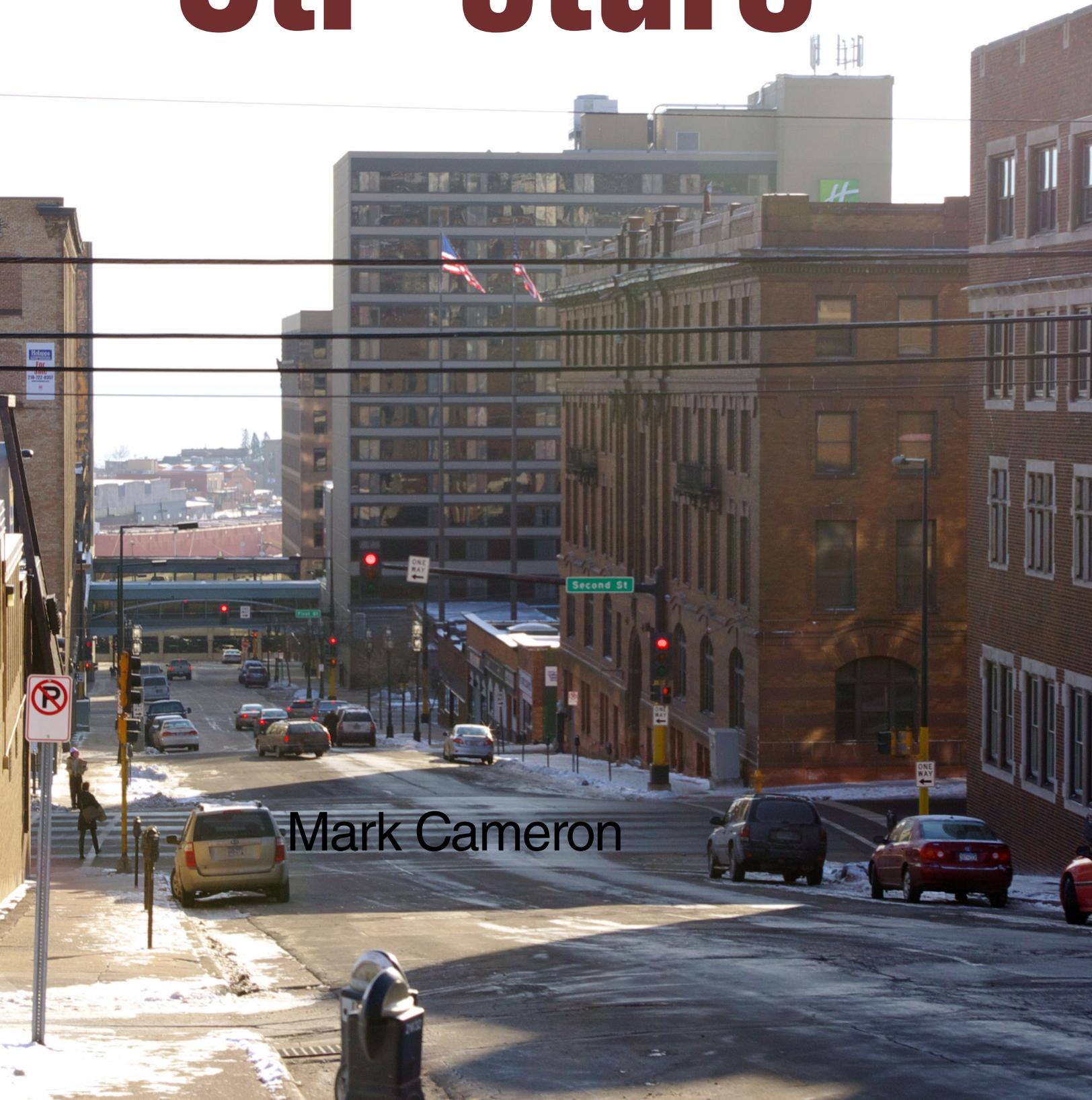


Reusing Structure



Mark Cameron



TITLE PAGE

REUSING STR CTURE

A Design Thesis Submitted to the Department of Architecture
and Landscape Architecture of North Dakota State University

By

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In Partial Fulfillment of the Requirements for the
Degree of Master of Architecture

Primary Thesis Advisor

Thesis Committee Chair

September 2010
Fargo, ND



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ABSTRACT

abstract

This thesis attempts to understand how built structures can evolve over time through use and reuse. It looks at how reusing a space is possible by taking a warehouse structure and reusing it for the new purpose of living space. Many cities are attempting to perform historic preservations as the cities age, such as a historic town like Duluth, which was founded with trading, was transformed into a mining town and now has multiple colleges. This project is setting out to better understand how a building can grow with the city's new images. Buildings evolve as users act upon them. Occupants will gradually alter the structure through use and modify their needs to fit into the building they live in.

keywords

Adaptive reuse, Apartments, Historic Preservation



PROBLEM STATEMENT

How does a building evolve to meet the changing needs of the user?

THE

IOS



STATEMENT OF INTENT

typology

I have chosen to reuse an open-spaced structure as an apartment building with retail and office space at the ground level.

claim

The users both alter and grow into the structure of a building through occupancy.

premises

actor

The users are defined by certain constraints, especially when financial responsibilities disrupt the ability to grow and will manipulate their needs differently than an unrestrained user.

action

While the structural element cannot be easily changed, the spatial areas within, through destruction and addition of non-loadbearing walls, and the skin on top can be manipulated. Also, buildings can be added onto to add more space.

object

The structure of a building is expensive to change after initial construction. To make improvements more accessible there should be segregation between permanent and less permanent elements.

unifying idea

The building evolves as the user acts upon it. The users alter the structure to better suit their needs, but the users also develop on their own to better suit the structure.

justification

When living in a throw-away style society with rapid growth and limited resources, it is important to understand what style of building can more easily evolve to meet new needs without needing to be thrown away to start fresh. This makes more fiscal sense as well as causes less construction in many downtowns that are already congested with traffic.

PROPOSAL

THE

In the disposable culture that exists today, buildings are sometimes treated like shells. They're used for a short period, lived in and worked in and then vacated as a company grows too big for the space. The empty building sits unoccupied until a new business either deems it a worthwhile new location for their business or the structure becomes so decrepit from a lack of maintenance that it has to be torn down for a newer and taller structure. How can we design buildings that are better equipped to expand with an expanding user?

Despite the current recession, companies are still growing beyond their current spaces, new companies are starting up and others are merging, and without relocating, this growth would be stifled. Purchasing a new building is an expensive endeavor, yet expanding a current structure can reduce some of the strain of growth. People are still moving out of old residences and into new ones as they relocate for work or grow their assets enough to move out. Is there a chance to keep urbanization without tearing down old buildings for the purpose of resurrecting taller ones?

A space too small or ill-prepared for an occupant will stifle growth while a well-designed space can help to enhance growth. A building in which the utilities are built into the structure will appear minimalistic and pleasant for the first few years. If, however, the company expands and applies more strain to the electrical load and the environmental control systems, the construction costs to insert new systems would be too high and the growth might be stunted. The same building with exposed construction might be perfect for the expanded company, and yet may not appeal to the aesthetic intent of the initial phase. Is there a typology of building that is better suited to reuse and growth?



NARRATIVE

Highly specialized buildings are useful for highly specialized companies. Spaces and structure that are designed to fit a specific need are beneficial to the companies or people for whom the place was built, yet are difficult to transform if a new occupant wants to move in or if the initial company grows in a fashion unexpected. The unexpected growth can be due to changes in society, as in a need for more housing as opposed to the anticipated need for office space or a new technology that requires a higher energy load in a space than proposed. How can we build for the unexpected without overbuilding for the current needs?

By continually asking these questions, we could conceivably cause fewer resources to go to waste through inactive or demolished buildings. By understanding what types of buildings are better equipped to be expanded, altered or changed it will become possible to help stimulate growth for businesses and people.



USER/CLIENT

client

A developer will most likely be the one in charge of the needs for the location. he or she will have purchased the land and be financially responsible for the design and construction. When the building is ready for use, however, the property will be sold and the developer will cease his or her financial interest in the project. The new client will change to the owner who buys the property and the landlord who runs it. The landlord will also be one of the users as he or she will live in one of the units. I am responsible for the decisions made immediately to the developer, but in a larger sense to the future owner and landlord.

user

Those living in the units will be the primary users of the space. The secondary users will be the staff needed to support the spaces including the landlord, a person to keep the public spaces clean, employees in the office space and employees and customers of the retail area.

There will be two peak usage times. The peak usage for parking will be when all of the cars are parked and the residents are in their apartments at night. The peak usage for the spaces on the interior will most likely be during the evening when the residents will be in their units or in the public areas with friends. The needs for the units will be different as the structure will try to promote diversity going the residents.



MAJOR ELEMENTS

Living Spaces

One and two bedroom apartments will be for rent. These will be the primary spaces in the building and are restricted to the individual residents or to those invited in.

Lounge Area

This is open to the public, but will primarily be used as an area in which to wait for residents to come from their apartment or for residents to wait for guests. It would also serve as a hub or entry point to different functions.

Laundry

This space is primarily for residents, but is open to staff as well. It is necessary as a support space for those living here.

Maintenance

The HVAC system and tools necessary to the maintenance of the spaces would be located here. This is primarily for staff use.

Restrooms

Restrooms would be located off of the lounge area and serve as support for those spaces. These would be mostly for the public as the residents will have restrooms in their own living spaces.

Retail

A space allotted for a small shop could thrive with the foot traffic along these roads. The space would have very public access for employees and customers

Office

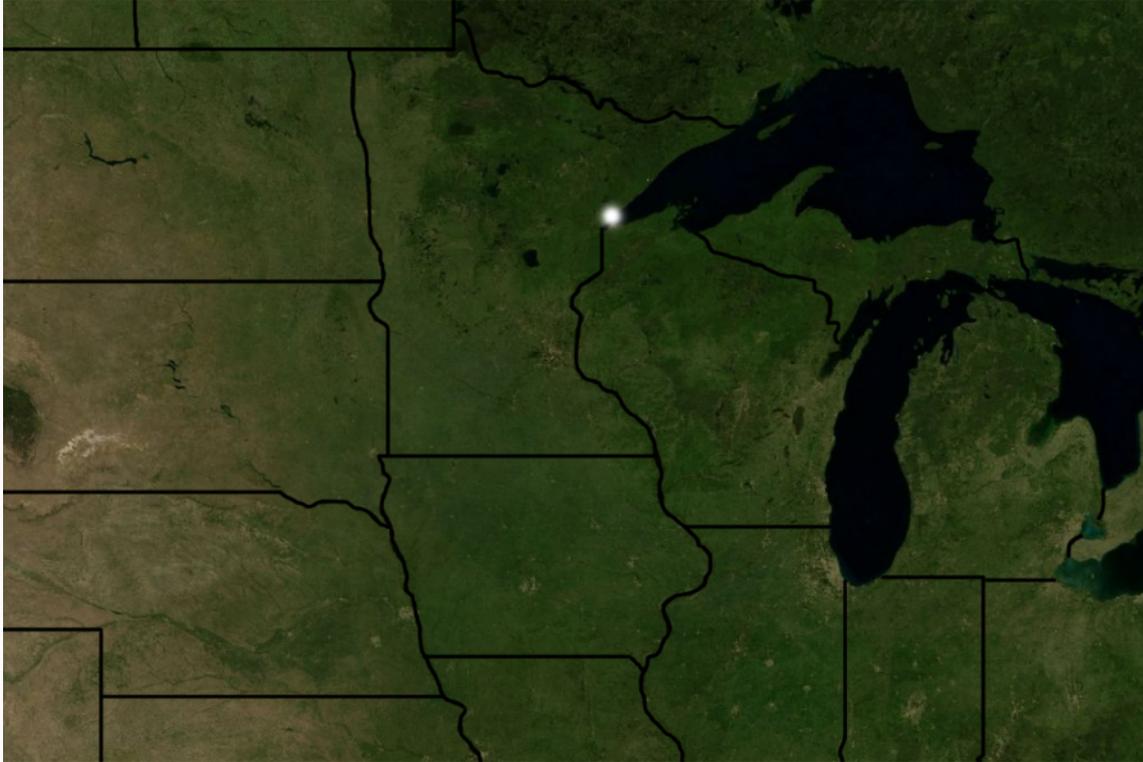
An office for a small commercial business on the ground level as well as an office space for the apartments are necessary. The office on the first floor would be for business personnel, with a smaller office on one of the residential floors for the tenants and landlord.

Transition Spaces

These allow people to move within and around the building.

Duluth is located in the upper midwest, adjacent to Lake Superior, and connected to the Atlantic Ocean through the Great Lakes.

regional



Duluth is a good research site for this typology as it is a historic trading town that will have numerous historic open truss buildings in the form of warehouses. Duluth is putting an emphasis on historic preservation (Greater Downtown Council, 2007). The population along the west side of Lake Superior is young as the two colleges, St. Scholastica and the University of Minnesota, Duluth are located there

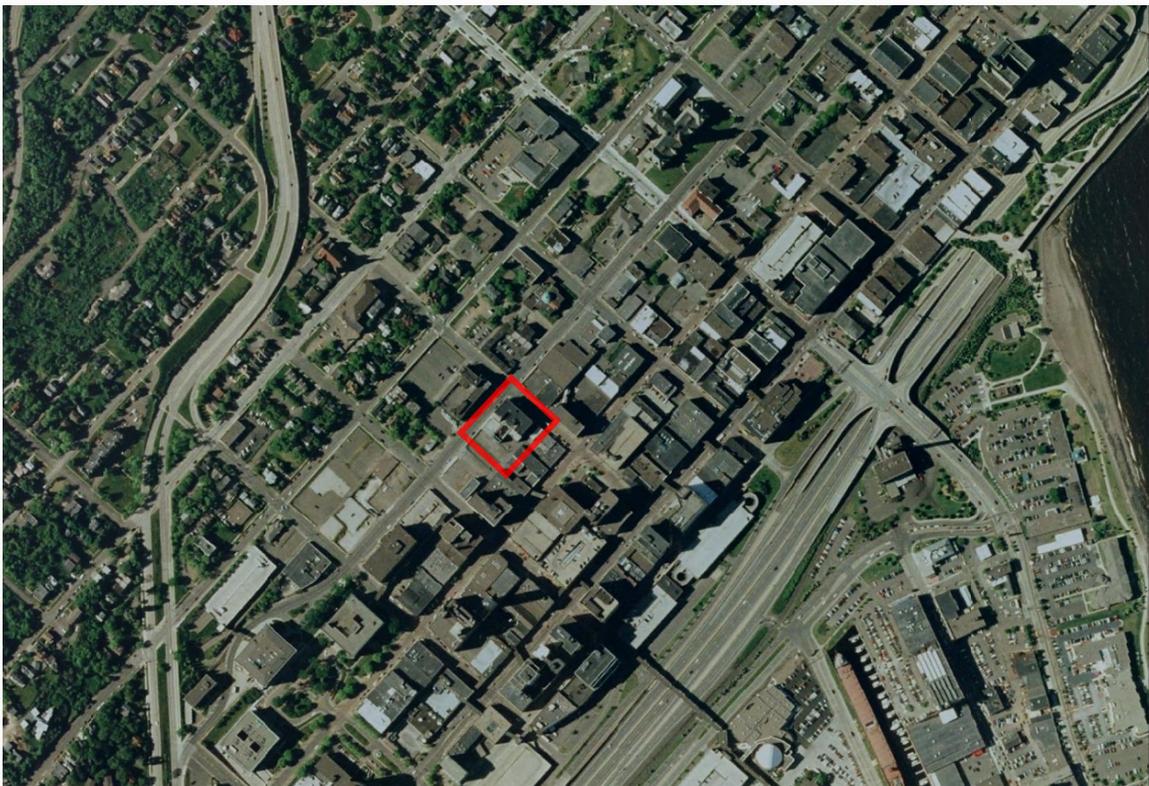
city



SITE INFORMATION

site

Located on the south corner of North 2nd Avenue West and West 2nd Street, this site is approximately two miles from the campus of the University of Minnesota, Duluth. It is at longitude $46^{\circ} 47' 9''$ N and latitude $92^{\circ} 6' 10''$ W. Currently, a masonry bearing wall structure sits here. The site lies on a slope, higher on the northwest side with the lake to the west. There is parking at the back of the building to the east as the existing building faces northwest. Interstate 35 runs along the southwest side. There is easy access to multiple bus lines with the Duluth Transit Center just two blocks away.





PLAN FOR RESEARCH

emphasis

In this project, I will look at how buildings are adjusted by an occupant and how they can change over a period of time. The needs of clients and users change over time as the functions they serve change. How does a building respond to new expectations placed on it and how does this response affect the needs of its occupants?

research

I will be employing a concurrent transformative strategy in my research. This is guided by a theoretical perspective and will attempt to research and better understand the theoretical premise and unifying idea as well as this project typology with its programmatic requirements, the historical context, and this site.

records

Documentation for this project will exist as both a digital copy and a physical record. All of my notes, sketches, designs and documentation will be presented in this thesis book for future students and scholars.



STUDIO EXPERIENCE

**arch 172
spring 2007**

Stephen Wischer
T.A. Chris Hawley and Heather Fischer

Introduction to Studio
Form and Spatial Design
Introspective Design

**arch 271
fall 2007**

Stephen Wischer

Tea House
Fargo, ND
Boat House
Minneapolis, MN
Twin House
Fargo, ND

**arch 272
spring 2008**

Mike Cristenson

Group Live/Work Community
Fargo, ND

**arch 371
fall 2008**

Steve Martens

Wildlife Research Center
Williston, ND
Masons Guild Hall
Springfield, MN

**arch 372
fall 2009**

David Crutchfield

Performing Arts Center
Austin, TX
Spaceport America Hotel
Truth or Consequences, NM

**arch 471
spring 2009**

Darryl Booker

Highrise
San Francisco, CA

**arch 474
spring 2009**

Mike Christenson and David Crutchfield

Urban Design Project
Jaipur, Rajasthan, India

**arch 771
fall 2010**

Cindy Urness

Gathering Center
Brandon, MN

RESEARCH

THE

the necessity of old

Have you ever been to a house that felt sterile, nothing has any history or any sense that people have lived in it? The place feels cold and distant, without the signs of distress that occupancy creates? A city full of new buildings can have that feeling; it is the old buildings that give character to a city.

The historic brick buildings that line the streets give a sense of history to a city, acting as a living biography of everything that has happened to the city and giving testimony to the former needs, styles and traditions that were once, if not still, very much at the center of the vibrancy of the city. Each addition to a building can give insight to the thoughts of the architect and the owner, for example, a room addition on one side for more storage with an addition recessed over top in order to preserve the front façade.

The life of these buildings, however, comes not only from the story they tell of the prior needs of the city district, but also what those buildings currently provide to an urban center and its inhabitants. Upstart and local businesses trend to older buildings as they cannot usually afford the costs associated with new construction. As Jane Jacobs claims in her book *The Death and Life of Great American Cities*:

As for really new ideas of any kind - no matter how ultimately profitable or otherwise successful some of them might prove to be - there is no leeway for such chancy trial, error and experimentation in the high-overhead economy of new construction. Old ideas can sometimes use new buildings. New ideas must come from old buildings,. (Jacobs, 1989, p. 188)

This phenomenon can be observed in the garages of both the Hewlett-Packard enterprise and the Apple group. The small overhead of a spare garage afforded them the ability to take risks and start their respective franchises, (Brand, 1994).

In *How Buildings Learn*, Brand discusses low-road buildings that have a low cost and are easily changed by simply tearing down walls, making a modification here or adding an element there. These types of buildings are helpful to companies just starting out in that the building is expandable with the company. If the space is too small, a business can simply rent the space next door, tear down the dividing wall and expand.

the obligation of new

While older buildings can provide residence for small businesses that need low rent, new buildings are needed for cities to grow, “The only harm of aged buildings to a city district or street is the harm that eventually comes of old age - the harm that lies in everything being old and everything becoming worn out.” (Jacobs, 1989, p. 188-9)

As was described on the previous page, old buildings and new buildings draw different types of businesses. New buildings tend to be built for the larger economic powers of the city. Businesses that can afford the high overhead costs of new construction tend to be more mature in their development process. Either well-established with high amounts of revenue that will pay high levels of taxes, or well-paid through private donors, as happens in the arts, these businesses perform as necessary a task as the small bookstore on the corner of the block. Diversity within the city district can only be achieved with different aged structures.

Talking about the biography of buildings, it is necessary for the story to be kept up to date. Contemporary buildings enhance the story of a city block.

Newer buildings will tend to be more technologically proficient than older buildings as environmental control systems are improving and our understanding of different materials has improved.

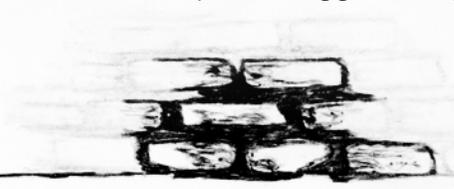
old vs new construction

There are a variety of reasons that developers will choose to move into an existing building, including inherent qualities of a specific building, a location or the advantages of a particular site, a return on their investment, or government assistance in paying for the remodelling (Shiple, Utz & Parsons, 2006).

Money can be a factor in the determination of old and new. For some buildings, when a complete overhaul is needed to cure asbestos, mold or simply deterioration in the original materials and structure, this cost might be too high for some of the local businesses looking to an old building for the low rent quality.

For some of these buildings, too much money is needed and so pride is one of the most necessary tools in the renovation. For some developers, pride can be what causes a building to be restored to the image evoked by its original state (Shiple et al., 2006).

Location can be a major draw in that some historic buildings are on sites and have features that are advantageous, "The aura of objectified physical presence is no longer the focus of perception, but rather the actual potential of intervening in a specific setting." (Jabornegg & Pálffy, 2009, p. 1153)



A McDonald's moved into an old house just off of a turnpike on Jericho Plank Road. The house had been a series of restaurants before the burger joint moved in and therefore had all of the essential tools to make the move. Old houses have a comfortable nature about them as they were built for the purposes of being a home. Add in the fact that the house was located just off a turnpike and the location made this an optimal spot for rehabilitation.

The burger restaurant purchased this site for a hefty sum of money and then proceeded to restore the building to its original state, including chimneys, railings and attic windows (Brand, 1994). This was an expensive investment that the company determined would pay off in future sales.

The other side of the coin can also be true, however. Demolishing a building and constructing a new building on the same site can be a more expensive route, "Some large equipments and factory buildings have massive volume and complicated structure, so to demolish which are costlier than to reconstruct them," (Wang and Jiang, 2007, pg. 475).

The needs for space are always changing as businesses do as well. Changing functions within a city and the growth or decay of that city doesn't mean that structures are fruitless after their first life, "Generally, the material longevity of buildings is longer than the longevity of functions, especially the industrial buildings, during the material longevity of which, may undergo many changes in function" (Wang & Jiang, 2007, p. 475).

The Old City of Jaipur, Rajasthan, India is almost 300 years old. Many of the stores are similar to what existed when it was built, yet the principal transportation now exists as motorcycles and bicycles. Those didn't exist in the original city and neither did the electrical wires that circulate overhead.

The city has developed over the years and refined itself in functions. There are some businesses and families that needed more room for storing their goods and they simply bought the store next door, knocked down a wall and soon had twice the amount of space. The shops were mostly three meters wide and were copious with supplies. Most of the shops occupied an area of the sidewalk as none of the authorities had the ability to stop the overflow.

In San Francisco's Alamo Square, maps from the 1850s show an interesting phenomenon in which people building row houses at the time would build in the middle of their lot, leaving room for phantom houses. The space left over was room enough for the bigger lots of about 250 feet into be subdivided to the 25-foot lots that later became more common (Moudon, 1986). The empty spaces, the amount of the space and the layout of the buildings that were built, shows foresight in the layout of the neighborhood.

Sometimes we need to realize that like our projects in school, buildings are never complete. Even once the keys are handed over, the building still has some settling. There is excess water in all of the surfaces that will dry, altering the size and shape of the of the structure (Brand, 1994).



There are instances where the sun's heat is different than anticipated, or there is a building nearby that reflects wind differently in real life than in the computer models. Although it is the attempt of the architects and engineers that all of these discrepancies be ironed out in computer programs and models, not every problem can be foreseen on the screen or in scale.

As architects, we try to have everything finalized in our construction documents and agonize over change orders. Contractors act the same way and want every piece of the building perfectly constructed when the keys are handed over to the client.

Because of the specific function and space requirement, industrial buildings are often constructed with advanced techniques, and most of them are solid, and the internal space is not quite consistent with function. Some factory buildings and warehouses are flexible in use. (Wang & Jiang, 2007, p. 475)

One thing that can usually foil either of those two ideas is time. The people moving into a new house or the business moving into a new building are moving because their current place doesn't meet their needs. Usually that means that they have outgrown their old location and are expanding into a new one. In the time it takes to design and construct a new building, the family might have another child, a new family member might move in, or simply have new needs for the current, but now older members of the original family.

With this, we can proceed to see buildings as continued projects that have the potential to be almost anything with the proper maintenance and with additions as the money is there and when space is needed. Growing buildings that start simple and move to complex are more likely to fit the needs of the user as they can be a custom fit.

approaches to old buildings

In cities all over the United States, there are renaissance districts, city sections that cannot be touched in an effort to preserve the history of a town. Is there a balance that needs to exist in which the historical significance can be exploited, but buildings don't fall into disuse for fear of changing too much? "In response to such concerns, insightful firms opt for strategies that preserve as much of the existing structures as possible -- exploiting form and materiality, while adapting them for today's needs." (Lentz, 2010, p. 77)

With this being said, that dialogue must be present between the current and the old. How two time periods and two styles of architecture meet can lead to a drastic change as one moves from the exterior to the interior. As architects, it is important that we provide some sense of honesty that comes from a conversation between what was there and what has come to be.

The term honesty is meant to denote a sort of respect for the historic building. Instead of being two completely separate buildings situated on the same site, one interior and one exterior that do not reveal anything about each other, the two should play off of each other so that there is an understanding that the two are connected, "It is criminal to intervene with any structure or building without knowing the historical, material and archeological history as well as assessing the significance of each sub-fractional element of the building. A level of intellectual self-discipline is essential" (Harrap, 2009, p. 1151).



Where is the balance between staying true to the original materials, design and structure while updating it to be structurally sound and viable with modern technology and modern materials? “Planning and refurbishing or adapting an existing building is perhaps nothing more than decoding the original designer’s hidden intention,” (Sobejano & Nieto, 2009, p. 1149).

For some, there is a very fine line between historic preservation corrupting the authentic fabric of a historic building. The issue arises at the idea of stopping the aging of a building and letting it sit in suspended animation by preserving it versus sitting idly by and watching it decay, “The buildings appear to possess a genesis of their own alteration, as if their existence were rooted in something other than time and space, so that ultimately our work merely involves revealing the intrinsic codes” (Sobejano & Nieto, 2009, p. 1149).

The argument that any intervention is an infringement on the original fabric of the building and that no restoration is acceptable supposes that the city should always remain limited to what was anticipated at the time of construction.

What are the ethical implications in using technology and knowledge that did not exist at the time of the structure being built and using them to enhance or support the building before it decays to give it, the architect and the city a longer life than was originally expected?

Developing a city and an urban plan requires utilizing structures from different times as they can help to promote diversity within the city district. Each of these play an important role in the city and the city district. A balance between old, new or adapted allows the different functions of a city to mingle and allows the city to thrive.

Not only is this a cause for urban growth but it is a symptom as well. It is cyclical how the two support each other in supporting a neighborhood and its residents. The older buildings give a sense of history that people can remember if they grew up with memories of the area or that younger people can see through the building s' autobiographies.

Genuine buildings that are updated versions of the site they adopt are one of the things that we as designers should strive for, "Old, new or adapted structures can coexist but there is no need for fakes" (Burkhardt, 2009, p. 1156). The first step of our designing process needs to be in understanding the site, its features and the context in which it lies. Once a designer has fully engaged him or herself in the building does the brick talk to us, as Louis Kahn says. The fabric of the site is very delicate and a preservation is a tight line to walk before it serves only itself.

An adaptation to a historic building that fails to serve the materials or structure of the original is seen as a fake. This is one of the reasons for the stringent rules that are placed on renaissance zones in cities. The argument lies between the historians see every building as an artifact from the past and the architect who sees sites on which to build.



SUMMARY

A balance must be struck between the two sides as both cannot have their solution. The buildings provide not only space for clients, but also a history that exists. This cannot be thrown away like it is in some societies; some of these have already learned from the mistakes of others.

Historic preservation can preserve some of the structures worth saving. It can also lead to a hands-off policy on many buildings that through neglect are not economically feasible for redemption. How is there a way to divide the two types with a smart ordinance that allows the buildings worth saving to be kept current while maintaining the elements that were deemed worth preserving?

To the argument against suspended animation of a building in decay, it seems that a building that is not kept current is itself suspended in its life. The building becomes static and then becomes an eyesore. A building that is unkempt and an eyesore will bring down the viability of a neighborhood as it becomes an unpleasant view and this can lead to a decay in the neighborhood that it serves.

The buildings that decay because no one wants to step on the architect's feet can be a sad sight to see. There are a series of Le Corbusier structures in India that were left to deteriorate because Le Corbusier was deemed too great an architect that no one was justified in thinking they could improve or even clean one of his structures. They must remain fully intact as designed and as such failed to live up to the design.

There is no such thing as a clean site that needs no alterations. As architects it is acceptable to manipulate a site of earth, so why is it not justified to respect, but manipulate a building to preserve the original designer's intent? "In the end, every site has been 'adapted', whether a building was present or not" (Wendt, 2009, p. 1155).

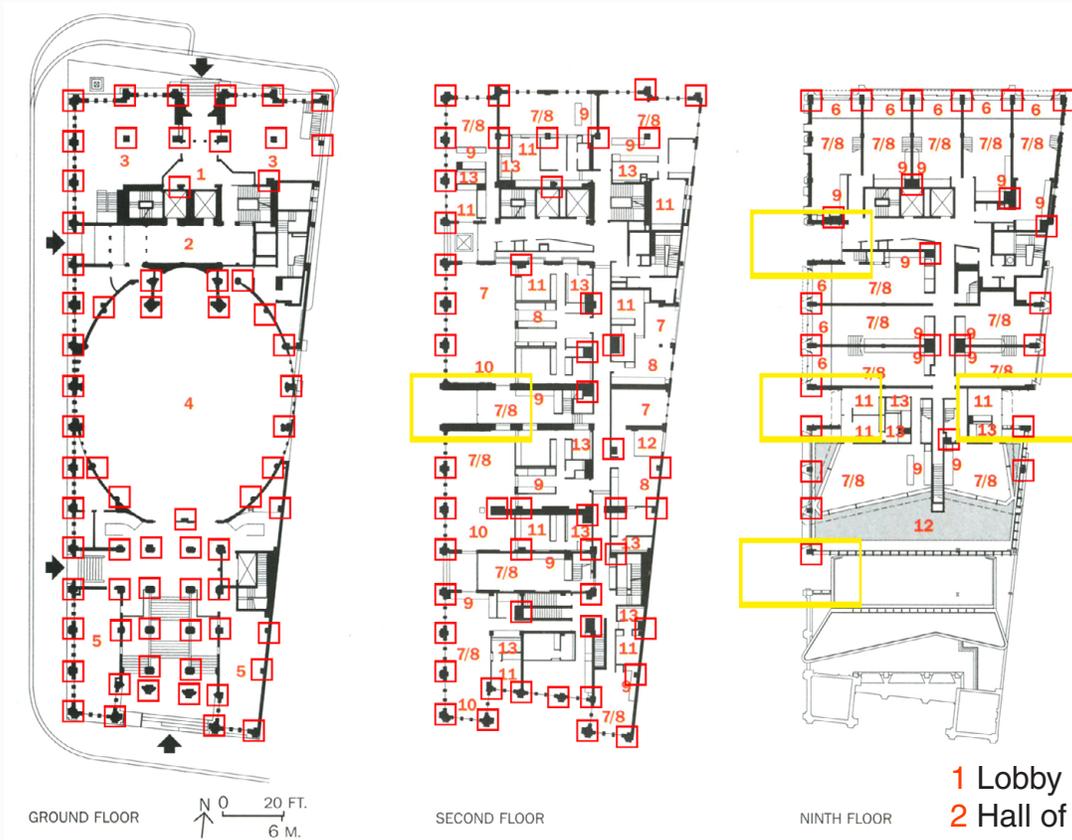
portico scots church

Looking at a church in Sydney, Australia that was built with the intent of an addition, this multifamily residence added a modern look onto a neo-Gothic structure. The original Scots Church was built with limestone that needed to be restored due to a treatment done in the 1970s. The new addition was zinc clad.

Due to the Great Depression, the church was capped at only five stories instead of the 150-foot height that the architect wanted. Nevertheless, the church was built with enough structure that it would be able to host the floors added over the top. The building is now host to 146 cooperative-style apartments and a size of 204,000 square feet.

Each of the apartments are two stories tall and has an indoor balcony area on the first floor, with a kitchen, dining room, living room, study area, bedroom and a bathroom. In many of the units the dining room, living room and the study area are inseparable.





structure

There are a plethora of columns on the first two stories of this building because the interior supports use timber. The original architect loaded the church with more columns than was necessary making preparations for a future addition that would bring the church structure to its full potential.

natural light

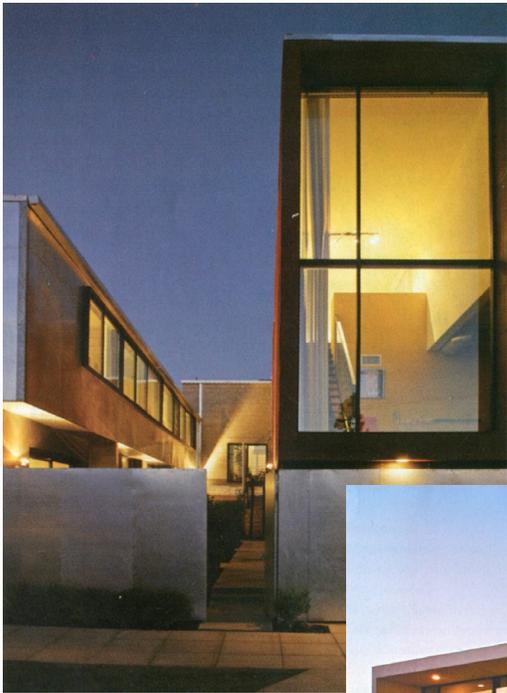
The original design for the church called for four separate towers to be built up from the base. This new design takes the idea of the four separate towers but connects them. From the angle of the picture on the opposite page the light wells that are built into the exterior of the building continue the original concept. The light wells also work to provide natural daylighting into the deep space that was not originally intended for a function that needs as much light as residences.

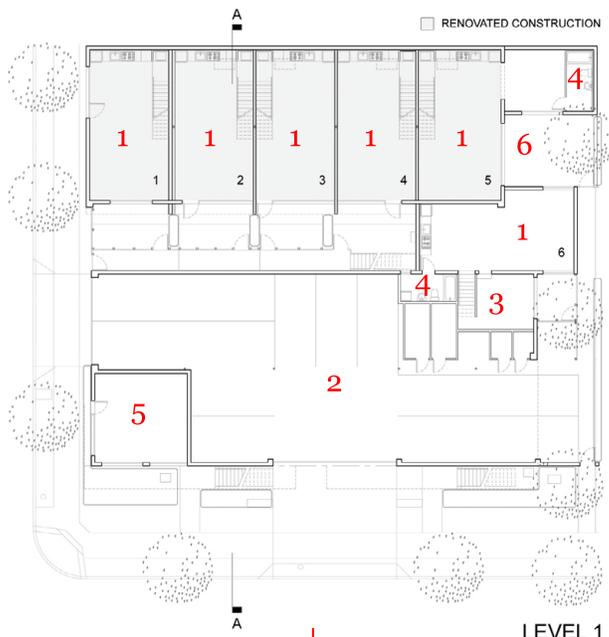
- 1 Lobby
- 2 Hall of Remembrance
- 3 Units
- 4 Assembly Hall
- 5 Church property
- 6 Wintergarden
- 7 Living room
- 8 Dining room
- 9 Kitchen
- 10 Studio/study
- 11 Bedroom
- 12 Terrace
- 13 Bath

k lofts in san diego

The K Lofts are a multifamily housing development in San Diego, California. Taking the site of an abandoned convenience store and its parking lot, this project uses the old structure to create a new use for it. The new building has 7,800 square feet, including two of the apartments inhabiting the space of the former convenience store.

This building includes nine apartments, each with a kitchen/living/dining room, a couple of bed rooms and a bathroom. Some of the residences have a patio space. The building also includes a garage and retail space.





- 1 Living/kitchen/Dining
- 2 Parking
- 3 Bedroom
- 4 Bathroom
- 5 Retail
- 6 Patio

LEVEL 1



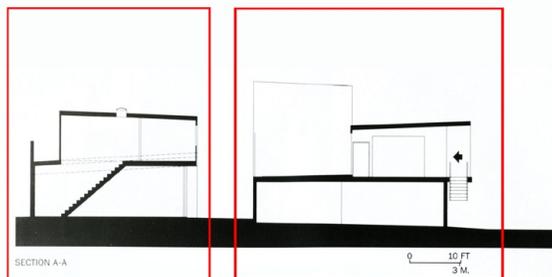
symmetry and balance

The two main units act in balance around the central courtyard. They are not perfectly symmetrical, but they have similar apparent weights.

courtyard

LEVEL 2

With the courtyard cut into the building in the way that it is, the two units to the north and south feel and act like separate buildings where it is impossible to get from one to the other.



Humbolt Mill and Annex

Sitting between the Guthrie Theatre and the Mill City Museum, an old and burned out mill was turned into a 148,000 square foot loft building. The building includes underground parking and retail space on the first floor. It takes the original open bays that were built into the brick walls and reflects them in the new annex of pale brick and Cor-Ten.

Each loft has the basics of a kitchen, bath and bedroom. The lofts in the annex also include a balcony while the original building has none, and the units on the top of the annex have a rooftop terrace and garden. Blocked views of the Mississippi River by the cylinders in the museum next door are overcome by having a variety of layouts.





circulation to space

The old mill had open and echoing spaces. With that as a template, Julia Snow designed the lofts to have the same echoing floor plans. The size of the lofts being what they are, the circulation does not take very much of the floor plan at all. There is a central corridor that leads to the elevator shaft on the south side of the building.

geometry

While the floor plans might be irregular from the variances in the shape and size of each of the individual lofts, the walls seem to line up to walls in other spaces. This is the type of planning that can only be seen when one is looking at the floor plans.

natural daylighting

Each of the lofts has natural daylighting as the walls are structural with brick in Cor-Ten, yet very open. The large windows and open floorplans allow for a lot of daylight to penetrate into the individual rooms. The circulation space leading to the elevators is glazed and allows for natural daylighting while one waits for the lift to arrive.

impact on adaptations

The case studies that I chose were all additions from a masonry building made into multifamily housing. My goal with these was not to see if it could be done, but how it could be done. A secondary inquiry that I had was to find out how a renovation can be done to give a historical building a modern feel.

It is important for me to ask if there is a way to have the old and new converse with each other. The materials and techniques that were employed by the craftsmen of these original buildings may not be feasible today because of cost or simply a lack of skilled craftsmen in those same methods.

I appreciated the fact that the expansions did not try to be the original. They stayed genuine because the architects worked to preserve the idea of the original building as much as they could while still making a current structure using modern materials that spoke to the older structures.

The conversation is evident in the light wells of the Scots Church that provided the illusion of the four towers, which were in the original intent. The open spaces and the broad rooms in the Humbolt Mill and Annex also showed that Snow had put some thought into what the original space felt like and what was needed to expand on the original architect's endeavor.

These buildings are a way of preserving the past and making it alive for the present generation. In the Humbolt Mill project, the architect was responsible for being the bridge that connected the old mill to the new Guthrie Theatre and the bridge needed to use both technologies.

These case studies have shown how delicate of a touch must be there in messing with some one else's design. The gas station in the K Lofts design was a building that would most likely not be missed by many people, but Jonathan Segal chose to leave the building where it sat on the site and involved it within his design where most of the lofts were put into that structure. Even though it was not a historically significant place, he connected the old structure to the newer buildings, which helped to tie together the neighborhood of eclectic styles.

impact on new construction

The site for any building has limitations that will hinder some ideas for a design. Even on a site for a new building the water table could be too high or the structurally significant soil too low.

The adaption that came from Scots Church in Sydney mentioned the limitation that came with building the structure to the higher level with the first rendition, "What seems like a gift for the next generation - enough bracing to support a profitable expansion - actually limited the possibilities of the final form. 'The new addition could weigh no more than the intended original,' Greer explains" (Sokol, 2007, p. 230).

I don't understand how that can be a limitation in that whether it was beefed up as the architect chose to do or if the original architect had left the building engineered. The building's structure would be equally as difficult to modify as long as it stood. If the original builders had merely engineered the space instead of over engineering it, the church would not have been able to support any design of an addition.

duluth's origin

In 1678, a group of merchants from Quebec and Montreal travelled through the St. Louis County area in an excursion to continue trading with the Indians in New France. The leader of this group was Daniel Greyselon De Lhut (spelled Luth in English), a French native and a prominent man.

Groseilliers and Radisson, who had been the first white men in the region of modern day St. Louis County in 1659, had already opened the fur trade. The expedition was necessary, however, due to interruptions that had occurred in prior years.

An ordinance had been made that prohibited trading with the Indians, perhaps to halt traders and missionaries from travelling into the forests where some of the bands of the Souix and the Ojibways were having a bloody strife. The expedition was supported by the governor general, however, despite the decree originating from him.

Along with a party of 17 Frenchmen and three Indians, Du Luth left late in the year of 1678. In the spring of the next year, Du Luth sent a letter to Frontenac saying he would remain in Sioux country until he was ordered elsewhere and that he would set up the king's arms, so that no English or other Europeans would take possession of the country. It is even believed by many historians that he established the first trading post at the head of Lake Superior.

In 1792, Jean Baptiste Cadotte was charged by the Northwest Fur Company with the task of heading the Fond du Lac post. This was located in the modern town of Superior, where the cedar pickets surrounding it and many of the buildings, to be occupied by the American Fur Company, still stood in the year 1855.

When the early pioneers came to settle, Fond du Lac was the only named town in the region. It was thought to be destined for great importance to the region as it was the lake port of Minnesota.

In 1826, Gov. Lewis Cass and T. L. McKinney concluded the first formal treaty with the Ojibway Indians, giving the United States the right to explore and mine all metal found around the lake.

In 1847 another that gave the United States of America rights to the land to the west and southwest of the head of Lake Superior was signed and in 1854 one was signed that gave them the land along the north shore of the lake and the northern boundary of Minnesota.

Itasca County was established in the first territorial legislature in 1849 and in 1856, St. Louis County, named after the largest river to flow into Lake Superior, was established by the legislature. Superior County, which was established prior to this also included this area but was not well-defined and had its name changed to St. Louis county.

With only about 400 people in 1860 the population grew, according to the state census, to more than 70,000 inhabitants in 1895 (Carey, 1901).

duluth's trade

Saw and grist mills were built and in operation in the 1850s and these, along with salted fish, cattle and what was still there from the fur trade, helped to keep this port on the Superior active.

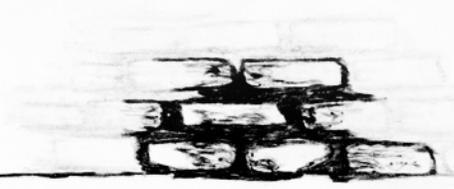
At about the same time as the mills were being built, the first schooner was brought from the lower lakes to Sault Ste. Marie. Although only in commission for a few years, many boats have followed this first one.

After the Civil War, grants were given to build railroads in some sections of Minnesota. In late 1870 the railroad connecting St. Paul to Duluth was finished. This railroad was aptly called the St. Paul and Duluth railroad. It was connected soon after to Brainard by the Northern Pacific railroad at a terminus in Carlton.

Due to its connection to the Atlantic Ocean through the Great Lakes and the St. Lawrence Seaway, Duluth has been a major trading port since it was established.

In the nineteenth century, prairie wheat was starting to grow in the Minnesota territory and railroads were being developed that made Duluth the Atlantic Ocean's connection to western America.

Today, ores and pellets from the Mesabi Iron Range add to the other resources of the Midwest. Duluth ships more than 30 million tons of valuable resources that are native to the Midwest region out of its harbor each year.



Using the St. Lawrence Seaway and the Great Lakes, ships can sail from Duluth to Scandinavia, West Africa, South America, the Mediterranean or Northern Europe in only 14 days, despite being so far from the Atlantic Ocean (Wright, 1988).

Duluth is one of the major ports for grain and includes some of the biggest companies in the Midwest. “In a year, over 200 million bushels of agricultural products pass through the port destined for overseas, Canada and domestic destinations” (Wright, 1988, p. 107). Due to the size and speed of shipping goods, Duluth has helped to improve the economy of the nearby mining, lumbering and farming trades.

It has become one of the economic hubs of the upper Midwest. Although not as big as originally envisioned by the first settlers in the region, Duluth has stood through time as a trading port and the connection between Minnesota and the rest of the world.

The port of Duluth and Superior, Wisconsin is the largest in the Great Lakes and the eleventh largest in the nation (Wright, 1988).

adaptive reuse

“Over the course of history, works of architecture have repeatedly been altered, enlarged, and reconfigured. This is reflected in the refurbished building, corresponding to the respective demands of the time be it in the altered shape and size of spaces or the new surface tectonics, (Jabornegg & Pálffy, 2009, p. 1152).

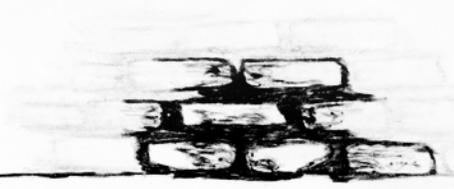
That being the case, the general image of architecture is that it is built to serve a specific purpose and when the building becomes unusable it is torn down so that another can take its place.

This might be the image projected by the modernist movement which deemed the architect as having complete control over his design, which is almost impossible when he or she is dealing with a building designed by someone else (Sobejano & Nieto, 2009).

This has led to some irreparable changes made to the historic structures in many European cities. Many buildings were demolished in an effort to make their cities newer and more relevant. The destruction of so much history has led to a historic preservation movement in many cities. "Particularly since the 1980s, awareness of the significance of refurbishment as a sustainable urban planning tool has developed" (Sobejano & Nieto, 2009, p. 1150).

The sense of history as well as the economics and the global movement toward sustainability have been the major driving forces behind historic preservation.

With the onset of the dialogue about global warming and the hazards of construction and the everyday use of buildings, people are more interested in what is on the site now and how that building can be improved. "Meanwhile, sustainable development has gradually become a basic consensus due to the continued deterioration of the global environment" (Wang & Jiang, 2007, p. 474).



adaptive reuse in duluth

Duluth has many warehouse buildings that are in need of repair and someone to maintain them. The city is old by our standards and has a history that needs to be preserved instead of rebuilt. “In the coming years, rehabilitating the building stock will increasingly dominate construction activity” (Burkhardt, 2009, p. 1156).

Within Duluth, many of these buildings are already being addressed with the insertion of local shops, offices, and housing. The mix within the downtown district includes the old brick cladding of some of the more rundown and unoccupied places to the newer glass and concrete structures of the major businesses that have moved into town.

This mix can be seen with a walk down Superior Avenue in the heart of the downtown area. Along the street is a collection of adapted buildings with new construction mixed throughout.

While all of these are in good repair and contain residents, a couple of blocks in either direction will show the older and sometimes dilapidated structures that are falling into disrepair from a lack of ownership.

Academic

This thesis is the final project of my academic career. As such, it still has implications to my education and to my understanding of architecture. This project is meant to stretch my view of the typology for this project and how the context and features of the site can impact the design.

This is ultimately supposed to be the culmination of my formal education, and therefore it will be a summation of what I have learned in school. In this I am going to try to improve my grasp of the different programs that we have used in studio.

In school it seems that we should experiment where there is a limited amount of consequences. Whatever the design is going to be for the project, I am going to try to push my comfort zone when it comes to designs.

Professional

For the future students or people looking at the project I intend that this project will be informative in the area of research that I have studied.

I am not intending to answer every question that the reader will pose, but I can lead them down the road of research that I took and maybe point the academy in a direction that will answer those questions.

Understanding that the issue of historical preservation can be muddled and very controversial, I hope that I can add a new perspective to the issue. It is my goal to provide an answer through my design that takes a stand on the issue. I do not want to walk the fence.

Personal

In working on this thesis project, my intention is the same as it has been in all of the projects in my prior studios. As this project's design is a vehicle to better understand the answer to my question about how buildings evolve through use, so it is also a vehicle to learn more about my design process, and what type of designer I am.

When we design a project, it is impossible not to let our personalities become infused into the process and, in the end, the design. My goal with this project is to try and use a different method of design: to employ techniques that I have been reluctant to up until now so that if I am asked to use them when in a firm or by a client, I can have a general knowledge and comfort.

This project can help me to realize a lot about myself and my goal is to better appreciate the decisions that I make and to recognize what the motivation is behind my choices.

It is one of my goals to work on time management with this project. Not settling for finishing the project or meeting a deadline in a rush, I am going to work at the schedule all of the way through and not be in a position where concessions have to be made due to a lack of time.

It is my opinion that however I respond to this question and project, the issue will never be fully explored and that even after the project is complete, I will still be exploring it further.

In examining this issue now and being aware that the answer will not be clear cut, I want to explore the possible solutions that might impact how I design as well as where I might design in the future.

The site which I chose to study is part of a block in Duluth. It is in an urban area surrounded on the northeast and northwest sides by streets, on the southeast by an alley and on the southwest by a parking lot. On the site sits a brick building five stories tall from the lowest grade on the site.

This building is a masonry load-bearing structure that has some superficial distress in some of the windows, yet the structure itself appears to be intact. This building fits in with most of the buildings within a few blocks as they are mostly made of brick; however, the amount of businesses leasing each building influences in what state of repair each of those buildings exist.

Laid out relative to the shore of the lake, the streets form a grid in the city that sits at an approximate 45 degree angle to the north. Many of the buildings in the area reinforce this with their rectilinear construction. Many buildings were built directly to a street with parking on the roof or in a recessed courtyard area surrounded by structures.

The streets that run along the site are relatively busy and provide a constant hum of traffic. This said, the noise on the site remains at a comfortable level.

A hill slopes downward starting almost a mile northwest of the site and, following the same direction of the road to the northeast side of my site, ends at Lake Superior approximately four blocks south. The slope of the hill allows a story to be fully below grade on the northwest side and become fully above grade on the southeast.

With an approximate slope of 18 percent along the road to the northeast, the hill is noticeable and can be less than ideal for some pedestrians, yet not insurmountable or meriting steps. The slope of the hill means that drivers are extra cautious and careful in their driving habits.







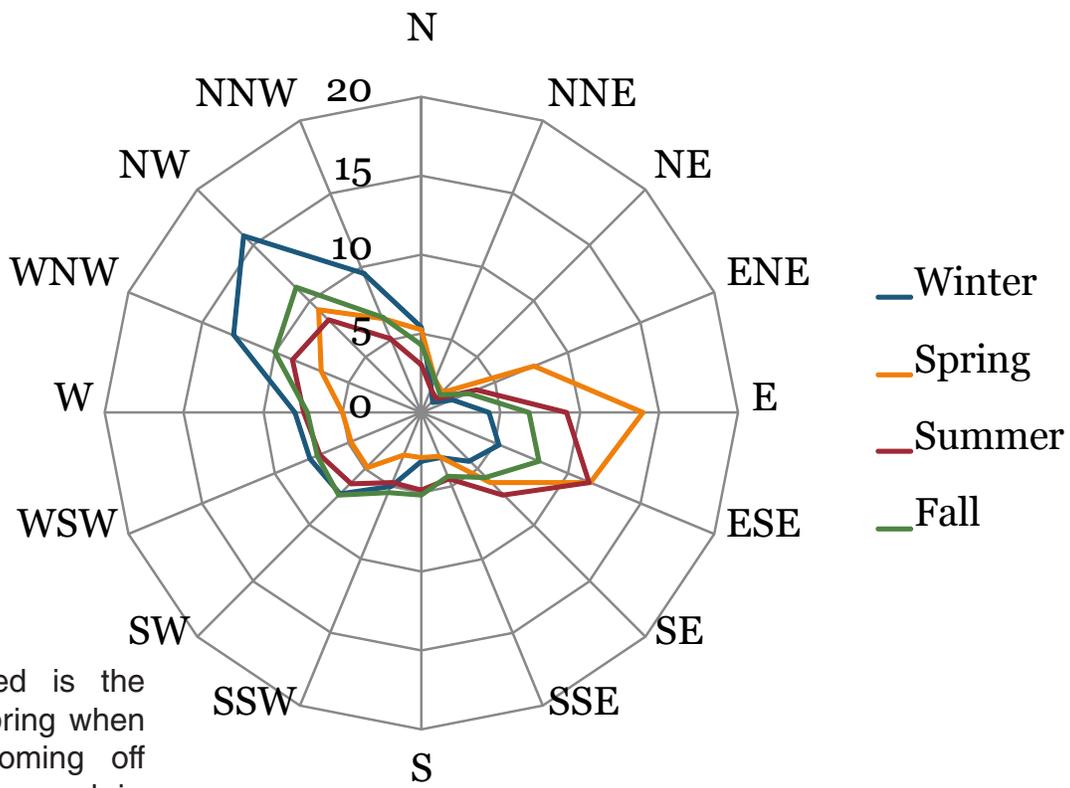
On the day that I visited, the sun was bright with very few clouds in the sky. The building on the site I chose is either the same height or taller than the buildings nearby. Another aspect that helped was the slope of the hill that places buildings to the southeast on a lower grade at almost a full floor, even in the building next to mine. The parking lot on the southeast provided another buffer on the southwest side of the site allowing sun in both the morning and afternoon.

The taller of the two buildings has windows covering approximately 40 percent of the façade, gathering a lot of sunlight, while the southwest side of the buildings have very little fenestration and will be darker because of this. The shorter of the two buildings, however, has very few windows at all and will receive almost no natural daylight in its present state.

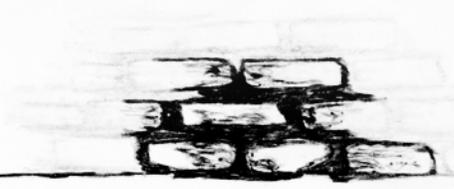
The wind is funneled from Lake Superior and was consistently cold. It appears from wind roses that the wind will be an arctic wind in the winter and will bring in cold air with it. The wind is calm less than five percent of the time and therefore will be pleasant in the summer and chilling in the winter.

Lake Superior is visible from parts of the structure, however, in many cases the surrounding buildings will obstruct the view of the water. The Lake is less than half a mile to the east of the site while the harbor lies to the south. The water from the Lake is very important to my site, not necessarily as scenery, but it is a source of water and impacts the climate of the city.

Vegetation on this site does not exist, nor does it exist within the view lines from the site. The soil on the site does not easily support many types of vegetation and most of the nearby area is fully paved. Within a few blocks there was a rock outcrop with a few trees, and had there not been snow some grass would have been there.



The wind speed is the fastest in the spring when the wind is coming off of Lake Superior and in the winter with the arctic winds. It is calm approximately five percent of the time in the spring and summer and less than four percent of the time in the fall and winter.



Soil Qualities

Urban land: 60 percent

This is land that is filled in from surrounding uplands, gravel pits or blasted bedrock. This, is qualified as a moraine landform.

Mesaba and similar soils: 20 percent

Gravelly sandy loam down 20 to 40 inches where the lithic bedrock starts. The water table is over 80 inches below grade and the soil is well-drained, moving half an inch to six inches of water per hour. The soil can only hold about two-and-a-half inches and is classified as 3e for vegetation. This means that erosion is the main hazard and that it offers severe limitations on the types of plants that can be planted here.

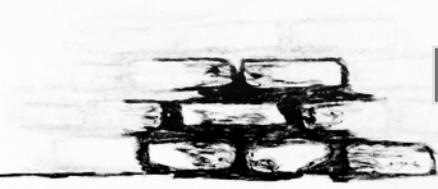
Rock outcrop: 10 percent

This is lithic bedrock and has a slope between three and 20 percent.

Minor components: 10 percent

Coarse-loamy, isotic, frigid Dystric Eutrudepts. The water table for the site is more than 80 inches below grade.

The slope of the site is approximately 10 percent.



PROGRAMATIC REQUIREMENTS

units required

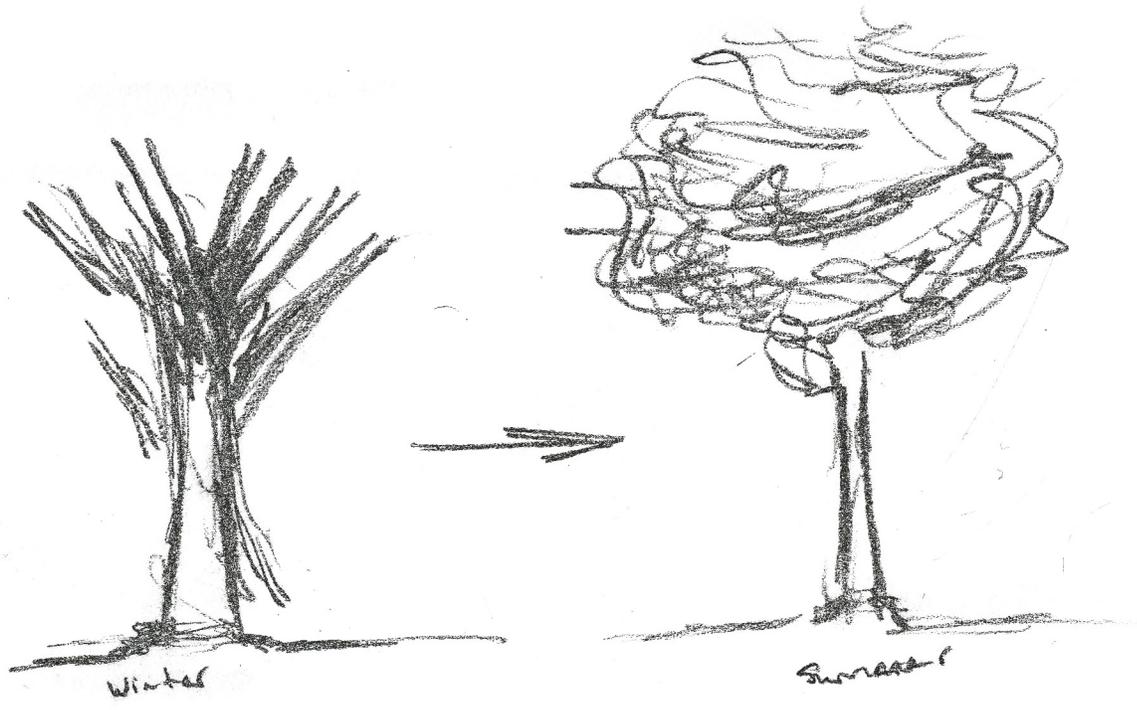
The building will consist of half one bedroom apartments and half two bedroom apartments. The units will vary in layout and location on each floor, but the sizes will remain as close to consistent as possible.

20 one bedroom	540 sq ft
bedroom	140 sq ft
bath	60 sq ft
kitchen	140 sq ft
living/dining	200 sq ft
20 two bedroom	850 sq ft
bedroom	150 sq ft
bath	60 sq ft
kitchen	160 sq ft
living	130 sq ft
dining	200 sq ft
roof patio	2,000 sq ft
Lobby	2,000 sq ft
Offices	250 sq ft

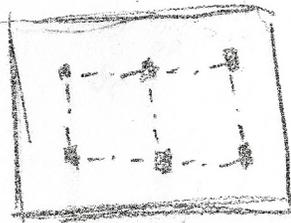
There are two offices, one for the landlord and one for the owner of the building.

Circulation	3,000 sq ft
Mechanical Space	400 sq ft

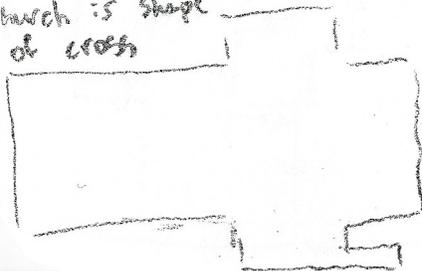
Included in this are the closets for cleaning and repair supplies.



Endo vs Exo

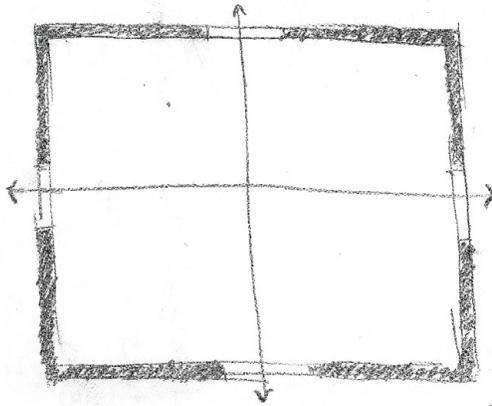


Church is shape
of cross

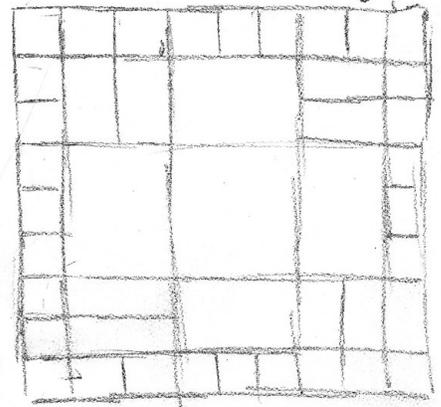


DESIGN PROCESS

Roman Gates

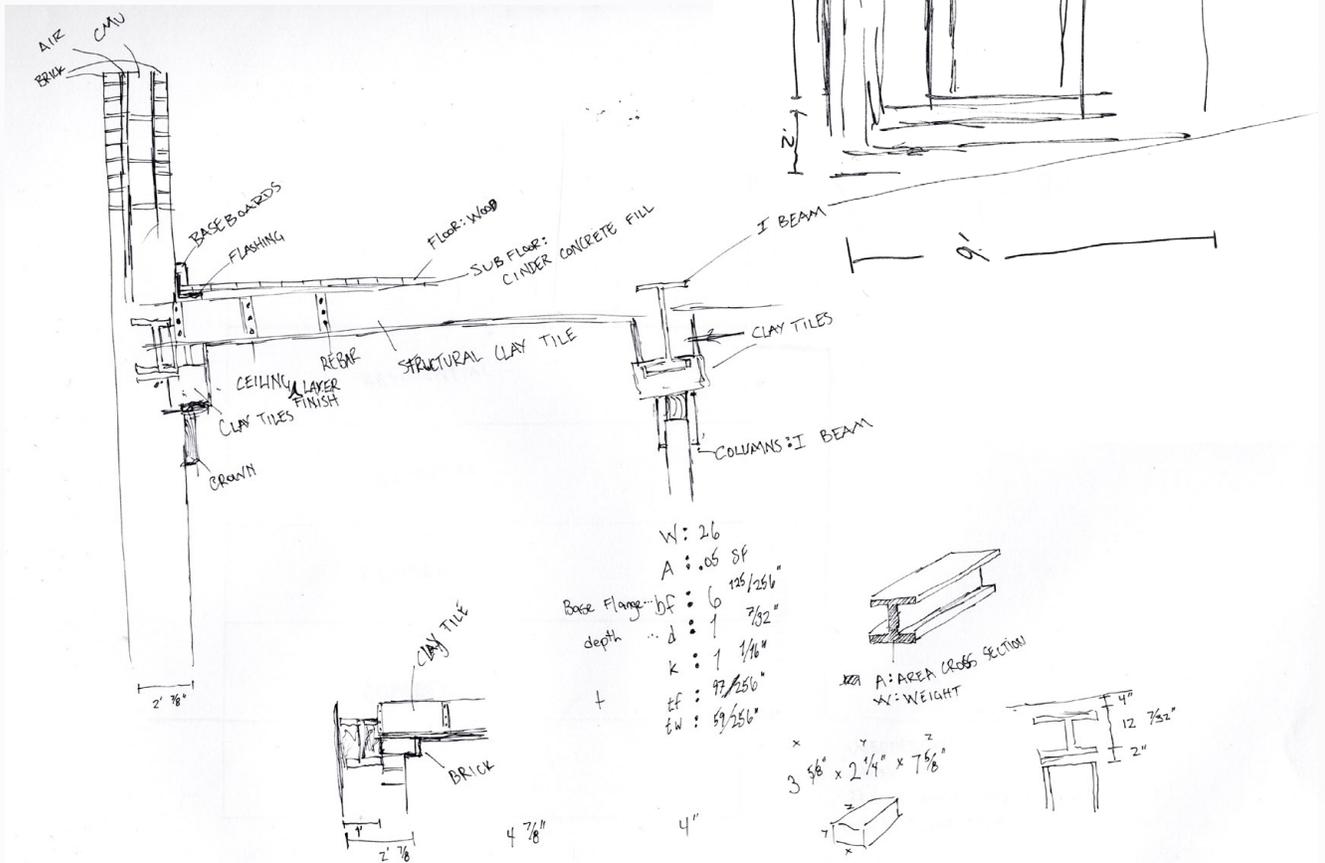


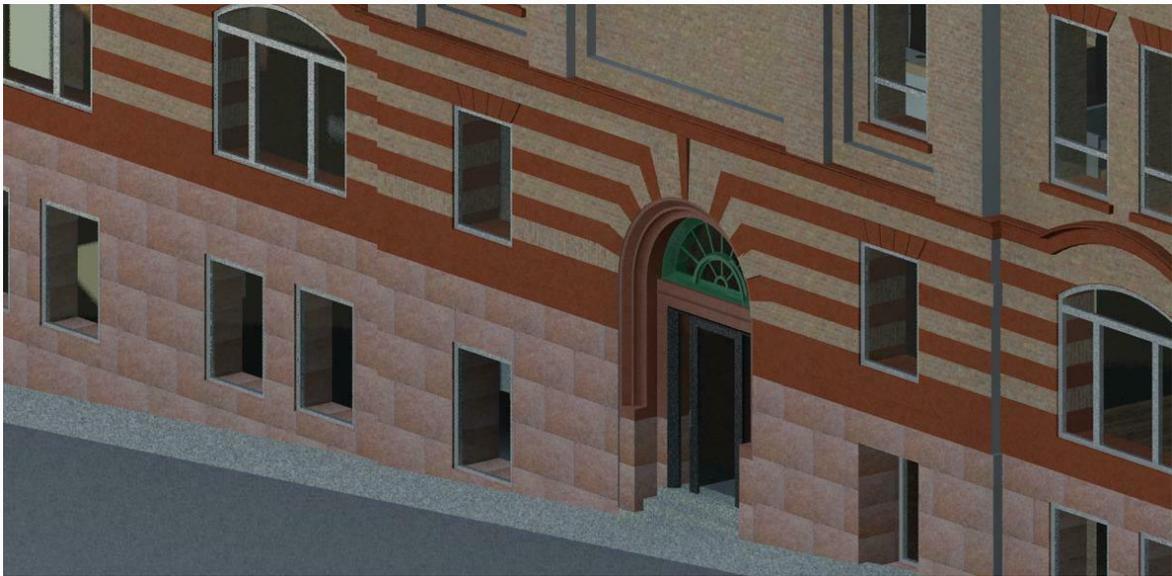
Vasta Purusha
Mandala / Hindu Temple Design



Investigations into structure, both literal and figurative led my design. This started with looking at the metaphor of a tree with the trunk as structure and the leaves as the skin. This moved to the literal stone structure of the Gothic churches and the figurative design plan of the cross. From the Gothic church plan to the structure of the Roman and Hindu city designs.

My understanding of the building began with sketching out the details before installing them into a Revit model. This allowed me to better visualize the dimensions and structure of the space.

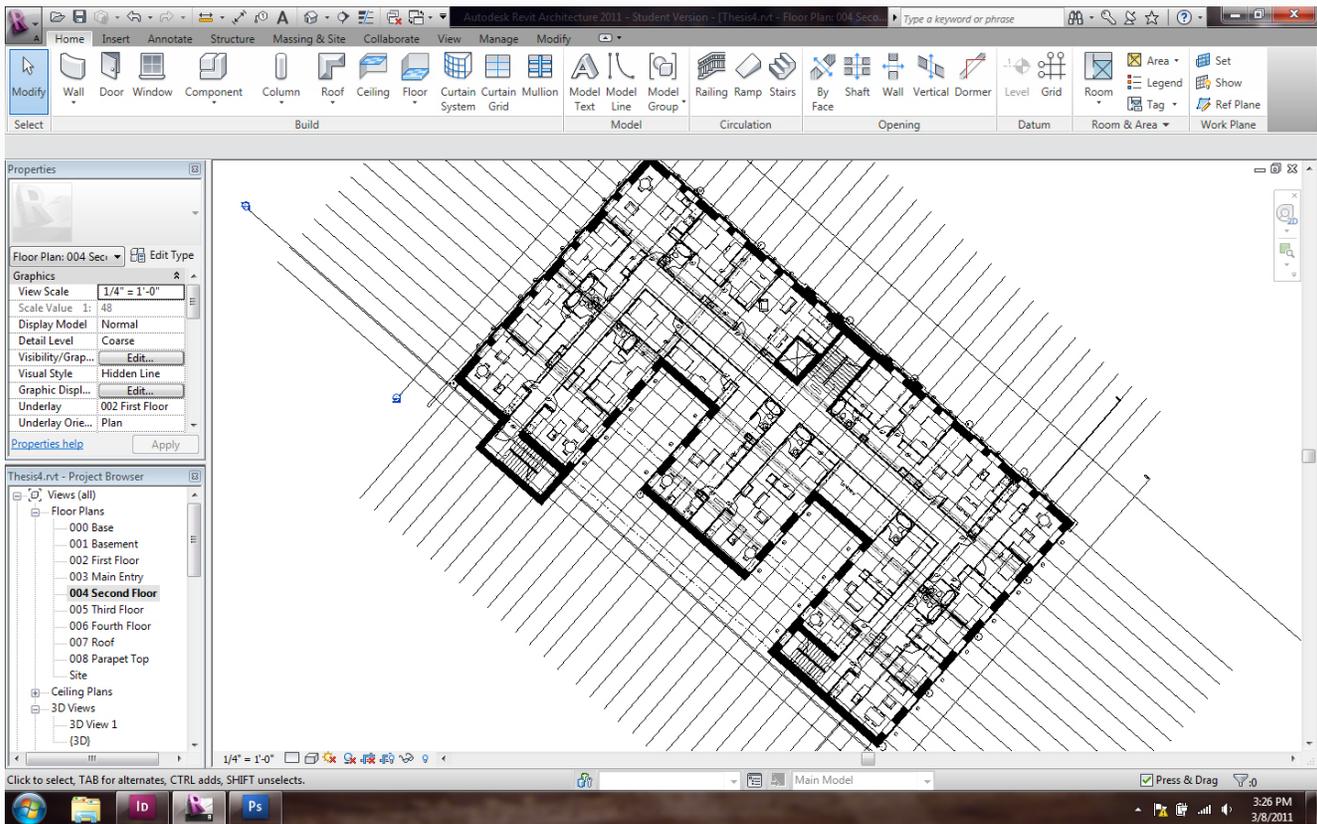


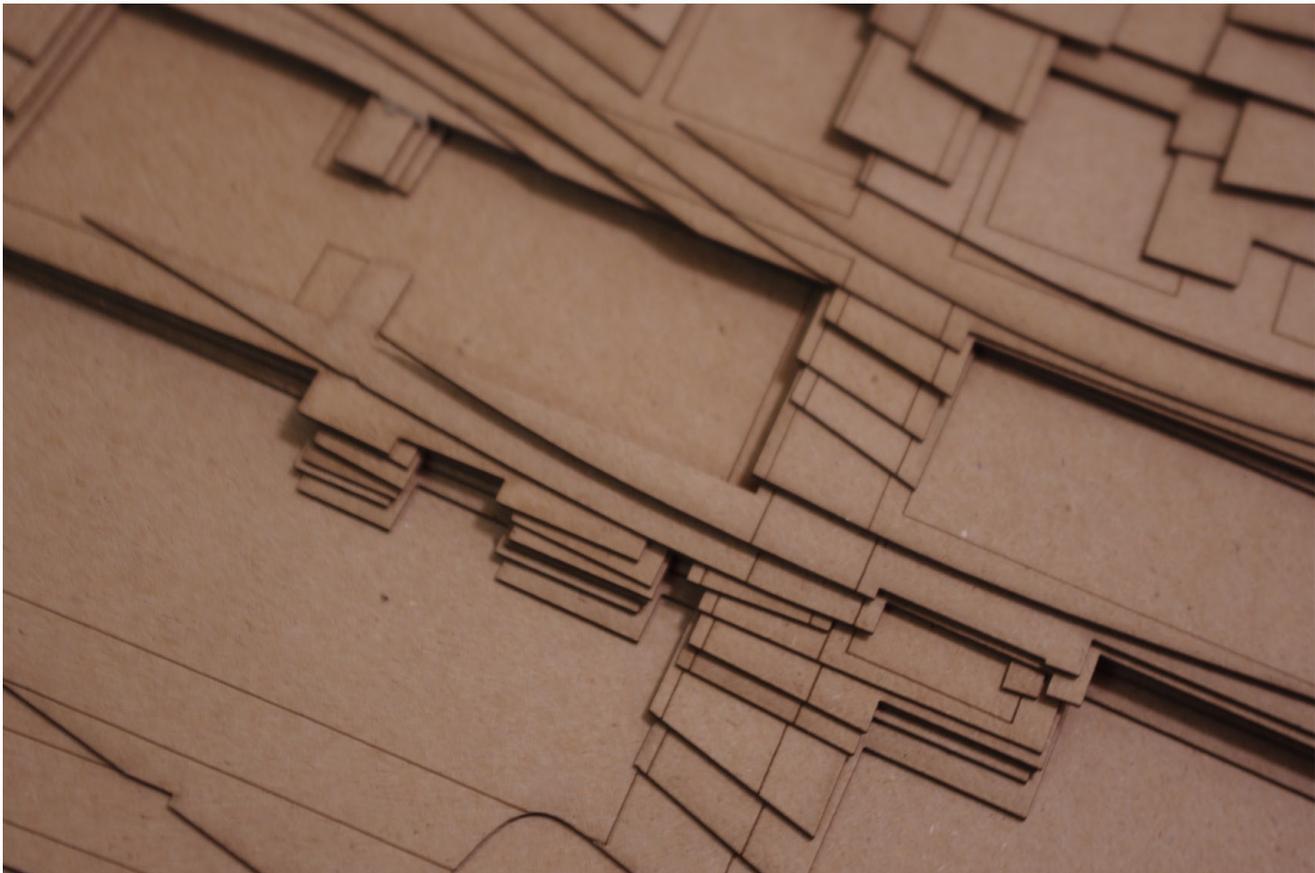


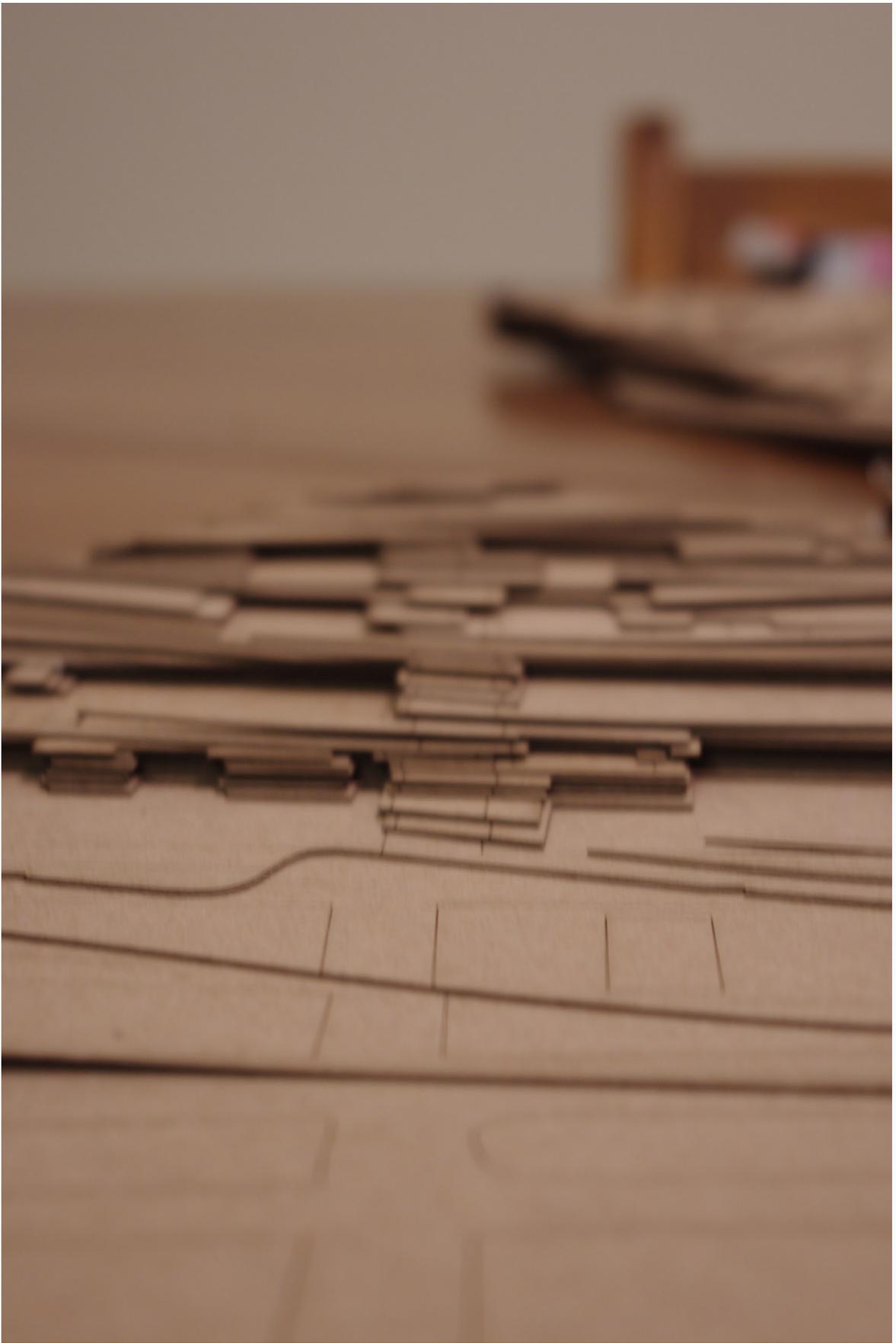
Modelling my building using a computer started with trying to replicate the existing building as best I could. This came from looking at building plans and details from the Duluth Planning Commission office as well as understanding common building practices from 1917, the year this was built.

A lot of effort was put into making sure that the materials I used on my computer were as close as possible to the real building to give the virtual model some life. There was a long period of tweaking the exterior materials and walls to replicate the building in Duluth.







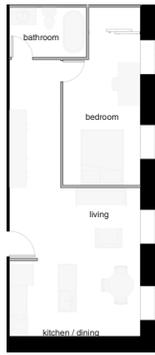




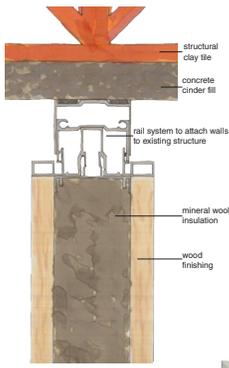
reusing structure:
 how do buildings evolve over time to meet the changing needs of its users?

Mark Green
 Mark Barham
 JACO
 Mark Phillips, Chicago, Boston

BOARDS



typical floorplan for a one bedroom unit
scale 1" to 2"

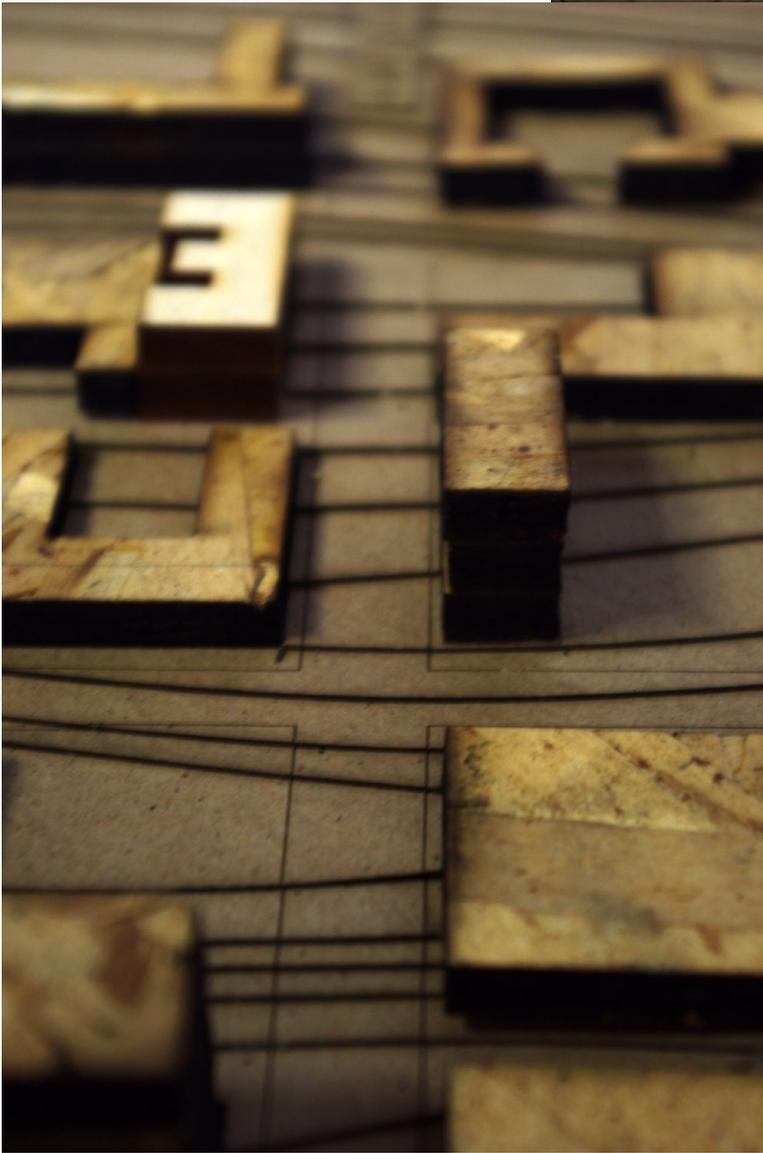
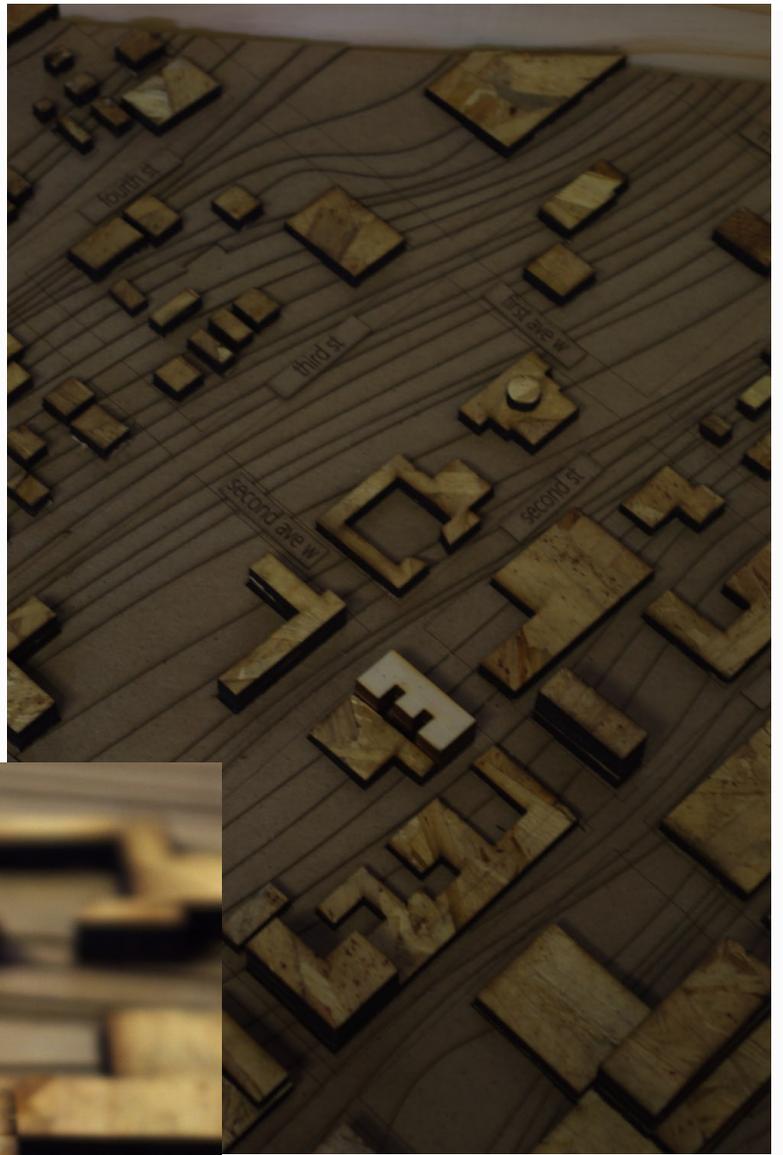


attachment system for mountable
wall panels to the current floor.





MODEL



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PERSONAL

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Quote I have learned many things here,
but the most important taught
was that there will always be
a need to learn more.

