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Infusing Mixed Use Into Vacant Retail

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Vacant single use retail in urban cores can be converted to a more successful mixed use typology through a series of architectural strategies. As urban cores grow denser, city infrastructure needs to be updated to accommodate new populations and changes in living styles. Certain building typologies have grown out of date and are now underserving their local community. Single use retail is a dying building typology in dense urban cores and it is being replaced by higher density mixed use projects in zoning and development models. Factors like the development of suburban retail centers and growth of online shopping have strangled the typology. When these retail buildings go vacant for extended periods of time, they are often demolished and replaced by new buildings, following a repetitive development model. Most development models do not allow flexibility for adaptive reuse of existing buildings. These models do not always serve each individual site well and often have to sacrifice architecture to offset the cost of demolition and reconstruction. Instead of demolishing these buildings, a series of architectural strategies can infuse these buildings with new use and new life. This strategy will return the buildings to use more quickly and save the cost and embedded energy waste that would have gone into demolition. Living space can be added to floors above while the public space below can be infused with new life. In this study, a thorough analysis of the single use retail typology as a vacant shell will be conducted, to understand what structural and architectural features exist in these buildings. The problems inherent with their design will be addressed in the solution. A study of mixed use typology will be conducted as well, to understand what has replaced the single use typology. The strategies for repurposing the vacant shells are formed after closely examining several examples of architects who act as developers, challenging the typical development models in their respective neighborhoods. Methodologies for programming these buildings are developed. Strategies for sustainability and quality of life are developed. Finally the use of technology, especially through the means of software and fabrication are examined as it relates to this thesis. Construction estimation techniques and developer pro forma methods inform the architectural strategies. The result is an architectural process for the adaptive reuse from retail to mixed use living. It transforms from one typology to the other sustainably and utilizing technology to remain sensitive towards cost.
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Problem

For the first time since the 1920’s urban areas are growing faster than their suburban counterparts 1. The trends do not appear to be changing in the near future. Although urban areas are growing in population, not all building typologies are succeeding, as some have been overbuilt. Economic changes in the last couple of years have exposed some of these typologies as being overbuilt.

In architecture, the concepts of urban infill and adaptive reuse have become extremely important. Cities are already built, and they were built for a different era, when cities and urban lifestyle functioned in a different way. There are three options for creating new architecture in these cities. The first option is urban infill, which fits architecture into plots or subplots that were previously unoccupied. As cities become denser and denser, these open spaces become harder to find. The second option is demolition, followed by new construction. This an option that has been used a lot by developers, and is sometimes appropriate. Often times, this solution is overused and inappropriate. The third option is adaptive reuse. This is what this thesis will focus on. Adaptive reuse is the process of reusing buildings for purposes other than the ones they were intended for 2. With urban cities being so crowded, and with so little empty space left to build, the opportunity to use adaptive reuse as a means to update infrastructure is as promising as ever.

The specific typology focused on in this thesis will be the change from single use retail to dense mixed use in urban cores. Single use retail has been abandoned as a development model in dense areas for a couple of different reasons. As the 2008 recession revealed, much of retail space has been overbuilt 2. Credible sources have projected that 10 percent of the roughly 1,000 large malls in

the U.S. will fail within the next 10 years and be converted into something with less retail.

Vacant buildings have a number of devastating effects on a community. Several of the negative effects associated with abandoned buildings are wasted revenues and lost tax revenues, declining property values, effects on the community and neighborhood aesthetics, negative impacts on public health and safety, promotion of illegal activity, and the encouragement of further abandonment. This being said, vacant buildings also provide a great opportunity. Vacant buildings offer a great opportunity for communities to redesign according to their needs. Large amounts of vacant buildings create lower property values, and this can be used as a means to acquire and redesign buildings. The single retail typology is as shown before, heavily tied to the vacancy problem and underserving their communities. There is a great opportunity to redesign these buildings, increasing their use to the community.

Background

History of Retail

The depletion of single use retail in cities really started in the 1950’s with the rise of the suburbs and in particular, the suburban strip mall. The post-World War II development of the suburbs contributed largely to the development of strip malls, which changed the direction of the retail industry. As the strip malls emerged, people no longer had to drive into the city to go shopping. Developers have found it cheaper and more effective to build large quantities of retail together in less dense areas around major cities. The birth of destination retail has worked its way into our society, altering the way people act and shop. Developers now build giant strip mall retail centers with specific shops that work together to complement each other and draw in beneficial tenant mixes. One of the most prominent of which is the grocery store anchored strip mall. They often locate themselves off busy streets and highways for easy access. These centers are in themselves the destination for shoppers, as they specifically aim to go to them for their shopping, instead of simply passing them by on their way to somewhere else. Because these centers are located outside of major urban cores, their property values and taxes are much lower than the isolated single use counterpart, and so they can be much bigger and while paying less for rent. Because they offer several different tenants next to each other in a row, tenants can often visit one center and grab several different types of products, offering the convenience of one stop shopping.

In the 1980’s the development of “power centers” changed the retail game again. Power centers are shopping malls that contain three or more big box retail centers in a single mall. They usually contain what the industry calls “category killers”. These are types of stores that specialize in a certain industry and have a stranglehold on the competition. Common examples are store like Best Buy. They create a destination for people to go to when shopping. This pulls people from further away than a traditional smaller store. They go to the store knowing that the store will fully cover the genre of what they need to buy and expect what they are looking for to be there. Smaller retail shops cannot compete with one of these category killers because they do not have to room for as much inventory and variation. This draws people from further away than traditional retail. Power centers are anchored by category killers, but in between they have smaller shops that feast on the traffic that the category killers pull in. There are some power centers in urban areas, but these only further hurt traditional retail that is not located in that center.
The next big change in the retail industry came in the 1960’s when cities started making zoning model changes to encourage mixed use developments. A lot of this was based on planning ideas relating to Jane Jacobs work as an urban planner. Cities thought it was healthier to diversify their blocks, give residential more access to commercial and vice versa. This zoning change encourage mixed use projects in cities, but they did not stop the growth of their competition, strip malls, in the outlying suburbs.

Mixed use projects are growing as an accepted successful development strategies for urban cores and are now largely promoted by developers and reflected in zoning plans. Since Jane Jacobs’ work in the 1960’s, zoning models have favored mixed use as a means to diversify cities and make urban living more walkable and denser 1. In recent years, more neighborhoods and smaller cities are also pushing for mixed use. This is because studies on mixed use have shown them to be very profitable for all parties involved. From the city’s perspective, they raise much more money in taxes then a typical single use retail development would. In a Planetizen study, Joseph Minicozzi compares a downtown mixed use retail building to a suburban Walmart development. The study he quotes estimates $360,000 per acre more in taxes for a downtown mixed use project compared to the counterpart as well as more jobs and residents per acre 2. This is a big part of why cities have been pushing and zoning for mixed use developments.

From the developer’s perspective, single use retail used to be the better option to build because it was cheaper. It was cheaper to build shorter projects, and they did not have to worry about wasted circulation or fire separations. This made single use more efficient for rentable SF because it wasted less space. Also, single use retail used one business model instead of two, and it was simpler to

calculate the risk. More perceived or unknown risk makes the developer less likely to invest in the project. In recent years however, more research has been published on the success of mixed use developments and their increased rent returns. Studies show that they have higher returns on average than comparable single use developments in similar neighborhoods and locations.

Another growing drain on this isolated single use retail is online shopping. More and more, people are doing their shopping in virtual space instead of reality. Although this has not entirely destroyed the demand for retail space, it is consuming an ever growing chunk of retail sales, holding the demand for single use retail to a lower growth rate than that of other uses such as residential, that still operate entirely in real space. This trend has also shifted a lot of the profit to be found in retail from smaller single use spaces to warehouse and distribution type centers found further outside the urban core.

The latest development in retail is one that hurts all of the above listed types, online shopping. Online shopping started in the late 1990’s and has really blossomed in the last decade. Some big box stores have been able to weather the storm of online shopping by creating their own online shopping branches. Stores like Walmart and Best Buy allow consumers to shop online, but smaller traditional retail is unable to compete with the online giants. Huge retailers have emerged like Amazon, Netflix, and Newegg that are challenging even big box giants. In the future, the trends appear to favor more change in retail, departing even further from the traditional typology that we started with.

Architecture and Finance

The key to reinfusing these vacant buildings with program will be to develop architectural strategies that work closely with investment strategies defined by developers. The vacant retail typology is under serving its financial potential for dense urban sites, and so these project can fund themselves if approached properly.

This thesis will assume a situation where an architect is either working closely in a partnership with a developer, or is the developer him or herself. As some architects, such as Onion Flats explain, this can actually reduce risk in a project. If an architect is talented at architecture, and has a thorough understanding of the financial factors later explained, he or she can take a much higher portion
of the reward in a project and also reduce the risk involved in relying on an entire industries health. A good project can succeed even in a bad market. A firm that attempts to control their own destiny may actually be able to do so.

The investment property, unlike single family residential, has a flexible building limit. In single family residential, the building’s cost is limited by the clients income, credit rating, and non architectural factors. Often times, architects are working with a strict Cost Per Square Foot number. In reality, this is only a portion of the true equation connecting architecture and finance. Architecture also generates a value per square foot with its desireability, and requires an operating cost per square foot.

Because developers often cannot create architecture themselves, they do not fully take advantage of this model. They often try to limit architecture’s influence in the investment. They minimize cost per square foot, aim for average market rates on rent, and average maintenance costs. An architect or developer that attempts to increase architecture impact on the model, by possibly costing more per square foot, but capturing peak market rates due to aesthetics and operates more efficiently, may ultimately be the more effective investment, and also the more effective architecture.

This idea of allowing architecture to greatly influence the impact on the investment and vice versa, will result in a building that is more successful in both ways. The architecture firms and precedents researched in this thesis will either have worked for developers in successful and innovative ways, or as the developers themselves, integrating architectural strategies with investment strategies.
Design Strategies

The design strategies for this thesis will be formed as a result of an analysis of architectural strategies developed through examples of precedent buildings and literature relevant to the problem. The firms looked at will all be involved in investment type developments. They have been integrating architectural strategies with finance and development models, often critiquing the development model in the process. Some of these firms have worked on mixed use type projects, some retail, and some purely residential.

The first issue will involve the reprogramming of the existing space. The first precedent that will be looked at is one of the first mainstream voices on the architect as a developer, Jonathan Segal. Segal acts as his own client, developing mostly new construction. He has strong ideas about programming that will help to form an architectural solution to this problem. Vacant retail is often not an ideal footprint for mixed use development. Segal has shown the ability to reprogram existing structures according to market demands, resolving issues that occur when typologies change.

The next challenge will involve the rehabilitation of these vacant shells. The second study will be based on Onion Flats, who rehabs vacant retail and industrial buildings. They focus on sustainability and their contribution will heavily involve ideas about insulation, natural lighting, and salvaging materials. They design, build, and develop as well. They create architectural solutions to salvage building shells, which has proven to be more effective than their peer developers, who mostly demolish and rebuild with new construction.

An strategy for detailing will be formed that will aid the rest of the architectural solution. A strong precedent is Kieran Timberlake’s publication, “Refabrication”, which speaks about efficiencies using new technology and construction methods and how this will influence architecture. Several of these ideas will help to inform the attitudes about detailing that were starting to become established through Onion Flats.

The study will then continue by looking at how parametrics and digital technology can inform these detailing strategies. The first study is of Studio Gang, who explores new ways of
constructing with conventional materials. Their project, Aqua, in Chicago, shows one details impact on a development project. Finding a method to simplify complex construction can keep a budget in check while dramatically increasing the value of an investment.

To further examine this, SHoP’s body of work can be examined. SHoP using digital technology combined with financial knowledge to create complex architecture that costs amounts comparable to typical construction.

A composite strategy involving ideas examined from these works will create an architecture that is capable of rehousing vacant retail.
Reacting to Markets

The first step of an architectural solution to vacant retail is to reprogram it into something else. Jonathan Segal’s firm, Jonathon Segal FAIA & Development Company has completed over 300 medium to high density development projects totaling over 300,000 SF. At 19 years old, his firm can be considered the mainstream pioneer of architecture development firms. This separates Segal’s from other firms in that it must program and budget its own projects based on market factors. He has proven more successful with this strategy then peer developers.

Jonathan Segal’s goal is two-fold, to both create architecture for cheaper, and also to create more appealing architecture. His minimalist style is related to his attitude about program, as seen later in the project, “the Q”. His aesthetics are directly related to the finance. All of his projects are distinctly similar in aesthetic. His mid-century style allows him to create a clean aesthetic that saves money through its simplicity.

The impact of financing on design impacts at two levels. The most apparent level is the final output. The clean mid century aesthetic is desirable in the Southern California market and all of Segal’s projects aim to capture that desirable aesthetic. The second level of impact is at the constructability and detailing level. The chosen aesthetic is very minimalist, which places a great deal of priority on the detailing and construction. Segal builds all of his own projects. He does this because he wants to save money on construction by cutting out the middle man between him and subcontractors. On two of his recent projects apartment projects, he estimated that using a general contractor would have increased his construction budget from $90 to $135.

Segal is not often known as an adaptive reuse architect, as much as a ground up builder. He does now however, believe in wasting what is on a site. In a previous project, The Union, Segal saved a hall in the middle of his site because he figured it would have cost him $100,000 to demo and $250,000 to rebuild a comparable structure. This $350,000 saving can either be kept as profit or funneled back into the development for better architecture.

The Q

“The Q” is a development project by Jonathan Segal. It was originally designed as an office development in downtown San Diego. As the market started to contract in 2008, the demand for program in the San Diego area was affected in different ways.

For this particular project, the shrinking demand for office space would have been disastrous. Segal was able to mid construction, change the program and architecture to reflect a changing economy 1.

This is a great example of an economy and architecture working in unison. Segal originally intended the building to be office space, which is what the market wanted. As the market changed, he changed the architecture to residential. Because construction had already started, Segal had to compromise between what was already built and what the market demanded.

He used the remaining site square footage to determine how many parking spaces he could get, and thus determined how many units would be in the building. He worked backwards from this to divide the unit up and create the architecture within the shell.

The Q leases ranged from a $950 studio to a $5,200 2 bedroom apartment, all well above market averages. Segal cited the reason for this to be because he gave the city something different, a new kind of development competing with suburban style ones and closed off boxes with holes punched in it 1.

Fig. 2.2
Jonathan Segal talks about the architect as a developer. The developer, as seen in these charts, is the middle man between the financial investment and the trades.

Eliminating the developer allows the architect to handle the cash flow, as seen in the bottom diagram. The architect now gets paid a higher portion of the total income, but also he or she gets a much larger role in the project.

Everything now goes through the architect. This is why Jonathan Segal talks about the developing architect as the master builder. The trades and consultants answer directly to the architect. The architect works directly with his or her tenants, which can result in a much more beneficial situation for the buildings users.

The risk chart at the bottom of each chart represents all of the possible risks inherent in the project’s team structure.
Eliminating a developer reduces the risks involved in the projects overall success.

The diagrams on the right side of the spread show a more realistic version of how this would work. A project requires both private and public finance most of the time. The architect would slide into the developer’s role, collecting money from others and distributing it into trades, and repaying investors with the tenants money.

The change in team structure allows the relationship between architecture and finance to be cyclical. Instead of a developer being higher up on the chain of command, the architect and developer are the same. The architect is responsible for making the financing work, but equally responsible for architecture.
Rehabilitation

Strategies about architectural rehabilitation of deteriorating spaces can been seen in Onion Flats work. Onion Flats is a design build develop firm based out of Philadelphia with different goal, outcome, and process than Jonathan Segal. Onion Flats was formed in 1997 by a group of brothers in the architecture and construction industry. Onion Flats builds highly sustainable, urban homes that benefit the neighborhood and the environment. They also intend to benefit the academic culture and Philadelphia architecture movement.

They do this because they saw the need for it in their home community. The city of Philadelphia had a lazier faire stance on contracts for development properties. This led to developers using suburban models for construction that was in ways detrimental to neighborhoods. These developers did not understand architecture, construction costs, or critical urban issues often discussed in the design community. They knew how to run pro forma statements on buildings and secure financing for projects.

The competing developers tore down useful and culturally important historic buildings and replaced them with suburban looking mini houses with front and rear yards. They were destroying Philadelphia’s historic culture, building cheap developments that would harm the environment, and not addresses the urban cultural needs of middle and low income families in these neighborhoods.

Developers like this started at an odds with Onion Flats main design principles, Howard Steinberg and Tim McDonald, because they believed that their noble goals did not align with the developers own interest of financial success. Eventually, as Onion Flats success grew, they began winning over developers and changing the strategy for housing in their Philadelphia neighborhoods.

Onion Flats is an example that proves that architecture and economics working together beat the two when they are fighting separately. Onion Flats started their development firm because they wanted to create better architecture. They had to finance their own projects in order to get them built, because they were the only ones who understood their projects relationship between architecture and finance as they did.

The firm buys vacant properties in need of architecture intervention. They said they do this because the properties are cheap. The vacancy creates opportunity for design and change in development models. Because they are architects, they understand the architectural and aesthetical problems with the property. Because they are builders, they understand how much it will cost to change the building from what it is now to where it needs to be. Because they are developers, they understand what the purchase and sale price of the before and after of this process will be.

The result is that Onion Flats has a model for developing buildings that is heavily dependent on modular strategies they’ve developed. This combines with specific site conditions that they find to create unique architecture in check with its costs. There is only a certain margin for cost and sale that they base on market averages. One of their proud talking points that they have stated is that their work “...costs the same as the shitty condo down the street.” This means their process starts from a financial launching point. They take their competitions construction cost psf and they set that as their limit. From that point on, they attempt to maximize aesthetics, sustainability, and quality while constant hovering below that cost.

Captial Flats
Origin

Tim and Pat McDonald started by purchasing a building for $23,000 in a “Old City” Philadelpia. They originally titled the project “Onion Flats” and later changed the name to “Market Flats” when they decided to become a business.

They initially worked only weekends on the project, because each had a full time job.
Market Flats

Fig. 2.9
Mission Statement

They are a design build develop firm in Philadelphia. All of their work is local.

Onion Flats’ mission is simple, build homes for people in the Philadelphia region to the highest sustainable standards and deliver to the market at a price comparable to a non LEED-H Certified homes.
The purpose of this firm is to create sustainable homes that benefit the community. They intend to make these homes at the same price as the competition (Raedmaker). The firm is made up of three brothers and a family friend. They could not find someone that would finance their design, so they became developers to finance their own design.

They formed four different LLC’s in order to limit risk and liability. Each of these firms replaced one that was previously mentioned in the cash flow, flow chart for the Segal section earlier.

By doing this, they break up risk in the project, with only a portion of their total project being liable at any given time. If one part of the project fails, not all four firms will be liable.

**Sustainability**

Onion Flats major design driver is sustainability. They believe in a design that benefits the community, culture, economy, and environment.

Before their formation, they lived and worked in a Philadelphia market that was not operating properly. Developers were tearing down historically and culturally significant neighborhood defining buildings and replacing them with suburban style lawn and house developments.

Onion Flats rehabs these buildings instead, preserving culture and saving resources. They infill loft like flats that focus on energy savings and density.

This lowers the total cost of living for their tenants, as less cost is wasted in heating, cooling, and lighting. Because they own their own buildings, this cost savings is passed on to Onion Flats, making a viable business model.
Fig. 3.4

Fig. 3.5
“Most architecture firms just don’t want that kind of liability, that kind of exposure, and we take on risks, because we believe that it’s actually less risky to be design builders when you can control the end product, you can control the process, and you can control your design and the quality that’s going into it. If you’re not educated about the potential of what I just described, you only see liability.”

Pat McDonald

Measuring Risk
Onion Flats speaks about risk above. Most architects believe that the risk inherent in development is reason to shy away from the field. Howard Steinberg argues that when an architect controls the entire process, any individual project is less risky than the typical model.

There is going to be more opportunity for control, less miscommunication risk, and more clarity in goals. The cash flow diagram to the right shows how money might move throughout a project for Onion Flats. This is based on how a standard developer would work with an architecture, construction, and property management firm in a typical project. They would borrow money from investors and banks in a typical model. They pay that money out to their architecture, construction management, and property management firms. Once they do this, they already have a guaranteed income. The only remaining risk is in the project’s success. They believe in their own architecture and their own ability, and because they are architects, they understand how to create a more enjoyable building than competing developers, so their projects are less risky.
Market’s Effect on Architecture

Onion Flats is part of a larger movement in the Philadelphia architecture community. They are the only true architect developers in the group, but there is a broader financial movement in the field. The most notable architecture firm in this movement is Kieran Timberlake. Timberlake, like other firms, is starting to focus on economic issues and utilizing current technology and challenging typical construction methods.

This is all part of a movement to reduce building costs and bring a higher quality to project that didn’t historically qualify for high design. Philadelphia is a great urban environment for this kind of experimentation. Movements like these have an easier time getting started in urban cities that embrace them. Philadelphia has a very progressively green agenda and tax incentive system, which helps firms like Onion Flats experiment and change construction models. Philadelphia has a large variance in land values, just as most cities with diversity do. This leads to lower risk projects that require less initial equity. Favorable zoning conditions allow mixed use, which allows buildings to add square footage and change program type. All of this allows more opportunity for captured capital gain, which funds innovation. Tax credits with historic renovation and sustainability allow Onion Flats specific goals to be accomplished easier. Academia is also a big presence in these firms. Cities often have multiple architecture schools, which allow architects to lean halfway between academia and practice. They can explore ideas on paper and then implement them in practice.

The last factor in this equation is just lack of competition. The developers in this particular city were not getting the job done. This is not true in every market, but in many markets there are developers that resist innovation. They are called copycat developers. Their education and background does not necessarily prepare them for the kind of experimentation that architects are equipped to handle.

A push to build greener, cheaper

Fig. 3.7

**Architects**

Stephen Koon and James Kennedy, architects of the new world trade center in New York City, have designed a new building that will serve as the headquarters for the United Nations. The design is an example of green building, with the goal of reducing energy consumption and pollution. The building is being built using sustainable materials and techniques, such as low-VOC paints and energy-efficient windows. The architects are also incorporating features such as green roofs and rainwater harvesting systems to further reduce the building's environmental impact.

**Interface Studio**

A dream that's sustainable. What does it look like to build a sustainable building? The Interface Studio Architects team is working to find the answer. The team is currently designing a new building for the University of California, Santa Barbara, that will be one of the most sustainable educational buildings in the world. The building will feature a range of green design elements, including a green roof, solar panels, and a rainwater harvesting system. The team is also working to ensure that the building is energy-efficient and that it will have a low environmental impact.

**Featured Firms**

**KieranTimberlake**

Firms like KieranTimberlake are leading the way in sustainable architecture. The firm has designed a number of green buildings, including the new headquarters for the United Nations in New York City. The firm is also working on a number of other projects, including the renovation of an old warehouse into a green office building.

**Union Flats**

Designed by the architects at Union Flats, the Union Flats project is a model for sustainable housing. The building is designed to be energy-efficient and to use a range of sustainable materials, such as recycled steel and concrete. The building also features a number of energy-saving features, such as solar panels and a rainwater harvesting system.

**Emery McLean**

Architects like Emery McLean are also exploring sustainable design. The firm has designed a range of green buildings, including the new headquarters for the United Nations in New York City. The firm is also working on a number of other projects, including the renovation of an old warehouse into a green office building.

**Fig. 3.7**

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The styles of detailing for the previous two firms wildly contradicted each other. Segal seemed to consistently use similar details which emphasized his modern minimal aesthetics. Onion Flats, who instead of new construction, worked with existing structure, would create specific details to solve specific problems, often having varying character spaces in the same project. These two ideas may be able to meet at a middle ground using strategies form by Kieran Timberlake. Kieran Timberlake talks about detailing in a way that they label, “mass customization”, meaning that a detail can be efficient and generic, but have built in variation that will make an outcome more specific.

Kieran Timberlake is by no means a design build development firm as the previously listed firms have been. Instead they are a design firm heavily rooted in academia, that has written about the critical relationship between art and commodity in architecture.

Their work, Refabrication, lays out the framework for a style which succeeds modernism while addressing these issues. They argue that architecture should be both art and commodity 1. They then explain how this relates to modern technology in architecture and how this had been accomplished more successfully in other fields 2.

Kieran Timberlake makes a running comparison between architecture and process engineering. They explain how process engineers are the “master builders” that architects desire to be, but haven’t for many years 3. Process engineers straddle the line between art and commodity, balancing style and desirability with cost, technology, and innovation 4. The process engineer understands that both sides of the equation are equally important and that is why they practice the all inclusive master builder process.

2. Kieran, Timberlake P. 61
3. Kieran, Timberlake P. 27
4. Kieran, Timberlake P. 14
Kieran Timberlake’s writing, Refabrication, published in 2003, discusses their ideas on the architect and his role within today’s construction industry. Equally importantly, they discuss today’s construction industry in relation to other current manufacturing standards.

Kieran Timberlake argues two major points that relate to this thesis. The first point is that architecture should be both art and commodity. They argue that this is not always done well professionally in the field today.

They have said that buildings today often spend over 50% of their cost on mechanical equipment 1. This effectively makes them machines. These machines are not designed by the architect. often, doors and window assemblies are not designed by the architect either. The architect instead is the one who joins these pieces together. They compare this to the construction industry, showing that this is parallel to the way manufacturing works. A whole car for example is broken down into components and subcomponents manufactured in different places, which they call a modular assembly 2.

The architects role in this type of process is to master the practice of joinery. An architect needs to understand how to weave together different components to make a whole. They need to understand the issues of joinery, how to effectively combine smaller components. Doing this offsite will often increase accuracy and labor quality while decreasing labor costs 3. Doing too much though will increase shipping costs, as there is a practical limit to what can be shipped.

2. Kieran, Timberlake P. 89
3. Kieran, Timberlake P. 123
Mass Customization

Kieran Timberlake also spends a great deal of time comparing modern construction techniques to those used in other fields. They see the current architecture construction process as being inefficient and ineffective. They are very interested in the idea of prefabrication and compare the process of making buildings to the process of making consumer products.

The largest historical breakthrough in manufacturing came when Henry Ford implemented the assembly line to produce Model T’s at much lower costs than competitors. This was highly effective at making a single product, but it was very ineffective at producing variety and customization. They reference a famous Henry Ford quote, “You can have it any color you want as long as its black.”

Aspects of this aesthetic style were incorporated into modernism and discussed by influential architects like Corbusier and Mies Van der Rohe. Modernism became the style of developers and large developments like projects. Their sole goal was cost efficiency and they ignored ideas about personalization and relationships to their human users. Modernism failed for many reasons, these two being a huge part of that.

Kieran Timberlake suggests that just as architecture followed industrialization before, they can do it once again. Now, industrialization has not moved away from the assembly line, but improved it. They reference Dell, who produced computers that are highly customized per individual order, over the phone or internet. They suggest that architecture can use technology to replicate the same process, creating things that are efficient, cost effective, and also personalized and unique. This book was published in the early 90’s before the era of parametrics, but the point is even more true now than it was back then.

"You can have it any color you want as long as its black"

"Dell. Purely Your"

"Beauty outside. Beast inside"

Fig. 4.1
Unplanned Customization

This argument was made in the early 90’s, almost 20 years ago. This is a time when companies like Dell were at the top of the market place. This leads one to wonder what’s changed since then. The new market isn’t for personal computers, its for smartphones and tablets, and the new players are Google and Apple.

These smartphone’s and tablets are highly successful, but there is very little variation between products. If people desire customization and variety than why do all these products look virtually the same. The only actual aesthetic difference between any of the brands came recently when Samsung decided to launch a larger phone than Apple, splitting the market into two types of people. Those with small hands and those with big hangs.

The reason people accept this lack of variation is because of a spontaneous customization planned into the design. Any two phone take are likely to operate differently, based on the users choice of apps. This can change the background and appearance of the touch screen as well. People then put a cover over their phone to express their personal style. This makes any two phones look and operate differently. It allows people to have variation that is efficiently built into a modular design.

This could be reflected in architecture through a module that repeats itself differently through parametrics. When a larger array of the phones is looked at, variation arises.
Studio Gang is a design firm that is based in Chicago, close to my selected site. They have done most of their work within that market, and have worked on projects from institutional and private to larger investment scale projects.

Arguably their most recognized work, Aqua, is an example of this typology. Studio Gang does not see themselves as an investment property financially focused kind of firm. They do not write about the same kind of effects of these issues that Kieren Timberlake, SHoP Architects, Onion Flats, or Jonathan Siegal do. They see their work as an art, sometimes heavily researched based, but often metaphorical and often detached from conventional solutions. This attitude is elaborated in their publication Reveal where they show a series of projects using highly rational solutions that are deeply and unapparently based in site research 1.

Studio Gang has however, worked on an investment property, Aqua, mentioned before. Although they did not write about the same economic goals that the previously mentioned architects did, their financial success can still be measured and compared to the traditional models. They describe the project as a “disjuncture between the engineering objectivity behind the design and construction of the balconies and the emotional experience of the building as a total object further demonstrates the consistency of Gang’s approach 1.”

What studio Gang proves, is that art and architecture are related to finance and investment. The firm has had success in the investment property market of Chicago, while not necessarily even focuses on the same goals that their clients are. A lot of the other firms discussed in this literature review focus on things such as market type, like Segal, construction cost, like Onion Flats, efficiency, like Kieran Timberlake, or form, like SHoP. Gang’s work talks about uniqueness in aesthetics that often mimics natural form with some sort of conventional building material. The previous pavilion in Lincoln Park Zoo Chicago, used bent plywood to create an open air yoga pavilion. The following two projects use steel poles to mimic the structural system of a birds nest and formed concrete to mimic elevation changes of mountain contours. What is the relationship that ties this abstract aesthetic method to financial success.

The projects show, as explained through the Aqua project, that a unique and appealing aesthetic can greatly influence the generated rate of an investment property. Aqua is a conventional development on the interior with a highly intricate skin. The only difference between this building and all of the other on the market is its cantilevered balconies, which is a purely aesthetic creation.

Because the rest of the building is conventional, we can evaluate this aesthetic move in terms of Aqua vs. conventional Chicago buildings, which have a similar interior but with a flat glass exterior. Aqua is at the top of the Chicago market place in terms of rent psf, and although cost more per sf. than a conventional project, it did not cost substantially more. It also claims to produce energy savings by shading the building from solar radiation with its cantilevered balconies. These three tangible factors, generated rent, construction cost, and energy savings, can be measured against city averaged and placed into the equation derived before to measure Aqua’s financial success. A parametric equation could have, in this project, or in future projects, projected and measured this exact relationship, justifying good architecture for designers and providing a good return on money for investors. Pinpointing this relationship will benefit both parties.

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Quantifying Value

Studio Gang’s project listed to the right, Aqua, as previously mentioned is equal to a standard Chicago development in every way except for its contoured balconies. The contoured balconies can be measured for an increase in rent, increase in construction cost, and increase is energy savings. These three factors differentiate it from other developments, and show how one architectural move can impact a building’s success so greatly.

Studio Gang used a completely financially irrational source of inspiration, a mountain range contour line, to impose onto their project. They superimposed the Grand Teton Mountain Range over its façade. This art generated a desire for the building because of its uniqueness. It moved the building from average rent to top tier rent. At the moment, luxury Chicago downtown living is estimated at $2.50 psf for rent, with Aqua’s at $3.02, significantly higher. A quick estimation of this over the size of the building shows Aqua generating an extra 10.4 million dollars per year. Its balconies also saved energy from solar gain, which could be measured in terms of dollars by the engineers. Lastly, the balconies had an extra cost, which was greatly outweighed by its benefits.

Although the initial reason for these balconies was not financial and the contours were drawn by hand in a very artistic way, the art eventually met finance to become a very successful project. An artistic inspiration like this one can be placed on a parametric slider, to project an increased rent for making a building more sculptural and unique. Digital software can simultaneously track energy savings and cost.

This is the methodology that will be applied to the skin of this development project. The skin is a marketing tool for the building and its clients, representing an elite quality that other buildings do not replicate. Tenants will pay more for a building proportional to the building’s appeal within that market. The skin will also cost money and save energy. The cost idea can be tracked in a method similar to how Kieran Timberlake looks at cost, a measure of pieces and joinery. Structure costs a certain price per weight or length and certain price to join and ship. All these factors can be measured against each other to design a financially and architecturally successful facade.

Fig. 4.8
SHoP Architects sees themselves as the “master builder” architect. They avoid clinging to an aesthetic “style” and have avoided becoming a building “typology” specialist. They believe that architecture does not have to be classified in those ways. Instead they focus on creating architecture which is unique in those areas from project to project, and instead they carry different similarities and design trends.

One of their major influencing motives is the effect of finance on their designs. Most of their work falls in the project size where financial backing and investors are required. SHoP integrates financial motives into their design in order to create a successful financial environment for their projects to thrive in.

They isolate economic issues within the design of their projects. They find drivers of cost and value that affect the architecture. They will focus in on a single detail or plan or section and develop a logical system to generate architecture while maximizing or minimizing the generated value or cost.

Change of Business Model

This is the project that directed Shop towards its financial focus. SHoP thought of themselves more as artists than financial analysts before this point. This was the winning entry for the 2000 MoMA / P.S.1 Young Architects competition 1.

The only financial consideration SHoP had in this project was its cost. As a typical architect would, SHoP had a budget that they had to stick to. SHoP was solely focused on the cost of this project. They engineered it so that they could create this complex shape from an efficient construction method. They used an extremely cheap material and thought of an extremely cheap but flexibly joint to connect them. This structure is just 2x4 wood studs with a nail joint where the pieces pivot. The complex forms were even simplified, as the sections were built on large templates 1. This decreased the only cost expense dramatically, the cost of labor.

All of this was great, but SHoP did not realize the true impact of this design until after it was finished. This pavilion only cost $50,000 and SHoP only earned $10,000 in fees for it. The structure stood for one summer and generated something between $500,000 and $1,000,000 extra revenue in those couple of months 2. This was an eye opener for SHoP.

If a project can generate an extra $1,000,000 more than expected in a couple months, then the relationship between cost and quality, architecture and finance, must be multidimensional. Good architecture can increase revenue dramatically. Bad architecture can decrease it. Cost can dictate good or bad architecture but it can also be independent. The way that developers think about architecture as being dictated by cost can be inaccurate.

SHoP thinks about architecture as not having a fixed cost. They often instead focus on revenue. If they can think of a way to increase revenue, then they are financing the architecture to do so. Their forms and details often break convention as they are experimenting with different kinds of architecture, that reduce costs or increase revenue.

2. SHoP Architects P. 40
Understanding Potential

This project, the Porter House, shows the benefit of an architect thinking of architecture in terms of architecture and investment. The building below was evaluated by several investor and several developers looked at typical boring solutions to what this buildings potential is actually worth 1. Shop came up with a unique solution that was both more interesting and dynamic, but also more successful financially, 30% more than any other valuation. Shop understood the structure and architectural issues in relation to the potential income from rent and financial issues. The best solution here was not to decrease cost, but maximize revenue.

quality is repaid in
profitability and space, they can create more profitable and more unique spaces

Fig. 5.1

CAL PROPOSAL
S.F. * RENT)+ (NEW * RENT)
- CONSTRUCTION COST - AIR RIGHTS

SHOP PROPOSAL
(EXISTING S.F. * RENT)+ (NEW * RENT)
- CONSTRUCTION COST

developers proposed modestly bringing the new floors.

only we, the architects, proposed a five floor cantilever.
Positive and Negative Volumes

This project shows SHoP’s process for quantifying volumes. This waterfront property was to have a large development on it with a lot of units. SHoP, being architects wanted this space to be used for public type recreation. It would better serve the community. SHoP as developers realized that public recreation does not generate profit. A building cannot be constructed without financing. If the property is private and not public, then the only way to get it financed is to make it profitable.

SHoP sees their architectural goal and financial goals as equally important. They decide to make them work together. Public space is a negative cost. Private space is a positive revenue generator. On the far right, SHoP diagrams different volumetric configurations, trying to maximize public space. They came up with a ratio of public to private and tried to balance the two. Public space can only be connected to ground plane, for circulation reasons, so the optimal configuration turned out to be a thin tower with a public alley piercing through it.

The point here is that without the financing knowledge, the public space could not have happened. Even if the architect’s goal is architectural, working finance into the equation and understanding the relationship enhances the architecture.

Public space does not generate profit. It must be funded by private space.
Complexity through Efficiency

This project uses two simple and logical drivers to create a complex form. This was SHoP’s approach to a high rise typology. The program would be a mixed use, so SHoP found typical floor plate that would fit each program. This was based on developer averages and market status quo’s.

They organized this idea into a sectional tapering effect, to create variation in elevation. In plan, instead of the typical rectangular layout, SHoP uses ellipsoids. They use three different ellipsoids and rotate them from level to level. This creates an apparently incredibly complex shape. The shape is actually very logical and easily constructible. SHoP demonstrates how to logically create a complex shape that costs only slightly more to construct, but which appears much more expensive and complex then typical construction. It creates an interstitial space between the slabs that does not waste material to construct 1.

SHoP proves that sculptural type architecture can be very calculated, efficient, and logical. This is the type of design method can be combined with parametrics to become increasingly complex while still practical. Instead of letting parametrics run wild, they can be control through logical relationships as the ones seen here.

Fig. 5.4
Solving Financial Issues with Architecture

The issue here is seen in the middle detail, a wall section. Architects like thick walls because they give depth and character to the building. The developers argument is that thick walls take away from rentable space. In a place where rent soars as high as Manhattan, the lost rent from wall thickness can offset the buildings desirability. SHoP solves the solution by creating a thin wall with depth 1.

Typical masonry wall sections are based on varying wythes of brick. More depth = more wythes. Each layer of depth may add 4” or more to a wall section. SHoP instead combine masonry, a modular unit, with concrete, a plastic material. This allows them to create extremely complicated patterns. The system is actually semi-modular but designed to give the impression of a lot of variation and depth while using a small width.

SHoP then uses digital technology and modular thinking to replicate this pattern. They found the optimal size for a panel of these bricks, that would give the impression of variation while limiting the cost of casting and shipping size.

This is in a way very similar to the ideas that Kieran Timberlake discussed previously.

Coming out of this comprehensive research, this thesis relates to every architect discussed in differing areas. It pulls parts and pieces from different stances. Jonathan Segal, as discussed, has a very successful programming method for an architect. He programs according to market demand, and keeps spaces flexible. In the Q, he switched from office to residential program mid construction based on market demands.

Onion Flats has an attitude about energy conservation and operational maintenance that this thesis gravitates towards. They try to hold cost at market values and really make their gains on operational maintenance. Their ideas about natural light and water management translate into access to outdoor space that people find more desirable. They own and rent their own properties and make extra money because sustainability decreases operational costs.

Kieran Timberlake does not develop, but they have an attitude about detailing that is derived from economic issues. They believe in a method of modular construction with complexity in joining, which leads to a mass customization. It is a way of efficiently creating uniqueness.

Studio Gang does not discuss economic issues in their writing, but they have a great development example in this market. They show that the artistic sculptural side of the architectural spectrum has massive and sometimes positive effects on the financial end. Their ideas about sculpture will be injected into this financially based methodology.

SHoP exhibits much of Kieran Timberlake’s methodology in their work, but using technology to create interesting variation from repetitive modules. They speak about the ability of technology to bring high design into a cost range comparable to standard design. They focus on mill time and prefabrication to reduce labor and error costs in construction.

All of these strategies combined will create a comprehensive strategy that addresses the comprehensives issues inherent in converting vacant retail to mixed use. These strategies inject architectural improvements on existing development models which increase the quality of the end product.
Refabricating Architecture

Mass customization out of joinery and detail

Creating art out of efficiency and code

Finance can affect form in positive ways

Developing to protect the environment + city

Turning research into architecture

Refabricating Architecture

Fig. 6.0
Methodology

Summary of Process

The methodology process will start with site selection. In order to complete a conversion from one building use to another, the right site must be found. This means that there must be demand for a building to exist, and a vacant building must be found where this demand exists. Without the demand, there will be no budget for construction and the building will not better serve the community. The methodology for site selection will be to reverse a developer cap rate equation, giving general estimates for vacancy and operating costs, and assuming standard rates for % down on a loan and mortgage terms.

After a suitable site has been found, a thorough neighborhood and site analysis must occur. This method will parallel the one similarly established by Jonathon Segal. The correct building use must be determined based on neighborhood patterns and the building size will be determined by parking requirements and family demographics. Much of this data can be found using GIS technology.

The adaptive reuse of the space will then follow strategies demonstrated by Onion Flats. The shell of the space must be altered to increase the quality of living and sustainable standards. Just as Onion Flats alters the facades of its buildings, an attitude about insulation and expressing the buildings shell be formed.

The issue of natural light will also be addressed. In adaptive reuse of many kinds, especially for single use retail, natural light will not be adequate enough to house residential program. Onion Flats has defined a strategy for bring natural light into its flats, but the strategy will be altered to bring natural light deeper down into the public portion of the building.

A strategy for expanding the building vertically will build upon the natural lighting strategy and reference concepts from SHoP’s Porterhouse, which added value to the building while recycling existing structure. This new strategy will be more modular, so that it can adapt to typical conditions found in retail and be applied as a general strategy to reuse of this type.

The issue of tectonics and aesthetic style must then be discussed. The tectonic for the
intervention will dynamically contrast the existing tectonic set in place. Retail is often empty and minimal in its construction, often with heavy construction bearing walls. Kengo Kuma’s style of construction, with unorthogonal, non minimal, light and complex forms will dynamically contrast the existing style found in retail.

This style will be made possible using technology and techniques explained by SHoP. A parametric software will be used to design in a way that creates seemingly complex forms that are closely tied to the issues of mill and labor fabrication times. The parametric software will be able track and estimate costs for the intervention. This will bring SHoP’s attitude of high design down to an affordable level, so that this retail adaptive reuse concept can be implemented on a large scale across multiple sites, bettering many neighborhoods.

At the end of this process, the site will be a mixed use project that has a new tectonic, contrasting and complementing the existing structure. A pro forma and RS Means based cost estimation will keep the project in check, weighing its feasibility and altering the project to keep it addressing the problems in realistic ways.
Architects do not choose a site. Architects are approached by clients, who often already have a site and an idea about programming and aesthetics. It would be improbable for an architect to have an existing idea and bring it to a site. If an architect does, they are then crossing the line between architect and developer.

Ultimately a land is either owned by a single person or entity like a corporation or government. It is their right to decide what goes on that site. If the site is privately owned, it often will either be designed to be pleasing to an individual or create financial return. If it is government owned, it may have a higher purpose of serving the community. In the end, an architect can either choose to design something on someone else’s site that already aligns with that entity’s goals, or an architect can cross over into the realm of developer, as this thesis will.

For the purposes for this specific design project, take the example of Onion Flat’s mentioned before. Onion Flats were architects that saw that the government was trying to work with private individuals in their community to develop projects that would both return on investment and benefit the community. Onion Flats saw that the model being used was wrong and their goals did not align with those who owned the land. Ultimately, even though Onion Flats was right, they could not design projects the way that was better. Instead, Onion Flats had to cross into the realm of developer in order to get their architecture financed.

This project assumes that economics and architecture are mutually beneficial, more money equals better architecture and better architecture makes more money. If the goal is to maximize the sum of the two, then the theory would be that the most profitable building in the market is also the best looking. It would also lead one to believe that the best looking site has the most potential to be profitable. These theories are more or less true and proven in the real estate market.
Playing by the typical set of rules will only allow for a site to be purchased at market value. This will only allow an expected budget for aesthetics and an expected return on investment. This project will thus add another layer of architectural problems to the real estate equation to intensify the aesthetic reward.

The value of a property is separated into two components, land and improvements. Undeveloped land has no improvements. Improvements are the built architecture and landscape architecture additions to the land. Land valuation is very accurate and easy to calculate. Current improvement valuation is not difficult either. Where developers make the money to finance is projects is in understanding the potential improvement valuation. This is hard to calculate. It is based largely on construction costs and market analysis. An architect would have a hard time valuating the potential of an improvement without market analysis. Adversely, a developer would have a hard time valuating an improvements potential without sufficient knowledge about construction costs. This is why most development projects are “safe” projects based on typical construction costs and typical market results.

The most succesful developments in terms of financial and aesthetic success challenge conventional approaches while integrating and understanding the relationship between aesthetics and economics.

This project will choose a site by finding a piece of real estate for sale whose potential valuation has been largely miscalculated by developers. This will ultimately be the most succesful financial project, thus it will be capable of being the most aesthetically succesful project as well. It will also steer the project away from real estate and isolate the problem on the site as an architectural aesthetic one.
Understanding Markets

Architecture and real estate are directly tied to each other. This equation derived to the right shows the exact relationship at the moment. This is an ever changing relationship based on interest rates, market values, and location.

The equation makes assumptions about a maintenance, taxes, marketing and vacancy costs of 25% of potential gross income. It then uses current interest rate and mortgage terms to simplify the problem into an architectural one.

The target construction cost per foot basically estimates the number that would have to be hit in order return 10% profit back on the initial investment per year, which is what most developers use to qualify a successful investment.

The equation was then applied to several real land listings in cities to capture a market cost psf.
Fig. 6.1
Based on the prior analysis. One can get a good idea of a market's demand for new construction and the parameters that an architect would have to work within to design a project. It is also evident, based on the rent cost analysis, that certain cities that are known more for “high design” are allowing more cost psf than smaller market cities.

The market chosen for this thesis is Chicago, for its flexible budget allowance, large market for statistical analysis, and proximity to Cincinnati.

Zooming in one layer further, we can see that cities do not have an equal dispersion of demand. There are peaks and vallies in neighborhood rental rates. The curve that is drawn here in a section through the city shows a sometimes dramatic dropoff between neighborhoods.
Three neighborhoods in particular stand out here. These neighborhoods are highlighted with the dotted line that shows the large dropoff.

These “fringe” neighborhoods have the largest variance in land and improvement values. This means that improving a property from the low end of the market to the high end of the market will often capture a larger return than a neighborhood where all of the property is either cheap or expensive.
Isolating an Architectural Problem

This map zooms in on the Wicker Park market. It shows five low priced lots available. The target cost per square foot equation from before was applied to all five lots to show what the development cost would be. The one highlighted property shown is the only that currently has improvements on it. This development has an eyesore improvement on it, which destroys its property value. A developer would take be taking a huge risk on this property with it because they do not understand construction cost and design possibilities as much as an architect. This is the perfect property for an architect to development. It isolates the real estate problem into an architectural problem.

The site in a vibrant neighborhood with a designated program due to its zoning and lots of traffic to support it. This means that the only questions in this project are architectural ones. How could an architect improve this buildings aesthetics to make it valuable again? If the rent is tied directly to aesthetics, as explained before, then all the architect has to due is bring the aesthetic value up in line with the construction cost.

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Fig. 6.3

1617 ASHLAND STREET
$298.86 P.S.F.

1617 ASHLAND STREET
$271.96 P.S.F.

1446 N ASHLAND STREET
LCT = 48' X 107'  SITE = 5136 S.F.
ZONE = B2 (MIXED USE) FAR = 5
BUILDABLE SF = 25,648
LAND COST = $735,00
INTEREST RATE = -4%
NEIGHBORHOOD RENT PER SQUARE FOOT = $19.80
COST PSF = $313.75
MAXIMUM EQUITY = $941,501.48
SITE COST PSF = 143.11 MORTGAGE TERM = 30 YEARS
MAXIMUM HEIGHT = 50 - 80 FEET

Fig. 6.4

1445 ASHLAND AVE.
$313.75 P.S.F.

1445 CLEAVER STREET
$323.33 P.S.F.
The chosen neighborhood, Wicker Park, Chicago, is significantly denser than the Chicago average, showing about 18,000 inhabitants per square mile vs. the Chicago average of closer to 12,000. The family size comes out to about 3.3 people per family, meaning that the target renter will have either 1 or 2 children, requiring either a 2 or 3 bedroom apartment. Although there is great public transportation access at this site, nearly half of all commuters use a car, and the average cars per apartment is 1. This means that the amount of apartments on this site should approximately equal the number of parking spaces. This will best reflect the neighborhoods demand.

A closer look at the businesses in this neighborhood reveals that there is a good deal of program existing in the mixed use block. Most of these businesses are, however, office and restaurant and not retail. The majority of the retail is concentrated in the north east and south west corner of the axon shown to the right. Because of the extra spatial requirements necessary for a restaurant type program, especially back of house requirements, an office would be the ideal lower level program. A traffic analysis shows that Ashland Street is actually very busy and should support a lower level office. The majority of the traffic occurs between 8 am and 6 pm, hinting that this is mostly commuter traffic.

The property values layer then shows what the values of neighboring properties are estimated at. The values were “zestimates” from zillow.com that were added on top of eachother when multiple apartments occured on the same property. These estimates show how significantly underpriced and underdeveloped the existing site is, worth nearly 2 million dollars less than similar properties surrounding it.

The conclusion here is that the property should be converted to office below with 4 apartments, 2-3 bedrooms above and a parking space each for a total budget somewhere under 2 million dollars.


69
Fig. 6.5

PROGRAMMING STRATEGY

DEMOGRAPHICS

<table>
<thead>
<tr>
<th>1 PERSON</th>
<th>2 PERSONS</th>
<th>3 PERSONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>12%</td>
<td>38%</td>
<td>33%</td>
</tr>
</tbody>
</table>

HOUSING DATA

- 1 APARTMENT
- 2 APARTMENTS
- 3 APARTMENTS

TARGET RENTER

3 PERSON 2 BEDROOM WITH PARKING SPOT = $12.28 PSF

Fig. 6.5
This diagram shows the development ages of all buildings constructed in the immediate neighborhood over the last 20 years. The diagram shows two different types of developments, a 3 story purely residential flat, and a slightly larger mixed use development.

The mixed use development always occurs on the same street with the same sized footprints and similar apartments inside.

This shows what a typical development is like in this neighborhood. It is the kind of development that will eventually replace 1445 N. Ashland after it gets demolished.

This type of development has several problems inherent in it, including its lack of light and access to outdoor space which will be addressed as a new strategy is developed.
The drawing to the right shows a typical bay of retail. Single use retail is typically only one
or two stories. It either spans from bearing wall to bearing wall, as shown here, or spans a
portion of the distance and rests on a post and girder system. Either way, the structure is the
same, but in one module or several.

The floor itself is made of a composite steel concrete deck. A steel coregated pan sits on top
of the open web bar joists, spaced usually around 8 to 10 feet apart, and is then poured with
concrete on top, usually 4 to 6 inches. The floors are designed by code, to carry 100 lb/sf live
load plus their dead load. The roof, however, is not meant to be habitable. Roof live loads
are significantly less, by code, and for example, in Chicago, the live load is only required to be
25 lb/sf. This means that if the mixed used portion of the project is to extend upward, 75 lb/sf
live load would have to be accounted for in order to support a deck or public room load as
required by code.

The bearing walls, as shown in the drawing, may or may not be insulated. Especially in
older buildings, energy standards were very different than what they are today. A strategy for
insulating and reducing thermal bridging would have to be developed in order to rehabit the
building.

Another key issue is the dependence on electrical lighting. Not only is electrical lighting
an energy drain, it also is not sufficient for residential living. Access to natural light is a
requirement, especially in bedrooms. A way to bring natural light into the shell of the building is
essential to rehabitting it.
Fig. 6.7

designed for 25 lb / sf Live Load

designed for 100 lb / sf Live Load

electric lighting and hvac hang from structure

R - Value of 1.45
Onion Flats has developed a strategy to let more natural light into their 2 story flats. They start with a skylight on the roof as shown on the right. Then they filter the light through a glass staircase, as shown in the two photos below. This strategy works adequately for lighting an apartment with direct access to the sky. Unfortunately, in the project to the right, and in many other situations for mixed use projects, there will be units below that do not have access to a skylight.

For this reason, Onion Flats strategy has to be altered. In the diagrams to the right, the idea of carving through the structure in between apartments is shown instead. A typical mixed use or rowhouse type development reserves space for parking in the back. The space above the parking is essentially wasted. In single use retail properties, there is no parking in the back, so if the space above was built, then a section of the middle of the property could be used to let light enter.

This strategy will bring light through the building not only to the lower apartments, but also into the public space on the ground floor. This does not sacrafice floor space, it simply redistributes it from the rear of the property to the middle, where it can more effectively bring natural light into the apartments.
Day Lighting Strategies

Unused Space

Fig. 6.8
Most of the walls in a vacant retail building will be either under insulated or not at all insulated. Onion Flats has developed attitudes about how to clad shells that can be helpful. Onion Flats and many other adaptive reuse firms, like to mix the old with the new, contrasting and highlight each other.

As seen in the photos to the right, Onion Flats often switches their cladding strategy at corners, sometimes insulating on the exterior, and other times doing so on the interior. This allows the masonry to sometimes be exposed on the interior and sometimes exposed on the exterior. It creates variation across the building while holding a constant attitude.

This exact process can not always be repeated in urban retail spaces, as most do not turn corners very often. They often use the full footprint of the lot. This can limit a lot of the possibilities for cladding the exterior outward.

For this reason, several strategies have been developed to the right, showing how the thermal line will follow the shell of the building, jogging on and off in relation to the fire exit circulation and neighboring buildings. Using this strategy will create instances where the masonry can be exposed without compromising the energy efficiency.
INSULATION STRATEGIES

BORDERING BUILDING  HALF BUILDING  EXPOSED  CIRCULATION  VERTICAL CIRCULATION  DETACHED FACADE

Fig. 6.9
In SHoP’s Porter House example either, the vertical addition strategy was explained. They extruded an area equal to the footprint of the building upward, and canted a part of it over a lesser built site. The structure from the warehouse below was partially reused to help support the structure. The amount of canted rentable square feet was able to finance the project.

As explained before, urban single use retail has a modular pattern in its structure. A strategy for modular vertical expansion will be developed to work with a retail’s structure. The study to the right shows a 40’ x 30’ steel bay being extruded from the foundation through the roof of the existing structure. This structure will be able to house 1200 sf, the size of a typical 2 bedroom apartment. The interstitial area left over between modules will turn into vertical circulation, access to outdoor space, and lightwells to bring natural light into the lower levels.

The bays will intersect with the roof structure, helping to support the roof. This will make the roof accessible so the structure can be built upwards. The affect of even only a one story addition on the chosen site is shown in the image on the top right. It drastically changes the rentable income of the site and that changes the value and construction budget accordingly.
Fig. 7.0

**Parking to Apartment Ratio**

- 1:1 → 1:2

**Width of Lot**

- 50' × 25'

**Sizing Intervention**

**Possible Configurations**

**Volume vs. Residual Space**

**Programming Strategies**

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3 PERSON 2 BEDROOM WITH PARKING SPOT

40' × 30' = 1200 SF @ $12.28 PSF
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Contrasting Tectonic
Introducing Complexity to Simplicity

The photos to the right are all works of Kenga Kuma. He has done a numerous amount of retail projects. His style introduces complex systems into otherwise minimal spaces. Retail spaces often have bare minimum architectural features and so this contrast helps to reinforce the clean minimal aesthetic as well as introduce a new clear intervention. The two systems benefit each other.

Kengo’s style often comes in the form of a skin, although one example to the right works as a structure. It is often permeable so that light can pass through it. This attitude will help natural light diffuse throughout the building, especially if this aesthetic occurs in the same areas where the building is being carved out for natural light.
CONTRASTING TECTONIC STRATEGY

Kengo Kuma Various Projects

Fig. 7.1

Fig. 7.2

Fig. 7.3

Fig. 7.4
As explained earlier, SHoP believes that technology can make complex high design more affordable and on par with standard construction. They believe that one of the highest costs of construction is labor, and therefore, they use technology to reduce labor. The project, 290 Mulberry, on the right shows how they used technology to make an extremely complex aesthetic on par with standard construction costs.

The building addresses the issue of wall thickness, and it wants to create complexity in depth across a small area. They used parametric functions to create buildable variations within a strategically sized panel. The size of the panel was set by the dimensions that the brick laying machine could operate with. A mortar was layed behind the bricks and the machine was able to use the digital model to lay the bricks in complex patterns. Only a number of patterns were used, in order to limit costs, but they were spread across the facade in order to hide the repetition. A similar approach can be taken and applied to a Kengo Kuma type attitude. A skin type structure can be designed that focuses on milling time and perimeter or volume cut by machinery. The system can be designed to minimize labor and focus the cost on the mill time aspect of the fabrication process. The cost portion of the process can be programmed into the parametric equation. The perimeter of the cut or volume of material milled can be counted in a Grasshopper script and possibly scripted as a parameter. This will allow the fabrication cost to become part of the design.

This assembly strategy starts as a critique of the standard waffle script. Shown the top right of the diagram, every inch of a waffle script is milled. For the amount of this structure needed to complete the single use retail project, the mill would need to cut 49,000 linear feet. The middle proposal shows a combination of milled and stock materials. The milled pieces are only used as connectors. This reduces the milling to 750 feet. This also greatly reduces the labor involved in the assembly. Because milling typically uses 8’ wide pieces of plywood, there would actually be more connections required, as member will need to be built up. The alternate proposal uses 12’ long stalks of bamboo to span between members. This reduces the total connections from 5,850 to 1,440. The result is a tectonic that is cheaper to mill, cheaper in terms of material cost, and possibly also cheaper in labor. Finding the balance point between manual labor and mill costs allows more complex structures to be assembled for more affordable costs.
Fig. 7.5

SCREEN STRATEGIES

CODE + ASSEMBLY

DEFORMATION

ASSEMBLY + MILLING

Steel Hose Clamp
$0.62 ea.

10' Bamboo Poles
$2.65 ea.

2 x 12 Lumber
$14.97 ea.

46,800
$22,444

750'x
$1,500

1,440
$1,440

0'
50'

Fig. 7.5
Pro Forma equations are often very complex and reliant on many factors. Individual decisions however, can be decided on a simpler basis. A “cap rate” equation is a measure of capitalization rate, which is a % return on an investment. Any decision will have a cost, and any decision will have an added value. If the value and cost can be estimated, then a cap rate equation can be drawn up.

This equation may possibly be tied into a parametric equation, depending on its complexity and accuracy. Because it is just a series of relations and mathematics functions, it would be ideal for a parametric equation. Some of the factors in the equation would be related to architecture and therefore, spatial qualities, other factors in the equation would be financial numbers, which could be plugged in.
\[ \text{CAP RATE} = \frac{\text{NET OPERATING EQUITY INVESTED}}{\text{VOLUMETRIC + SITE ISSUE}} \]

\[ \text{CAP RATE} = \frac{\left(\text{RENT} \times (\text{VACANCY}) \times (\text{MAINTENANCE})\right) - \left[\left(\text{CONST. COST} + (\text{LAND COST}) + (\text{SOFT COST})\right) \times \left(1 - (1 - \text{INTEREST RATE})^{\# \text{ YEARS}}\right)\right]}{\left(\text{VOLUME + DETAIL ISSUE}\right) \times \left[\text{BUILD TIME} \times \left(\text{CONST. COST} + (\text{LAND COST}) + (\text{SOFT COST})\right)\right]} \]
Design

Fig. 9.0
Fig. 9.5
Vacant buildings are a problem in our society. Single use retail is a typology containing many examples of vacant buildings. This thesis explores the issues of vacant single use retail and analyzes architectural strategies that could help restore and convert these empty shells into useful buildings. Using strategies relating to development, sustainability, and technology, this can be feasibly executed.

The result will return buildings to use faster, which will reduce many of the negative effects vacant buildings have on communities. It will be more sustainable, reducing waste from demolished buildings and reduce new materials needed to replace the building. It will also result in a higher quality of architecture, as the cost per foot of the project can be spent more effectively on quality materials instead of demolition costs.
Fig. 1.1: John Fricano


Fig. 2.3: John Fricano

Fig. 2.4: John Fricano

Fig. 2.5: “Onionflats | Philadelphia.” Onionflats | Philadelphia. N.p., n.d. Web. 2 Nov. 2012

Fig. 2.6: John Fricano

Fig. 2.7: “Onionflats | Philadelphia.” Onionflats | Philadelphia. N.p., n.d. Web. 2 Nov. 2012

Fig. 2.8: “Onionflats | Philadelphia.” Onionflats | Philadelphia. N.p., n.d. Web. 2 Nov. 2012


Fig. 3.0: Sokol, David. “Taking Liberties.” Green Source Jan.-Feb. 2009: 52-54. Print.

Fig. 3.1: John Fricano

Fig. 3.2: John Fricano


Fig. 3.4: Sokol, David. “Taking Liberties.” Green Source Jan.-Feb. 2009: 52-54. Print.

Fig. 3.5: Sokol, David. “Taking Liberties.” Green Source Jan.-Feb. 2009: 52-54. Print.

Fig. 3.6: John Fricano


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Fig. 4.0: Kieran, Stephen, and James Timberlake. Refabricating Architecture. New York: McGraw-Hill, 2003. Print. 88

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Fig. 5.8 : SHoP, Architects. SHoP. ; Out of Practice. China: Monacelli, Incorporated, 2012.
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**Fig. 5.9**: SHoP, Architects. SHoP. Out of Practice. China: Monacelli, Incorporated, 2012. Print.

**Fig. 6.0**: John Fricano
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**Fig. 6.2**: John Fricano
**Fig. 6.3**: John Fricano
**Fig. 6.4**: John Fricano
**Fig. 6.5**: John Fricano
**Fig. 6.6**: John Fricano
**Fig. 6.7**: John Fricano
**Fig. 6.8**: John Fricano
**Fig. 6.9**: John Fricano

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**Fig. 7.5**: John Fricano
**Fig. 7.6**: John Fricano
**Fig. 7.7**: John Fricano
**Fig. 7.8**: John Fricano
**Fig. 9.0**: John Fricano
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**Fig. 9.2**: John Fricano
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Fig. 9.4 : John Fricano
Fig. 9.5 : John Fricano
Fig. 9.6 : John Fricano
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