti-trust lawsuits long ago.

The light-wood frame is not only now feral monopoly, but also substantially corrupt. It has conquered middle-America and mutated into specimens of shocking size and expense. Not only has the catalog of its manufactured trappings has ballooned and been value-engineered into a language of baroque pastiche, but cape houses dot the prairie and ranch houses dot the suburbs. Dens, family rooms, double-height vestibules, sewing rooms, craft rooms, and yes, “man caves” have been conjured into popularity like so many greeting-card holidays, and flat-screens hang over gas fireplaces as if to deliberately profane the once vital instrumentality of a hearth. It’s safe to say that nobody asked for any of these things. Sure lots of people like them now, but many domestic features of today’s housing stock are still perverse bells and whistles. Nobody would have asked for them before marketing consultants and value-engineers earmarked them into speculative model homes. If we don’t have a satisfactory portrait what prospective home-owners really need today, we at least have an average of what they get.

A survey by the National Association of Home Builders in 2011 returned an average new single family home of 2300 sq. ft. It sits on a parcel ten times that size and commands an average sale-price of 311 thousand dollars<sup>5</sup>. After 30 years of mortgage payments and property taxes at today’s national average rates<sup>6</sup>, the real cost of this house might approach something closer to 640 thousand dollars – more than double the realtor’s sticker price, and over three-times the builder’s construction costs<sup>7</sup>. Like so much about this house, the price-tag is deceptive.

The developer will likely need loans or investors to build this house, and the speculative consumer will invariably rely on a mortgage loan to buy it. According to Cambridge, MA developer Bob Engler, developers summarize the critical roles in a truism: “Buyers buy what builders build because that’s what lenders will finance.” It’s not immediately clear whose needs this house serves, but it is clear that only about a quarter of U.S. households currently make more than eighty thousand dollars per year<sup>8</sup>. In theory and according to HUD’s definition of affordability, this house is only affordable for them.

In practice, national averages are an expedient fiction, and the picture darkens. This mythical average house in a mythical average market might be “just right” for a household that relies on the single \$80 thousand dollar annual income of an engineer. Another likely household might combine the \$40 thousand dollar incomes of two middle school teachers. Yet a third might

top off the \$50 thousand dollar annual earnings of a plumber and the 15 of a short-order-cook with the tiny 5 thousand dollar pension of an elderly live-in mother. Any of the above might be very comfortable or might struggle to find housing in Evanston, IL. Median home prices there currently hover around 230 thousand dollars<sup>9</sup>. They might fight to survive even as renters in Anaheim, CA, where home prices average nearly twice as much<sup>10</sup>, and they might live like kings in Syracuse, NY, where the average home today costs less than half.<sup>11</sup> Any of these households may or may not have childcare expenses, medical bills, college loans, or credit card debt, but in any case they mark the fortunate 75th percentile of current U.S. Income distribution. For some of them homeownership is a cakewalk, and for others it is completely impossible. The bottom 20% of U.S. income distribution is not the only demographic that today's privately produced housing stock fails.

The net result is that only 65% of U.S. households can currently manage within their boundlessly diverse circumstances, to own a home. In the 30 years between 1962 and 1992, home-ownership averaged near 64%<sup>12</sup> and conventional wisdom cites fundamental income distribution as the limiting factor. Global financial meltdown followed soon after home-ownership crested at 69% in late 2004<sup>13</sup>, and today after five years of personal tragedy and market correction, this rate is again falling near 65%<sup>14</sup>.

Nonetheless, the aspiration to own a home remains extremely popular. Even in the thickest of the sub-prime mortgage crisis, approximately 90% of respondents to the 2010 American Community Survey both wanted and expected to someday own a home<sup>15</sup>. Comparison of this popular aspiration and its painfully demonstrated economic limits reveals a striking disconnect. Not only will 35% of U.S. Households likely be lifetime renters, but most of those - a full quarter of all U.S. Households it would seem, will ultimately fail in their current aspiration to own a home. This seems inevitable unless something big and fundamental changes, and it won't be the light-wood frame. Speculative light-wood-frame housing is today a completed project. It has been value-engineered and refined past its full potential. Though it partially created and evolved into the ideal of a now embattled and shrinking middle-class, it won't directly serve anybody else and was probably never meant to. The days of its long monopoly seem inevitably numbered.

Tomorrow's housing has a very different constituency. Forty years of gradually increasing U.S. income equality were severely exacerbated by 2008's crash. U.S. income distribution is trending to support even lower rates of homeownership, and the tastes, attitudes, and capacities that



Tomorrow's new households are now forming bear little comparison to a stereotypical baby-boomer's. "Generation Y" or "the Millennials" already have for instance, a much more turbulent relationship with debt. They also have a previously unheard-of domestic flexibility. They are approximately 50 million strong, born roughly between 1980 and 2000<sup>17</sup>. Nearly thirty percent of them aged 25-34 currently live with their parents<sup>18</sup>. The unemployment rate for 18-29 year old workers was nearly 4 points above the national average, at 11.8%<sup>19</sup>, and one estimate considers an additional 25.2% to be "under-employed"<sup>20</sup>. According to a metropolitan life insurance company report, only 30% of this age group are building savings<sup>21</sup>, 42% self report an inability to pay their bills on time<sup>22</sup>, and the national foundation for credit counseling attributes them a current average of three credit cards, 20% of which carry balances of over \$10 thousand dollars.<sup>23</sup> Two thirds of 2011's graduating college students carried student loan debt at the highest-ever average of \$27 thousand dollars.<sup>24</sup> While 17% of those aged 27-34 had taken out a first time mortgage a decade ago, only 9% of today's same age-group have<sup>25</sup>. When the time comes (however belatedly) for those remaining to enter the housing market, they will likely be lacking or late to traditionally secure careers. They will likely lack the savings to meet today's new semi-standard minimum 20% mortgage down-payment<sup>26</sup>. Many will have hopelessly damaged credit, depleted family resources, and those among them who are capable of securing a home-loan might be understandably reluctant to do so.

Financiers claimed universal ignorance of potential consequences in the aftermath of 2008's crisis. Whether they are to be believed or not, the production of housing as debt-enabled speculative commodity is more complicated than it seems and less transparent than is healthy. It carries risks that even yesterday's home-buyers might not have tolerated had they been apparent. For speculative housing development to work at its traditional monopolistic scale again, these risks must be concealed or left unexplained, and taken on-behalf of would-be home-buyers again covertly, by investment bankers. If the housing market recovers unaltered, the constant risks of faulty speculation will eventually return too. Still unit for unit, housing today is perfectly tailored to its dual function of concrete consumer good and abstract investment commodity. Housing today is built by and for debt, though tomorrow's housing at least wants alternatives.

Recalculated within the full hypothetical 30-year cost of the NAHB's average 2011 home, the profit margin of any given actor today would rarely break 4%<sup>6,7</sup>. In the best of times, developer's profit margins have averaged near 20% of sales price<sup>27</sup>, or 10-15% of the 30-year cost. For Home Mortgage Lenders, the margin on each unit is comparatively enormous, constituting as much as

36% of an eventual 30-year consumer cost<sup>6,7</sup>. In that light, the federal government would seem to have vastly over-accommodated housing's dependence on such an abusive mechanism. So many complain that the controversial mortgage-interest tax deduction helps affluent home-buyers most, but in truth it helps their creditors far more. Once hailed as a likely solution to any number of "housing problems", mortgage lending's monopoly on housing "transactions" has evolved into the system's most egregious dysfunction and probably the root of all others. It incentivises the commodification of housing for retail. Conventional developers can maximize their profit margins only by building at cookie-cutter volume. This in turn incentivises hasty production with cheap standard materials, marginally-skilled labor, stale technology, and overly-conservative design. Retail housing producers have little incentive to incorporate features that might reduce operational energy costs because they won't pay them, and their profit-maximizing marketing strategies have fabricated a popular taste for fraudulence and excess. For all of these reasons, the time has come to de-standardize, de-commodify, and de-leverage housing.

This daunting trifecta is no job for singular new typologies. After a century of value-engineering, the light wood frame tends to crush competing typologies in the free market, and any that might gain a foothold would certainly be flattened for serialization on the prevailing debt-reliant delivery model. The stated goals would directly contradict the habits of an industrial economy, and call for a new set of attitudes toward both housing and domesticity. Weather the post-industrial economy will be named for "service" or "information" can be figured out later, but the United States needs post-industrial housing now.

Where housing production for speculative commodity can be described in the succinct call-and-response of supply and demand, tomorrow's post-industrial housing is better defined here by the five interrogative pronouns: who, what, where, why, and when.

The "Who" of tomorrow's new housing stock no longer has an early-onset career path, reliable savings, or a clear set of footsteps to follow in their trajectories. This is to say that tomorrow's households will not likely "assemble" a life of modular milestones like the stereotypical baby-boomer, but will undertake life either individually or en-masse as something more opportunistically collaged. Their lives will be far less driven in pace by centralized institutions like marriage, college, organized labor, or even corporate culture. Such variability makes tomorrow's households hard to anticipate as demographic brackets, and so difficult to serve with "off-the-rack" shapes and sizes of speculative housing. Such apparently bleak circumstances can still accommodate secure

and rewarding lives - but really only by design.

This brings us the “What”. Tomorrow’s housing should be designed. It should be substantially owner-occupied, and occupant-initiated. Gen Y’s uncertain levels of future financial security would prohibit the old notion of “growing-into” a too-large speculative home. Tomorrow’s households will have an unpredictable chronology of evolving needs, and so should be able to tailor housing in a progressive or incremental delivery process. They should have the option to build-up what currently must be paid down. A working 23-year-old’s hypothetical “mini home” should be owned outright, re-articulate, and expand four or seven years later into a “starter home”- then a “family home” , “live/work” place, or be “downsized” as necessary. Advertisers would have us believe that today’s youth value experience over material goods, so this would seem to be their wont as well as their need. Tomorrow’s home-owners should have mechanisms by which to feel out and tailor housing as a process. The result would be a novel and tantalizing amendment to Winston Churchill’s famous quote: Rather than “We shape our buildings; *thereafter* they shape us...”<sup>1</sup> it might read “We shape our buildings *because* they shape us”. At the scale of an owner-initiated home-building project, Churchill’s “We” can be a single household. It would be the same household as Churchill’s “Us”.

Though the materials and labor of today’s housing are dictated primarily by the speculative retail delivery schedule, a self-initiated and elongated incremental time line would alleviate critical constraints. Rather than matching proprietary building components to proprietary building trades, the maturing paradigm of “distributed knowledge” (borrowed by the design community from computational science<sup>28</sup>) can invigorate in-situ material and labor-market landscapes. No longer centered not on regional distribution centers these could radiate panoramically from the extreme locale of a given building site. Said another way, global knowledge and information can tap the deepest potentials of locale. Rather than relying solely on what lumber-yards and big-box building materials suppliers choose to keep in stock, The availability of materials can be quantified in a much simpler equation of as-is, in-situ, proximity to home. Post-industrial materials and labor are not exclusively manufactured, specified, and installed. They are also and indiscriminately raw, commissioned, and made; by huge machines, tiny machines, and hands; by highly skilled professionals, unusually skilled crafts people, and adventurous amateurs; by full-time, part-time, and occasional labor.

The “where” of tomorrow’s new housing must also be an exercise in design opportunism. Land

is generally expensive, but both prime and highly unconventional real-estate might be bartered in part or whole for services. Tax ceded parcels can be obtained for trivial sums through civic re-investment programs, and the United States' sprawling suburbs constantly beg for more manageable and affordable sub-divisions of their gargantuan parcels. Post-industrial housing starts are as such, best suited for coach-houses and infill. They are best suited for combining two twenty-five-foot-wide vacant, blighted, urban row-lots into two forty-foot-wide co-op low-rises with double street and alley-side fronts. They are ideal for remote plots alongside little creeks or deep in forests, so long as those are no longer the outposts of long, petroleum-fueled, daily commutes. Just as housing toppled our investment markets five years ago as a controlling minority share of GDP, we should call on housing to drive necessary change in our supporting infrastructure and cultural attitudes. Tomorrow's housing should break up segregated property-tax bases and income-enclaves. It should stitch injured, languishing urbanity back together, and demand accommodation by sustainable transport systems. Where the material and labor infrastructure of the conventional light-wood frame biases global and mega-regional scales, designed incremental housing's inherent opportunism would distribute profits and capitol into small local enterprise. It would bolster the inherent resilience of such myriad and overlapping locales, and encourage the necessary changes in infrastructure within them, at scale.

"Why" is always a complicated question, but in fact less-so for this vision than for today's reality. Today's speculatively produced housing is almost more about abstract commodities of individual security and comfort than their human analogue in day-to-day reality. It is about prices fixed to meet the many bottom lines of crowded partisan real-estate transactions, and about feeding the big withdrawn machinery of global finance. Tomorrow's housing should be about shelter, essential human needs, and essential human comforts. These should not be precariously balanced on investor confidence, but subject only to enterprise, time, gravity, and the elements. A layoff, illness, bad investment, or any number of misfortunes seemingly unrelated to housing can put mortgages in default. Defaulted loans can put families in the street with the added insult of ruined credit. Any such misfortune suffered by an owner of incremental housing would instead simply stall the delivery process intact. Far from being doubly disenfranchised, they could rely on out-right an unleveraged ownership of a home to better cope with, and more readily rebound from any otherwise adverse circumstances.

"When" at the scale of a unit, relies on the central tenet of an extended incremental construction time-line. That single added flexibility allows time to consider and better evaluate materials,

labor, and size through the lens of design, case by case. At the scale of annual housing starts, “When” would occur as-needed. The antithesis of speculation in both planning and process, owner-instigated incremental housing would leave speculation-driven investment markets to exploit other commodities. It would instead feed capitol and momentum directly back into those many local economies which are currently starved of grass-roots enterprise, and are also notably both more inherently stable and inherently resilient than global investment markets. Regardless of how their retirement funds might structured, what small business owner or local service provider could object to that?

The “post-industrial vernacular” is a notion rooted precisely in grass-roots enterprise. It is a project for the newly networked collective imagination to give wings, and for the likewise networked paradigm of distributed knowledge to orchestrate on the ground. Both notions are spreading rapidly enough through popular culture, but are still now and for these specific purposes best represented within design communities. This is not to say that architects should act directly as developers or contractors, as they do today with such telling infrequency. Conversely, it calls for a new type of general architectural practitioner – with a mandate not only to design lower and middle-income housing, but to explicitly embed logistic delivery services within design.

A preliminary diagram of this new incremental architect can be outlined in his or her prospective clientele. A given client might or might not offset their housing costs with D.I.Y. labor, but would almost invariably be called on to act as something like their own general contractor. This is a common-enough model for mortgaged conventional building in the U.S. today, and is very common in the UK as well<sup>29</sup>. It is referred to there as “self-build”, though the self-builder’s hands don’t always get dirty. The designer would verify sources of material and labor-availability for a commissioned increment of design and construction, and the owner/client would contract and realize it, referencing supplied contact information, drawings, files, and notes.

A full docket for one designer (weather independent or employed) might include up to 20 twenty individual projects and clients, which is to say that a designer working 50 weeks a year could devote 12 work-days per year to each of twenty projects. If the average income of this clientele was \$40 thousand per year (ranging from \$10 to \$80 thousand), and their monthly housing-production expenses were taken as a flat 30% of income (in accordance with HUD’s definition of Housing Affordability), the design fee could reasonably garner 30% of each resulting housing allowance. The designer after all wouldn’t be performing a developer’s or contractor’s role for a

12% or 20% fee, but would be supplanting the current role of debt, and so could similarly garner a fee on the order of 30%<sup>6,7</sup>. In constructional increments spaced between one and three years, a household making \$20 thousand per year could complete an \$80 thousand dollar project in twelve years. Another household making \$80 thousand per year could complete one of similar scale in three years. Instead of a thirty-year mortgage or rent-without-end, these households' 30% housing-cost budgets would be applied to highly abbreviated build-to-own time lines. For Incremental Homeowners, this would mean decades of not only enjoyable, but also economy-invigorating disposable income. It would mean the security of greater lifetime savings, could also mean the freedom to pursue their own endeavors, careers, lives, and dreams. The designers' material and constructional ingenuities, and tailored-size design services, not to mention the absence of incurred interest would very hopefully stretch \$80 thousand dollars into far better housing than it might otherwise buy in a condominium or suburban tract.

With a docket of twenty projects ranging from three to twelve years in duration, a resulting average annual design fee of \$4,400 for each of these twenty projects, this single designers gross annual billings might approach \$89,000. They would do far worse to design high-rise office bathrooms. High-rise office bathrooms tend to be designed by full-time employees making modest wages. Any such day-job holders might just as well take on one or two housing projects in their evenings and weekends.

The rising cost of various infrastructures, including "industry standard" design software, large-format printers, and work space are often blamed for the general decline of small architectural offices. The traditionally large and increasing scale of architectural design projects poses further barriers to these, manifest as both unwieldy and fluctuating ratios of staff size to work load. Incremental housing design conversely breaks small individual projects into several still smaller ones. Rather than requiring a hierarchically stratified team of schematic and production designers for each large project, a single designer would need many simultaneous incremental housing projects for his or her continuous full-time occupation. Where internship and practical training on large institutional design projects often consist of highly delegated monotonous production work, the conversely intimate scale of incremental housing design would provide a direct window into the whole process and real-time training in it. Just as proliferating access to tools and information might nullify the primacy of standardized building components, the same proliferation might undermine the necessity of "industry standard" design software. Still presently a very young technology, conductive touch-screen tablets have nearly closed the continuum between

digital and hand drawing while at the same time expediting collaborative communication. Where the past decade of design's digitization built up barriers to small practice, it's next decade of innovation promises to revive it's entrepreneurial prospects.

The following for example, is a list of architectural design deliverables that might be required for a large corporate campus project:

1. IMAGES: six or ten high-gloss renderings made with rarefied, extremely expensive, and frequently obsolescing suites of software
2. MODELS: A 200-hour presentation model made of laser-cut acrylic and CNC milled urethane prototyping foam, made by a small army of interns, and displayed on a really big conference table.
3. CONSTRUCTION DOCUMENTS: Dozens of two-inch-thick books containing thousands of drawings and volumes of litigiously written specification, or (but most likely also) an meticulously crafted and encyclopedic digital building information model.

A corresponding list for a modest incremental home might consist of:

1. IMAGES: Six or ten renderings quickly collaged from photos of small and simple physical and/or digital models, drawn over and embellished by hand with a few free programs and a few apps costing between nothing and ten dollars each.
2. MODELS: One or ten small two-hour physical models that might never be presented on a board-room table, but instead would be photographed, annotated, and dimensioned for use even as shop drawings. These might be collaged not only into materially rich perspective views, but also into working plans, sections, and details of similarly lush character. Rather than obsessive high-fidelity and crisp corners, such drawings could communicate rich atmosphere and material information under critical dimensions and necessary documentation.
3. CONSTRUCTION DOCUMENTS: One comprehensive, progressively updated, and indexed PDF file, Prezi, or Google Doc for the selective but common use of clients, zoning boards, contractors, and fabricators alike. This file might include navigable embedded 3D digital models, or might accompany links and invitations to shared digital files. This packet could again be produced completely by hand and analog methods, with a handful of apps and programs costing less than lunch, or some happy combination of them all.

As exciting as the prospects for a democratically re-professionalized design practice might be, the risks and pitfalls of actually building it's projects abound. Inexpert construction after all tends to leak, mold, burn, and collapse. The formulaic nature of most current building systems and the extreme professionalization of building-related engineering fields both testify to this undeniable fact. Nonetheless, the same information that professional engineers find in thick hard-copy manuals is increasingly available in on-line calculators and through case-specifically interactive software applications. Far from rendering engineers unnecessary, these reflect a similarly

impending evolution of their work flows and professional practices. Though of a scale conducive to cautious over-engineering, incremental housing projects could just as well commission an engineer's or building scientist's selective services. Incremental labor is called into further question. Even if you or I had never seen a brick, we might learn how to lay one from a you-tube video. That video might not be a substitute for instruction by a master mason, but it would be much more informative and expedient than a printed manual. We could infer a brick's weight by watching a demonstrator lift it, and how to mix mortar by watching mortar mixed in real-time. Designed incremental housing calls for a more generalized builder, as much as for a generalist designer. This builder might not be a single "master builder", but embodied in a revolving cast of contractors that might learn as many necessary skills in-process as any one might bring intact. If we can learn to build from today's distributed knowledge, it can also be tapped to verify and regulate the quality of resulting construction. Building codes are currently shifting away from prescriptive methods of compliance to software-assisted models of "performative" compliance. While current building performance simulation software are often used to strengthen more elaborate cases for non-standard building code compliance, some are also now implemented as direct metrics for code compliance. For much more on this topic, see "The Case for a Federally Administered Design Software Plug-In Building Code", immediately following this essay on page 142.

Another, and the last practical sticking point, is that architects, developers, and large contractors are famous for clogging up court-rooms. Making more and smaller projects out of housing might seem likely to exacerbate that problem. Architects today though, are unique among the regulated professions for their traditionally tiny and rarefied clientele. Those few clients tend to commission large civic and urban scale projects, in which the sheer volume, minutia, and monotony of critical constructional details seem to assure the failure of at least a few. Architecture's characteristic leaking and cracking is largely a consequence of a disconnect between office size and project scale, even when the offices in question are huge corporate ones. A small novel house might be less prone to leaking and cracking than a novel high-rise hotel, simply because there are fewer and less monotonous critical details to design correctly. Other professions, including doctors, lawyers, accountants manage to service far more populous clienteles' with certainly some, but comparatively low rates of failure and dissatisfaction. They do so despite the relative complexity of law, tax-codes, and human physiology, and maintain long-term, regular, and even sometimes life-long relationships with their clients. Still further, these more systematic professional relationships occasionally result in mutual familiarity, friendship, and trust.



What's called for in summary, is an indirectly incentivised and completely private general residential design practitioner. Their services would be formatted to supplant housing's current reliance on debt with phasing logistics embedded in new residential forms and tectonics. Just as the light wood frame scales in size and quality-of-veneer to serve middle and high income households, incrementally packaged housing design services could instead tailor delivery time lines to serve low and middle income households. By professionalizing and regulating the same here-to-fore informal mechanism that houses so much of the global south, the United States could raise the living standards of it's low and middle-income households alike. In just simply annulling a few arbitrarily defined "disadvantages" of currently disadvantaged households, we might even break the tether between income bracket and class distinction. Nobody really wants low-income housing after all. It's been lately re-branded as "affordable housing" and even "workforce housing" for precisely that reason. More than just re-branding, incremental design services can offer high and ultimately identical material standards to middle and low income households, albeit at variable rates of delivery. Substantially independent of income distribution or inequality as it were, designed incremental housing services could rally the American private sector to expand, and maybe even re-invent it's middle class.

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**DESIGN  
PATRONAGE  
AS A NEW FORCE  
IN FREE MARKET  
HOUSING DELIVERY:**

**THE CASE FOR A FEDERALLY ADMINISTERED  
DESIGN SOFTWARE BUILDING CODE.**

**(OR)**

**CODE COMPLIANCE? THERE SHOULD BE AN APP FOR THAT.**

The production of housing costs too much, and the United States endemic reliance on debt in housing delivery is dis-functional. In 2001, residential mortgages totaled more than six trillion dollars, or almost twice the federal government's total debt at that time.<sup>1</sup> The underlying problem hasn't escaped the federal government's notice. There are two notable instances in recent U.S. history in which the fundamental cost of housing delivery was acknowledged by the federal government to be detrimental, if not a societal debilitating. Federal efforts to defray the costs of housing backfired in both cases, and they provide valuable lessons. First, the effective de-regulation of mortgage backed securities by FNMA's 1968 privatization, and the disastrous though delayed reaction of 2008's sub-prime mortgage crisis reminds us that the very real costs of housing should not generally be buried or overly abstracted. Such high costs should never be ratified by their tacit denial again, by any even slightly opaque financial mechanism. Second, the short life and unceremonious abandonment of 1969's "Operation Breakthrough"<sup>2</sup> could remind us that fickleness of demand for housing might forever preclude any singular tectonic shift toward its centralized manufacture, and more generally that *resistance to change* is a defining characteristic of our spectacularly decentralized building industry. In tandem with the Operation Breakthrough manufactured housing design competition, section S-108 of 1968's Housing Bill guaranteed a market of 1000 prefabricated units per year for five winning projects and new home manufacturers over a period of five years. At the time, the federal government anticipated an unprecedented shortage and high demand for housing in the 1970s. The goal of Operation Breakthrough was to solicit the best and most feasible proposals for pre-fabricated and manufactured housing to meet it. Demand for such housing had never been strong enough for any single manufacturer to reach heavy industry's necessary economies of scale, and most that tried quickly went out of business. Congress, the Department of Housing and Urban Development, and the new Nixon administration hoped that a strategic five-year-long subsidy might help those endeavors reach a critical mass, but that the basis of anticipated demand proved greatly over-estimated<sup>3</sup> and

Operation Breakthrough was quietly tabled.

In fact, the standardization required of mass-produced housing is a tough sell where standardized mass-produced building materials currently offer comparative variety and choice, bland and conservative though the results may still be. Those economies of scale required of a viable factory-made housing have eluded American industrialists since the 1930s,<sup>4</sup> and big industry finally set aside that forty-year obsession after HUD promised it in 1968 and '69 but failed to deliver. The federal government succeeded in popularizing homeownership by “refinancing” its usual costs with mortgage backed securities and by subsidized mortgage interest, but poor regulatory oversight and endemically irresponsible retail lending practices recently caused that system to topple like a house of cards. The components of standard light wood frame and masonry cavity walls (or “conventional construction”) seem already value-engineered to the limits of their industrial economies of scale. Any new factory made housing unit typology would struggle to compete. The usual cost of housing might however be further reduced by conversely loosening the choke-hold of “path dependency” in new housing construction. Brick-and-mortar costs might be reduced by seeking ways to better unleash our newly networked societal creativity on what housing is made of, and how it is made.

Of late, the department of Housing and Urban Development hasn't taken a particularly strong or high-profile hand in building technology research and development. Just a year after HUD's founding however, The Model Cities and Metropolitan Development Act of 1966 established it's mandate “to work closely with and assist the housing industry in developing technology to reduce the cost and improve the quality of housing.”<sup>5</sup> Though HUD's efforts today focus more on legislation and regulation, those too can in certain instances bear directly and powerfully on construction and technology.



Though the federal government grants states and municipalities the power to adopt and regulate their own building codes and zoning ordinances, it can retract or re-delegate that authority at whim. Though many of even the smallest cities and towns have their own unique building codes, there is in fact *such a thing* as a national building code. One building code currently has national jurisdiction over all the rest, but only on wheels. In 1976, HUD Code (or the Federal Manufactured Home Construction and Safety Standards) gave mobile home manufacturers access to a national market by liberating them from the prohibitively varied constraints of state and local building codes<sup>6</sup>. Administered and implemented at the federal level, it recalled just that little bit of federally granted regulatory jurisdiction from states and localities to empower a new force in low-cost home delivery.<sup>6</sup> Chapter 40B of the Massachusetts Comprehensive Permit Act was a similar recall of jurisdiction granted previously by the state to localities, relieving would-be developers of affordable housing from the burden of compliance to often prohibitive local zoning ordinances. Federal legislation on Section 8 housing voucher subsidies in a certain sense empowered private landlords and management companies to supply affordable housing at market rates, and CDBGs (or community development block grants) bypassed state government to give determination over federal housing subsidies directly to localities.<sup>7</sup> In all of these instances, “up-stream” federal entities carefully re-drew the boundaries of regulatory authority to empower new actors or strengthen existing actors in the delivery of affordable housing. Architectural design professionals might be similarly empowered to act within affordable housing delivery by consolidating the IRC (International Residential Codes) as a plug-in for industry standard design software and positioning such a “digital design edition” of the IRC (like HUD code) as a federal over-ride to state and local building codes. More than just auto-spacing electrical outlets in a sketch up model, such a software platform would be conceived as the cornerstone on which many currently scattered federal building and housing technology initiatives might be consolidated to great collective benefit.

Colton claims that regulation-imposed expenses can increase the final sales price of a home by 25% in certain localities and that building codes also contribute greatly to housing's constructional path dependency by seriously inhibiting the introduction of new building products and systems.<sup>8</sup> he notes that presidential commissions on housing frequently stress the need for regulatory reform, citing the 1968 and 1969 Douglas Commission (The National Commission on Urban Problems) and the Kaiser Committees (The President's Committee on Housing)<sup>8</sup> and their further recommendations that sweeping reform at the state and local levels be imposed and monitored specifically by HUD.<sup>8</sup>

A federal building code is even more brilliantly suited for such a regulatory intervention in light of ICC code developers' recent and exciting shift in tack from standard prescriptive to new performative models of compliance.<sup>9</sup> The IECC or International Energy Compliance Codes offer one such "performance-based" path to compliance, though here and in all cases it's important to note that "performance", really means "computational performance simulation". For this, the IECC relies on one of a handful of approved software applications developed by the DOE and others by private entities. All such programs are currently in essence, dressed up spreadsheets. One of the best among them, DOE's "ResCheck" software provides data fields into which wall sections and HVAC equipment are input as line-items, windows and doors specified by manufacturer-supplied thermal transfer resistance ratings, and square footages are specified for each plane of the building enclosure, along with a general solar orientation referencing latitude by state and city. The resulting analysis will give a thumbs up or thumbs down on IECC compliance, but more importantly will also quantify the deficit or surplus of a specific design's energy performance.<sup>10</sup> Where old prescriptive building codes written in long-hand legal-ease are necessarily limited to defining mandatory minimums, performance based codes can acknowledge and occasionally even incentivise better-than-minimum compliance.

Software like ResCheck is not at all ground-breaking. It is part of a recent rapid proliferation in building performance analysis and simulation software, most of which is in fact far more sophisticated. Addressing everything from natural ventilation to energy expenditures; from interior daylight and solar heat gain analysis to the performance of novel structures, these programs are more often developed as collaborative academic research projects and even commonly as individual graduate theses throughout the building design and science fields. To use such performance simulation software for regulatory compliance is the revolutionary spark, but to consolidate currently scattered efforts around a common platform and user interface (i.e. a digital-design building code) would drastically change the production and performance of new housing.

The least user-friendly of such programs function like ResCheck as freestanding applications. Like spreadsheets, these also require tedious and time-consuming data input for each design iteration. The best of them conversely “plug-in” to more powerful and general design software, and so can be used in rapid iterations to constantly inform a given design from the earliest stages of its development. The gold standard for such an application is “reciprocal design and analysis” which is touted as a more organic process resulting in better integration of performance within design.

Rather than comparing proposed designs to a standardized control-case precedent (as both ResCheck and current building codes do), the best of such programs simulate the raw and comparatively unbiased effects of physics and natural phenomena on each limitlessly customized design solution. Such programs test structures for static equilibrium, model thermal transfer through enclosures, factor in wind speed, direction, precipitation, and atmospheric conditions from decades of local weather data. A far more impartial means of gauging compliance, radically

performance-based building codes would strike at least one real blow against path-dependency in the built environment. Rather than prohibiting all but the least novel designs and construction methodologies, such an impartially simulation-based model of compliance could even be imagined itself as a path to certification for novel designs and construction methodologies.

“Building Performance Simulation” may sound overcomplicated and menacing, but really implies nothing more than extra tool-bars and drop-down menus in a given existing design-software. Many after all are probably far easier to learn and certainly much more fun to use than the International Residential Building Code, and some almost certainly have more users. Though it might seem logical to lawyers and administrators that building codes be delineated in technical writing, consider the full insanity of substituting legal-ese for drawings in a set of construction documents.

In fact, HUD and many other federal entities are currently engaged in the visual representation of residential building technology concepts and are also engaged in anointing “best practices” for building and construction. These efforts are all currently extraneous to building code development, and can be taken in part to reflect both building codes’ communicative shortcomings and failure to address innovation. Part of HUD’s current “PATH” (partnership for advancement of technology in housing) initiative for example, is a collaboration the NAHB (National Association of Home Builders) research center to produce diagrams of recent or progressive residential technologies called “Tech Sets”. These single sheets bear titles like “The Sun in the 21st Century Home”, “a Durable Building Envelope”, and the rather plain “HVAC Forced Air System”<sup>11</sup>. Similarly NIBs, (the National Institute of Building Sciences) which maintains National CAD and BIM standards with the AIA also collaborates with eleven government agencies to maintain “the Whole Building Design Guide”.<sup>12</sup> Homeland Security, the Department of Veterans Affairs, NASA, the National

Parks Service, the Smithsonian, and National Institute of Administrative Courts all participate in administering the Whole Building Design Guide but for some reason, not HUD. The apparent purpose of this archive is to selectively illustrate and so clarify sections of the IBC (international building code) at least in regard to a fairly narrow set of standard constructional details for use in government (and especially military) building projects. Each section of the Whole Building Design Guide is hyper-linked to pertinent code statutes and trade-journal articles; all of the included drawings are tellingly labeled as “conceptual – not for construction”

As for innovation in housing technology, HUD’s PATH initiative has an ongoing “Technology Roadmapping” initiative, working with private industry partners “...to identify housing technologies with the greatest need and potential for development.”<sup>13</sup> Individual Roadmaps address “Energy Efficiency in Existing Homes”, “Advanced Panelized Construction”, and most pertinently “Information Technology” and “Whole-House and Building Process Redesign.”

They conclude that Information Technology “... can greatly improve the speed and efficiency of the entire home building process. A roadmapping group recommended ways that computers, software, and communications (especially wireless and the Internet) can improve speed, efficiency, and quality in the homebuilding process [in the following ways:]...”

- \* Develop a common language: enable people to communicate across the residential construction process.
- \* Streamline the regulatory process: increase efficiency in permitting, plan review, site inspection, and product approval; develop a noncommercial information portal; provide a source of objective, reliable technical information about homebuilding for builders, trade contractors, and consumers.
- \* Address production management systems from conception to closure.
- \* Link information technology tools and data within and between firms to improve the housing production management process from start to finish. <sup>13</sup>

This in so many words, calls for the adoption of BIM “Building Information Management” Software

as a tool for housing delivery. BIM is already a standard mode of large architect-designed building projects, though Kermit Baker estimated in 2006 from various AIA-conducted surveys estimated that less than 25% of new housing in the United States had even the most remote passing connection to architects or architectural design services, further acknowledging that almost all such connections between architecture and housing were indeed remote and passing.<sup>14</sup> BIM is not prominent in Housing delivery schemes because design professionals aren't.

PATH's Whole-House and Building Process Redesign Roadmap "... was developed to strategically overcome the slow adoption of new technologies into homebuilding [and includes recommendations to attack these persistent barriers by]...

- \* Accelerating the acceptance of innovative homebuilding technologies
- \* Creating an environment conducive to systems solutions such as collaborations across the industry
- \* Industrializing the homebuilding process by applying manufacturing processes and technologies
- \* Improving house construction by applying system science, analysis, and engineering...for the sake of making home construction more affordable, higher quality, customizable, and receptive to new innovations."<sup>13</sup>

Without calling for it, this can also be construed to illustrate the need for more prominent architectural services in housing delivery. In lieu of this however, the same committee proposes "... the development of a design tool to optimize house design. The tool would need to address multiple parameters such as cost, energy efficiency, material selection, and other issues that are part of developing an optimum design. The tool would enable designers to evaluate different scenarios with each subsystem and to converge on the most efficient overall design based on a set of objectives defined by the user."<sup>15</sup>

By virtue of it's necessarily inherent design determinism, the prospect of such an automated

home-design optimization tool seems to miss the same recurring point. While it might enable contractors and homeowners to generate a few narrow permutations of “auto-green” housing, quite human, well trained, and very numerous existing architectural design professionals can achieve the same goals with the assistance of software that they continue to develop independently and aggressively. Many of these softwares strive to accommodate and perpetuate design diversity, where a single deterministic “optimisation software tool” would conversely stifle and inhibit both diversity and innovation. Said differently, architects could achieve the same goals better than a rickety and joyless optimisation automaton, if only their minor and fading role in housing delivery were somehow re-incentivised.

To that end, all current building related “best practice”, innovation-mainstreaming, and visual-communication efforts underway in various government agencies might better be consolidated into a digital design edition of a federal residential building code. Instead of few unhappy bureaucrats struggling to copy out window sill flashing details, the front lines of such a building design-certification initiative might be an online community of self motivated builders, designers, and enthusiasts regulated by a HUD regulated Wiki-Design-Code editorial staff. Their collective experiences and successes would far exceed a few industry standard “best practice” constructional details, and hopefully would debunk such flawed notions as “best practices” in general. In the hoped for case of truly outlandish but functionally viable proposals, (say for instance, a structural wall of discarded car tires densely packed with subsoil and reinforced with internal tension cables) Such a code platform might be further used to crowd-fund the design assistance and stamp of a licensed engineer. Given “teeth” as a certification tool, the forum could similarly broker royalties and manufacturing for inventors of an ingenious clip, hinge, or assembly. The general intent would be to delineate building codes not in sparingly illustrated, debilitatingly precise technical writing, but rather in an innovation-friendly profusion of a lush visual information, not conceptual

but “approved for construction” and constantly expanding under reliable editorial guidance.

The potential effects of such a designer empowerment (designers being here liberally defined as design-software users) would be wide ranging. The first and most important would be those afore-mentioned potential circumventions of current path dependency in housing construction - especially as it bears on the basic construction costs. Developer Bob Engler said recently that “Buyers buy it because the builders build it because that’s what the lenders will finance”. This is true, and also sums up the limiting effect of speculation in housing delivery. Land, bricks, 2”x4”s and the labor exerted on them all cost what they cost. Discarded tires, straw bales, and rammed earth all might cost less per square foot of enclosure, but finding someone who knows how to build with any of those material systems can be a serious challenge. Convincing a builder, a lender, or a homeowner to try one such unconventional system can be even more difficult, but a robust regulatory support structure for addressing novel construction would certainly help. Where lenders and developers can anticipate the market performance of a 2,200 square-foot platform-framed cape house from long experience; any formal or constructional deviations from familiar design are all added risks. Individual prospective-homeowners however have far more varied tastes, and It’s worth noting that the very least speculative of all housing is commissioned by people who intend to live in it. Though that deceptively simple delivery model may now be a rare luxury, designers with a wider palettes of material choice and constructional methodology might well figure out ways to further popularize and democratize it. Imagine for example, a viable means of incremental housing delivery for U.S. markets. It’s been said that incremental building is the default mode of housing delivery throughout the global south and in cities across the world, though the United States dominant models of homeownership, and comparatively high standards of safety and quality tend to limit it’s current feasibility and popularity here. If anyone could adapt incremental housing delivery to the “first world”, architects would.



To restate, what's proposed is a federal residential building code conceived as something like a wiki-regulated, open-source, building information model warehouse with integrated simulation-based building performance analysis capabilities. Such a basis on building performance simulation would make such a federal building code paradoxically much more local than existing local building ordinances. Builders and designers could surf BIM libraries for straw-bale systems in Nebraska, Adobe and rammed earth in New Mexico, Hardwood timber in West Virginia and Soft-wood timber in Idaho. New "vernacular" or local building systems might even emerge. The foundation of a digital building information "model wall" could automatically adjust to frost-penetration depths appropriate for Minnesota's climate, specify a termite shield detail for Louisiana, and vapor barriers calculated to prevent inter-wall condensation from specified climate data and even HVAC equipment.

Just as the Community Development Act of 1974 consolidated Community Block Development Grants to consolidate seemingly disparate federal housing programs including Model Cities, Open-Space, Water and Sewer grants, 312 Rehabilitation loans, Urban Renewal and Neighborhood Development, Public Facility loans, and Neighborhood Facilities grants,<sup>16</sup> the institution of a digital design-platform residential building code might benefit from the consolidated efforts of the following seemingly disparate organizations and endeavors:

- \* HUD generally, and its Current PATH initiative, with extensive cooperation from the National Association of Home Builders' Research Center, currently chairing PATH's industry committee;
- \* The National Institute of Building Sciences' "Whole Building Design Guide" and CAD and BIM standard initiatives
- \* The efforts of the International Code Council's IRC staff
- \* Varied and sundry building science and performance-analysis software and "Best Practices" initiatives scattered throughout other cabinet level agencies, (most notably the DOE and USDA)

- \* Public Private Partnership with Leading Industry Design-Software developers, currently exemplified by companies like Autodesk, McNeel, Sketch up, and several others.

To consolidate the agency initiatives listed above might well require legislation, and probably like CDBG's consolidation, would require a dedicated law. Because most of the above list however, including the ICC and NIBS, operate independently of the federal government as non-profits, a significant amount of non-legislative negotiation would also be necessary, as would the addition of expert staff to HUD. HUD might first propose the development of a design software plug-in building code as a PATH budget line-item, approaching private partners and acquiring on-staff expertise in preliminary R&D exercises, while simultaneously taking stock of political friends and enemies.

Any representative of almost any building material or component manufacturer would support a BIM-involved building code, as nine of the twenty-one chairs on HUD's PATH industry committee are building component manufacturers or manufacturer's associations.<sup>17</sup> It may be fair to say that they have been hungrily eyeing design software consoles as new markets, and have been waiting for BIM software to catch up with its early promise and for more contractors to begin using it.

Seven of the twenty-one chairs on HUD's Path Industry Committee are currently filled by builders or developers. While some delivery innovations that might result from a federal digital design-platform building code could circumvent the services of builders or developers, that code platform would still be in essence a tool. A tool of its sort would make code compliance and project management more expedient and save money for small builders and large developers alike. Where the NAREB (or National Association of Real-Estate Brokers) opposed 1937's enactment of the public housing program as a threat to realtor's collective bottom lines, the National Association of Home Builders endorsed it even then.<sup>18</sup> Considering their continued collaboration with and close

ties to HUD, the NAHB could probably be counted on to support not only the proposed, but frankly any federal building code enthusiastically. The NAREB however, would probably be correct in appraising those cost reductions promised by such an initiative as another threat to their bottom line – just as they saw public housing subsidies throughout the twentieth century.<sup>18</sup>

While states and municipalities take a strong hand in zoning ordinances, they generally adopt construction-related statutes from one model building code or another. As such, they might be somewhat ambivalent to the prospect of a construction-focused federal building code. On the other hand they would very probably have concerns about the quality and safety of such a huge project and would probably fight for the power to adopt or reject this “digital design-platform building code” on their own schedules– just as currently they do existing model building codes. Since on-the-ground enforcement of a federal building code would likely be delegated to local and state authorities, it’s founding legislation would need to allocate significant resources for the training of those local employees. Anything less than full federal jurisdiction would make a bad start for the proposed initiative, so pre-legislation research and development would also ideally yield clear, substantial, and confidence-inspiring results.

Richard Bender in his 1973 book, “A Crack in the rear view Mirror” suggested three possible future scenarios for housing delivery. The first is the old dream of “the factory-made house”, manufactured in high volumes at dwelling-unit scale. The second anticipates new cities and planned communities or “life-service-oriented communities” as a unit of housing production, providing housing along with infrastructure and utilities at critical economies of scale. The third imagines a fascinating if far-fetched success of the 1960’s and ‘70’s “back-to-the-land movement, stressing the “role of the individual in relation to technology”, ultimately eliminating reliance on centralized public infrastructure, and leading to a joint technologically-enabled de-specialization

of labor and an automated de-industrialization of production.<sup>19</sup> While the first two scenarios have partial analogs in today's built-environment, the third does not. At root, this Utopian vignette requires not only heightened access to technical information, but also a new standard for the quality and instrumentality of such information. Where "the Whole-Earth Catalog" proved too culturally partisan – Where the internet has so far proven too huge, unfocused, and fallible, a Wiki-administrated building code for software design platforms might to some greater degree succeed.

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# **APPENDIX**

**THESIS**

**DEFENSE**

**BOARDS**

# DE-LEVERAGING DOMESTICITY:

## INCREMENTAL DESIGN FORAYS ON MIDDLE INCOME HOUSING

THE 10 COUNTRY, NEW JERSEY

\$1,585<sup>00</sup>

FIRST PRIZE, DESIGN COUNTRY RESIDENCE

Chad Miller  
M.Arch Thesis, Fall 2012 | MIT SAUP  
Co-Advisors: Brandon Clifford and John Ochsendorf  
Reader: Mark Jaworski

### 50 YEARS OF AMERICAN HOME-OWNERSHIP

Record HIGH in late 2004: 69.2%

20 year average: 64.2% (1962-1992)

Mid - 2012: 65.5%

Projected Trend

50 year average: 65.0% (1962-2012)

### Average New Construction Single Family Home, 2011

U.S. INCOME DISTRIBUTION 2012

### THE DISCONNECT:

THE DREAM

THE LIMITS

### INCREMENTAL vs. SPECULATIVE DELIVERY

DESIGNED INCREMENTAL HOUSING

OCCUPANCY

SPECULATIVE REAL ESTATE

PAYING DOWN

### LOGISTIC ATTITUDES

The Incremental Architect

The First Industrial Master Planner

The General Class of Contractors

### INCREMENTAL HOME-OWNERS

THE AVERAGE INCOME: 40K

4.6 K PER YEAR ANNUAL DESIGN FREQ.

### A PORTRAIT OF THE INCREMENTAL ARCHITECT

20 CLIENTS / YEAR

2-4 Blocks / Client / Year

### "NARRATIVE DESIGN ARTIFACTS"

HOUSE PLAN

BLOCK PLAN

SITE PLAN

### "GENERATION Y"

Born 1980 - 1996

Age 18 - 30

POPULATION: 50 MILLION

- IF NOT SEVERELY DEBT-AVERSE,
- SEVERELY CREDIT CHALLENGED,
- LACKING OR LATE TO "CAREERS"
- AND PROVEN DOMESTIC RULE-BREAKERS

25%

62.5%

60%

25%

### LABOR AND TECHNOLOGY

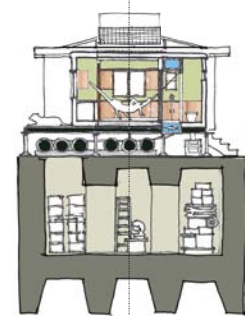
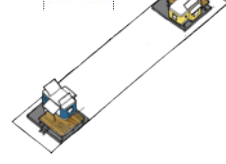
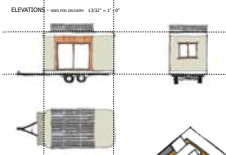
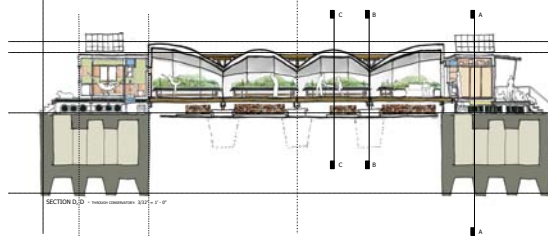
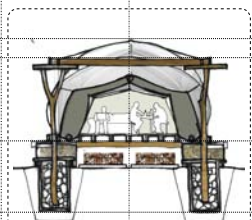
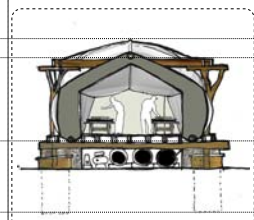
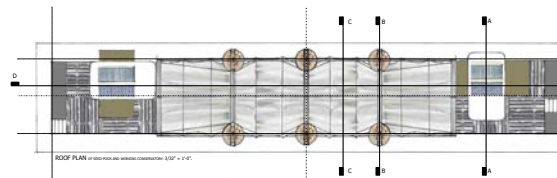
### CONTINUOUSLY OWNED

### SHAPE AND SIZE

1952 1982 2012

2013 2014 2015

JESSE & LUIS (NORTH LAWDALE HOUSING CO-OP), NORTH LAWDALE, CHICAGO, IL.  
 +12 MONTHS | TOTAL COST: 13K

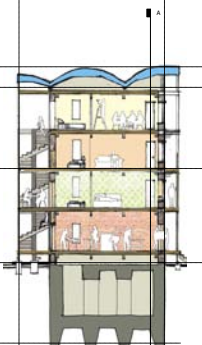
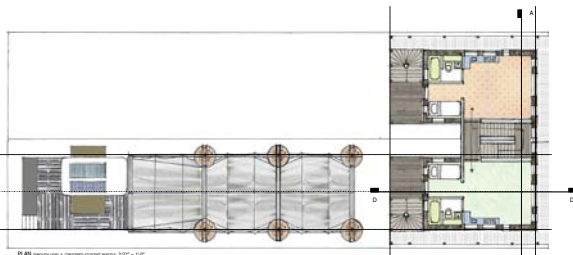


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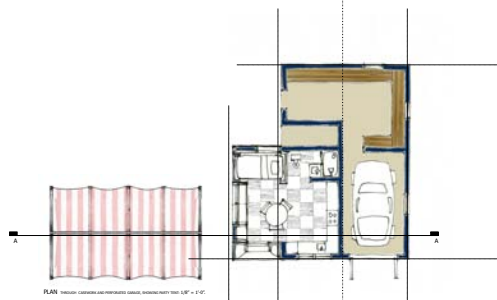
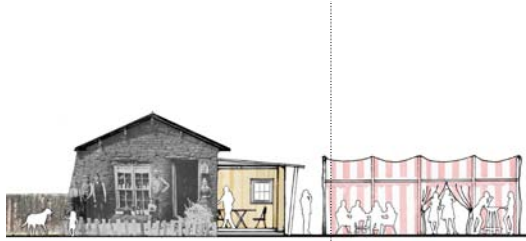
JESSE & LUIS (NORTH LAWDALE HOUSING CO-OP), NORTH LAWDALE, CHICAGO, IL.

+144 MONTHS | TOTAL COST: \$0K



NICKY & JENNIFER, EVANSTON, IL.

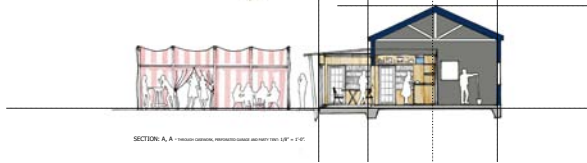
+12 MONTHS | TOTAL COST: 27K



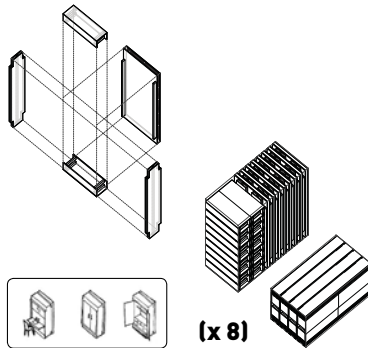
PLAN: HOUSE CONCEPT AND INTERIOR DESIGN, PROPOSED FRONT PORCH, 1/4" = 1'-0"



DIAGRAM A1.1.2. SECURITY  
CONCEPT AND LAYOUT



SECTION: A, A - HOUSE CONCEPT, INTERIOR DESIGN AND FRONT PORCH, 1/4" = 1'-0"



(x 8)

EXPLODED AXONOMETRIC OF HOUSE CONCEPT, 1/4" = 1'-0"

DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORAYS ON MIDDLE INCOME HOUSING. ©2022 HILLIER. A HILLIER DESIGN. ALL RIGHTS RESERVED. DESIGN AND CONSTRUCTION OF THIS HOUSE CONCEPT, HOUSE MODEL, AND/OR ANY OTHER MATERIALS OR INFORMATION CONTAINED HEREIN IS THE PROPERTY OF HILLIER AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.

NICKY & JENNIFER, EVANSTON, IL.  
+18 MONTHS | TOTAL COST: 40K



ELEVATION, WEST SIDE (SEE PLAN) 1/8" = 1'-0"



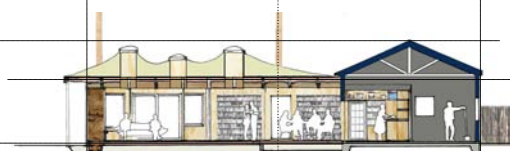
LEVEL 1 PLAN - INCLUDES TERRAZZO, GRANITE, AND CEMENT FLOOR FINISHES 1/8" = 1'-0"



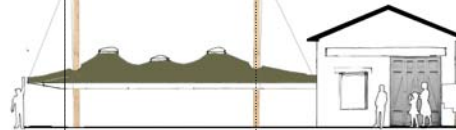
EXCAVATION PLAN 1/8" = 1'-0"



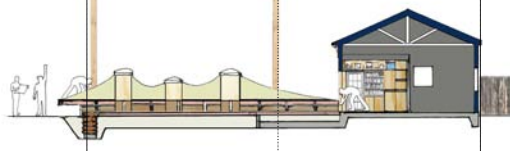
ELEVATION, FRONT (SEE PLAN) 1/8" = 1'-0"



SECTION A, A - INCLUDES LOOSE SOIL, CEILING, CONCRETE, AND FINISHED BASEMENT FLOOR 1/8" = 1'-0"



SECTION A, A - INCLUDES ROOF FINISHES 1/8" = 1'-0"



SECTION A, A - INCLUDES ROOF FINISHES 1/8" = 1'-0"

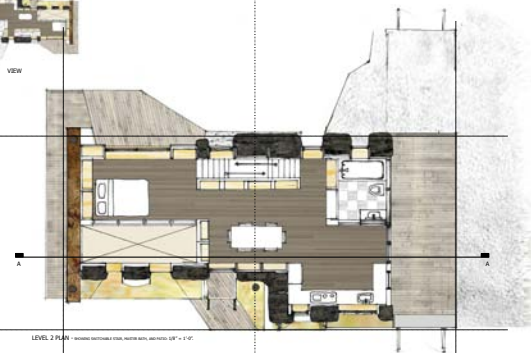
DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORAYS ON MIDDLE INCOME HOUSING. (LEFT TO RIGHT) LAYOUT/FORM, LIFE AND USE, QUALITY, CONSTRUCTION AND FINISHES/DETAILS. SOURCE: MARK SHAW/ARCHITECTS

NICKY & JENNIFER, EVANSTON, IL.

+36 MONTHS | TOTAL COST: \$0K



ELEVATION, EAST SIDE (SEE SECTION A-A) (SCALE: 1/8" = 1'-0")



LEVEL 2 PLAN (SCALE: 1/8" = 1'-0")



ELEVATION, WEST SIDE (SEE SECTION A-A) (SCALE: 1/8" = 1'-0")



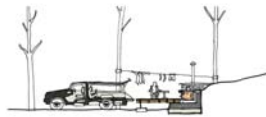
SECTION: A-A (SCALE: 1/8" = 1'-0")

DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORAYS ON MIDDLE INCOME HOUSING. ©2015 HOKU. A HOKU COMPANY. ALL RIGHTS RESERVED. (PHOTOGRAPHY: CHRIS COOPER AND BENJAMIN SUTHER. GRAPHIC: NICKY AND JENNIFER)

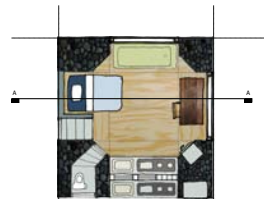


JAY, SWATARA, MN.

+12 MONTHS | TOTAL COST: 13K



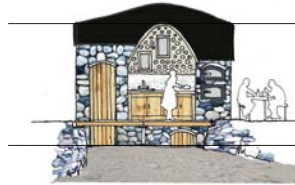
CONCEPTUAL SECTIONS (SCALE: 1/8" = 1'-0")



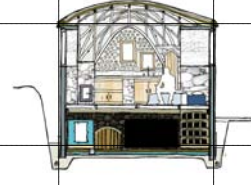
PLAN (SCALE: 1/8" = 1'-0")



NARRATIVE DESIGN ARTIFACTS (SCALE: 1/8" = 1'-0")



SOUTH ELEVATION (SCALE: 1/8" = 1'-0")

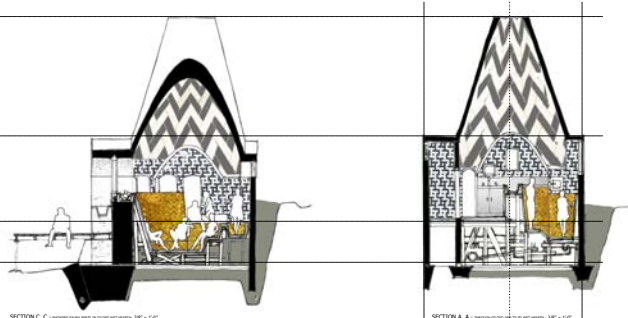


SECTION A-A (SCALE: 1/8" = 1'-0")





JAY, SWATARA, MN.  
+72 MONTHS | TOTAL COST: \$0K

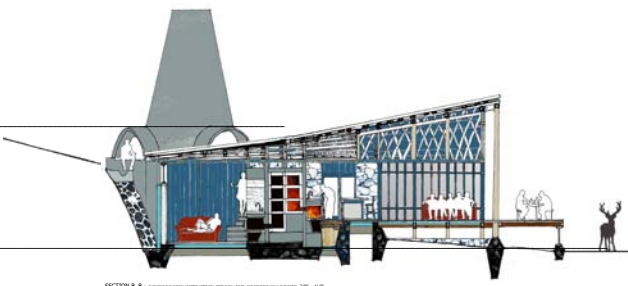


SECTION C, C' - SECTION THROUGH FRONT PORCH AND LIVING AREA. 3/8" = 1'-0"

SECTION A, A' - SECTION THROUGH KITCHEN AND DINING AREA. 3/8" = 1'-0"



PLAN - SECOND FLOOR PLAN INCLUDING ALL ROOMS, AND PORCHES. 3/8" = 1'-0"



SECTION B, B' - SECTION THROUGH PORCH AND LIVING AREA, INCLUDING PORCH AND PATIO. 3/8" = 1'-0"



HEARTH GUIDE WORKS - 2018

DELEVERAGING DOMESTICITY: INCREMENTAL DESIGN FORAYS ON MIDDLE INCOME HOUSING. (LEFT) HEARTH GUIDE WORKS (2018) (RIGHT) HEARTH GUIDE WORKS (2018) (MIDDLE) HEARTH GUIDE WORKS (2018) (BOTTOM) HEARTH GUIDE WORKS (2018)



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