

Vision To Completion



Sean Meyer | North Dakota State University | ARCH 763

Vision To Completion

A Design Thesis Submitted to the
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By

Sean Meyer

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Master of Architecture

North Dakota State University Libraries Addendum

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Thesis Abstract

How can architects and designers build a healthier relationship with construction workers? To answer this question I will design a mixed use condominium prototype. My design will focus on creating a respectful and understanding relationship with the companies involved in the construction process. The research for this project will include qualitative, correlation, and simulation methods. Qualitative research will analyze how construction workers are viewing the projects they are given. The qualitative research will work hand in hand with finding the correlation between the issues among each profession. The simulation method can be used to reinforce my research by showing the building process. I will be interviewing multiple people from every profession to assess the problems between them, and then come up with a prototype to build a healthier relationship between the two professions.

The Narrative of the Theoretical Aspect of the Thesis

The idea of bettering the relationship between architects and builders stems from my work at Roers Construction Inc. When I started at Roers, in 2018, I was working on the U32 apartments. I was introduced to many people, who after working with them, would ask questions to get to know me better. Often times I would get a look of disgust from co-workers when they realized I was going to school to become an architect. That look was followed by the comment “well at least your working in the field so you can see what we put up with.” During the 3 years I have worked for Roers, I have faced this interaction anytime I met someone new.

I have also reached the point of questioning why would an architect design something like this. There are times aesthetics are difficult to build, but some designs have difficult tasks for no reason. What I mean is the design gains nothing by incorporating some elements. Other things that can make a builders life hard is changes to a design. Sometimes it is necessary, but we need to think of all the ways to do a change and pick the option that benefits the design but not overburden the builder.

The research methods I am using look into the issue of why construction workers do not like working with architects. It will look at individuals across many different professions from carpenters to plumbers. What I hope to find is a way to educate architects how their designs can affect builders. Conceivably, architects can start creating with the builder in mind which in turn should create a healthier relationship between the two.

The Project Typology

For the typology I am looking at buildings that are typically larger in scale. Small single family homes don't have the same struggles that a five story apartment has. For this reason I am planning to design a mixed use condominium. This will provide a large enough building to work out issues as well as present opportunities to show multiple building techniques in one project. What this means is the bottom floor could be retail with steel construction and the condos on the upper floors could be wood construction. It is important that this building is able to be used to educate architects on the many ways of building affect workers.

Typological Precedents

The projects I have studied are: the Yeonam Building, the Peuple Belge Building, and the Pilestredet Residential Building. With the theoretical question I am asking it is difficult to find a case that relates directly to the problem. Many of these studies are focused on just the building typology to give insight on this style of building.

The Yeonam Building is one that I think is particularly helpful for the design I will be working with. The site in this case is smaller than the site I am working with. The Yeonam was able to fit a dwelling unit as well as other business operations. It was able to achieve this while making the spaces feel larger than they actually are. One thing I especially like about this case was the use of depth and creating shadows for a façade that is not boring or dull.

The Peuple Belge Building to me is an interesting building. I do not personally like the form that was made but I enjoy the methods they used. Concrete is one of my favorite materials to use as both structure and as an exposed finish. This project uses precast concrete to make bigger openings for windows. The concrete is polished white and it gives off a minimalist and modern sort of style. One thing I liked about this case is its in France and that allows me to see how a different culture plans buildings.

The Pilestredet Residential Building is the largest study that I looked at. With its sheer size it is hard to use any aspect of the floor plans to work with my site. However the idea that the architect had in mind is something to take away. To create something meant to diversify a community is something I have tried for with other projects but fell short of. Its evident research was done to find the demographics of the area would affect the design they were working on.

These three studies show how a mixed use building can be organized based on size and other environmental factors. Something I want to keep in mind while doing my project is how my site differs. These studies come from European and Asian countries and so the culture is different. Therefore the design may work there but, for example, the first case has one stair for six floors and American building codes does not permit this.

Codes are one big thing to keep in mind between the locations of these cases but The other thing that I mentioned was the culture is different. The site is in a small rural town in the Midwest whereas the cases are located in larger cities. From my experience, city life is dramatically different from small town life which would dictate the styles of architecture that I can use so the residents would be satisfied with the building.

To conclude, I want to talk about how these cases relate to my theoretical question. The reality is there are not many cases that do because construction workers and other professionals do not document disagreements or dislike for companies. If they do document these issues it usually stays within the company and does not make it to any case studies. For these studies I was not able to find if the construction workers enjoyed working with the architect or if the architect was too demanding. The only thing I could do to further look into these cases is to contact the companies involved and try get an answer.



Yeonam Building 6

Yeonam Building

Introduction

This study is an example of mixed use housing located in Mapo-Gu, South Korea. The architecture group is A Round Architects with Changhyun Park leading the project. The size of the site is 3,153 square feet (293m). The building is easily distinguished by its use of red brick and plants growing from its each story. The building plays with many depth changes to make for an interesting façade that casts many shadows.

Existing program

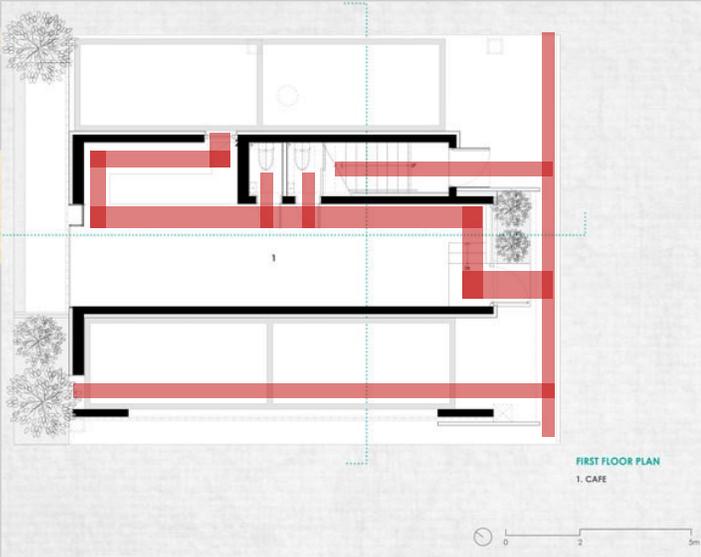
On the first floor there is a café open to the public. Then there are two floors with an office, meeting room, pantry, and storage on each floor. The remaining floors contain a living room, dining room, kitchen, library, master bedroom, bedroom, terrace, and an attic.

Research

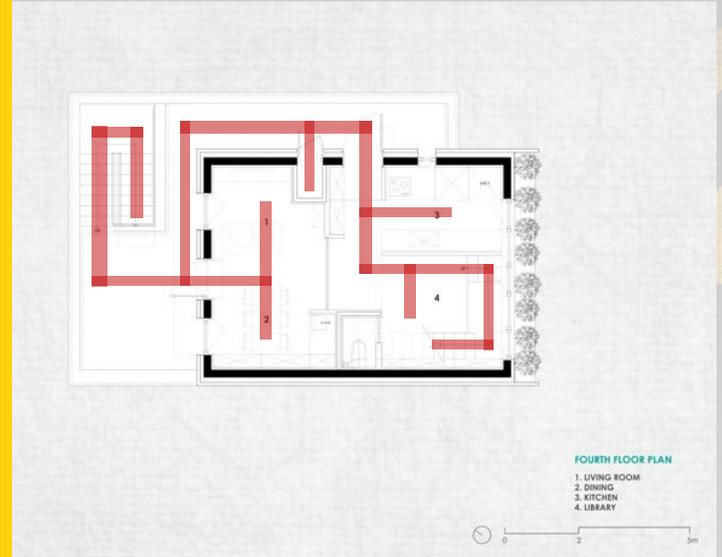
This case is similar to the third case because there is an emphasis on keeping things natural. Both cases taking inspiration from nature and include elements to make it feel natural. This case is the smallest study I chose and showcases how things can be organized in a smaller area. From Arch Daily, I was able to find out that this building was trying avoid blending into the environment but rather match and be an individual entity. Socially it is a great place for people to get coffee and talk. It still uses space for office work and for an individual or small family a place to live. I believe the concept was focused on playing with light. The many pushes and pulls of the brick creates a unique change in shadow. In some of the interior views it seems as though the spaces are deeper and the architect may have been trying to make the space feel larger.

Conclusion

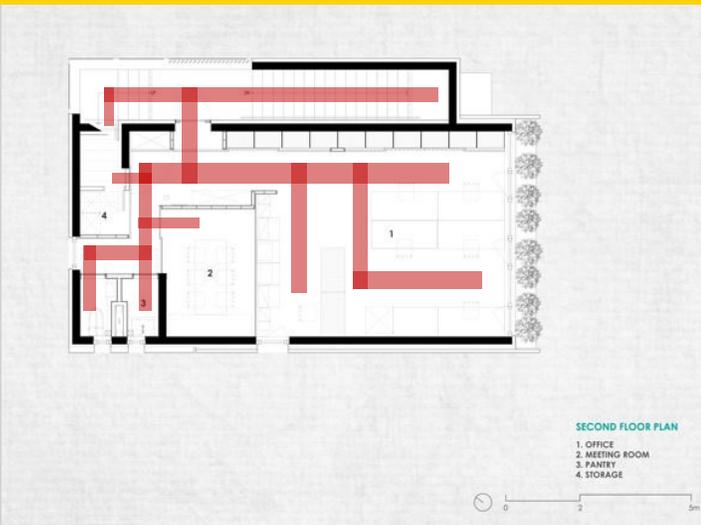
This case does not necessarily relate to the theoretical question I am asking. It does help with understanding how to organize spaces in a smaller site. Since the project I am proposing will be on a small site I will need an understanding of organizing in more efficient ways. The theoretical question is left untouched by the conclusion of this case study.



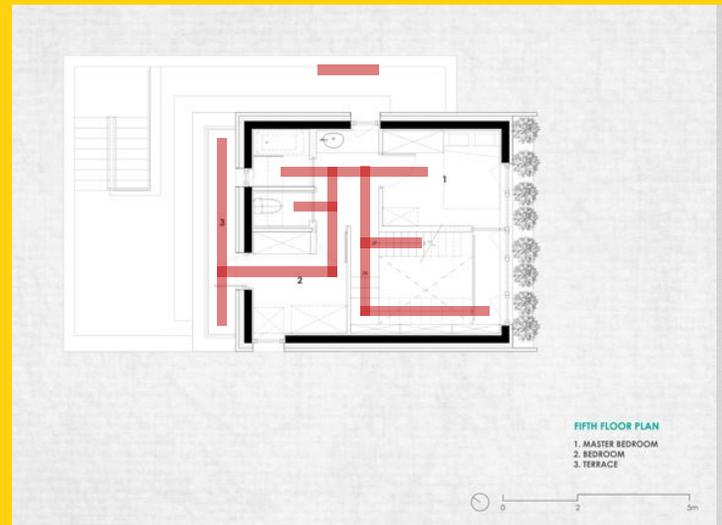
1st Floor



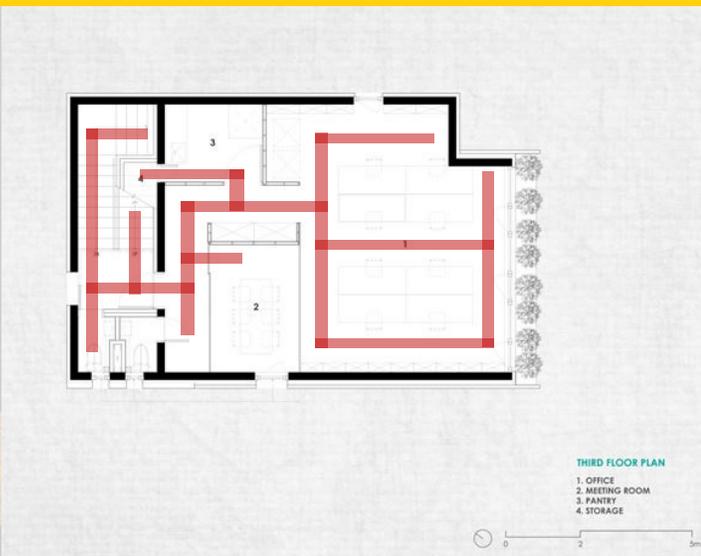
4th Floor



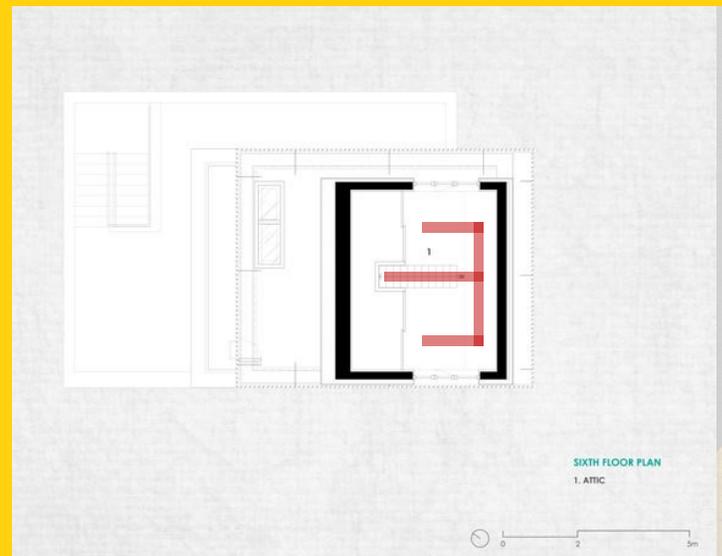
2nd Floor



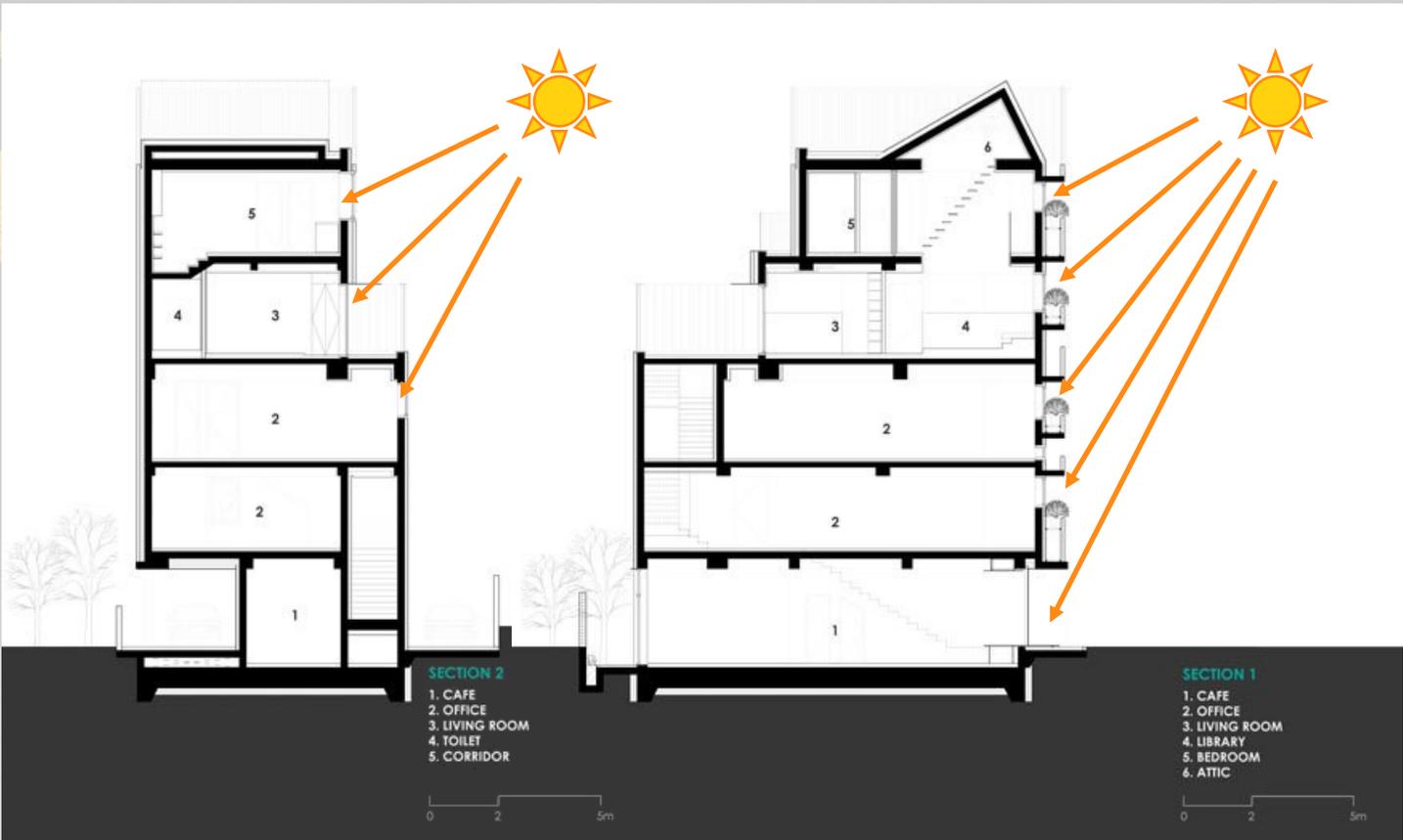
5th Floor



3rd Floor



6th Floor 8





People Belge Building



Peuple Belge Building

Introduction

This building is a mixed use apartment designed by Coldefy and Associes Architectes Urbanistes. The building was built in 2019 and has a site area of 21,215 square feet(1,971m). The case is located in Lille, France. The building has a defined step look as the floor heights change. It takes on a modern simplistic look using a polished concrete finish. They used a high performance concrete which was prefabricated in Belgium.

Existing Program Elements

The first floor contains the Le Cerisier en Ville restaurant while the floor below has the Brasserie, La Grotte. The upper floors contain guest rooms which the are managed by the chef of the Le Cerisier. The top four floors are all multi-dwelling units with terraces and loggias.

Research

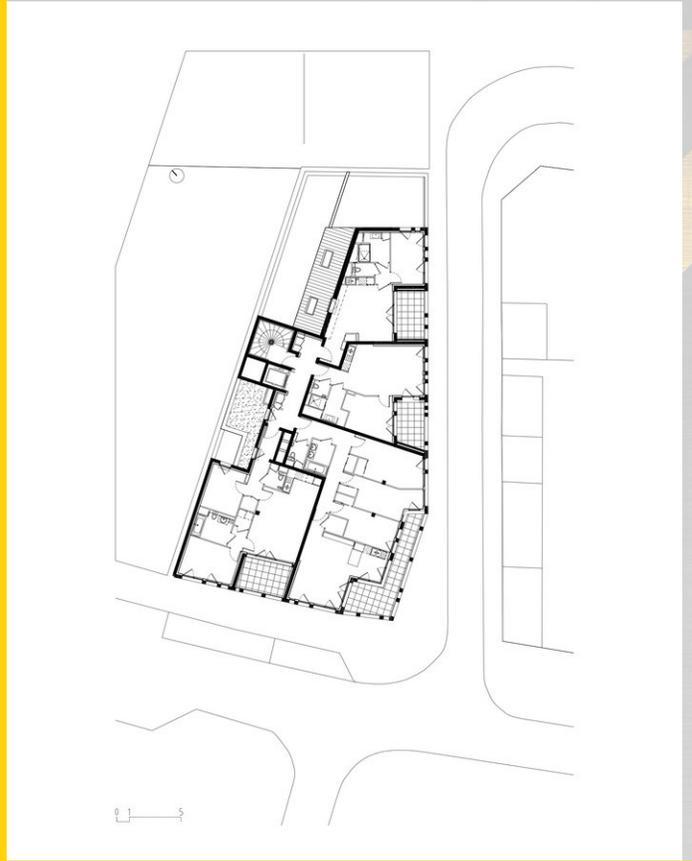
This building is similar to the other buildings because it is using geometry to create interesting shadows like the first study. It is also using geometry like the last study to create a new style of building in the area. This case differs because it is using an engineered concrete to create a structure with large window openings. This building is trying to actively be seen and attract attention. The idea is it is a fine modern establishment with one of the top chefs in the region cooking at the restaurant. Due to the country this building is in it is common to add apartments or guest rooms on top of a business. I believe the architect was trying to make a place that feels luxurious and look at using new methods to create such a place.

Conclusion

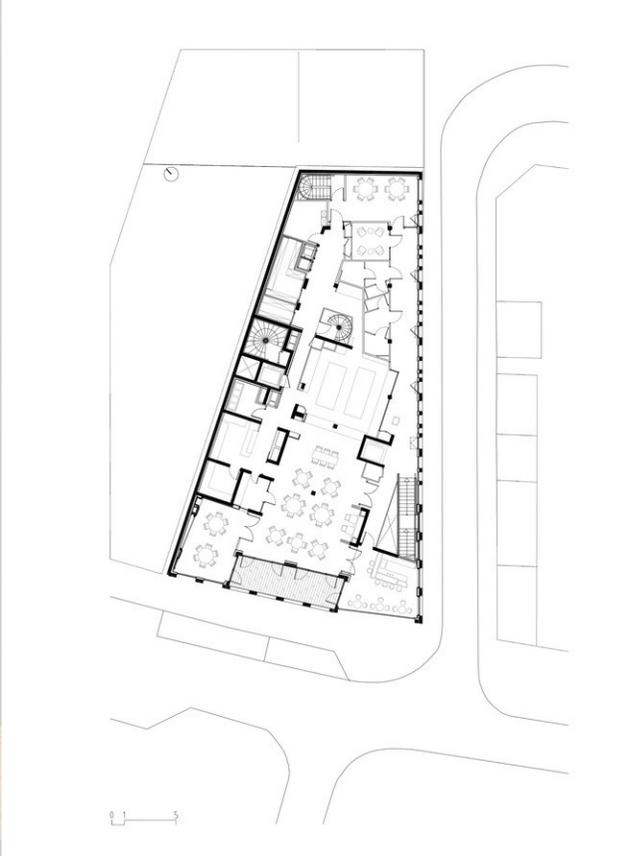
This case provides me with an idea of some of the new technologies that are available. It does not change or alter the theoretical question. I only begs the question will new technologies like this be what construction workers want to work with or will this be hard to work with? The theoretical question remains unchanged but new research and questions can be answered or brought up.



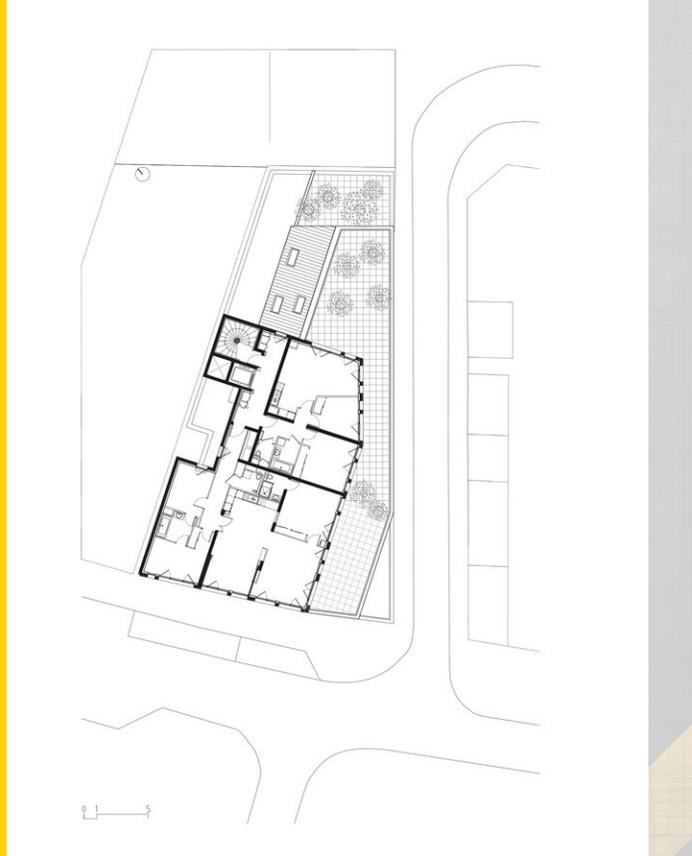
Ground Floor



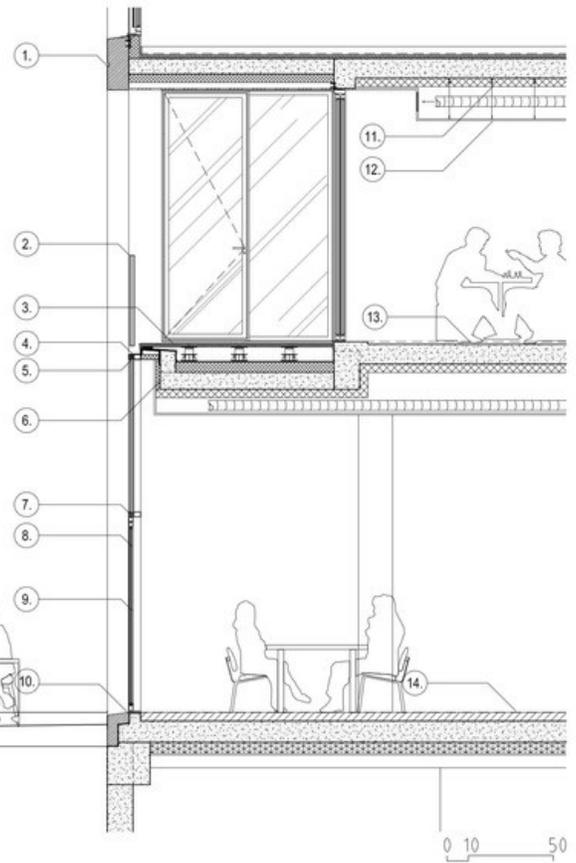
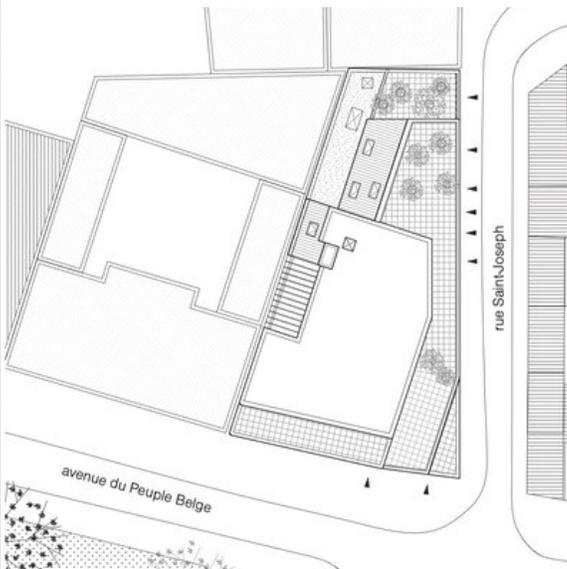
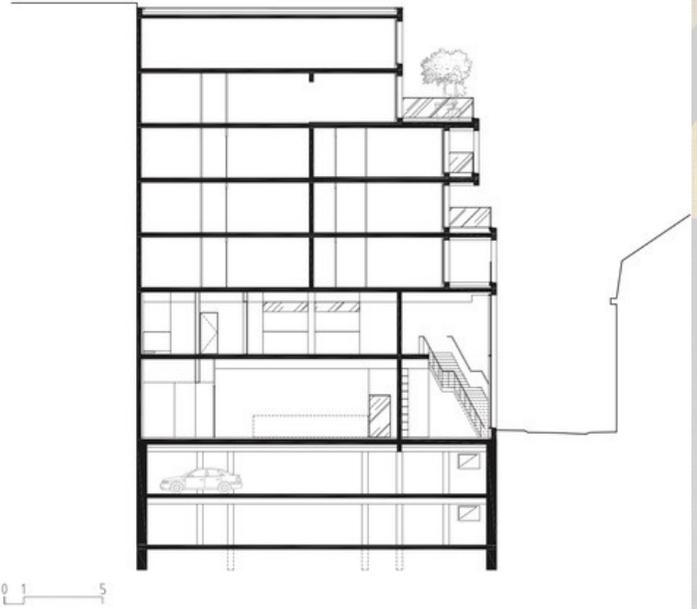
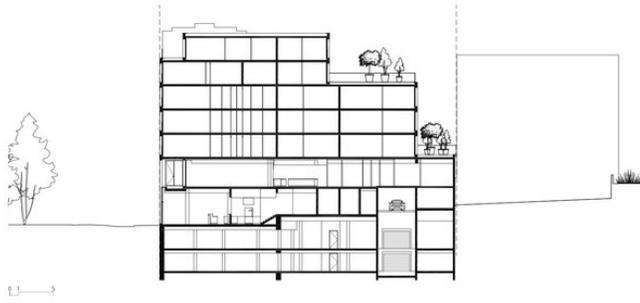
2-4 Floors

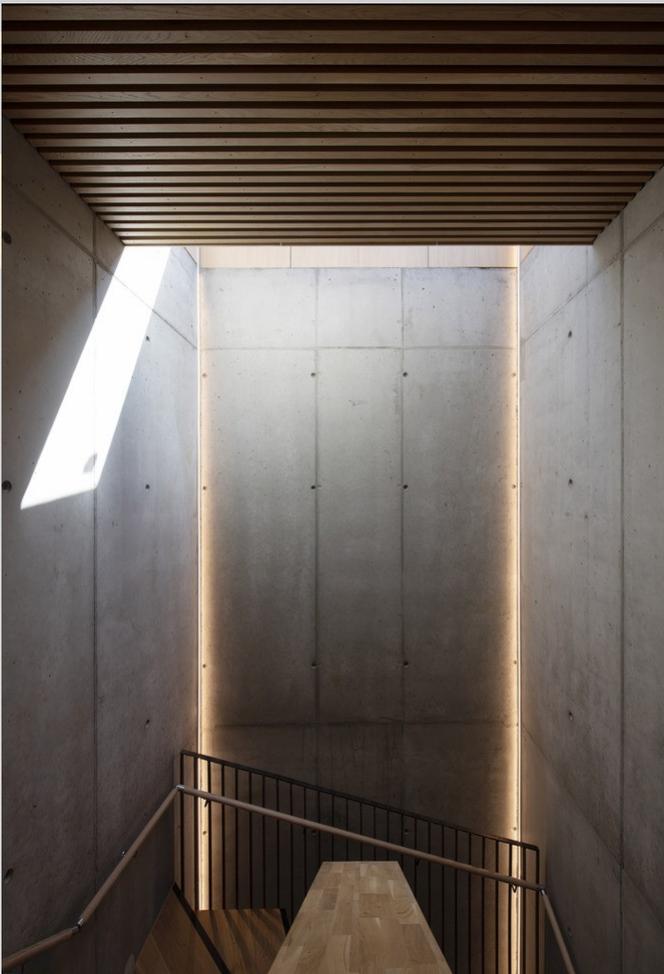


1st Floor



5th Floor
12





Pilestredet Residential Building 14

Pilestredet Residential Building

Introduction

This building can be found in Oslo, Norway and it takes up 76,423 square feet(7,100m). The lead architect is Reiulf Ramstad of Reiulf Ramstad Arkitekter. This building is a mixed use apartment that was built in 2020 for Aspelin Ramm Eiendom AS. The project consists of three buildings ranging in heights from four to six floors. Both the interior and exterior use geometric shapes to create a complex organization of space and form.

Existing Program Elements

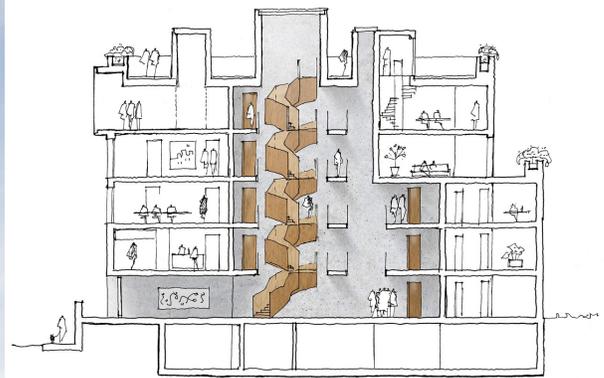
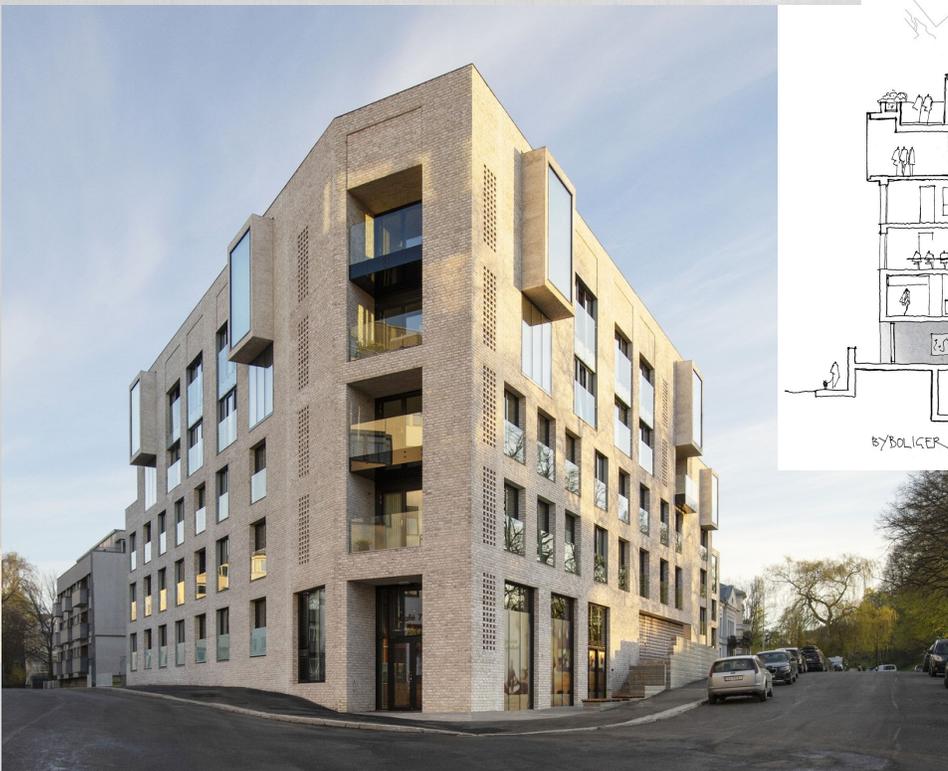
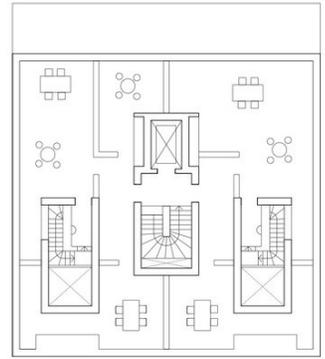
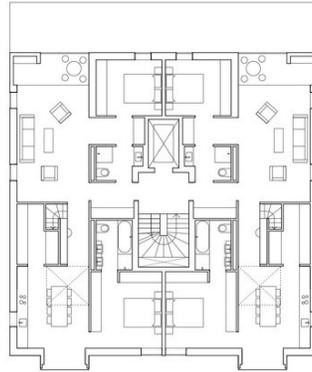
The two smaller buildings have alternately four and two apartments per floor while the larger building holds six to eight. The apartments are sized and priced at many ranges to ensure a diverse community. In total there are 59 residential units. The project has underground parking and provides rooftop gardens for public use. On the ground floor there is a neighborhood café.

Research

Like the other two cases this building is beautiful through the use of simple shapes and patterns. However this building is the most complex out of the studies. It is actively trying to diversify the community by offering many different price ranges and unit sizes. This project reacts to the site by acting natural and blending with some of the environment around it. This building is perfect for setting up a community that socializes and can see many different walks of life. I think the idea in this project was to solely focus on the user rather than worry about creating something that looked impressive. That being said the design definitely shows off some impressive work that can be achieved with simple geometry.

Conclusion

This case shows how geometry and simplicity can make a design look and feel like its worth more. It does not help with my understanding of my theoretical question simply because I do not know if the construction crew had troubles constructing this building.



BYBOLIGER PILETRØDET 77 KONCEPT SKITTE RR 12/11 2017

Major Project Elements

Condos

Bedrooms, kitchen, dining, living, bathroom(s), storage, washer/dryer, mechanical closet, office/study

Retail

Bathrooms, storage, the rest of the rooms depend on the occupancy but I would imagine restaurants and or small shops would occupy so things like a kitchen or a cash register counter

Parking will be needed for the residents, the businesses, and the consumer. An accurate count can be made once the occupancy is calculated.

User/Client Description

The client would be either a company or developer interested in creating a space for those looking to be homeowners but aren't ready to buy a house. They would also be looking to rent out a space for retail to increase the value of the property. The user would be a business or multiple businesses, depending on the size of the building, who are looking to expand their business or start a business on the lower floor. While a homeowner would be the user for the upper levels. I am unsure of the total numbers involved as it could change depending on how many units can be placed in the building.

The retail businesses require a means to store all their goods as well as a way to get the goods delivered. Depending on the business whether food, clothing, gifts; each requires different spaces such as a kitchen for a bakery or clothing racks for a clothing store. Each of the businesses will require bathrooms that could be shared. They also require parking for customers which will be along the street.

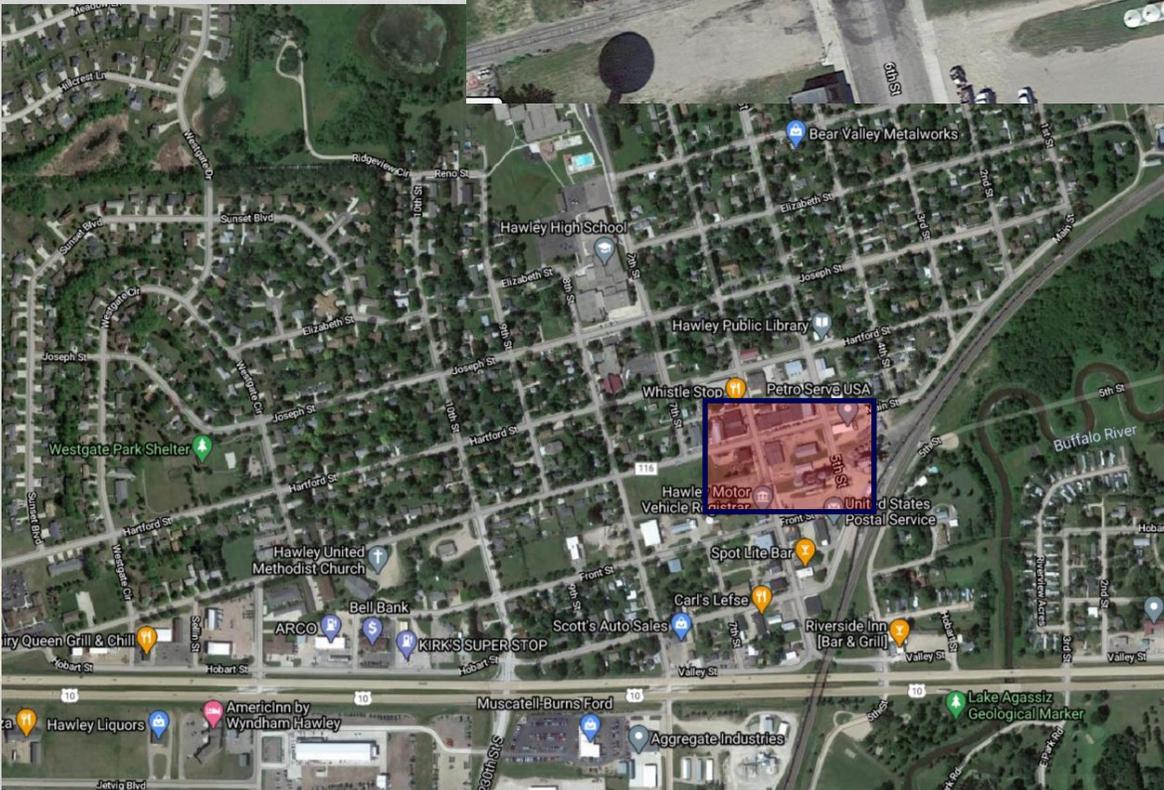
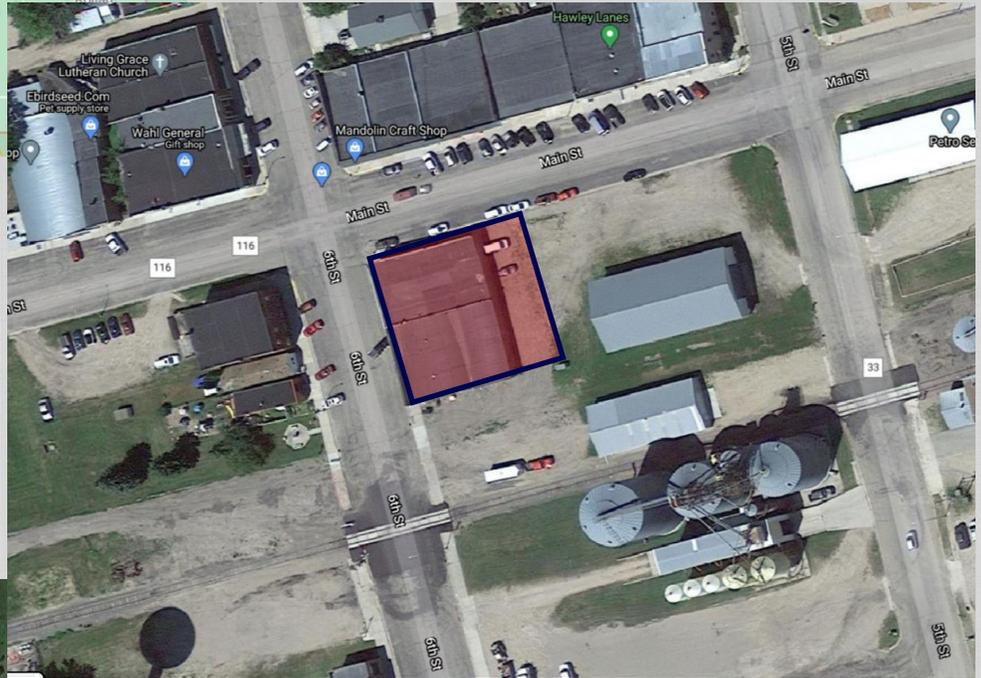
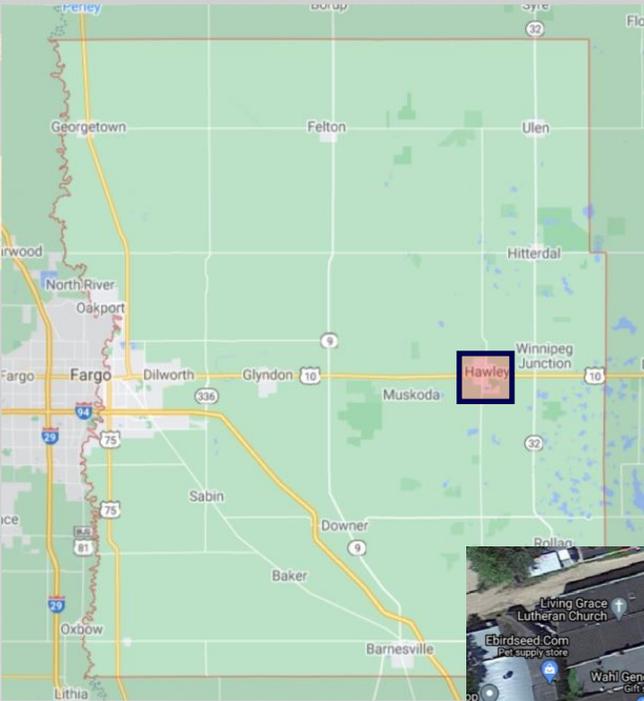
The condo owners will require all the essentials that a regular homeowner requires. With the condos on the upper level an elevator will be required as well as proper egress. Parking will be assessed based on how many units fit in the building. I would assume for a unit I could figure 2-3 parking spots with options to pay for more spots. Economically these people must be middle class but because the location is in a small town that will be based on local income data.

The Site

The site is located in Hawley, Minnesota on the corner of Main Street and 6th Street. It is currently owned by MJR Properties and is approximately 14,000 square feet. A building occupies the site currently and I am unsure if it is occupied. Although it does not receive much business if it is occupied.

My thesis question does not necessarily gravitate towards any site. The problem lies with how the building is built or designed and with any site there are complications and other problems that arise. The site is maybe a little smaller than I want but is a good size to work with the problem at hand. If the site gets too big I could start to lose track of the problem and if it is too small I would not be solving the problem. As I state houses and small buildings don't have as many problems or complications that large commercial or residential buildings have. The reason I chose this site is because it is in a city that is growing and the downtown area needs something to help bring it to life. So not only am I looking at my thesis project I am working at adding something to a small town to help it grow in the right direction.





The Project Emphasis

The major emphasis is on the construction worker. What is emphasized more may change based on the responses and research from said workers. I'm guessing the focus will be the materials and methods of construction. It could also be the shape and form of the design. Overall I will be focused on the construction worker through the process of the building.

A secondary focus is on the design still being supportive of its site and community. The building should bring new business while adding diversity to the old businesses. It should also be a friendly space to bring people together and revitalize the area.

Goals of the Thesis Project

Academically I would like to provide a way to educate students and professors the importance of actually understanding what it takes to make a design work. Construction workers handle many issues that architects need to understand the safety & cost of. Not everything can be done as drawn on the blueprints.

Professionally I would like to change the view architects have of construction workers. If we realize that our degree and knowledge is just as powerful as a builder's experience. By working integratively, we can reach a common ground and actually improve our selves.

Personally I would like to be the change in architectural thinking. After graduating, I can take these ideas and push for ways to work with other professions in creating respectful and healthier relationships.

Plan for proceeding

The research method I will use to start with is qualitative. I need to interview and survey as many professionals as possible. I have some architects I was told would be helpful, people such as: Jerimiah Johnson, Phil Stahl, and others. Through Roers I will be able to send a survey across the whole company and interview many coworkers at the jobsites.

The first thing I need to answer is the underlying why of my thesis question. Why is the relationship between construction workers and architects poor. Once I find the answer to that I can start looking into things such as how to lessen the burden on the workers through use of better materials or design. Without answering the why I can't create a prototype building which can be used to educate and promote a healthier relationship between the two professions.

I will need to do research to find the importance of my site. Living in Hawley I have a sense of the people and the design of the town. That being said I have never looked into an historical importance or asked people what they think of the downtown area. Another thing I want to look into is the use of condominiums or apartments. I have stated this would be a mixed use condominium but there was no research on the demographics of the city to support such a plan.

After I have compiled this research I can start with a correlation study. I must find what building materials are favored by construction workers and the city. I also need to find the correlation between these materials and why some are favored over others. This again comes back to answering the why of my theoretical question.

All surveys and interviews will be documented into a written essay. The essay will take similar questions and answers and condense them into an understandable paper. The survey will not be asking yes or no questions rather they will be open ended allowing the person to express there thoughts and feelings. Each response will need to be assessed for honest answers. Answers which need further explanation will be further investigated through contacting the individual.

Previous Experience

- 2nd Year Fall Project: Teahouse
Typology: Commercial
Instructor: Charlotte Grueb
- Spring Project: Dwelling for Lednew and Amy Vaccin
Typology: Residential
Instructor: Daryl Booker
- 3rd Year Fall Project: Entomology Laboratory
Typology: Government Research
Instructor: Mark Barnhouse
- Spring Project: Chicago Consulate
Typology: Government
Instructor: Ronald Ramsay
- 4th Year Fall Project: Miami Highrise
Typology: Mixed use Office
Instructor: Mark Barnhouse
- Spring Project: Fargo Main Master Plan
Typology: Urban Planning
Instructor: David Crutchfield



Thesis Research

Summary of research

In this section I look at three types of research to provide a basis for my project design. There is a literature review, a survey, and an interview. Each bit of research is conducted to find similarities across multiple sources. I will go over briefly how each segment is framed and how research was conducted.

The literature review includes three articles I found which provide detail on some aspects of the construction industry. In the search for these articles I used the key words such as “difficulty in construction” to find articles that point out what causes problems in the field. For the most part I was able to find articles which could relate to architecture with one article directly focused on architecture and contractors. For this literature review I wanted to look at a scholarly answer to my theoretical question.

Next was the survey questions I asked. I wrote up a six question survey and presented it to construction companies in the area to get answers from field operators. I did not get as many responses as I would like but I was able to get enough information. For the survey I wanted actual field workers to identify the problems they face on a day to day basis. This information is to help me find the root cause of my theoretical question as well as get possible solutions field workers believe would work.

The last bit of research I cover is an interview I had with architect Phil Stahl. It was important to me to get an understanding from the survey so I could then present some of the answers to Phil. This was a way for me to “fact check” the answers given. Although not all situations are the same, for the most part Phil was able to relate to the contractors and identify the problems that we all face in the construction industry. I also wanted to speak with an architect to find if there are any problems architects have with contractors which may cause issues.

After conducting all this research I was able to reach a way to move forward with my project. Each study is qualitative in nature and provides specific detail to the many issues presented for my theoretical question. In the following pages I present the detailed research I have conducted.

Literature Review

Article I

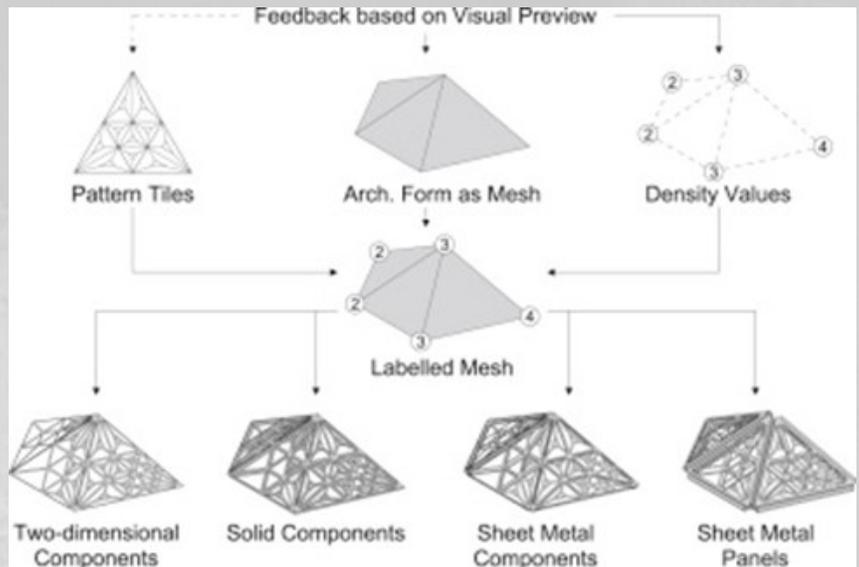
The first article is about the use of Parametric Design(PD) in contemporary architecture. The authors first give background on the use of parametric design and how it can change the way we design. Then the authors provide case studies for which PD was used. The three case studies are the Future of Us Pavilion in Singapore, the Louvre Abu Dhabi, and Morpheus Hotel in Cotai, Macau. Through my schooling I have been briefly introduced to PD but have never fully explored the possibilities it has. For my thesis I am working on improving the relationship between Architects and Construction Workers. One thing I have run into with my thesis is many construction workers saying there is a lack of detail in drawings. This may stem from a lack of print reading skills or our skills as architects can not translate details properly. I wonder if parametric design is something that would be more confusing and if it has a use in all types of architecture. What I mean is in the city of Fargo we do not make incredible architectural statements we design practically. To answer this we dive into the article where I will be covering the background and the Future of Us Pavilion(FoU).

The background explains how there are six overlapping applications of PD in architectural practice: (1) the translation of design ideas into parametric models, (2) the rationalization of designs into buildable shapes and components, (3) the control and setting-out of architectural forms, (4) the generation and testing of design variants based on various criteria and specialist input, i.e., efficiency-focused design exploration or optimization, (5) the sharing of information, which, for the case studies presented in this paper includes the automated generation of construction documents and (6) the capture of design knowledge from different stakeholders. (Thomas Wortman) So what we can do is program design parameters into a 3D modeling software and start to experiment with the structural and aesthetics of a project. Once a suitable design is reached the program would be able to create a set of construction documents with ease. This how the author points this process out with the example of Hesselgren, Charitou, and Dritsas Bishopsgate Tower in London. Another good example of this process is the Aviva Stadium which was designed using the first commercially available parametric modelling software.

Sheperd, Hudson, and Hines are the ones responsible for explaining the process as a master model controlling the envelope, which is then developed into separate models for the structure and cladding.

The Future of Us Pavilion was developed into two projects a pavilion and a wall screen. The model's inputs are (1) a triangular mesh representing the form and panelization of the design, (2) pattern tiles defining the pattern for the design's envelope and (3) density requirements for the envelope represented as a point cloud. (Thomas Wortman) Using these inputs the model could then be labelled and given data such as curvature or corner points. In the article it is stated that each mesh face is interpreted as its own entity. This allows a separation of the whole to give directions of how to build each part. This also gives a model where a user can make quick 2D documentation as well as produce a 3D printed model for varying uses.

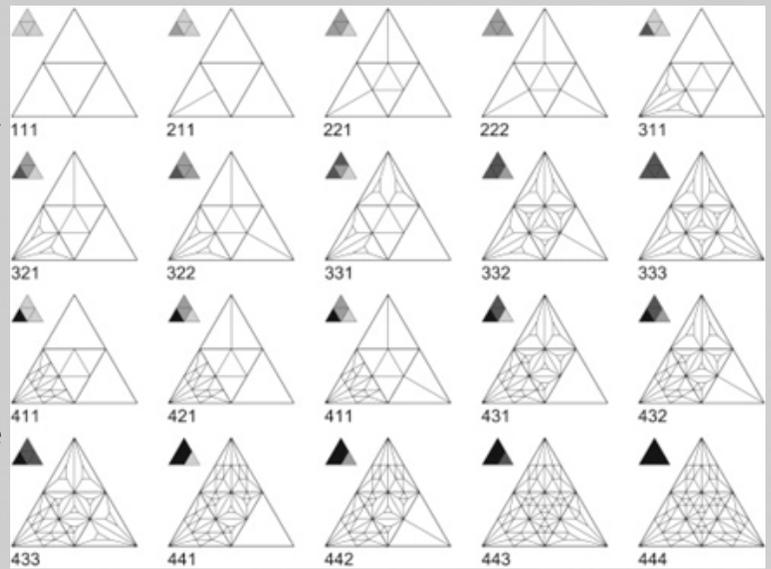
For this project They are working with triangles to create the form of the pavilion. For each face generated in the model someone can change the density or pattern within the triangle. By changing things such as the pattern or density things such as light and shadow as well as wind and other environmental factors come into play. With the



software you can easily check to see how each change affects these factors. In the picture you can see how the model can produce multiple patterns and translate that into faces which can be manufactured.

When modeling this project the designers can use face based data or mesh based data. Mesh based is data based on points, which connect to make edges, which can form a face. By using mesh based data the model is more precise and contains data points which are easily translated into drawings or models. The face based data as stated by the article is “a less efficient alternative.” To use the model, for say 3D printing, you would need to convert to mesh based data. If the face based model has any discrepancies converting to mesh will cause problems and therefore wasting time to fix a model.

For the FoU, density and pattern are what the designers were changing to find the right shade and shadow in the project. The image shows how the model was easily manipulated to show how each pattern would affect light and overall appearance. From this model the article states, "The parametric model produced cut sheets for foldable components that can be assembled easily into a double-curved wall." (Thomas Wortman)



Though there is more to the article I believe from this information I can start to draw conclusions on how Parametric Design can change how

we model and present drawings to contractors. I believe prefabricated design tends to work better to achieve a well built product. When we are given pieces to assemble rather than make the pieces by hand on a jobsite there is less of a chance for human error. This is even better when we can prefabricate products using laser cutters and aluminum. With the model given for the FoU we can see how easily the model was developed and analyzed. From that model the data was given to a factory to cut pieces which were then put together to make a beautiful pavilion. The whole process eliminated lots of human error. Lots of error comes from communication which as I stated earlier that contractors need more detail in drawings to build specific part to a building. This article shows some great insight into how we can change our perspective of the building process.

Article II

This article is about the changes in the architecture, engineering, construction, and facilities management industry. The article poses the idea that “A new business rule for competitiveness is to “collaborate or perish”.” (Shen, Hao and Helium) With supporting evidence the article points to the failed collaboration in the industry and how it is “the most important opportunity for improvement.” I feel this article is directly related to my thesis project. Though I have not concluded any answers to my thesis question I do know collaboration and communication is a problem in the construction industry. I am interested to see how this article will present a solution to the problems in the industry.

To start, the article highlights major problems with the interoperability with software used in the construction industry. The problems are:

It is difficult to access accurate data, information, and knowledge in a timely manner in every phase of the construction project lifecycle.

There is a lack of interoperability between systems, with several standards competing for managing data. A common methodology for managing construction projects’ information assets does not exist.

Program plans and designs are optimized for a limited set of parameters in a limited domain. The capability to support “total best value” decisions does not exist.

Tools for project planning and enterprise management are maturing, but an integrated and scaleable solution that delivers all needed functionalities for any kind of projects is not available.

Lifecycle issues are not well understood and therefore modeling and planning do not effectively take all lifecycle aspects into account. Operation, maintenance, environmental impact, and end-of-life disposal issues are given limited consideration in the project planning equation.

The ability to assess uncertainties, risks, and the impact of failures is not mature, partly due to the lack of knowledge to support these evaluations, and partly due to the limitations of available tools.

The business foundation for addressing increased security concerns does not exist, and the ability to address these issues is limited by the lack of understanding of the risks and alternatives. (Shen, Hao and Helium)

The start of the solution is to find a way to integrate two or more software systems so they can share information and communicate. This idea is what brings the collaboration into the project by allowing multiple people to share information effectively.

The first step towards system integration is data operability, which is the ability for data generated by any party to be properly interpreted by all other parties. (Shen, Hao and Helium) For this to happen we can use building information models to develop models for each party involved. The idea is by sharing data through these models we can eliminate the need to recreate data models. If every party is involved, errors and inconsistencies can be reduced which speeds up the construction process. The model is usually organized in clusters of hierarchy based on things such as structure, mechanical, or electrical. (Shen, Hao and Helium) The problem with BIM is what the article describes as “flavors.” Every profession has a specific “flavor”, a way of interpreting a piece of information, and the differences can cause problems.

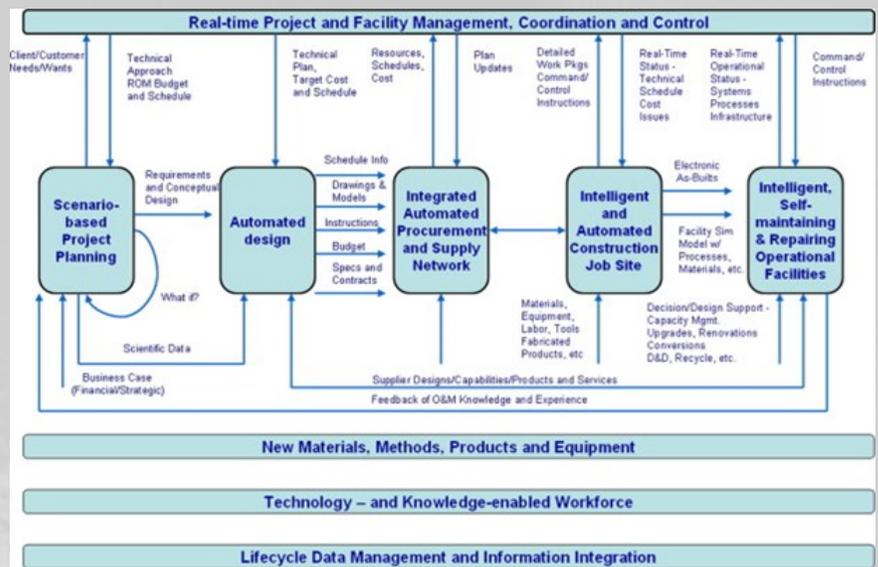
The other important aspect of systems integration is frameworks interoperability. According to the article, “while data interoperability is preferable to achieve efficient systems integration and effective collaboration, it is not practical for the integration of legacy software applications which were initially developed by different vendors and were not expected to work together.” (Shen, Hao and Helium) So frameworks interoperability is all about translating communications and information from differing programs.

Some of the approaches to systems integration include: the internet, distributed objects/ components, software agents, semantic Web, and others. The internet as described by the article is adequate for use in daily construction project management. Although for a large collaboration, between architects, engineers, and owners, the Web based system lacks sufficient ability to solve complex problems in a collaborative setting. (Shen, Hao and Helium) Software agents have been used before the Web was available and are “best suited for applications that are modular, decentralized, changeable, ill-structured, and complex.” (Shen, Hao and Helium) The article notes that the benefit of this approach is the focus on real world objects rather than functions.

The article shares how virtual collaboration is not widely used but will most likely be the future of collaboration. Since the article was written in 2010, it is understandable that at the time virtual collaboration was not great. With the Covid-19 pandemic we can see how virtual collaboration has become very important across many industries.

Currently, in North America, the Construction Industry Institute(CII) and Fully Integrated and Automated TECHNOLOGY(FIATECH) are working on many joint projects to increase effectiveness and sustainability of the industry. (Shen, Hao and Helium)

Both are working on models which use a roadmap designed to produce the best construction process. The image shows FIATECH's roadmap which they believe will see use in the next 3-5 years but may take many more to finally be widely known. (Shen, Hao and Helium)



Even though this article is from 10 years ago it is great to find how my thesis question has been researched and is still being worked on. The main focus is about developing a way to collaborate effectively in the construction industry. Like I mentioned I cannot draw any conclusions for what the root problem is between architects and contractors, but I believe this article shows compelling evidence that communication and collaboration are not working the way it should be. In this time we have amazing technology to work with so you would think we could come up with a perfect model for appealing to everyone involved in the construction process. There definitely needs to be more discussion on this topic and more solutions need to be tried to find what works best.

Article III

This article is about the challenges of working together in the construction industry. A thought which the article conveys is how no one knows how to do the other person's job. In a way I find this to be true and it is evident with the basic problems between the professions. The challenge then becomes listening to each other and coming up with an effect strategy to erect a project. For this article, I will go over how the many listed problems can occur in the field of work.

To start off, the article has a great story:

"I still remember my then-lead carpenter saying: "Know what I do when I get drawings from an architect? I throw them in the garbage!"

(Coincidentally, he soon became my ex-lead carpenter after announcing partway through the project that he was leaving for a month-long vacation in Italy with his wife. I told him not to hurry back.)

His remark typified the negativity with which some contractors view architects. And why relationships between those who design and those who execute are often worlds apart. It's really a shame; the successful blend of design and construction talent is a common thread when researching Creative Eye, my regular feature in the print edition of Canadian Contractor. A successful collaboration can result in outstanding results." (Bleasby)

This story shows the first problem and that is a simple disrespect of others. There are cases where both sides can't cooperate because of differences and there are some instances where one side tries to work with the other and is shut down. The lesson in that story is to show respect to whoever you are working with and if a disagreement comes along work together to find a solution.

The next problem the author points out is the scope of work an architect has. Architects develop concept drawings which turn into construction documents. After that the architect can be involved with the building process or it may be out of their scope of work. (Bleasby) With this many architects have a certain degree of knowledge of building which can lead to incomplete documents. The author uses the example of "How are we supposed to frame that multi-dormer roof."

The point is the architect may want the builder to figure it out because they don't know or they forgot the detail and know how. (Bleasby) In this case it is the responsibility of the architect to let the builder know their scope of work. For the builder they need to be understanding and work with what they have.

The author brings up the next problem as: too many bids and misleading estimates. Architects commonly provide a client with an estimate which tends to be what the client sees as right. This can lead to confusion later on as a contractor could say the estimate is way off. This causes other companies to get involved which can cause a mass of high or low estimates. (Bleasby) The confusion of this process will lead to many unhappy clients and contractors. A good thing that can come from the bid process is finding contractors who deliver on a project with a good quality result. The best part is the new relationship architects and trusted contractors will have.

Knowing what you are getting into may be one of the hardest decisions to make. The question is how will the architect support the project are they there to give drawings and walk away or answer inevitable questions that pop up. (Bleasby) The article goes on to say the best process involves the architect as an administrator or supervisor. For the client it means there is an unbiased person moderating any changes that need to be made. For the contractor it means there is a person available for questions and interpretation of details. (Bleasby) The architect will typically be on site more often creating a relationship with the builders. The most important part is the relationship as a trusting relationship develops into cooperation. The more cooperation there is the better the end result.

The last point the author makes is building a relationship of talents. Both the architect and builder can learn from each other. As the project is conceived it is important to work with the builder to create an early partnership of respect and cooperation. The author brings back his point from earlier by saying:

"In my particular case, my 'former' lead carpenter never appreciated my architect's skills, never liked the design from the outset, and felt he could have come up with a better house himself. He wanted to be top dog, and openly ridiculed specific aspects of the design, offering his own solutions in conflict with the architect. In turn, the architect was dismissive of the carpenter and his comments, and understandably so.

It was not a scenario for the 'ideal build', one more reason why the carpenter got the 'heave-ho' alluded to earlier." (Bleasby)

The relationship built before the design is made is better than the forced relationship from the winner of a bid. Respect is always the key to a healthy relationship.

I absolutely enjoy what this article is about and how it states the problem we face in our field of work. In the end my thesis project is not a normal project where I am actually working with a contractor to build my project. However this article perhaps displays the most important aspect of the problem between the two professions. We do not show respect for each other and we need to work on that. In my thesis I can try to reach out to contractors for help in the design as well as show how respect is earned in the field.

Conclusion

For these articles I was looking for a chance to look at solutions to my thesis question: How can architects and designers build a healthier relationship with construction workers? Each article provided possible solutions and different ways of looking at the situation. Article I helped in understanding how parametric modeling can benefit design and construction, Article II looked at interoperability of software and how to better the cooperation of each party involved, and Article III helped in the understanding of what could be the most fundamental problem in the industry. I want to take this knowledge and apply it to interviews from both architects and contractors to find the correlations. This in turn will help provide me with the path I should take my design for this project.

For the first article, parametric design has been proven to provide results which are stunning in practice. The FoU pavilion is designed using triangles with varying degrees of density and patterns. I believe the project was a success, because the technology used produced a product which could be easily assembled. The technology did not hinder the architects abilities, it actually enhanced them by showing the density of the panels. This gave the user an easy way to analyze shade and light. They were also able to send the model straight to a company to laser cut aluminum panels with extreme precision.

Prefabrication in my mind is something that all builders like. It minimizes mistakes and requires less effort for the most part. A question I would pose is, how economical would it be to use this method for a standard building or house. Many houses and buildings have patterns but not to the extreme that the FoU pavilion uses. The pavilion is all triangles which create a curved shelter. I feel like this modeling method is great for producing patterns in building rather than custom shapes. The other thing is location, and in Fargo or any other small city design is based on simple shapes and known construction methods. Could this be used to create a wood framed house?

The second article is great at detailing how interoperability is lacking in our programs. Although the article is from 10 years ago it does still make a valid point. Using a program such as Revit is great for collaborating with your design team, but what about the engineers or plumbers involved with the project.

Every profession looks at a project differently and may not use the same modeling software. This creates a large gap between collaborating effectively and working to interpret someone else's work.

From interviews I have found some builders find a lack in detail for some drawings. With this article I think this could be linked to the miscommunication of software or other problems within the collaboration. With the technology we have now I think it's safe to say a zoom meeting is not the most effective way to go through details with other people, but if everyone involved has access to a shared model and understand how to use the software we could effectively use zoom to talk and edit the model as a collaborative group. I want to look into what software is available and how every profession uses it to develop an idea of what works and what doesn't.

The last article I feel is less scientific as it is drawn from interactions in the field. The article does a great job pointing out how the many differences between an architect and contractor can create a gap. A key part of this is finding out how everyone is involved with the project. Architects may be hired to draw construction documents and then they are done. Both sides need to be clear what they are doing and from that work together to finish the project.

The big point they make is to be respectful. Most contractors do not know how to be an architect and most architects do not know what it means to be a contractor. Once we understand something as basic as that we can start building trust and cooperation. The relationship is built early on by including the contractor in the design phase. In the typical design, bid, build model we exclude the contractor in the design work. They are clueless to the mistakes that can be made and therefore have to consult the architect for a change. It has been mentioned many times that we can learn from the other profession and therefore we have to work to combine our knowledge. I want to find a way to bring this model into the design of my project. If I can work with a contractor to bring a design to life it proves how effective this collaboration will be. These articles provide some great information on how technology and collaboration can be the key to a great relationship between architects and contractors.

My thesis question may be answered best through solving what an architect can do to improve the construction process but it may be better solved by asking what is the architect's role in the construction process. For the most part an architect is a professional hired by a client to make design decisions.

If an architect goes the extra mile they can be much more than just the designer of the building. We can all agree teamwork is what makes many projects successful. In a team we need leaders with the knowledge of what is going on. Architects hold the knowledge of design and the clients dream, whereas the contractor holds the knowledge of building methods and motivating a crew to get the job done with a high level of quality. If the architect wants what's best for their client they can build a healthy relationship with the contractor through the many methods highlighted by the three articles above. This is what I want to find out through my project is how do we build that healthy relationship and is it our job to do this as an architect?

Contractor Survey

Part of my research involves surveying and interviewing those in the construction industry. I contacted local contractors with the hopes they could send these questions to their field workers or anyone with field experience in the past. The survey asked six simple questions based on how what the problems are in the industry and possible solutions. The following pages show numbered answers to each question. These numbers correspond to each response throughout all the questions.

The first question is designed to establish experience and position in the company. All responses have been considered valuable but those with more experience tend to have better more thought out answers. Position in the company helps me understand what point of view they have for answering the questions. I would expect a carpenter to answer different from a project manager based on their experiences with architects.

The next two questions are trying to get to the root problems in the professions. First what is the perceived problems and do you have any solutions. To answer my thesis it is important to understand what the problem is and from that I can look at their solutions and work to find the best solution. I framed question three, as architects trying to meet the needs of construction workers, to show the respondent how they should point out what is causing trouble for them.

Questions four and five are based on material use. I have some field experience and I know how some materials are hard to work with and others are easy. I asked this question so I could get answers from people with more experience as to how material choice may impact a project.

Of course to finish the survey I ask for any additional comments or concerns. I hoped that after answering the above questions they would think of suggestions or have tips for my project going forward. One thing to keep in mind, I know some of the people who responded to the survey so some answers that seem silly or are an inside joke are not taken into account for the project.

Question 1: What is your profession and how many years of experience do you have?

1 David Langlie | Assistant Superintendent | 4 years McGough | 701-866-6445

2 JN | Senior Superintendent | 27 years superintendent, 32 years in the industry

3 MBratton | Senior Superintendent | 24 years

4 Sbecher | Superintendent | 27 years

5 SHilde | Construction Project Manager | 11 years

6 RHanson | Project Coordinator | 6+ years

7 Roers 1 | Project Manager | 4 years

8 Roers 2 | Superintendent | 40+ years

9 Roers 3 | Superintendent | 20+ years | Al Sondrol

10 Roers 4 | Project Superintendent Commercial Construction | 14 years | Devin Odenbach

11 Roers 5 | General Superintendent | 30 years | Philip Keller

12 Roers 6 | Project Manager | 2 years | Dalton 701-219-0581

13 Roers 7 | Finish Carpenter | 10 years | Anthony Matney 218-443-3858

14 Roers 8 | Carpenter | 12 years | Justin Hoff

15 Roers 9 | Construction | 7 years

16 Roers 10 | Construction Executive | 20 years

Question 2: What do you believe causes problems between architects and those working in the field? If you believe there is no problems or reasons to dislike an architect explain why?

1 The biggest problem causing item on our projects is the communication between us and the Architect. There are some Architects that are very engaged in the projects and with the construction team, and there are some that are not. Typically, if the Architect and the GC are working as a team to achieve the same goal, the project goes very smoothly. McGough tries to engage all design partners in our weekly coordination meetings with our subcontractors and partners. This allows the design team to see the daily tasks that are happening and helps them understand any constraints that we have that are holding up work that could be worked on if we had the design information. This helps the architect understand how they impact the project, and helps everyone work through the issues as a team and come up with the best solution for all parties. We really strive to work together and come up with the most efficient, cost effective, and best quality product for the owner and the people in the field doing the work. If the architect does not engage well, we typically see issues with RFI's, Submittals, Modifications, ect. holding up work, and the architect might not even realize it is impacting the project.

2 Communication Approach- people view each other as standing in the way of making the profit margin. If the approach is changed to working together to a common goal (which we really are), they become a partner and not the opponent. This needs to be remembered by the construction side as they have the ability to make the rest of the team fell at ease once they have presented themselves as a team member.

3 The drawings need to be more complete. RFIs and submittals need to be returned in a more timely fashion. The architect needs to be on-site more reviewing construction progress and process with the GC.

4 The biggest problem I see is the documents being cookie cutter and not having enough details for specific components that tie into each other. Then to top it off, the architect gets defensive of their design or, maybe worse, unresponsive.

5 I believe the root cause of the issue is the disconnect between architects and field workers in that neither knows what it takes to do the others work. Field personnel do not understand the design process and what goes into it and how different changes or requests can affect it. Vice-versa, architects do not always understand how their designs and decisions can affect those working in the field. This disconnect usually becomes apparent during the change management process when one side does not agree with the other sides proposed solution to an issue.

6 I believe field sees architects as "head-in-the-clouds" or "dreamers" with lofty ideas that may not work in the field. I believe the basic white collar versus blue collar worker is at play. Self-esteem is perhaps a culprit for field workers along with lack of field leadership in driving respect for all jobs and positions. From a young age we hear, College, college. Go to college." Thinking this makes a person feel worthless if they do not go to college.

7 The architect tends to choose the owners side more often than not. This isnt the worst thing in the world but can cause animosity between the field and the architect.

8 When the prints have some discrepancies in them and don't show all the details

9 Poor communication, lack of detail, money

10 The biggest problem is architect and engineer not communicating properly. Every job the architectural and structural drawings do not jive on some details. The notes "see plan" when you look at a detail od a cut section and have to navigate to a page that is irrelevant to the detail I'm looking at drives me nuts.

11 Lack of field experience, to see the process of how things are actually assembled.

12 Sometimes I believe they do not see the struggles of actually building of some details. Some details make sense on the plans and spec but out in the field they don't and most of the time you can find a easier and better way to complete it.

13 Things look good on paper but don't work in the field or becomes a major pain in the add to make it work

14 Lack on the job experience/field work. All architect lives matter.

15 There are times when they draw up a detail on a plan but it isn't going to work the way the print shows and they still want it done their way.

16 The biggest problems are caused by lack of detail. A lot of the guys complain about arrogance with architects or they talk to them like they are better than them. I am a professional engineer and worked closely with contractors on civil projects that I designed prior to coming to Roers. I learned quickly that I didn't know everything there is to know about designing and that I could learn somethings from the guys in the field. The more time I spent in the field the better designer I became and the better our relationships grew. I would suggest having architects do the same.

Question 3: In what ways do you think an architect can change to better meet the needs of the workers in the field?

1 It really works well to have the architect on site a day or two each week to help field questions and work with the trade partners to the most effective solution to issues that arise. Another huge help is if the architect is able to call into, or attend our coordination meetings so they understand the impact they have on the project.

2 Build-ability- just because you can draw it does not mean it can be built and made in a timely manner. With a team approach this can be eliminated. Some architects we work with have bought into our team approach and consult with us, working through problems. This in turn generally reduces the amount of time spent haggling back and forth as they know the solution already and buy in before it is presented to an owner.

3 See above

4 Be more responsive to the team on the ground. If an issue is coming across your desk, chances are it is holding a scope of work up which will take a concentrated effort to get back on schedule.

5 I think architects, and design professionals in general, benefit greatly when they can speak directly with the field personnel who are responsible for the building of their design. Some of our best and quickest solutions have come from getting the design team on the phone or on site if possible and working through the issues with all parties involved from design team, construction manager, to field foreman. The more time the design team can be on site during the project the better in my opinion.

6 Meet and greet with all subcontractors which includes all off their team. Letting them know that we are all one team with one goal. Continue to reinforce this throughout the duration of the project.

7 Being more open to helping solve the issues at hand with the field rather than ask what does the field think they should do. Sometimes the field doesn't know what to do.

8 Listen to some of the ideas that the field works have

9 Have field experience in construction.

10 There is no class or book that will teach a person more than having a few years of field experience before becoming an architect. Just because you can draw it doesn't mean you can build it per that drawing. On site condition is not visible in the office.

11 Generally any architect that has field experience is more knowledgeable of what products work and how they go together, It makes for an easier over the phone solution , or even gives the architect some insight on how some products may perform

12 Be onsite more often and see the construction process. I alot of times they are just going off of the plans and items do shift in the field.

13 GET FIELD EXPERIENCE SO YOU KNOW WHAT WE HAVE TO DEAL WITH

14 Doughnuts you already know!

15 Be more flexible. If there is an easier way to do something then let us

16 see above

Question 4: Are there specific building techniques or materials which are generally disliked and should never be used?

1 The biggest thing is making sure the architect understands and spends ample time to ensure the exterior enclosure details are specific and effective. One of the largest warranty issues that pop up is water/condensation issues after the project is complete. Exterior enclosure is a very complex system and any mistake can cause major issues to the building. Understanding all the large ticket items (waterproofing, moisture barrier, window systems, flashing, and roofing systems) and how they all tie together to complete a seal around the building is something we spend a lot of money and a lot of time on. Part of this is because many of the designers we work with do not have detailed enough plans, or their details do not work the way they are drawn. We want to ensure the owner has a system that will perform the way it needs to, and is intended to.

2 EIFS systems with wood- This is inherent to mold and moisture problems.

3 No, but understanding standard construction practices will be useful during your design process and more cost efficient for the owner. Observe the construction process, it will make you a better designer.

4 There are probably more than coming to mind right now, but one that is always an issue is polished concrete. The expectation of polished concrete is a finished product, but it will never be consistent and will always have flaws because it is still concrete.

5 Pre-Engineered Metal Buildings are popular in this region and are a cost-effective solution for the right client, but they are less flexible with post design changes and if not designed/sized properly from the start can be a hinderance for the project throughout the construction phase. All materials and techniques have their time and place, it is understanding what materials fit each project best that sets projects up to succeed.

6 N/A

7 Single specing materials. This can cause an issue when there are long lead times. When architects don't check with suppliers to make sure they are still in operation

8 No

9 Yes

10 Building materials are always the constant wood, steel, concrete they have been used forever. I've worked with it all, they all have their purpose. I do not like OSB on roof trusses. It feels soft and cheap.

11 Every building is unique to materials and assembly

12 I can't think of any at the moment.

13 No. All material is necessary in some areas except quality pine trim. Use poplar if on a budget

14 Prefab wood framing. Stick built from start to finish hands down better finished product. But from a business standpoint totally unethical. And nailbase trebek!

15 None that I can think of+

16 Nothing comes to mind. Just make sure if it is something unique to provide enough detail for the Contractor.

Question 5: Are there building techniques or materials which are easy to work with and are considered better than others?

1 Typically, straight lines and 90 degree corners are the easiest to work with. It seems like design standards have started to add more curves and difficult angles to their designs. Aesthetically it looks more complex and defined if there are arches or many corners. Currently I am working on a project at UND that has storefront windows with an arched top and the brick columns have 10 corners in them over a span of 5'. The arch-top windows make it difficult to construct and difficult to ensure you have adequate flashing coverage around the arch. Having 10 corners in the brick over such a short distance is very time consuming and is very expensive to do. We understand these design features are to give defined look to the building, but if they can be avoided or modified with quality, look, and cost in mind, we can give the owner a cheaper and better quality product. Many times this may not even be the architects decision, but helps them understand budget and quality.

2 The material is not as important as a well developed design. A good design makes all the products work together for a better experience all the way around.

3 No, we can build anything. It all comes down to money. Early involvement with CM is a great way to design to a budget instead of designing a Cadillac and VEing it down to a Ford.

4 One that comes to mind is precast. It is a great way to build fast and efficient and has curb appeal.

5 Precast concrete walls are a great way to get a quality finished product in place quickly and reliably, however not every project/owner/designer wants precast concrete to be a featured part of their project. When it fits the project's nature, precast walls can be a benefit to the projects schedule, quality, and possibly cost.

6 N/A

7 N/A

8 Metal studs seem better to work with because you get a better wall for finishes

9 Yes

10 I have not personally used a material that was ridiculous to work with.

11 Any time we do an elevator shaft , Block gives us the best product when it comes to being straight, true , and easier to keep the fire rating

12 Materials that are found local or regional. Like tile, alot of fancy tile comes from Italy or somewhere over seas. If that is the instance we always have delays.

13 Poplar trim is best and easiest to work with

14 Nothings really that easy. Everything is a process that leads to a finished product.

15 I don't have a preference

16 Nothing to note. Whether it's steel, wood, etc. just make sure gridlines are provided with dimensions that jive.

Question 6: Any additional comments or concerns?

1 Always make sure all engineers (structural, mechanical, electrical, plumbing, acoustical, civil, food service, landscaping, ect.) is coordinated with the architect. There are many times where the plans do not match between the different engineers and architects, and this causes clashes in the field. This results in a large amount of the RFI's on a project, consuming a large amount of our time, and the CA's time.

2 It is an old adage, but communication is really the key to any successful building project. This runs all the way up from the laborers in the field through site leadership, through PM's, Sub-contractors, Architects, Consultants, Owners, and neighbors. If good communication is established and maintained you will have a successful project.

3 Thanks for the interest. 701-866-4202

4 Thanks for asking these questions. The best advice I could give as a superintendent is build a relationship with the team on the ground. When things get tough, it makes it a lot easier when everyone is working toward the same end with little conflict. The best projects for me have been when the design team is quick to respond to my calls and get me answers. This is a delicate balance that has to be respected by both parties i.e. not abused, but I can tell you it is good day when I call and get something resolved quickly that is holding up significant scope of work.

5 The more discussion and collaboration architects and design professionals can have with construction managers and field personnel the better off projects will be in my opinion.

6 N/A

7 N/A

8 N/A

9 No

10 I cannot stress enough the value of having worked in the field before drawing in the office.

11 It seems the biggest complaint I hear is lack of details or dimensions on the drawings . I haven't done a project that hasn't had issue with ceiling heights . Most we can work through , some are severe . Better coordination between MEP engineers for equipment and above ceiling work

12 Making sure architects are keeping up to date on answering RFI's and shop drawing reviews. Usually RFI's are items you find in the field and need answers in within a couple of days so it doesn't delay the schedule.

13 Love my boy Sean of the dead

14 Ahh ahh well ahhh ya see!!!

15 No

16 N/A

Summary of Survey Questions

In this survey there is no one clear answer as to what is causing a dislike of architects in the construction industry. However with the many problems I can start by looking at each one and decide which seems to be the most prevalent. This can then be answered through my project. Some of the big issues are: communication, inadequate details, lack of field experience, and status.

To start off communication is one important aspect of every job. Many of the contractors want answers or need an architect's expertise. We need to be open and understanding as well as make coherent drawing or change orders for the contractor to keep working. Some of the solutions the respondents wrote come down to having a way of openly communicating. Some say architects need to be on-site more often to quickly discuss the what is going on. Others point out how we need to understand sometimes they have solutions to the problem and other times they have no clue how to figure it out. We need to talk freely so both parties can figure out the solution. The way it sounds it's alright to say I don't know.

The next problem is problems with detailing. Many complaints come from either a lack of detailing or a drawing which is cookie cutter and doesn't work. One respondent said they hate it when a drawing says see plan and it points them to a drawing that has nothing to do with the detail they want. This part can be solved by being more careful with labeling drawings and now can be alleviated with technology such as Revit. The other problem is the lack of detail. In these cases we can be more thoughtful of which details are included or we can be more responsive to RFI's which are sent in. Many times a detail can hold up a project and it will drive a project manager crazy if the problem isn't resolved in a timely manner.

My favorite response to the issues is the lack of field experience. I enjoy this response because I understand how this is affecting the industry. When I started as a laborer I had virtually no knowledge of building. Now I can tell some tricks of the trade such as the nail trick or which tool is best for the job. A majority of the responses point to either a lack of field experience or how neither profession knows how to do the others job. A common saying is it looks good on paper but when you go to build it, it doesn't work. The best solution for these issues is to get field experience either through construction or listening to contractors.

The last problem construction workers has is with status or the classic white collar vs. blue collar. The belief is architects are dreamers with there heads in the clouds. Architects hold a higher status and treat everyone with disrespect because they have a degree. Whether this applies all the time or part of the time it can easily drive one person to hate the other. Not all architects are this way but when we show up to a jobsite in a nice suit it shows the field workers how we are disconnected from them. A suggestion, not necessarily directed at this problem, is to have a meet and greet between everyone involved. It is a way to let everyone know we are a team and through this whole project we are working together. I really like that comment because I believe it is a way to break that idea of white collar and blue collar.

Other than the root problems in the professions I am able to identify some of the better building materials and techniques as well as the problematic ones. To point out right away there are plenty who find it possible to work with any material as long as the architect understands the use of the material in the design. On the side of favored materials or techniques there is: 90 degree angles, precast, metal studs, concrete block, local materials, and poplar trim. With this list I can see the breakdown of the professions from management to finish carpentry. All of these have there place and are noted to either be easy to work with or have a quality which produces better finishes. For disliked materials and techniques I found: EIFS, polished concrete, pre-engineered buildings, pine trim, and SIP nailbase. The interesting thing to note is many of the respondents didn't have a problem with the building materials rather the detailing and understanding of the products. Many say they can work with any material as long as architects give ample detail. The other thing it comes down to is how the client will feel about the product. It can either be unpredictable in appearance like polished concrete or it can be susceptible to damage and need replacing.

To summarize the impact of this survey, I believe I can address each issue in my final project. When it comes to the root problem of my thesis question I know how communication is a huge problem in the industry. In my project I can try to communicate with project managers and supervisors as well as my studio professor to try and come up with a great design.

This could be a look at how this process works and provide useful feedback as the project is being developed.

The lack of detail that is explained may lead to a new idea for detailing projects. I can look at the impact of dimensioning or 3d drawings for those who need a better view of the detail. Back to the communicating with project managers, I would be able to ask how different details can be understood to see if there is enough information or find what changes need to be made. The lack of field experience can only be brought up in the presentation because I simply cannot show getting field experience through this project. Lastly, is status which like field experience can be addressed in the presentation but not through the design of the final project.

For the project I believe I will take some of the material suggestions to heart. They have their uses in every project and this project can help show how material choice can make a project economical and easy to construct. The best part of these responses is I get the opportunity to see what I can do to change the industry for the better. I would like to thank those who took to time to fill out this survey.

Phil Stahl Interview

Phil Stahl is an architect in Fargo with 26 years of experience in commercial and residential projects. I met with him to get responses to the feedback from contractors. To start out I introduced my project and he had to say many stereotypes to point out. Many believe we are richer because of a higher education, we never worked a day in our life, real work is with your hands not your mind. These thoughts can help drive a dislike for architects but for the most part they are not true or need to be addressed differently.

Something I asked was how we address faulty details or issues with details. He brought up the point that architects are trained to think two dimensionally and three dimensionally so we can understand details and drawing easier than most. Many contractors question details because of this meaning they don't have a full understanding of what is happening a drawing.

Many construction workers hate doing things twice. It is important to understand how things are being built and for what purpose. With the inconsistency in the field Phil recommends an inch tolerance. This comes from a knowledge of how things are built and if something is too big it can be furred out whereas if it is too small you have to find a solution which may not be easy.

On the topic of RFI's Phil recognizes it as a two way struggle. On the architects side they have work to get done and a contractor can submit lots of RFI's which take away from a project they are working on. On the contractor side they need answers to keep working. A contractor can abuse the system for time by submitting an RFI and Phil's solution is to put these first. The idea is the contractor is a customer and you want to provide them with good service. This gives an opportunity to gain respect and proves to the client that you didn't hold up the project.

Communication is a problem Phil approached with an interesting thought. He believes that most architects fall under the INTJ personality on the myers briggs test. This means they are introverted, intuitive, thinking, and judging in personality. For architects to be introverted means we are terrible at communicating effectively to someone who is the complete opposite. Architects need to understand where they stand personality wise to better communicate with contractors.

As far as detailing goes Phil explained how Revit can only provide so much information. It doesn't have set details based on location or material so we have to fill in the blanks. This means we need to have a good understanding of building with specific materials if we are to produce the best details. As far as detailing projects public projects require a full set of documents where as on a development team you can get away with skipping details because the team already knows them.

Phil gave me some tips for material use and building techniques. He mentioned EIFS is a bad material to use especially in our climate as it is prone to mold. He mentioned how zinc is a natural mold deterrent and if you can use it in a place that might mold or rot do so. He also talked about working with structure rather than around it. If we can work with a module structure for wall placement and other details we can save money and effort. An important thing to remember is the modules of materials such as brick and lumber as it can save the contractor time and money when building openings and walls.

I am glad I was able to talk with Phil as he reinforced some of the ideas the contractors had and gave me a look at what life was like from the other side of the fence. From this interview it is important to focus on the relationship between architect and builder. Both have to work together to make a building a reality. Both have strengths and weaknesses, its about recognizing them and working through them. As architects we can think more like builders to make designs that make sense. We always need to show respect and appreciation to those making the design come to life.

Summary of Research

To finish the research on my theoretical question it is important to state the direction I would like to take my project design. I will briefly highlight what I find to be the most important parts of each section to come up with my design emphasis. The sections are the literature review, the survey, and the interview.

The literature review contains three articles related to architecture and how it is incorporated with the construction industry. In article one I find it important to understand how parametric design is used to develop a project. They were able to give a general design and easily change multiple parts to first off, give the architect an idea of how the parts affect the design. They could then send these pieces to be cut out using plasma cutters with precision accuracy.

The other article I feel is important in my thesis question is the third article. This article talks about how we need to understand each other and be respectful. The business model currently is focused on us vs them which creates a divide, and the article explains how to change the model to be focused on teamwork. A big thing to take from this article is, both the architect and the construction worker have valuable knowledge which should be shared and in turn received with respect.

The survey presents questions to contractors to understand from their point of view what architects are doing wrong. From this study I was able to find out how communication is a large cause of many problems in the field. I also found out how details and other drawings can be a hassle to work with as well as the lack of building experience. Each of these problems had potential solutions given by the contractor. It is likely I will include each one of these in my final presentation whether it be through words or through the actual design of the project.

The Interview with Phil Stahl gave me a view of what its like to be an architect facing many of the previously discussed issues. In the interview I was met with the idea that architects are different than builders in the fact that architects are taught to design and think three dimensionally and two dimensionally. This makes it easy for us to read and understand drawings we make, but when it is given to a contractor they may have a hard time deciphering the print.

We need to understand the differences between each other to create a relationship based on teamwork and cooperation.

Another thing Phil said that was intriguing was the thought that contractors are like our customers. When they want answers we should give them feedback in a timely manner to keep them satisfied with the business. This creates continuing service and a new found relationship based on respect. The last thing that I find notable which Phil said was, the understanding of modules. We can save contractors time and money by building for the material. If we know the size of a concrete block we should design openings with the intent of cutting as little as possible or creating something that isn't obscure.

From this I can conclude how I want to proceed with the design of my project. When it comes to the building of the project I want to show how understanding modules can create opportunities to for saving money while still creating an amazing end product. To address the communication and detailing issues discussed I would like to talk with project managers and other field workers to see if there will be discrepancies in the project and how I can better the details of the design. The last thing I would like to focus on is showing how parametric design and other computer software can make pieces which can be easily assembled on a jobsite.

Project Justification

The project I have chosen is important to me because of the experiences I have had as a construction laborer. I have worked on many jobsites alongside many professionals and I have worked through the struggles and challenges which are presented in the field. At this point in my career I have no experience as a designer. So it is important to start learning and presenting ideas to improve myself and my peers as we head out to be architects. Professionally a project like this will help me understand what changes need to be made in the firm.

In terms of knowledge gained, I already understand problems that occur in the field but through this project I can gain the best information from across many professions. I will learn the root cause of the hostilities between the professions and be able to apply a new way of thinking. I can learn different ways to design to avoid common problems or mistakes as well as choose materials which are the best fit for the job.

This project benefits the architectural community by providing a project which models the changes we need to make to work better as a team. As said earlier this project will help me bring fresh ideas into the profession, but those who listen to me present this project will have the same knowledge which they can carry with them. Academically I can show how my knowledge of architecture and construction can be used together to make a project worth reviewing.

To justify this project financially I can look at the site and collect historical data showing the financial opportunity this project presents. Since the project is a mixed use apartment building, the justification of implementing the project comes from calculating financial growth based on renting space to tenants. Any client who is interested in real estate could see how a project like this in growing city would produce a net profit. Therefore many people could be interested in building said project. The only limits to the project are wealth of the citizens who would be renting.

Post-occupancy can go in many different ways. The owner could lose or make money same as the renters of living space and commercial space. If post occupancy goes the way I intend the project to go, the downtown of the Hawley could see new business and may spark positive growth. This could include more small business or the start of better environmental design. There are a number of ways this project can effect the city.

Environmentally speaking this project has potential to improve the area. Currently the site contains an old steel building which houses an electric company. The project can use sustainable practices to create green space in an otherwise concrete downtown. It can also use updated equipment and materials which cause less harm to the environment. The technology used in the building would need to be simple and cheap to justify the project. The biggest reason for this is location and wealth of the citizens.

The downtown area of Hawley is home of many regular visitors to businesses. However not many people are seen outside or walking along the sidewalks. Socially, this project could change something like that by making space to invite socialization. Culturally, this project can change the way the people see the downtown area. Currently it is an old style place with many brick buildings and there has not been any major new buildings in that area.

My project can be located anywhere just based on the nature of the question. The project is focused on professional relationships rather than design. The site I have chosen offers the opportunities stated above. It also allows me a chance to explore my question without being overwhelmed by a larger site.

My project will directly impact the profession by answering the questions we have put off. Through my research I can prove there are problems with architects and construction workers and therefore I want to bring the two together. We do not choose to make enemies and so if we have we need to find a way to make up for it and in this case work for a better solution. I believe this project is imperative to the change in mindset of myself and my classmates, as well as those who are practicing architecture. I do not believe I can solve the problems I am faced with but I can set the foundation for others to expand upon. If I come up with a solution in this project who's to say I will be right. So I need to work on solving my question but in the case I am wrong or don't find the best solution, someone else can continue the research. This is why I must research this topic and present a solution which can better the relationship between architects and construction workers.

Historical, Social, and Cultural context

The thesis question I am asking, I feel, is something that developed when architects faded out of being master builders. To explain what a master builder is, I have a quote talking about a master mason who is essentially the same as a master builder:

“The master mason was in charge. He was architect and builder rolled into one. He often directed a work force numbering into hundreds. But he also worked among his people. He cut stone and installed plumbing. That puzzles us, wed as we are to the notion that academic and manual knowledge don't mix.”

-John H. Lienhard, Professor Emeritus of Mechanical Engineering and History, University of Houston; my emphasis.

This notion of being on site building alongside your crew makes for what I believe to be the best relationship. It is built on respect and understanding. From my own experience with job supervisors I can say there are ones who have gained my respect through action. There are some who would rather stay in the job trailer and do paperwork. The ones I respect join the crew and actually break a sweat working. The best example is when I was on garbage duty and the supervisor joined me and stated, “no one is above cleaning.” This statement proves how everyone on the jobsite is treated as an equal, a team.

Why then would the master builder be so important. Well as you may have read in my research there is a disconnect between the professions. Architects have poor communication, they lack field experience, they hold a higher status. Each one of these most likely came about after the master builder went away. Communication is essential to keep a project on track and having an architect on site improves communication ten fold. Many contractors complain architects aren't on site often enough to ask questions and solve problems.

Field experience can be learned either through building or through listening and seeing. As a master builder it is implied that a person would be at some point building alongside their team or at least see on a day to day basis the building that is happening.

In our world today we have Youtube and other resources that can show building processes. This being said architects have no excuse for not at least trying to learn and see how construction works. Knowing building processes makes a world of difference when it comes to detailing.

The last argument, is that architects hold a higher status. With the example of garbage duty it was obvious that the supervisor say everyone as equal and therefore even though he did hold a higher title than me I can at least feel like an equal. Many times architects come dressed in suits to jobsites which instantly implies "I am smart and rich." Whether that's what they want to convey or not its what many builders see. With the master builder they are in the same work boots as everyone else. Today its not just wearing casual clothes to a jobsite its about how you approach the builders. Instead of completely disregarding them greet them, ask them how the day is going. It shows how you are human just like them.

These are some of the reasons I believe architects have become distant from builders. The master builder format I believe is something we need to move back towards. As a historical argument there are plenty of reasons why the master builder was needed and why it worked so well. The whole idea is to garner a relationship based on respect for each other.

So how can we start to bring this concept back and more importantly how can this relate to my thesis. In my design phase, I already plan on meeting with supervisors, project managers, and other field workers to discuss my project and details. With the delivery methods we have today there is a push to use the Integrated Project Delivery method. This model is very similar to having a master builder but has some distinct differences.

With IPD we see architects meeting with all the heads of each profession. Routinely they meet to go over things such as scheduling and details of the building. The architect is still the one in charge of the design but from day one they are meeting with the contractor to find any problems that could arise. A way to think of this is having a studio professor guiding his students design, but catching issues with code or other design flaws.

The master builder was the one in charge of the design and the building of the project so instead of having a contractor and an architect there was a master and supervisor. Both these models work well because they are based on forming a relationship where both are responsible for the finishing of a project. Where as the typical design bid build model pits everyone against each other. All parties want to make money so when the architect and builder are fighting to make money they tend to blame each other for problems that arise.

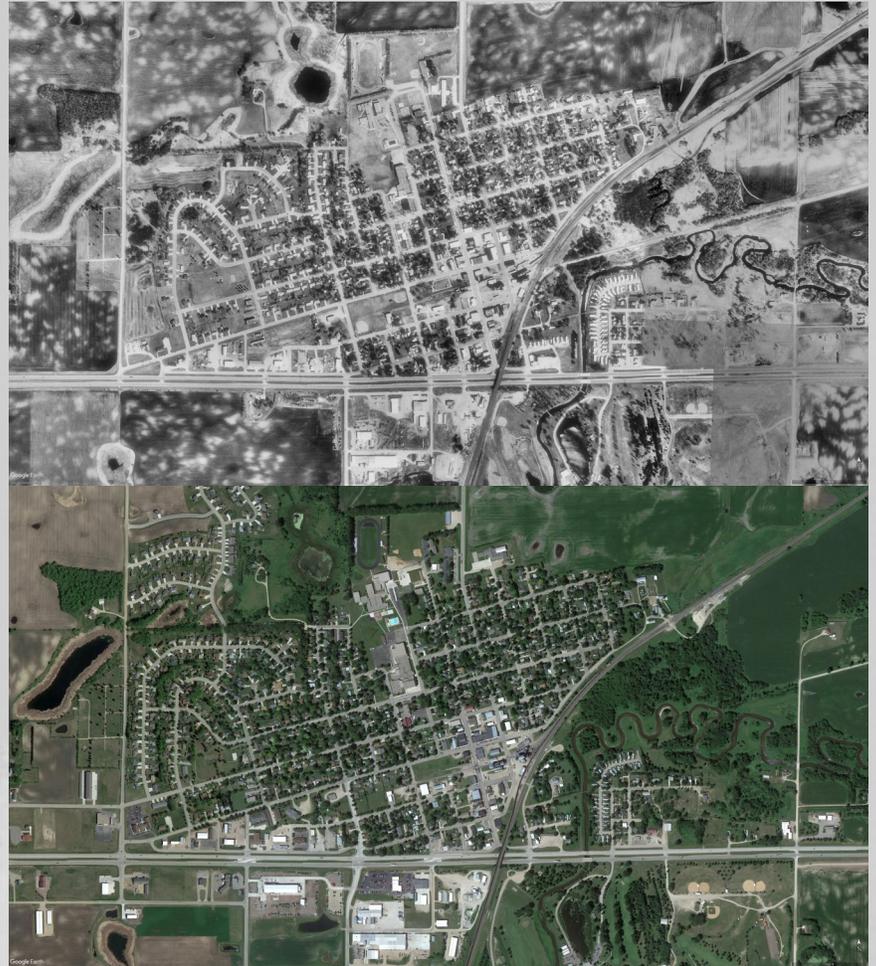
Moving to the next portion of the project context, is the social trends or developments associated. Socially my project has two impacts, one for the thesis question and one for the actual design related to the site. The focus of the project is on the relationship to the builders and so that social impact is the most important. I will still go over the site impact as it holds value to doing such a project.

The thesis question of improving the relationship between architects and builders is one which may not be trending in the world right now. However, based on new delivery methods we can see how there is a problem with the current methods and changes need to be made. I can't find any specific dates on when or how architects became disliked among builders but in a social context we see trends such as of waste in the industry. From Architizer they quote such findings:

“[A]n Economist article from 2000 identifies 30 percent waste in the U.S. construction industry; a NIST study from 2004 targets lack of AEC software interoperability as costing the industry \$15.8B annually; and a U.S. Bureau of Labor Statistics study shows construction alone, out of all non-farm industries, as decreasing in productivity since 1964, while all other non-farm industries have increased productivity by over 200 percent during the same period.”

The article from Architizer has insight into how this could be from the traditional design bid build model. By working with methods such as IPD we can see a decrease in things such as waste and other issues. The social issues which I have discussed in the survey part could virtually go away with the use of better communication and sharing knowledge.

The other social impact is with the people of Hawley. There are no official documents which show the growth of Hawley or how the architecture has changed but I can look through pictures and google earth to get an idea of how the community is growing and developing. From the two photos, of Hawley, you can see over the years of 1992 to 2019 how the place has grown and developed. Hawley grew and as a part of that growth newer building practices developed. Houses from the oldest parts of town don't share the same façade and landscaping which the new developments have.



The point to be made with looking into the history and growth is to show what style my project should have. I believe its safe to assume it should be of a new style with hints of what exists. The building needs to belong within the context of the city to fit the social changes of the city. If I jump to a crazy design such as something like Frank Gehry would make it would most likely drive at least half the city into dislike and hate for such a new building. A majority of the population is young to middle aged which hints a the need for new development.

As shown in the pictures urban sprawl on a small scale is happening. Although it is not bad for the community it is something which can cause bad habits. By designing a mixed use condominium downtown the city could start looking at ways to reduce urban sprawl and hopefully start looking at its housing situation. According to demographics there are more owners than buyers.

This is why condominiums would work best for a new development as it is similar to owning a house but has the feeling of an apartment in some ways. The other thing to support the development of mixed use condominiums is the average salary of people in Hawley. Those married with a family on average make 104K a year and the median household makes 72K a year.

With all the social impacts considered the project needs to be new with in the context of what exists. It must be conscious of the demographics and salaries of the people. The design should promote building for a denser population rather than spreading outward.

The project is about changing cultural values in a sense. For architects there would be a change and for the people of Hawley they might also make a change. Architects would be looking at shifting how they view building and the people associated with the building process.

The idea is to design with the builder in mind. What processes and materials can be used to maximize productivity and minimize confusion and struggle. Technologies which help make building easier is prefabrication. Things such as laser cutting and 3d printing are ways that technology can make calculated parts to be assembled. Other things such as wall panels and concrete are simple pieces which are stood up to make a wall. There is a environmentally stable facility which can cut and make walls to a specific shape and size. Prefabrication is great but the other part of changing in an architect is how they view the builder.

Through the research I have done it seems that culturally architects hold themselves higher than builders. A barrier is created which can make cooperation difficult. It's the logic of having someone who is willing to work hard and someone who is afraid to get their hands dirty. Architects need to take a step to change how they interact with builders whether it is dressing for the jobsite or bringing donuts to the crew every once and a while.

The other important cultural change which I hope to make is how the citizens of Hawley view the downtown area and new ways of building. There are many changes I believe would benefit the people one of the important ones is more vegetation. The downtown area lacks green space and many other natural elements.

The people should look at transforming the downtown area into a hub of activity and social gathering. A good example is Fargo's downtown even though it lacks green space it has many activities and reasons to visit. For the most part people seem to drive up go to a place for food or to run an errand and then leave. There is no gathering or walking like I believe there should be.

The idea is to add green space and places to visit inside and out. People should see this and feel inclined to have the random meetings with friends and neighbors. Bringing housing to the area also helps to create these interactions. As someone leaves their condo they could see a friend and strike up a conversation.

Overall I want to make a difference in the changes of how we look at design. We should focus on making our relationships with builders better because they work hard make architects visions come to life. I also want to make an impact on the people of Hawley. Now that I have been in school for years I can see the possibilities and opportunities which the city has. Its not just adding a new building its adding something which presents the idea of socialization and designing for people.

Site Analysis

As you may recall my site is located at 330 6th Street Hawley, MN. This site is roughly 14,000 square feet in size and currently holds a building which houses Lewis Electric. The site has views of downtown Hawley which include places such as City Hall, Whistle Stop Café, and many other local businesses. The most interesting views are that of the water tower and grain elevator. Many of the buildings in the area are finished with brick, steel, or wood. This area of town is visually old with a couple new buildings here and there. The architecture of the area relies on material rather than shape and form. The buildings are rectangular prisms with many having an awning. The colors and patterns of brick stylize each building and make them unique.

All commercial and government buildings in the area do not exceed 2 stories with the tallest building reaching approximately 30 feet. The grain elevator is the largest mass in the area and is approximately 100 feet tall. As far as how the topography goes, it does not affect the site. The maps show this area to be mostly flat with a decline a couple blocks to the south of the site. The city follows a grid system which is angled 75 degrees from north or 15 degrees from highway 10. The buildings near the site are tightly packed with either little or no space between them. They make the downtown area feel more dense than it actually is. Parking in the area is along the street which also adds to the dense feeling downtown. The less dense area is around City Hall to the southwest of the site.

Light downtown is direct and during the right season can be over burdening to the eyes. The only shade comes from the buildings which can keep many of the sidewalks cool but neglect the roadways. In terms of vegetation there is almost nothing in the immediate area. A couple of trees and some patches of grass are what make up the downtown setting. Once you leave this area the residential parts of town contain much more vegetation. The only water source near the downtown area is the red river which is too far away from the site to present any problems or opportunities.

The climate of Hawley is characterized as humid continental with the average annual high temperature of 51 degrees Fahrenheit and a low of 29 degrees Fahrenheit.

The area receives an average of 21.6 inches of precipitation mostly from the summer months. There are no reports for wind in the area so the closest town with data is Fargo. The prevailing wind in Fargo is mostly from the south for 6.4 months. Due to the lack of vegetation and the most likely prevailing wind 6th Street can essentially become a wind tunnel.

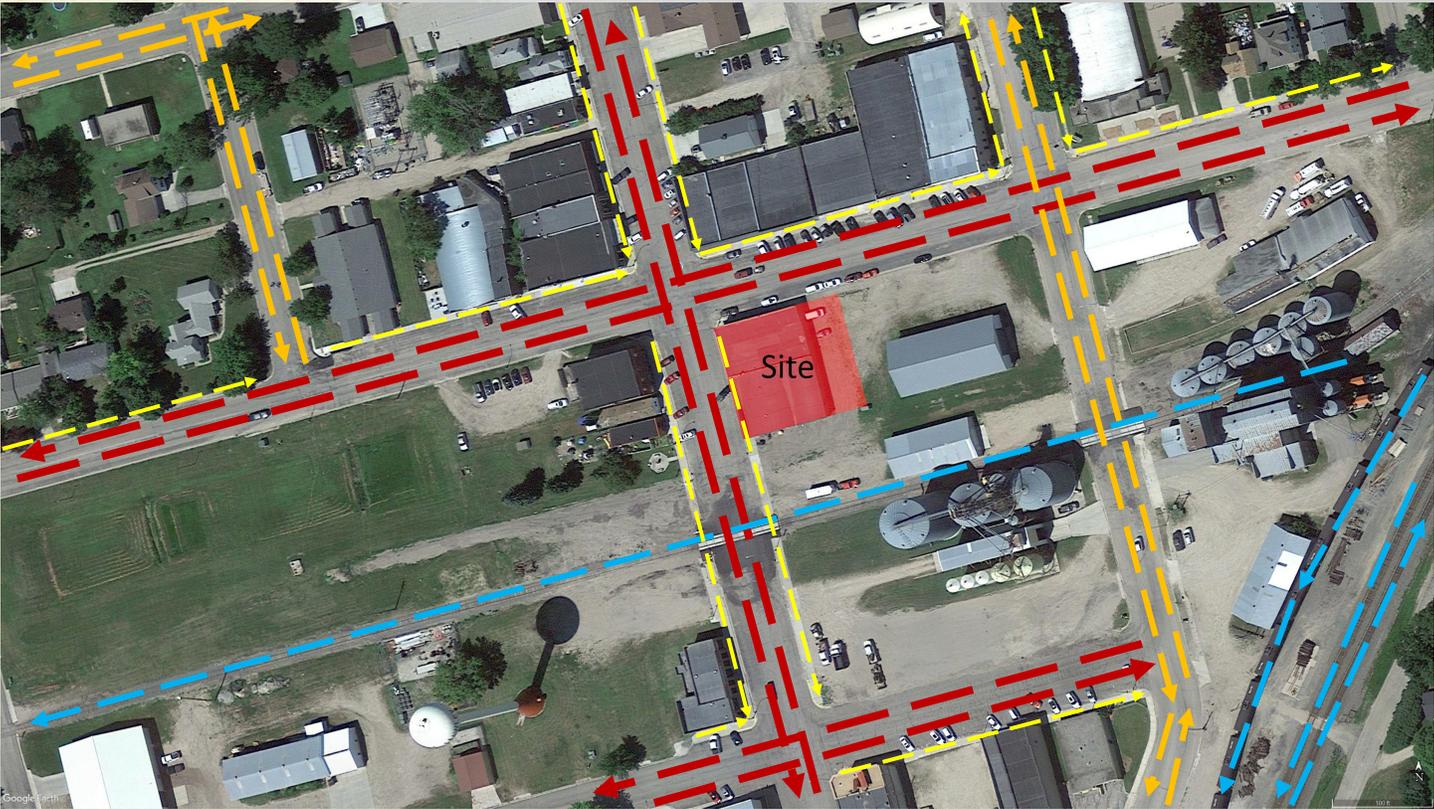
I can't judge human use of the site accurately due to lack of knowledge of its use. I know Lewis electric is housed inside but I do not know if the business is thriving or if they use the building for storage. Historically the building has been home to an auto repair shop and furniture store. Other than this I really have no idea what else the building is being used for because the north portion looks vacant.

The site does not seem to have any signs of distress from natural elements. The only thing that looks to be in distress is the building itself. All the other buildings in the area look to be cared for and maintained whereas this building on the site looks to be degrading overtime. It may be the plan to eventually remove the building so no maintenance is being done or money isn't available to keep the building in tip top shape.

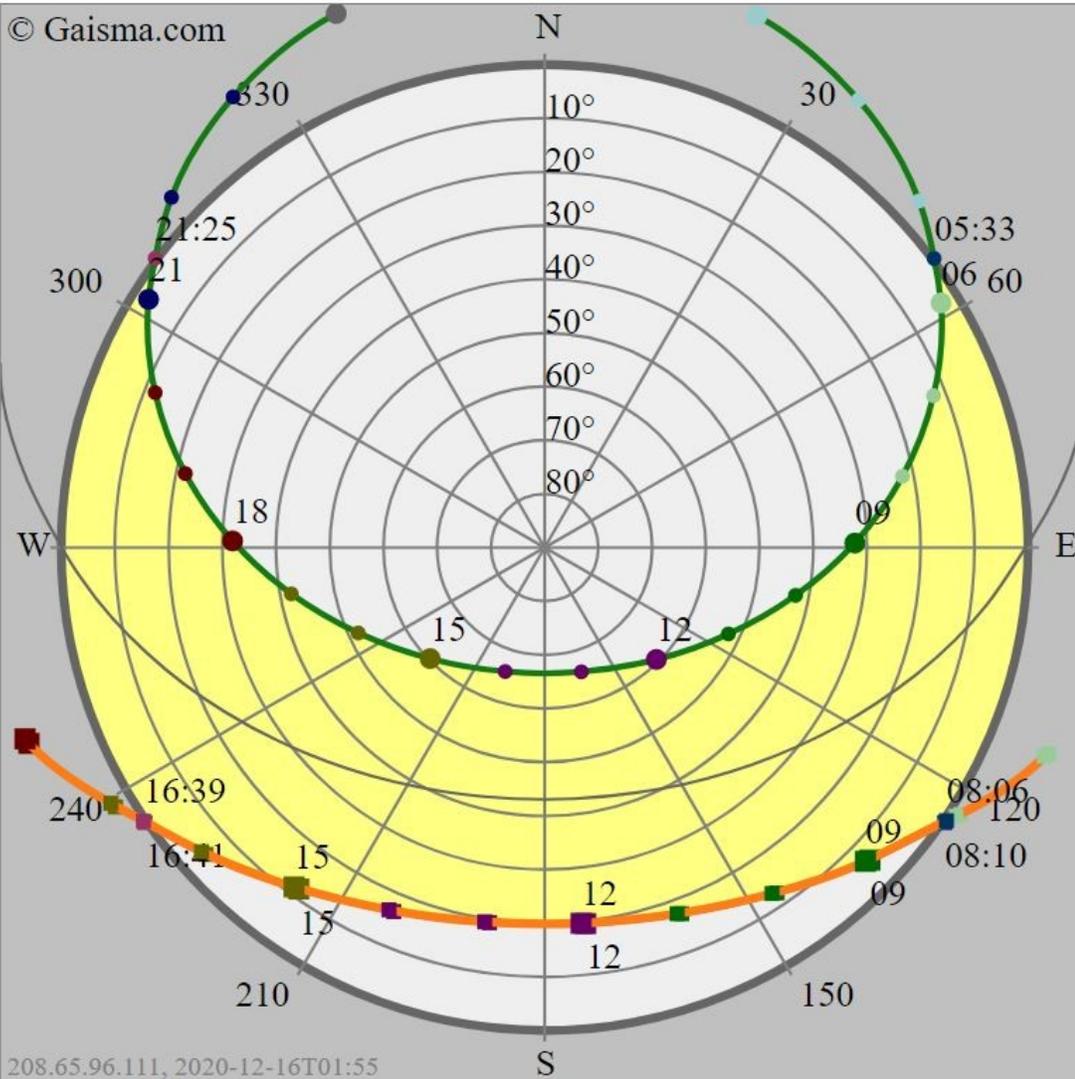
The soil in the area for the first 80 inches is mostly composed of loam to clay loam soils. The soil is classified as Hydrologic group A which means it has a high level of water transmission and is also well drained. The AASHTO classifies the soil as A-7 which is characteristic of very fine grained soils. The available water capacity in centimeters per centimeters is 0.17 and the pH is 7.0. The soil has a rating of 6 for wind erosion meaning it is not susceptible to erosion from wind. The soil shows no restrictive layers for water movement and vegetation root growth. The site has a water table at 120 cm and does not flood.







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Sun path

- Today
- June solstice
- December solstice
- Annual variation
- Equinox (March and September)

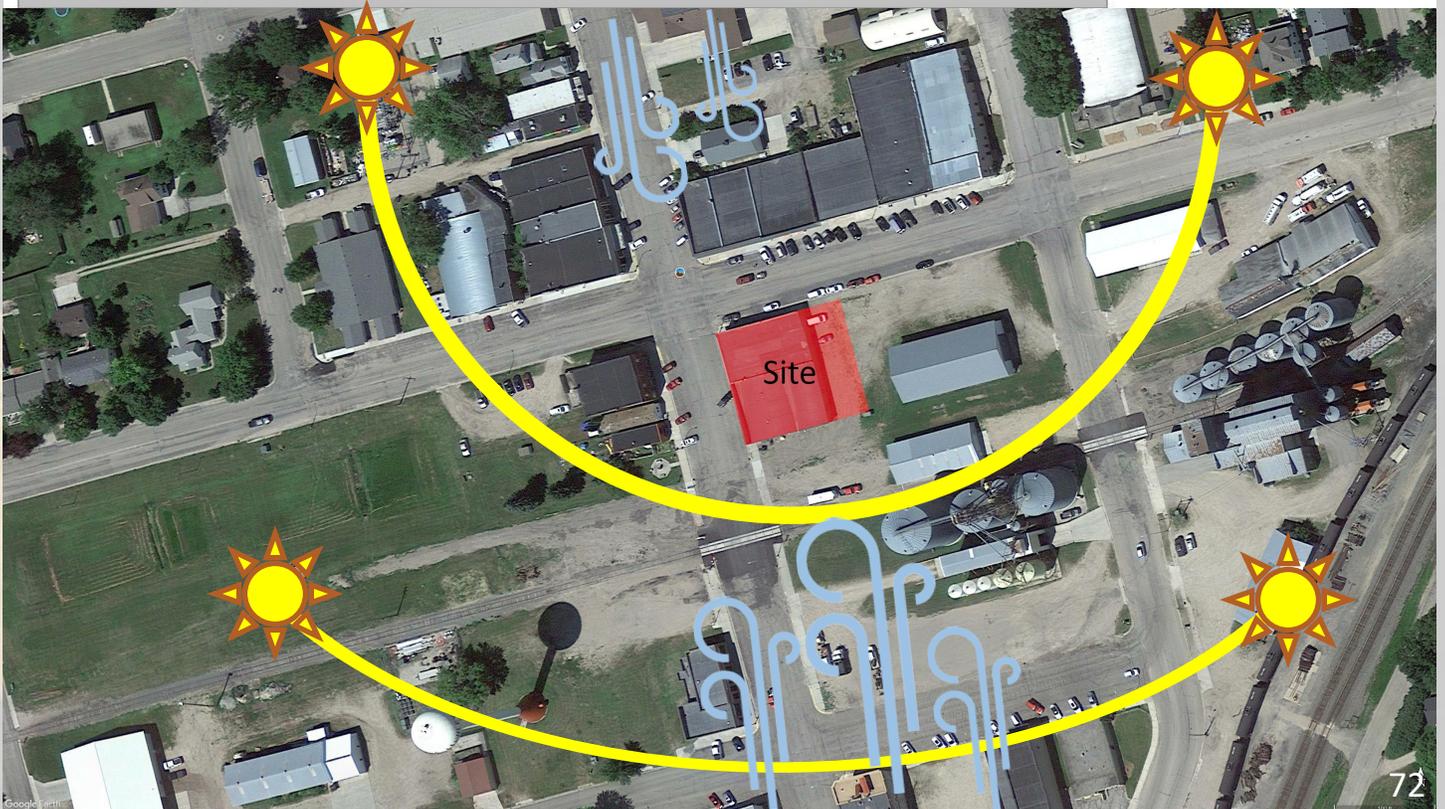
Sunrise/sunset

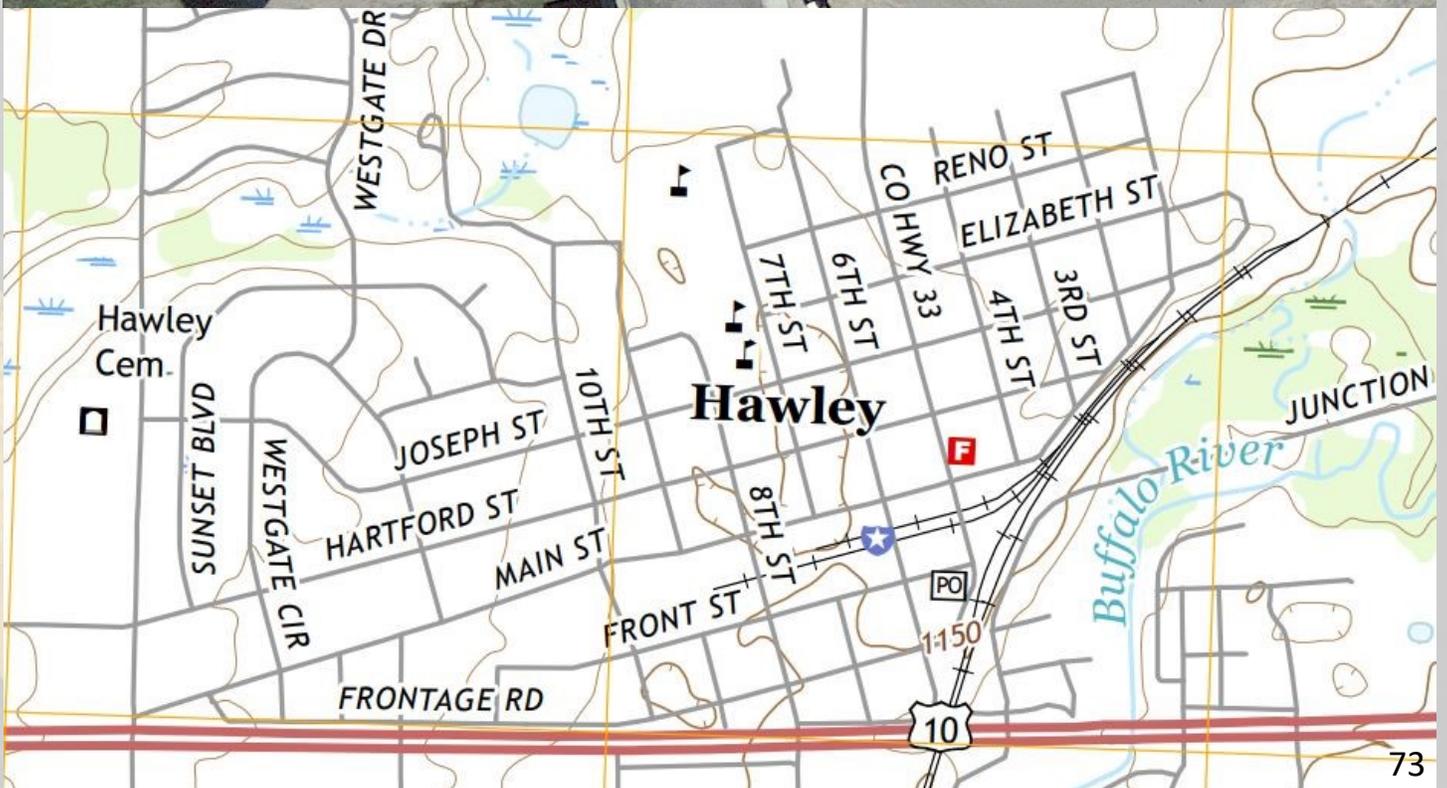
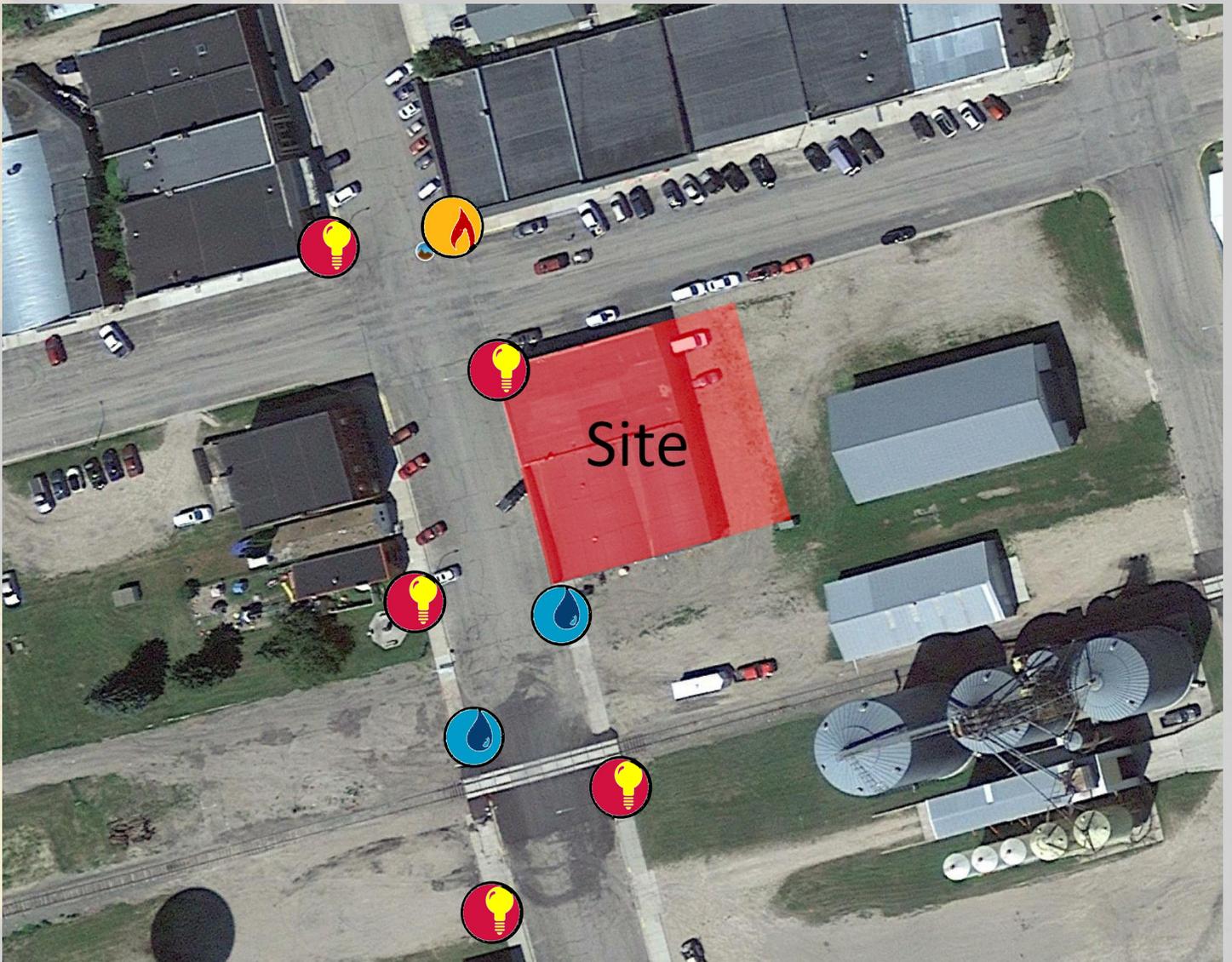
- Sunrise
- Sunset

Time

- 00-02
- 03-05
- 06-08
- 09-11
- 12-14
- 15-17
- 18-20
- 21-23

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Performance Criteria

Space Allocation

The performance of spaces will be measured based on occupancy. Living units are measured based on number of bedrooms and how many occupants may be in those units. The commercial space is measured using occupancy limits and density. Performance of spaces will be measured after spaces have been finalized using drawings of floors. Square footage is the key to finding occupancy and limits of performance. I will be judging the performance of the space by proving the occupancy limit can be achieved without objects overloading a space. The end result will be a percentage showing usable space compared to maximum occupancy. A percentage of 100% is ideal, but unobtainable, and a percentage lower than 50% would reflect failure to design usable and profitable space.

Energy Consumption

The amount of electricity, water, gas, and material energy will be measured for this aspect of the design. Electricity will be measured in kilowatt hours; water in gallons per year; gas in cubic feet per year; and material energy in megajoules per unit weight. Performance measure will come from manufacture labels for equipment and building materials. The analysis of these components will be done by estimating max usage of one year of use. To judge the performance of these four parts I will research standards for energy use. To meet the proper performance criteria I must meet or exceed industry standards.

Environmental Performance

To measure this portion I will look at thermal, light, and acoustical performance. Thermal performance will be measured in BTUs for mechanical equipment and environmental heating factors. The performance of walls will be measured using R Values. Drawings and BIM models will be used to calculate thermal performance. To meet performance requirements I will use industry standards and judge the success of the project on meeting or exceeding such standards.

Light will be measured in foot candles and lumens. Measurements will be made for every space based on activity and required light for said activity. An analysis will show how natural light and synthetic light will meet light requirements. Judging lighting performance will be based on meeting the lighting requirements as well as how well electricity use is lowered if possible.

Acoustical performance will be measured in decibels and sound absorption coefficient values. The measurements will come from highest decibel activities in spaces compared with the sound absorption coefficient of walls and floors. The analysis will show if sounds will penetrate through to other spaces as well as how sound will react in spaces. For spaces to meet the criteria I will judge each space based on activities happening within. Living units should not be able to here noise from other units or commercial space. Commercial space should not be too loud or have an amplified decibel from hard surfaces reflecting noise.

Behavioral Performance

Two different measurements will be taken for this aspect of the project. The first relating to how people use the building and the other being how construction workers build the project. People will be measured by how often they will use the spaces. The living units would be who would be willing to rent and the commercial space would be who will repeatedly support the business. To analyze the behavior of the people I can ask local Hawley residents how they would interact with the project. To judge the success of the project I would need to have many people in support of either renting or supporting local business.

The other measurement will be on the behavior of construction workers. Since the project is based on the relationship of builders and architects I will measure buildability of the project by speaking with project managers and supervisors from major construction companies in the area. I will judge how well this meets the criteria by judging the willingness of a supervisor or pm to take on this project and if there are changes that need to happen. Another way to judge behavior is to ask other employees if they would work on such a project or if they would not. The importance is on how well the architect can create for the builder to eliminate confusion and unnecessary building.

Psychological Impact

The aesthetic of the building is what I would like to measure. I want the design of the building to fit into its surrounding while creating a sense of new development in the area. The analysis of this will be qualitative based on feedback from local citizens. To judge the success people must show a general interest in having a new building in an old style downtown setting.

Environmental Impact

Since the site does not have much of a natural environment I would like the project to introduce some natural elements. As far as measuring and analyzing this there is no criteria I have other than adding natural elements to the site.

Code Compliance

The building will follow all international and local building codes. To measure the success a thorough analysis and summary of important codes will be provided. This summary will point out specifically how the building follows these codes.

Cost

To measure the cost of the building I will do two estimates. One estimate will be based on cost per square foot, whereas the other will be a detailed list of materials and equipment. By doing both estimates I can ensure an accurate estimate. Under this section I will also look at profit from the building over a span of time to show how the building will make money.

Summary of Performance Criteria

The project is focused on the improvement of the relationship between architects and construction workers. Therefore these project elements are what will make the framework of a good design. These programmatic requirements are meant to work together with the construction industry in a way that still presents a well thought out project.

Many of the criteria I stated is kept simple to avoid too high of standards for the building. I want high standards for the building but working towards an answer for my thesis project takes higher priority. Looking at innovations in the two fields of work I believe will produce a quality building in the end.

The building is to be designed with the intent to bring life to the downtown area of Hawley. The building must be interesting and inviting while giving reason to spend time here. This building should also show how the area can look at new development for old or underused buildings. The design will incorporate some elements of passive design to lower energy cost and environmental impact.

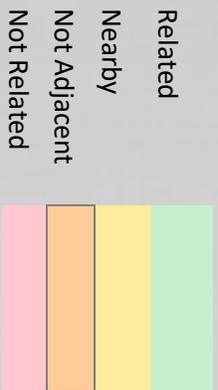
During the design phase I would like to look at the construction methods used in this building. The building should show either a good means of construction or a new innovative solution. The documents involved should prove, through collaboration with other professionals, the feasibility of this project.

Condominium Units

	Small		Average		Large	
Master Bed- Bedroom	180	18%	224	16%	320	16%
Kitchen	100	10%	150	11%	174	9%
Dining	150	15%	200	14%	252	12%
Living	216	21%	360	26%	616	30%
Master Bath- room	40	4%	48	3%	64	3%
Bathroom	40	4%	48	3%	64	3%
Storage	80	8%	100	7%	140	7%
Office/Study	100	10%	144	10%	224	11%
Total	1006	100%	1406	100%	2034	100%

Commercial Unit (Restaurant)

	Small		Average		Large	
Kitchen	400	39%	440	31%	484	26%
Service Area	100	10%	160	11%	200	11%
Bathroom	40	4%	48	3%	64	3%
Dining Area	200	20%	400	28%	600	32%
Storage	80	8%	100	7%	140	7%
Utility	100	10%	120	8%	160	9%
Office	100	10%	144	10%	224	12%
Total	1020	100%	1412	100%	1872	100%



Condominium Units

	M. Bedroom	Bedroom	Kitchen	Dining	Living	M. Bathroom	Bathroom	Storage	Office/Study
M. Bedroom		Yellow	Yellow	Yellow	Yellow	Light Green	Pink	Pink	Yellow
Bedroom	Yellow		Yellow	Yellow	Yellow	Pink	Light Green	Pink	Yellow
Kitchen	Yellow	Yellow		Light Green	Light Green	Pink	Yellow	Pink	Yellow
Dining	Yellow	Yellow	Light Green		Light Green	Pink	Yellow	Pink	Yellow
Living	Yellow	Yellow	Light Green	Light Green		Pink	Yellow	Pink	Yellow
M. Bathroom	Light Green	Pink	Pink	Pink	Pink		Pink	Pink	Pink
Bathroom	Pink	Light Green	Yellow	Yellow	Yellow	Pink		Pink	Yellow
Storage	Pink		Light Green						
Office/Study	Yellow	Yellow	Yellow	Yellow	Yellow	Pink	Yellow	Light Green	

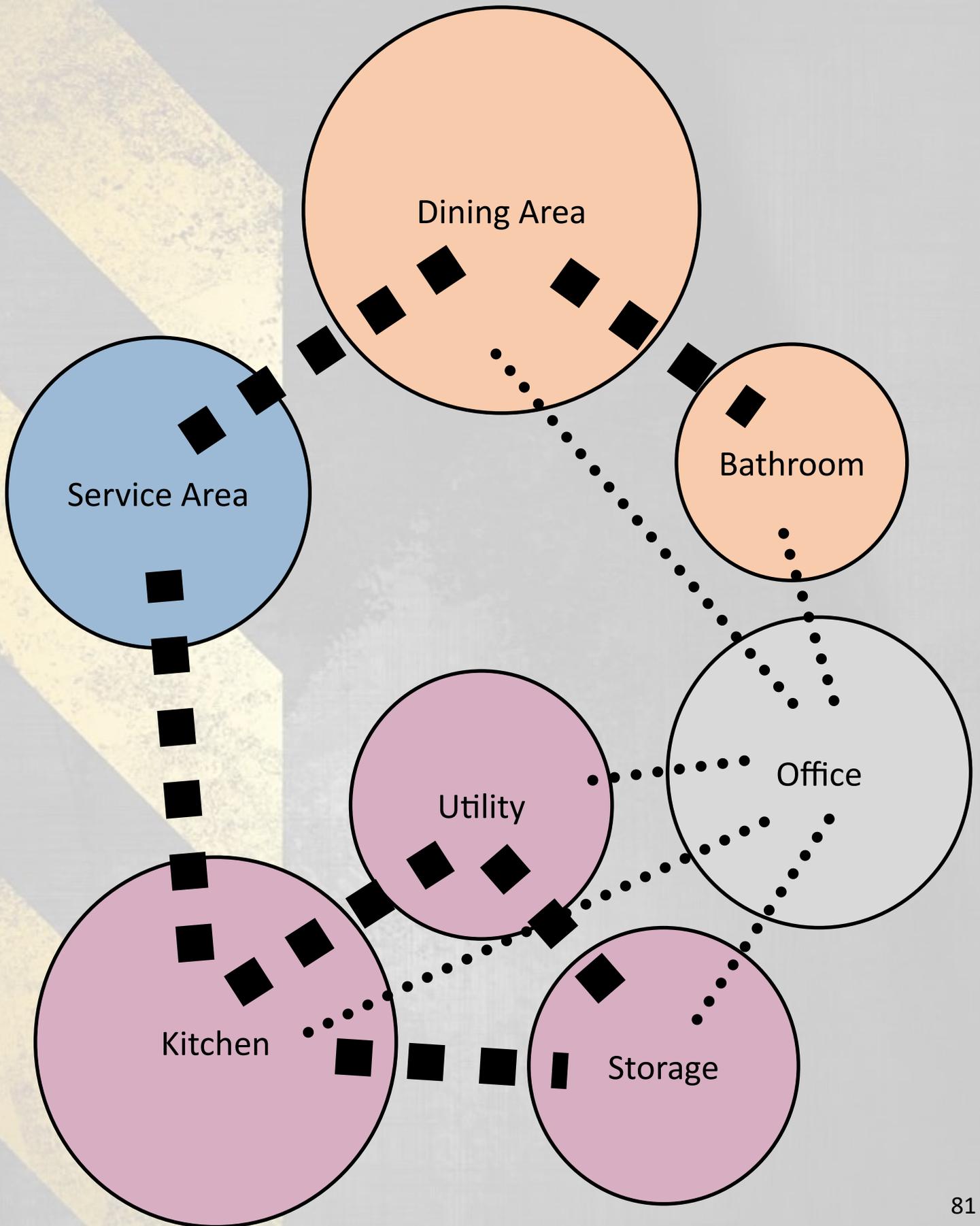
Commercial Unit (Restaurant)

	Kitchen	Service Area	Bathroom	Dining Area	Storage	Utility	Office
Kitchen		Light Green	Yellow	Orange	Light Green	Light Green	Yellow
Service Area	Light Green		Yellow	Light Green	Orange	Orange	Yellow
Bathroom	Yellow	Yellow		Light Green	Orange	Yellow	Yellow
Dining Area	Orange	Light Green	Light Green		Pink	Pink	Pink
Storage	Light Green	Orange	Orange	Pink		Light Green	Yellow
Utility	Light Green	Orange	Yellow	Pink	Light Green		Yellow
Office	Yellow	Yellow	Yellow	Pink	Yellow	Yellow	

Condominium Units



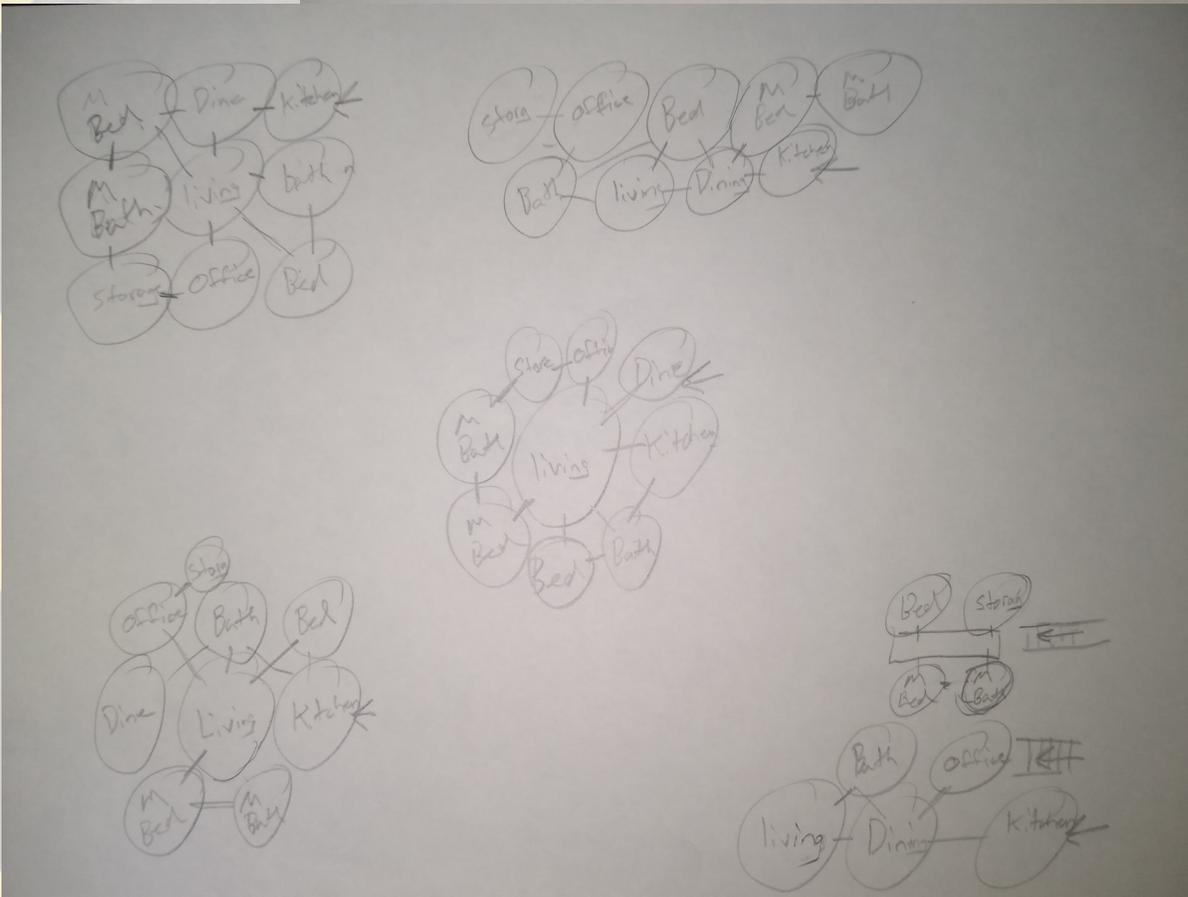
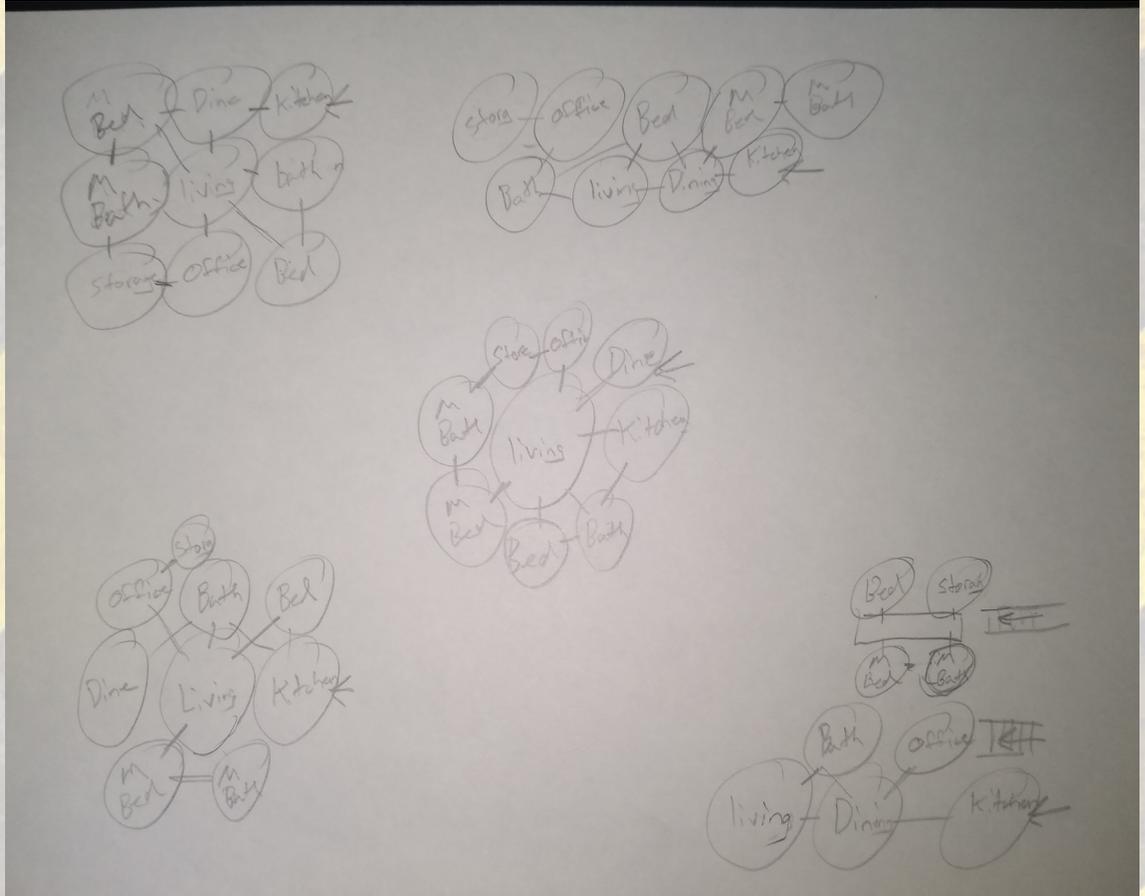
Commercial Unit (Restaurant)

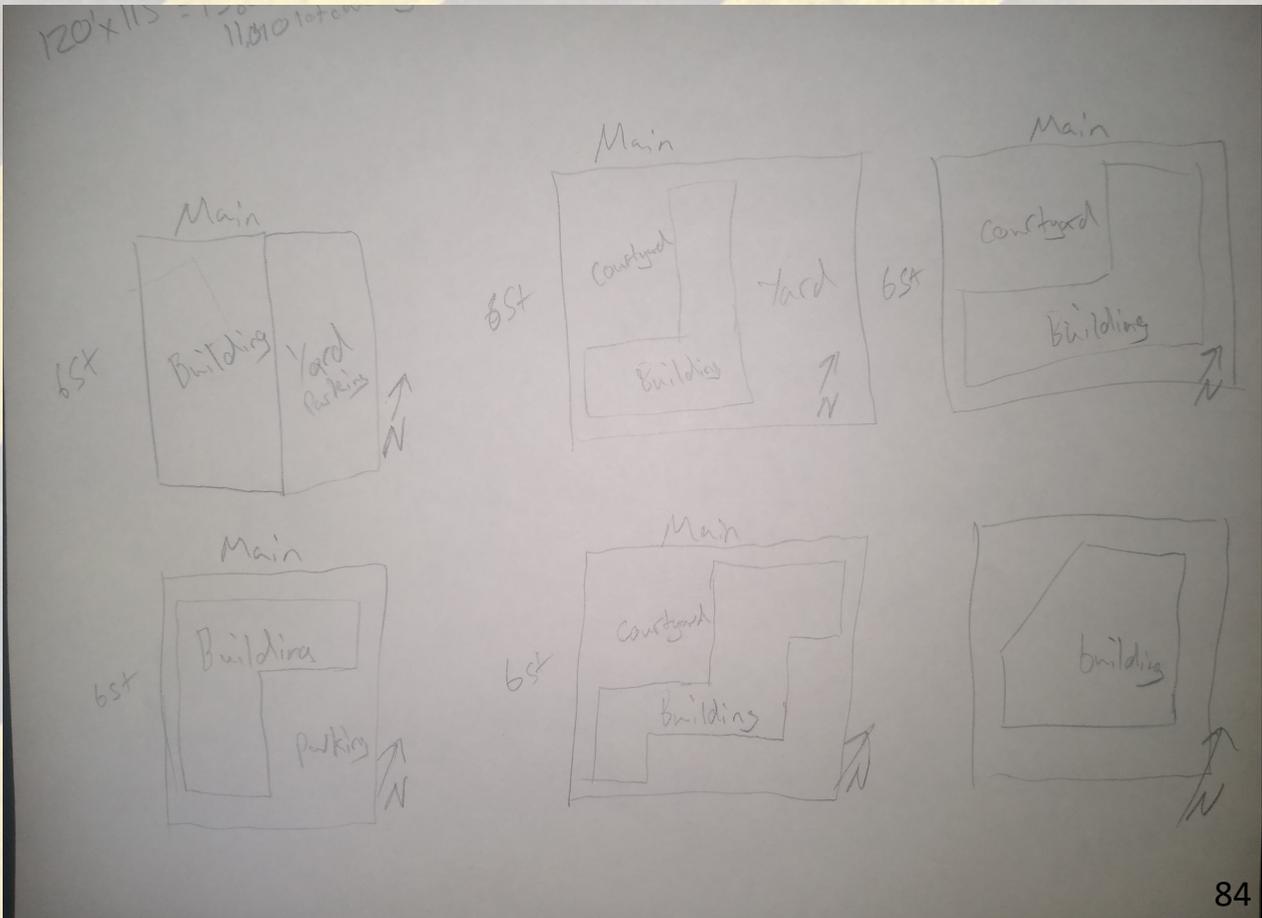
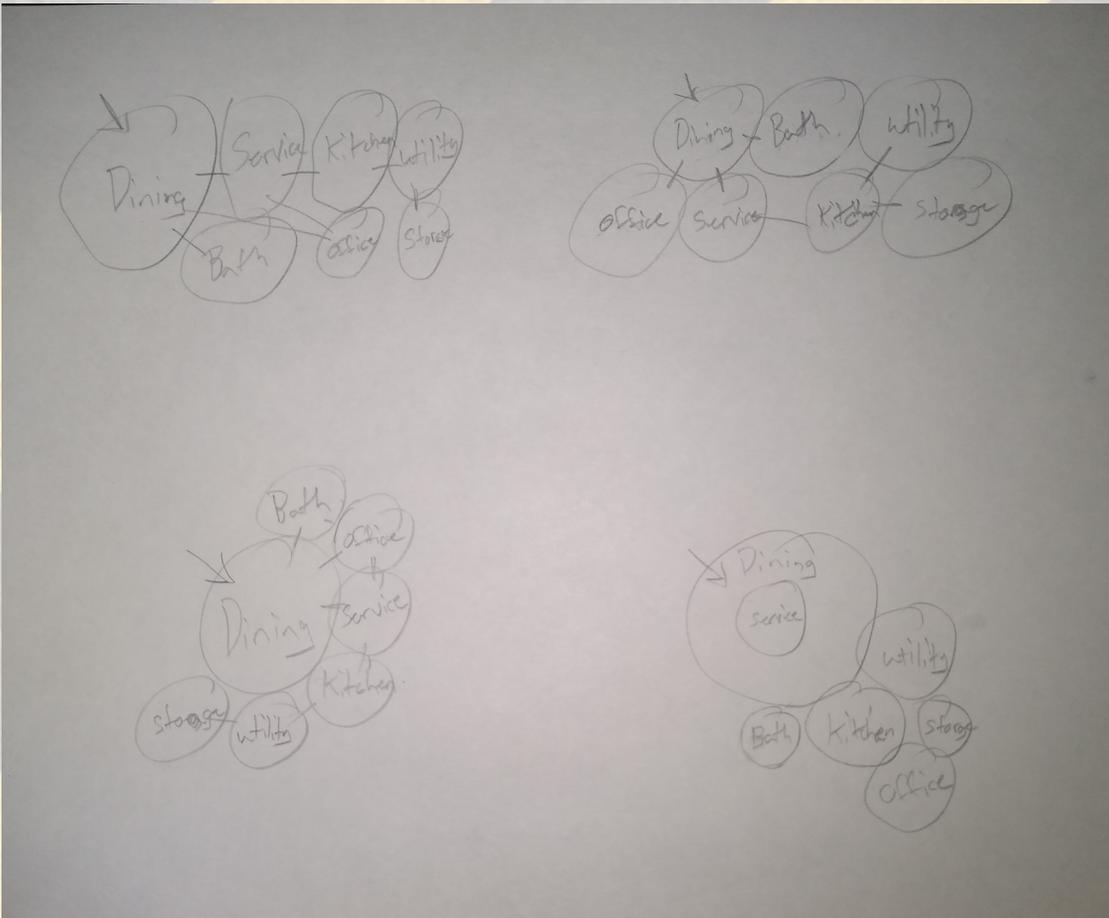


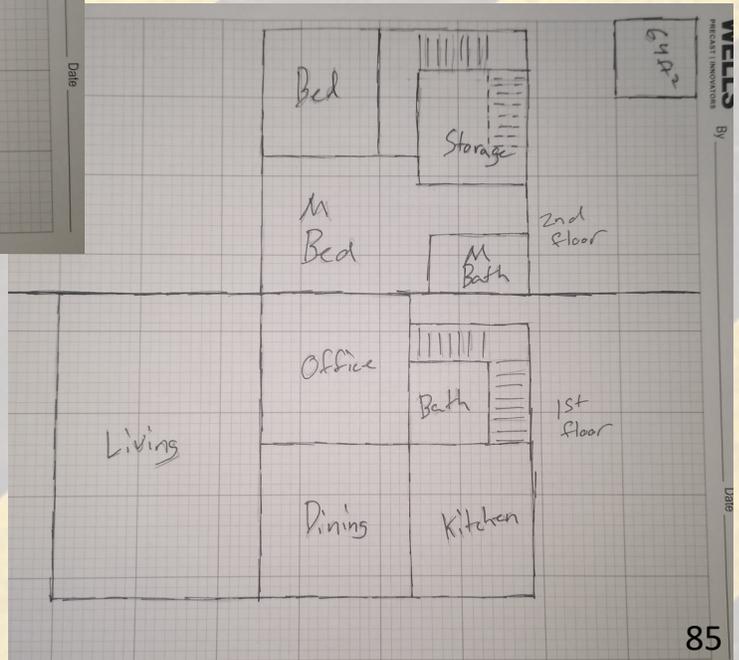
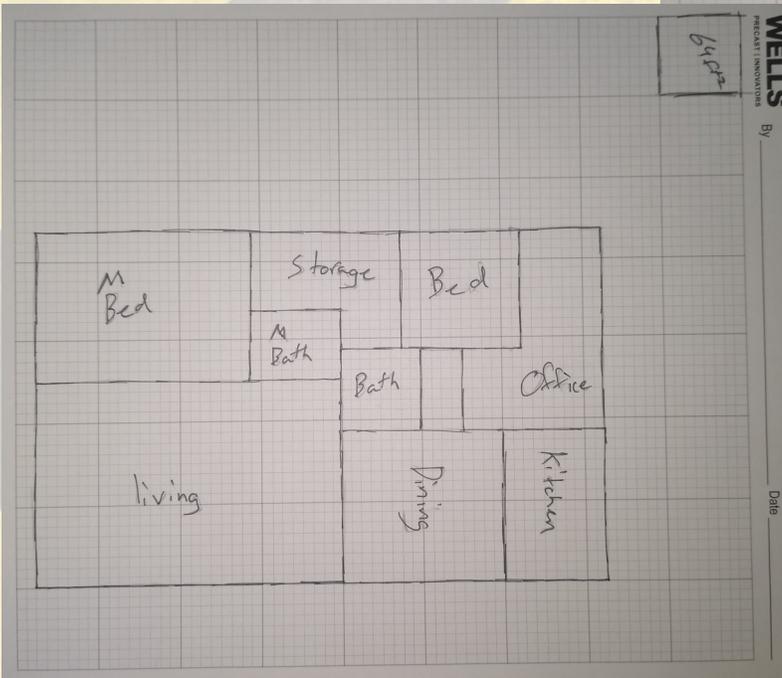
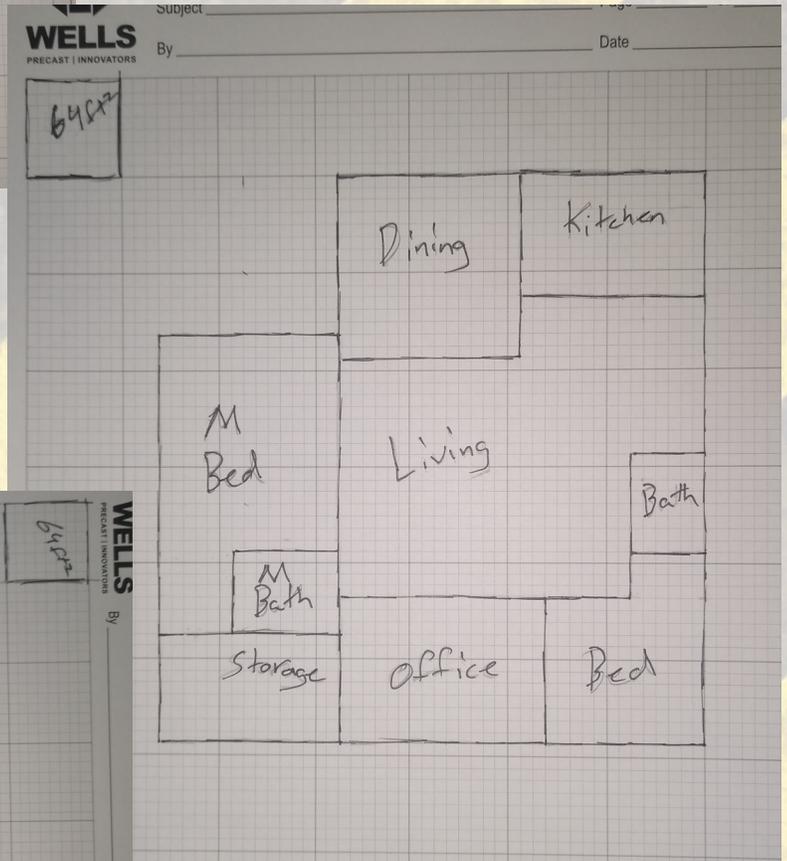
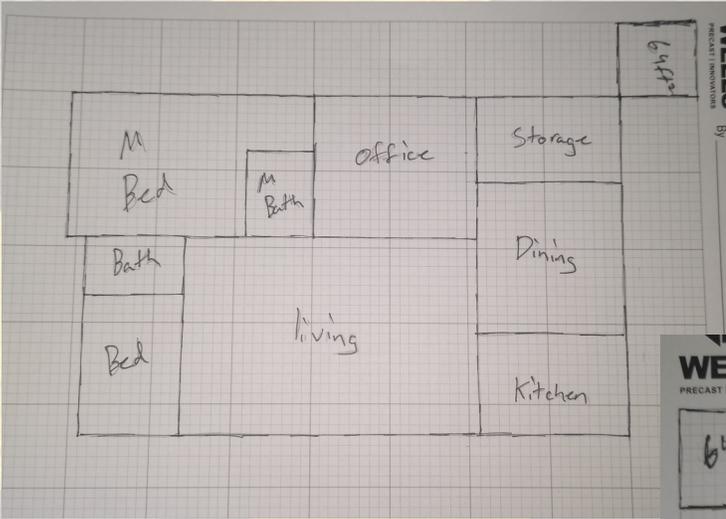
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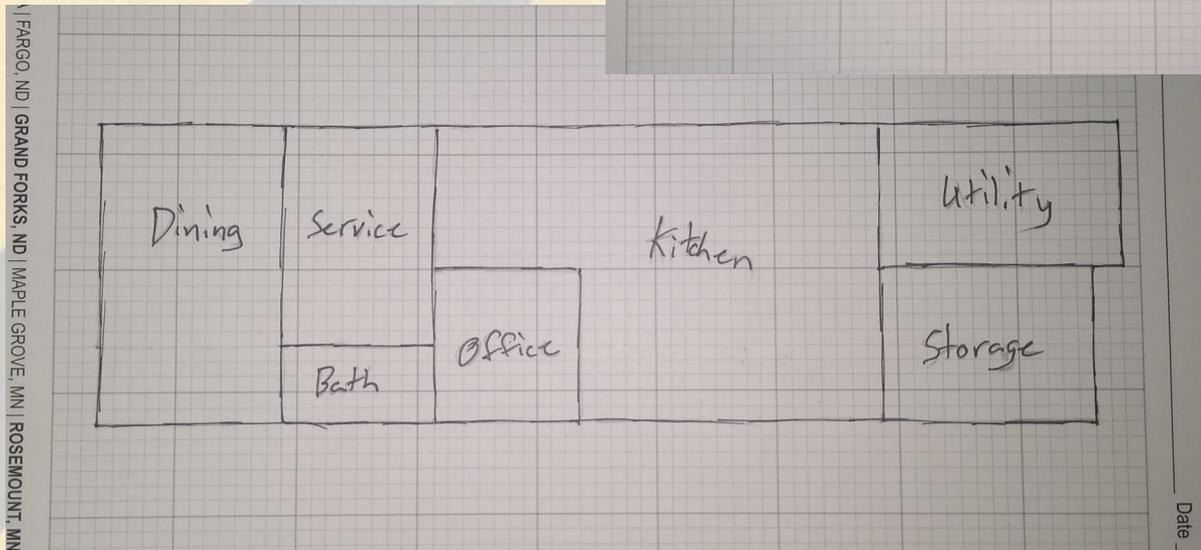
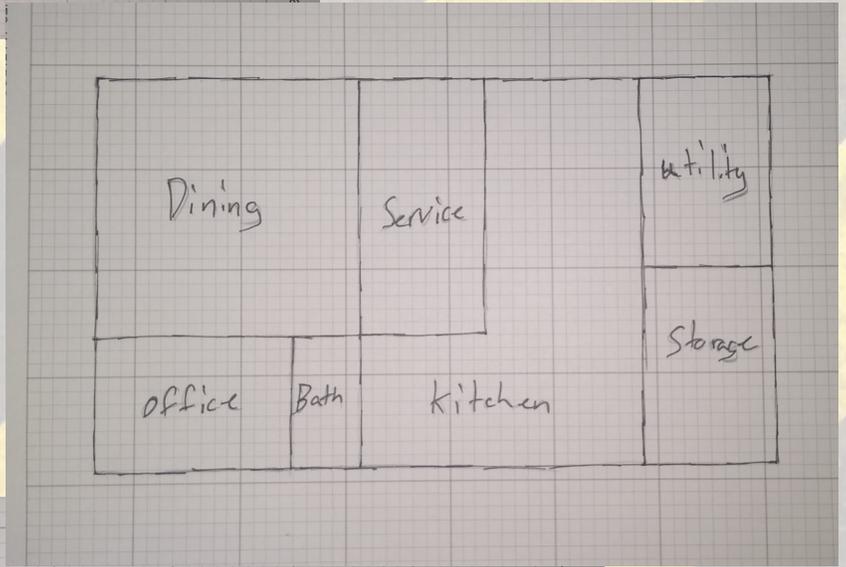
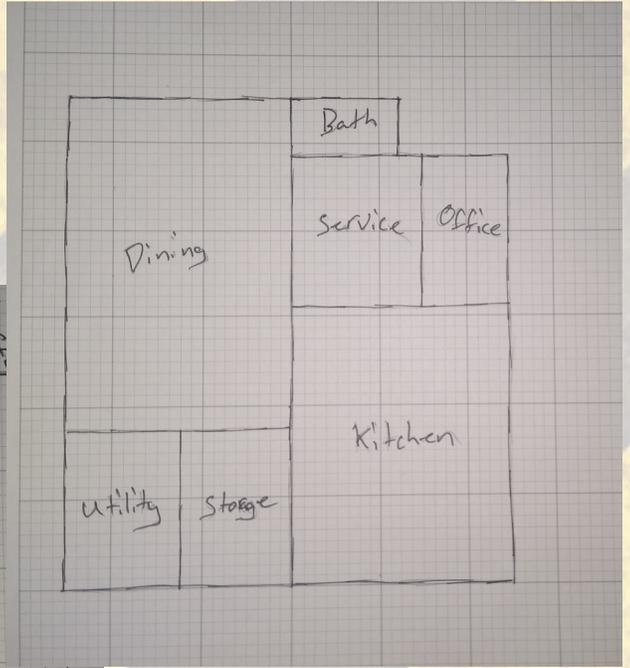
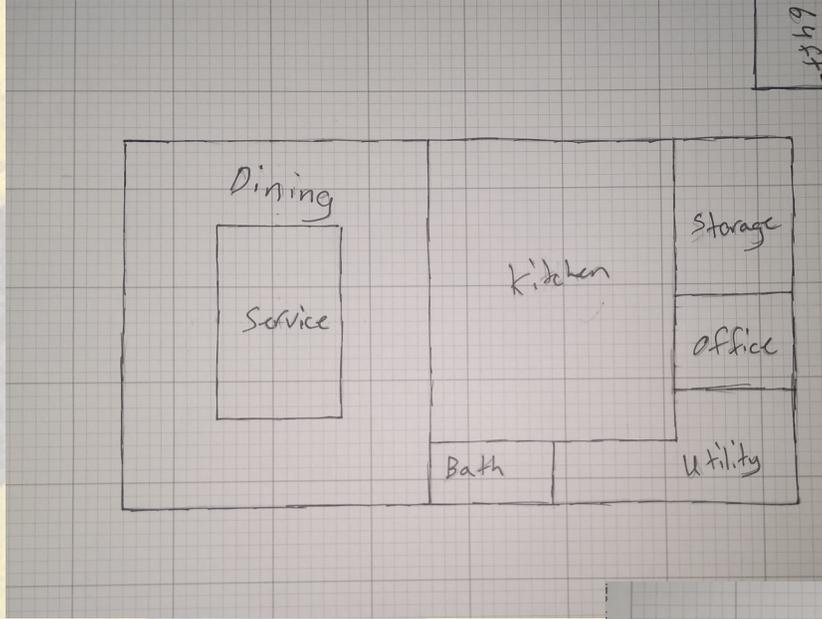
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Process Documentation



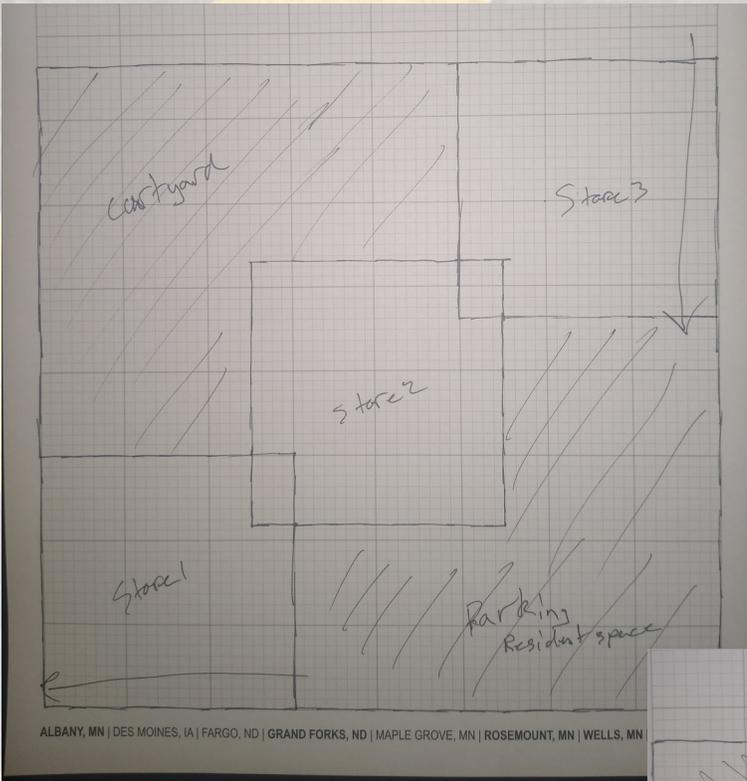




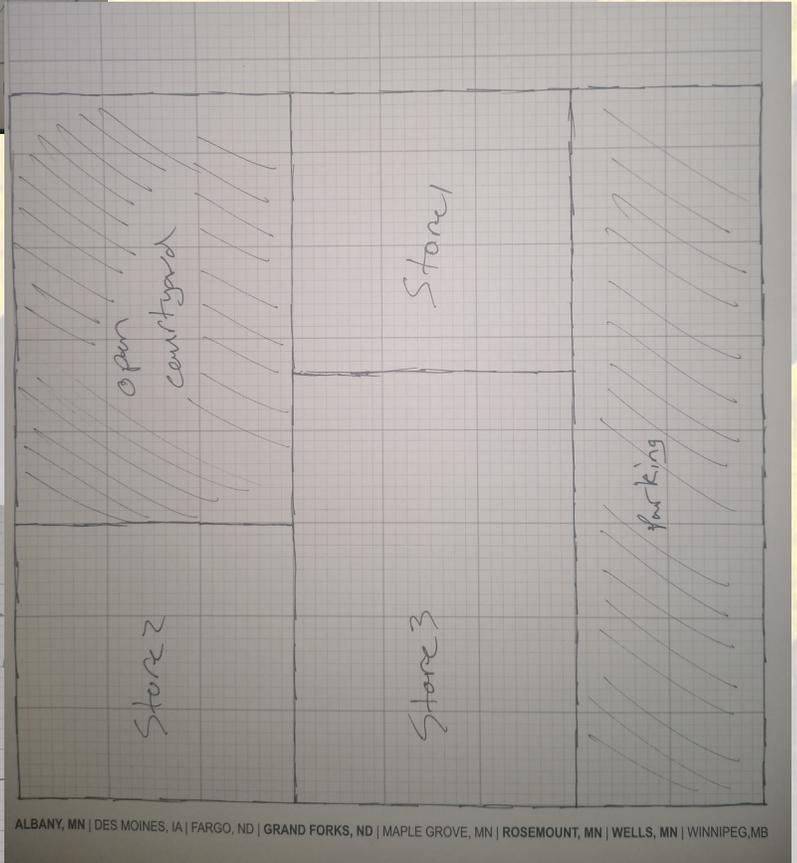


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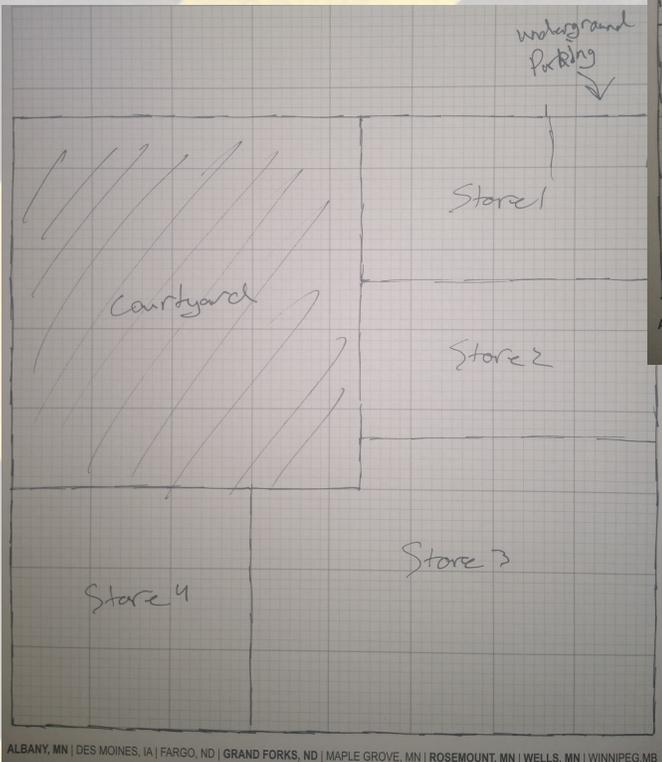
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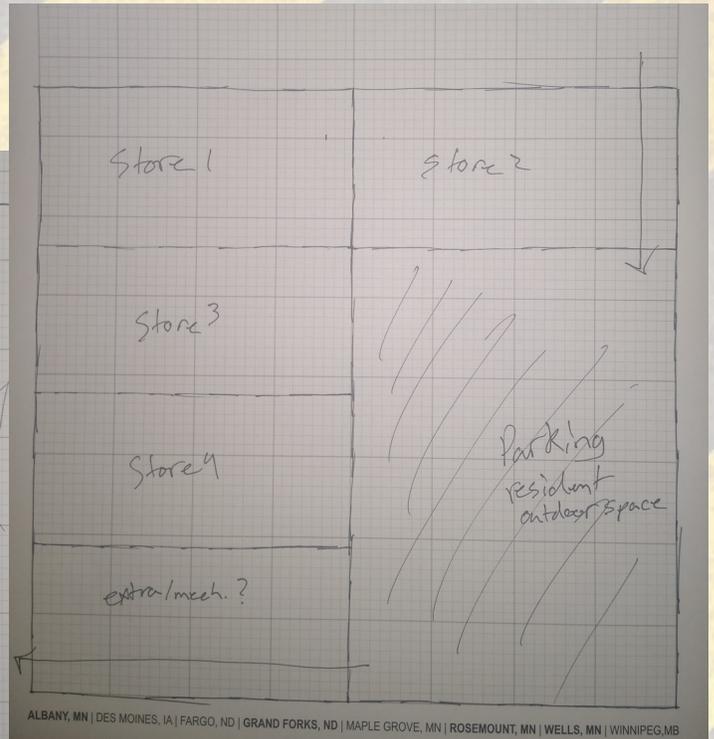
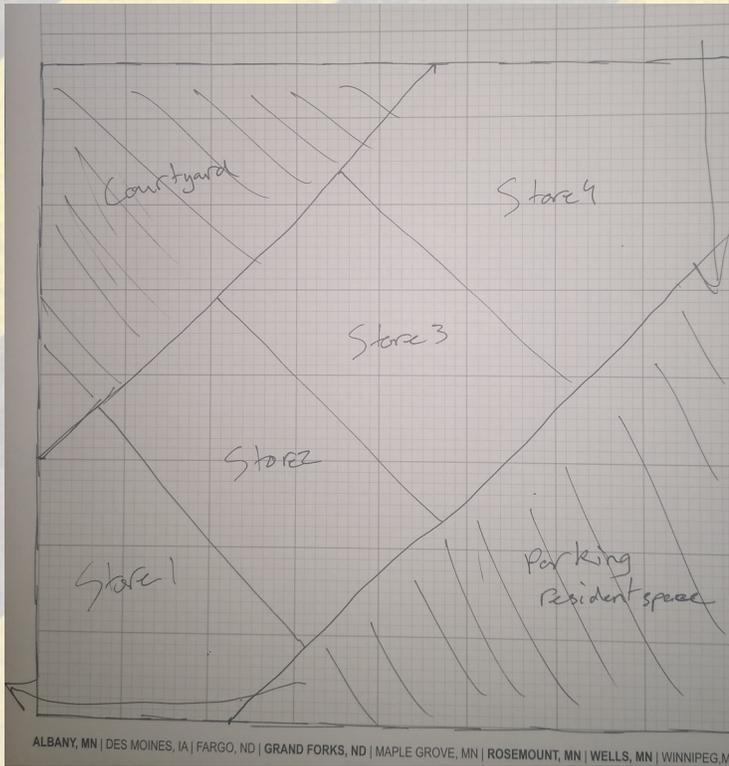
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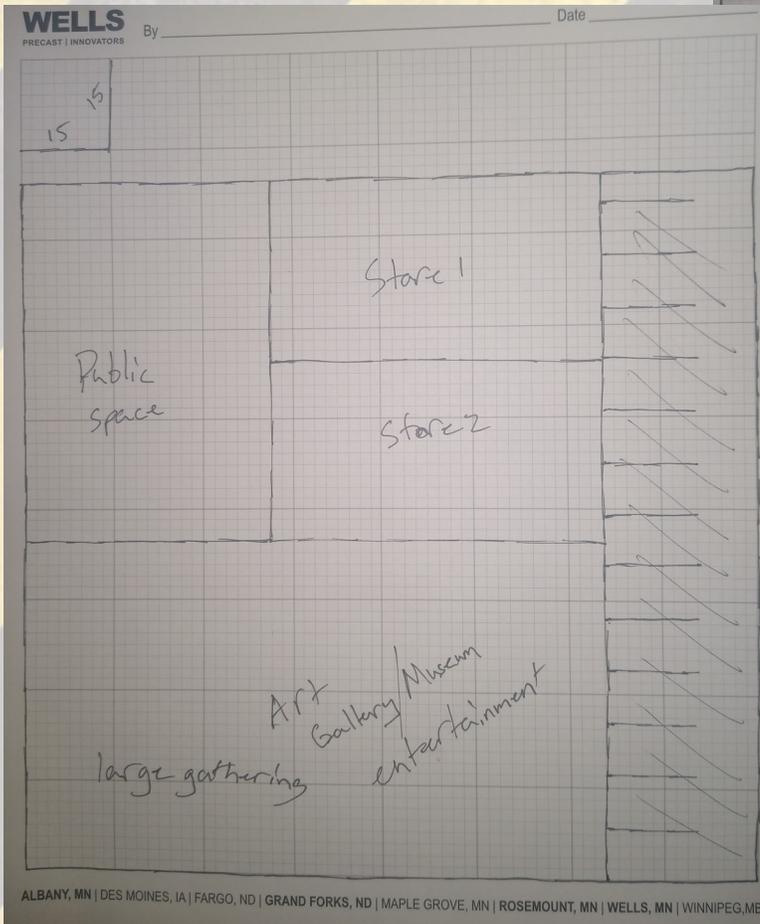
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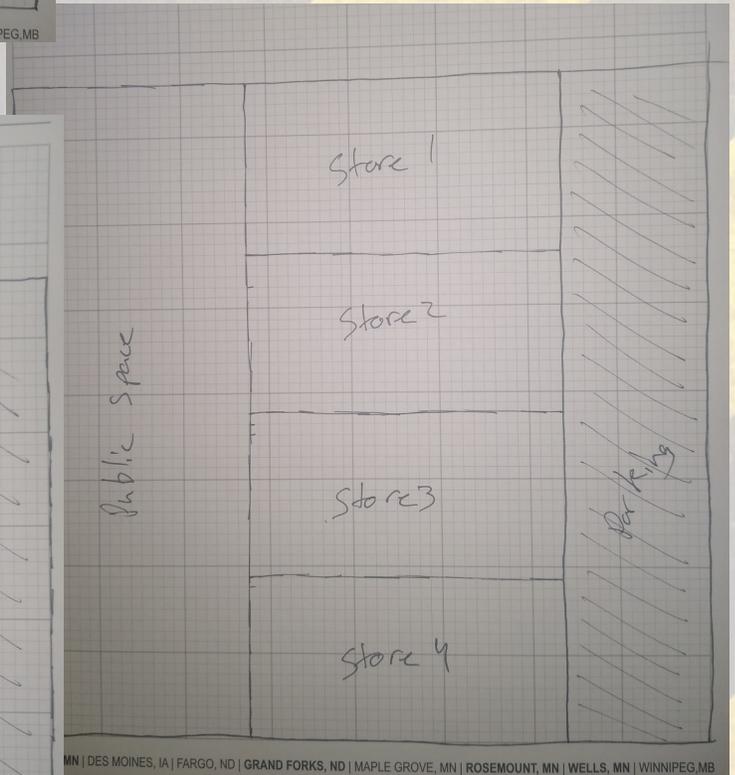
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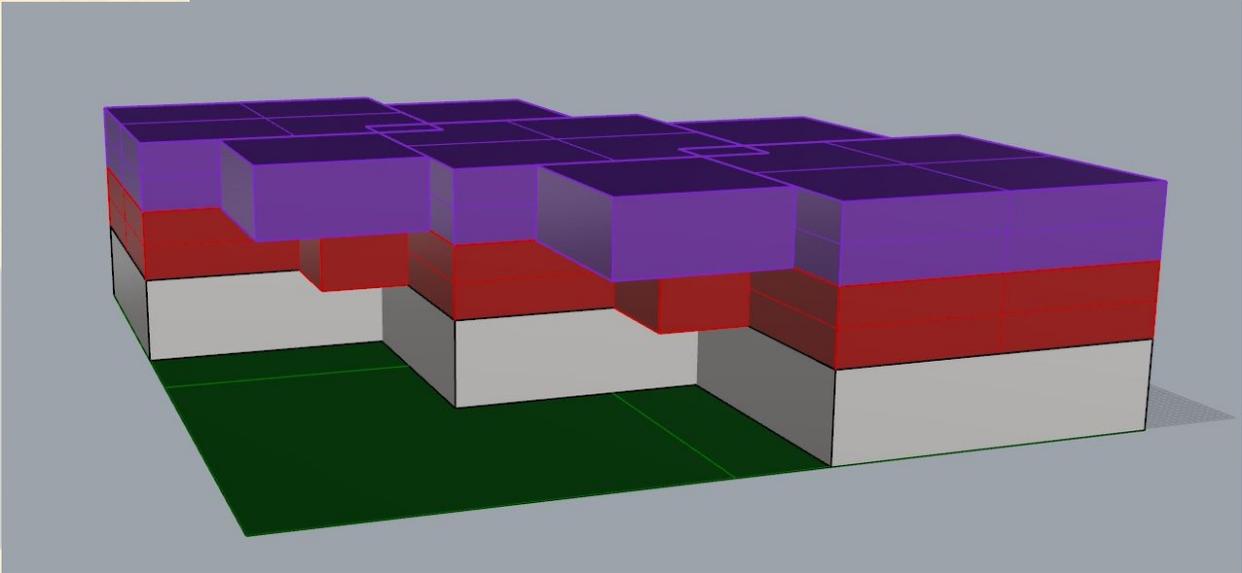
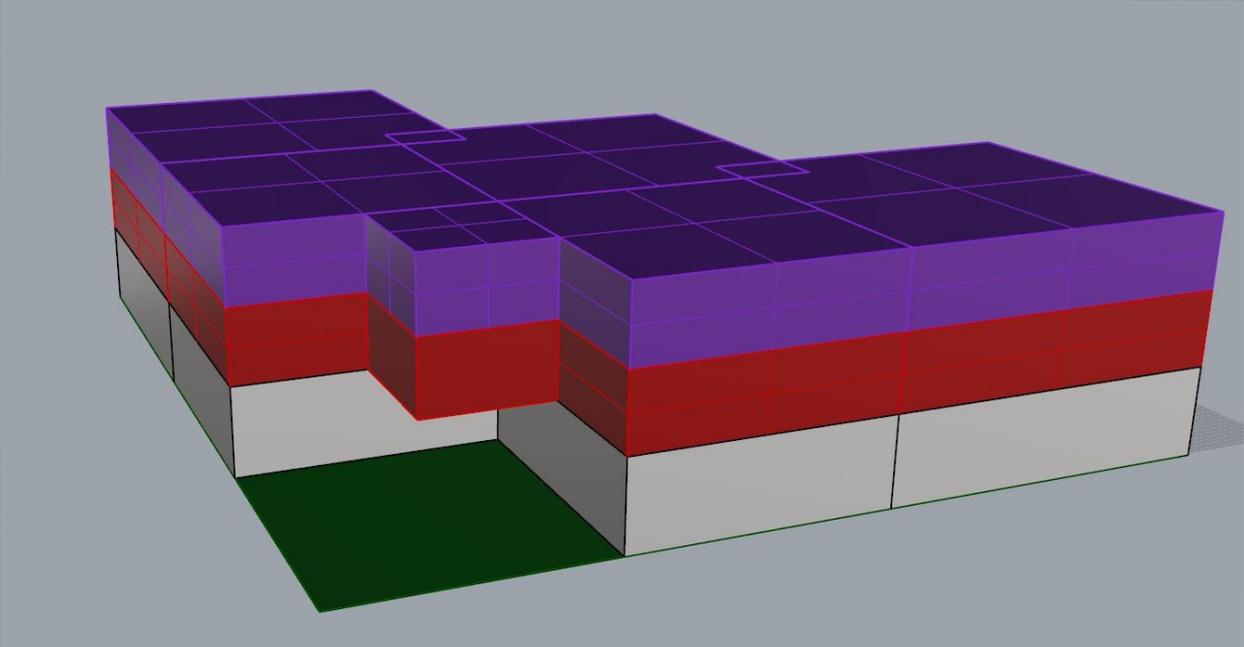
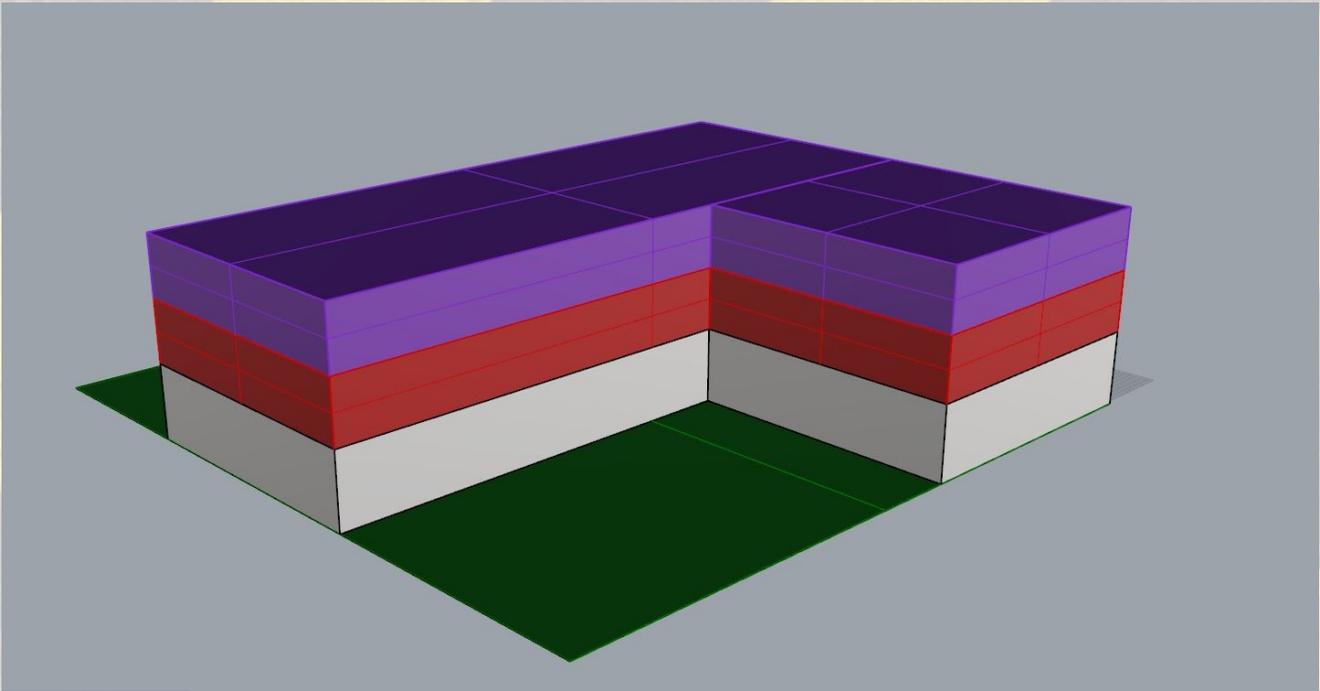
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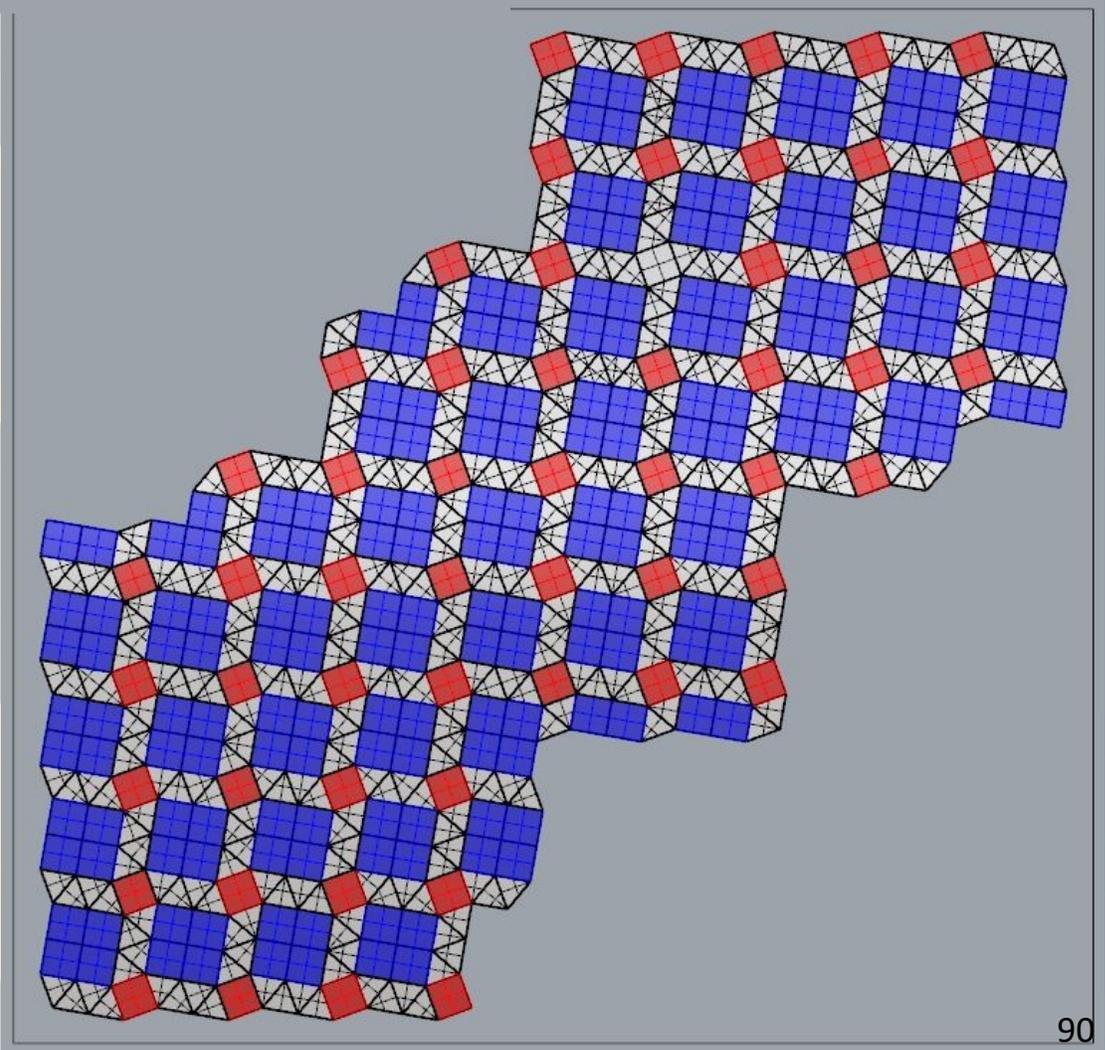
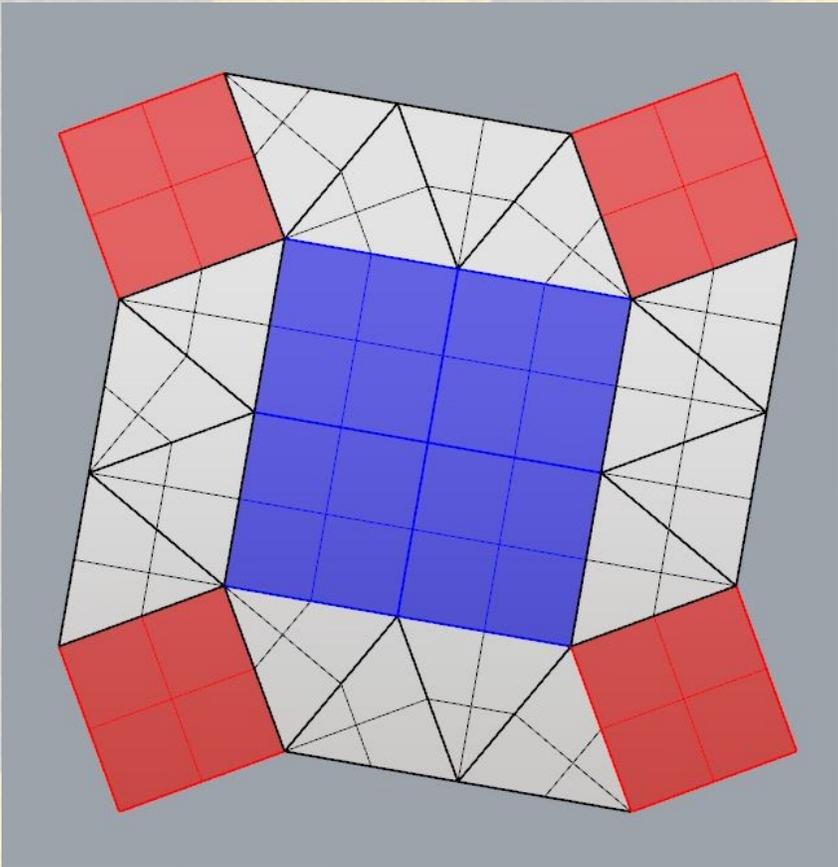


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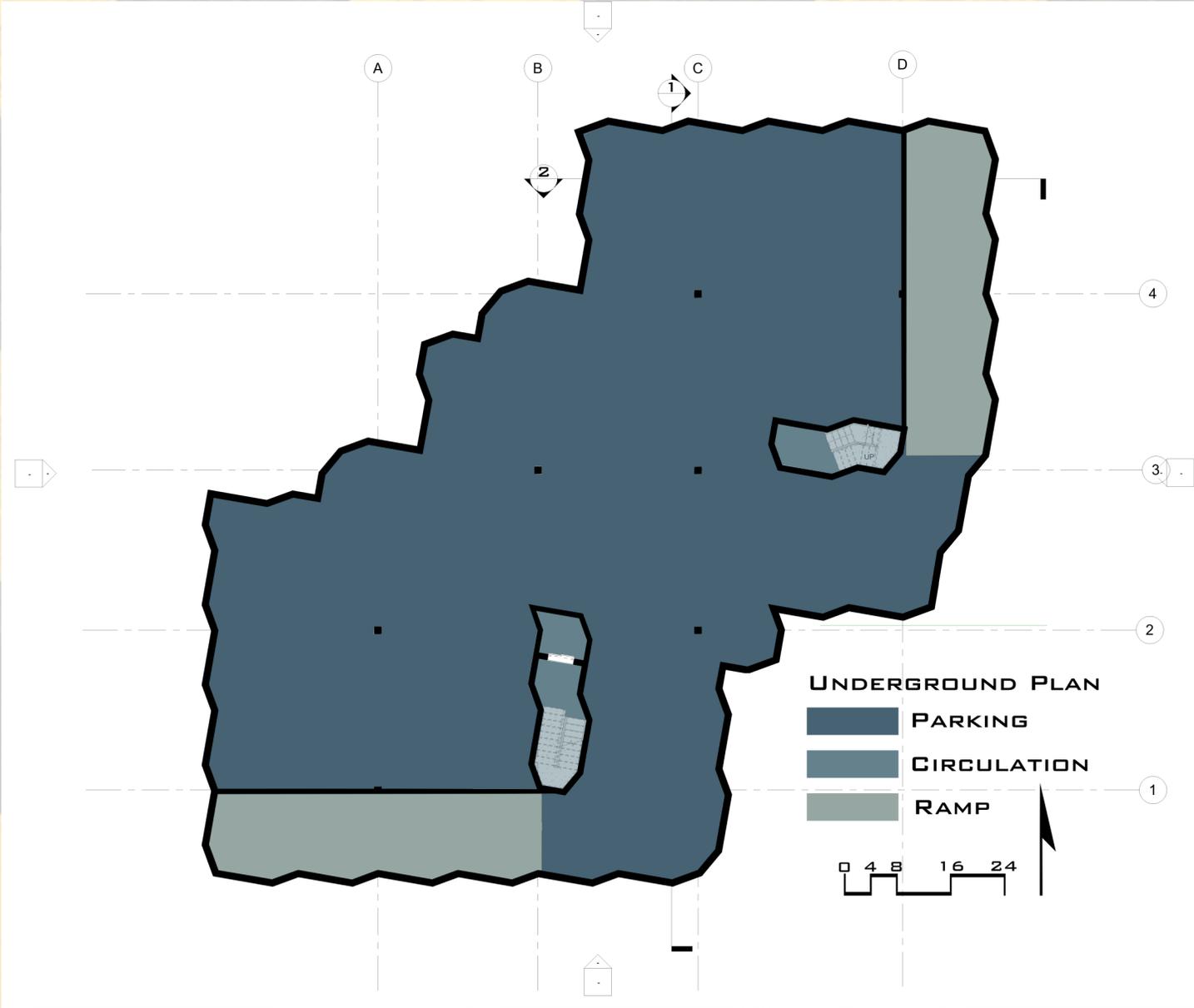


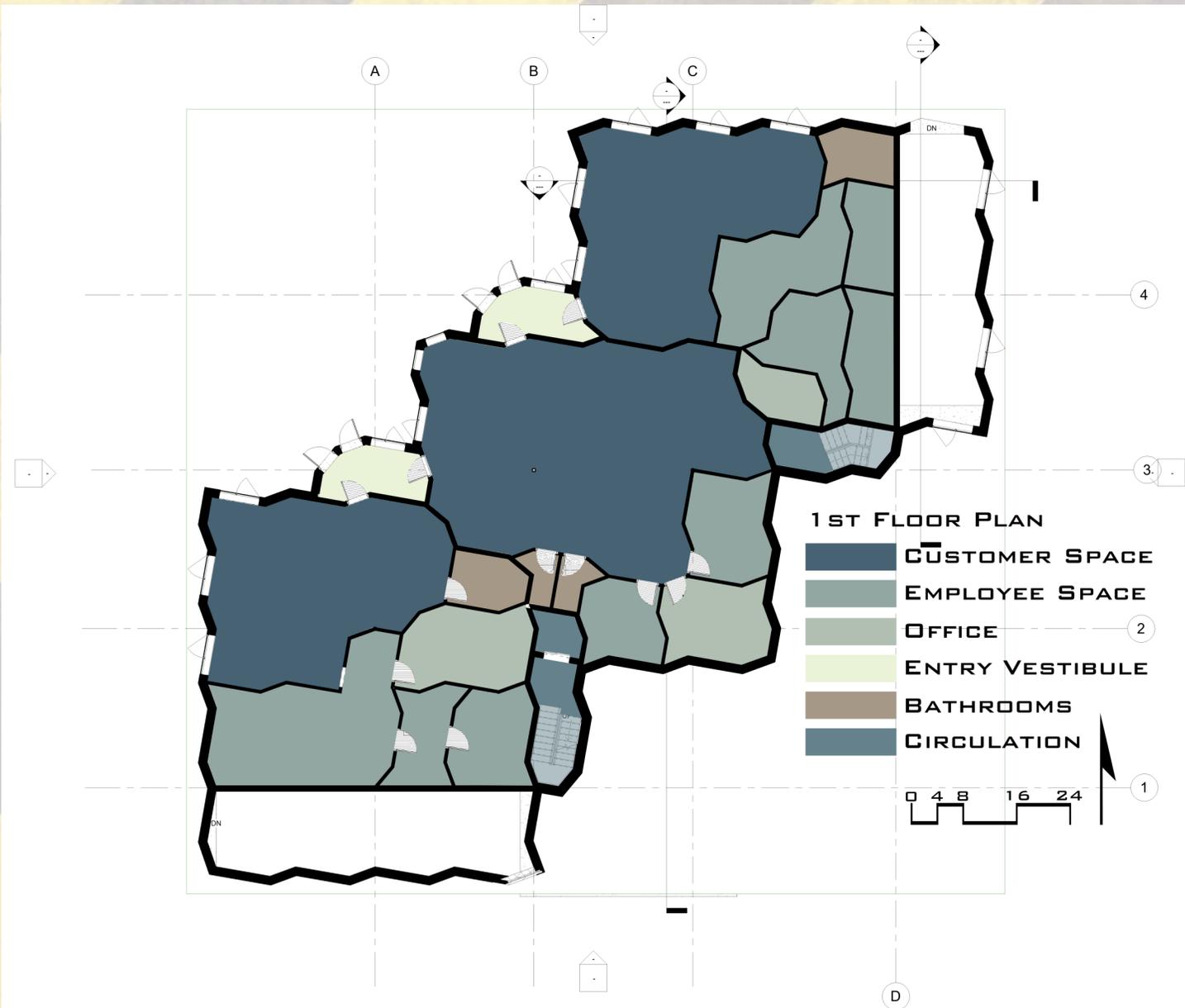
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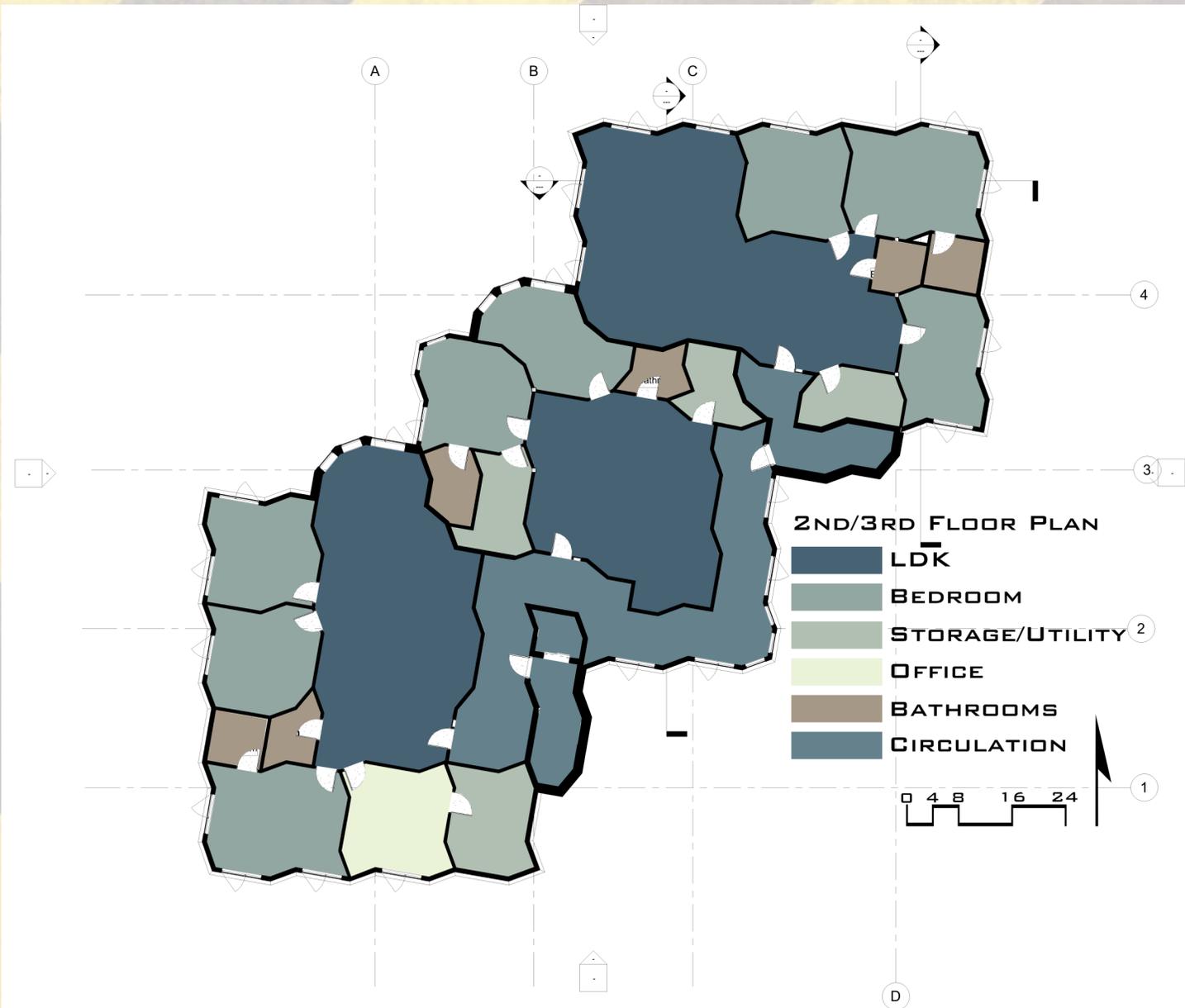






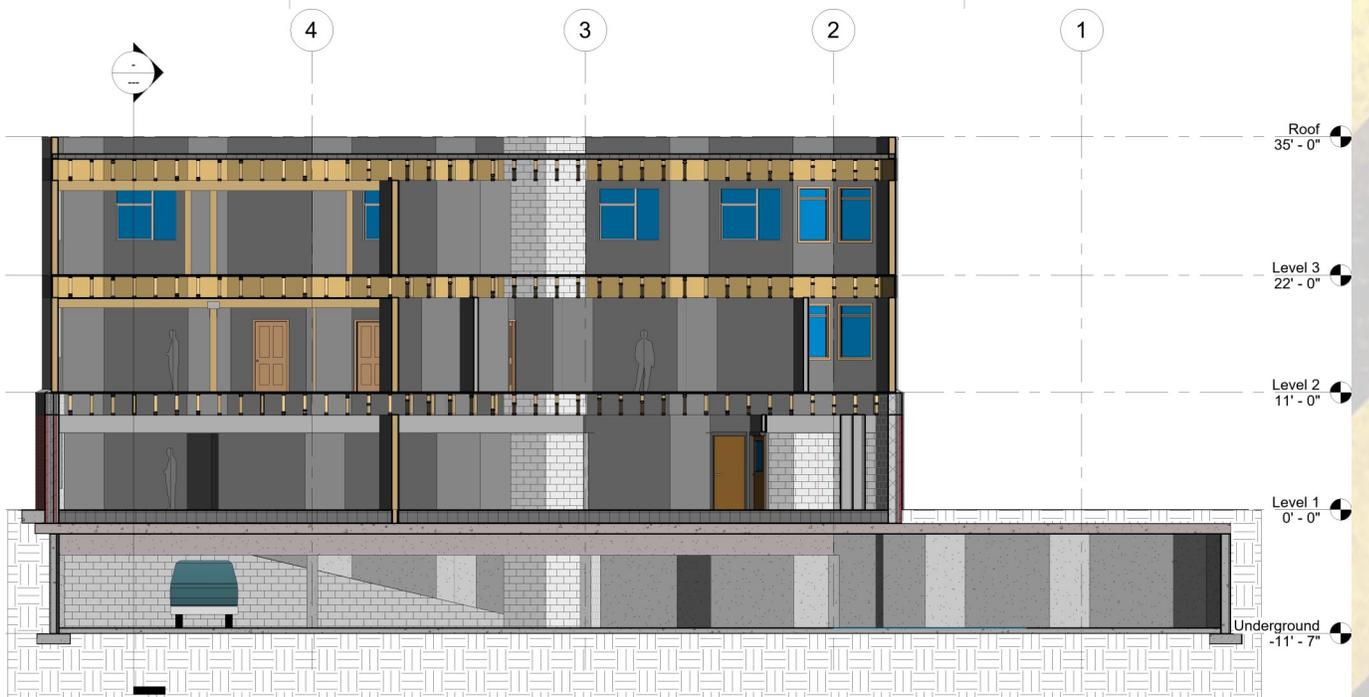


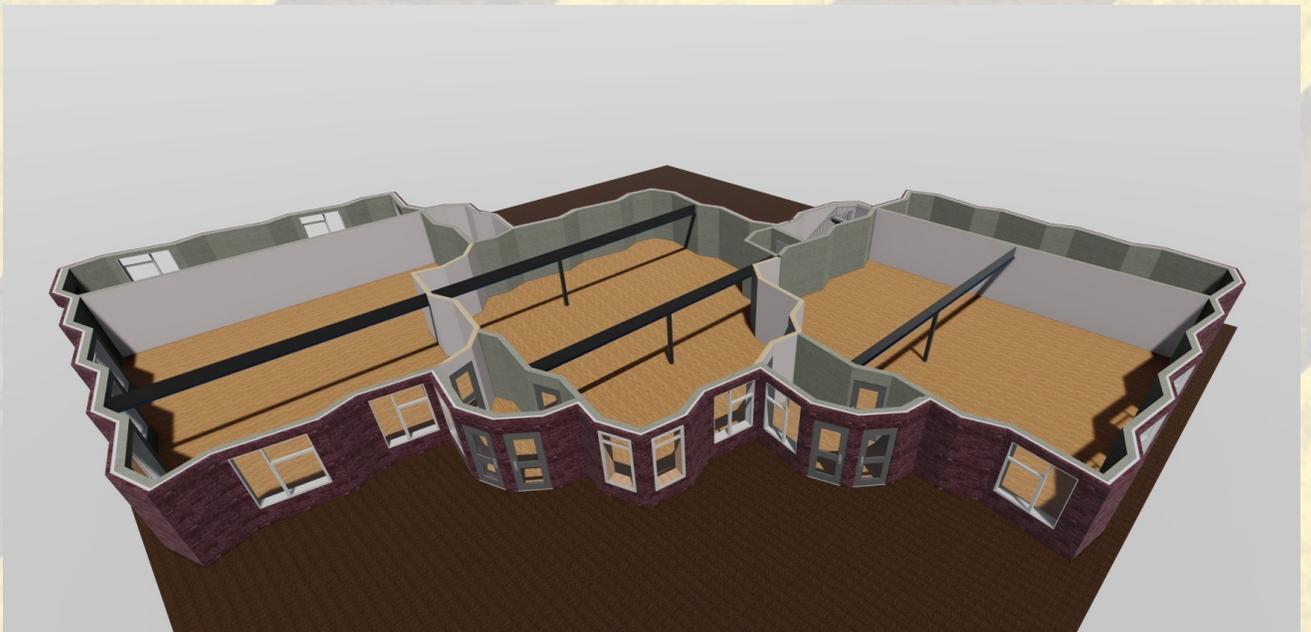
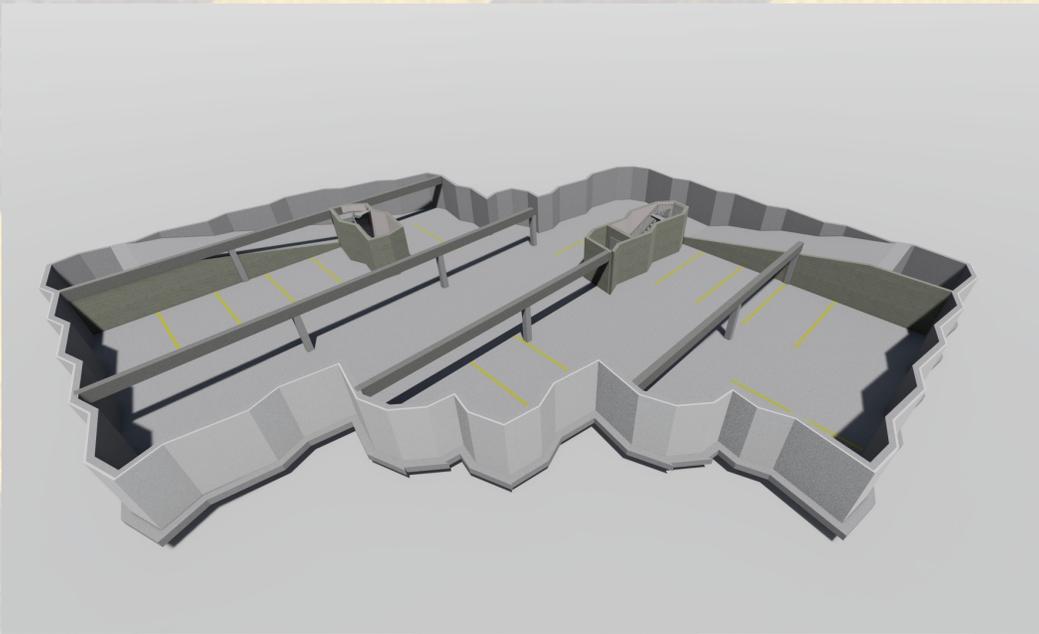


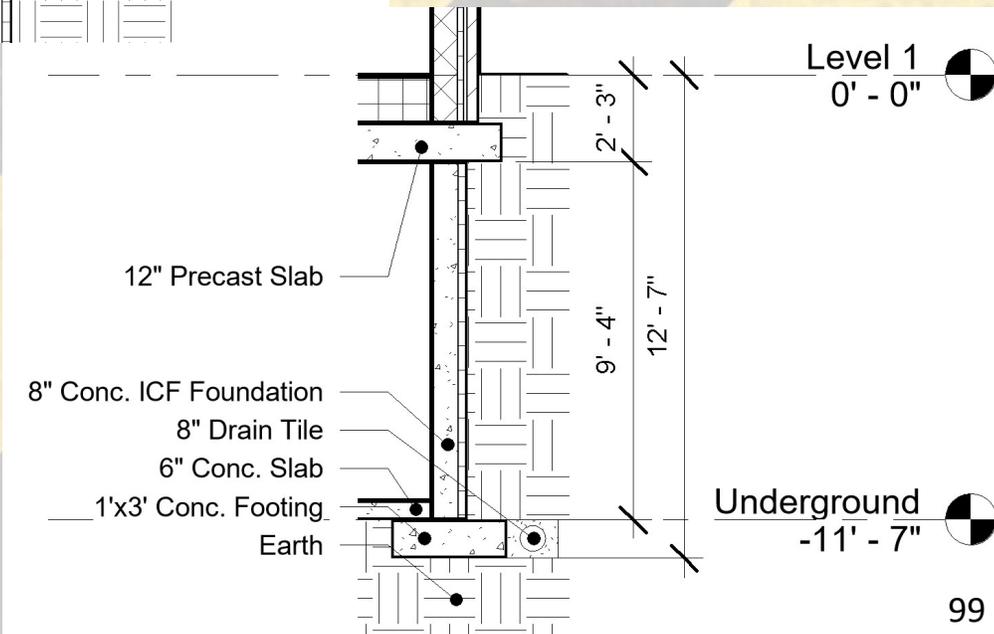
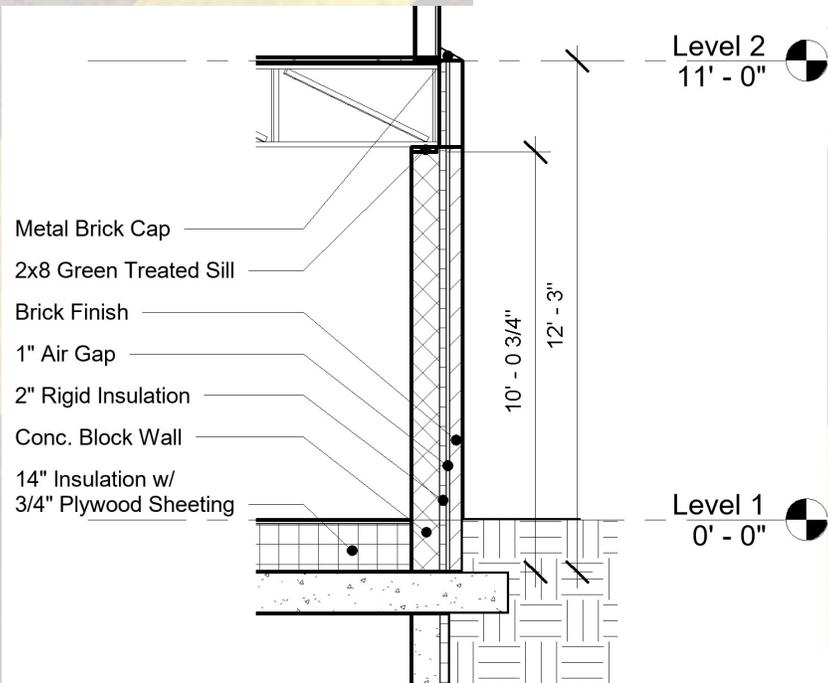
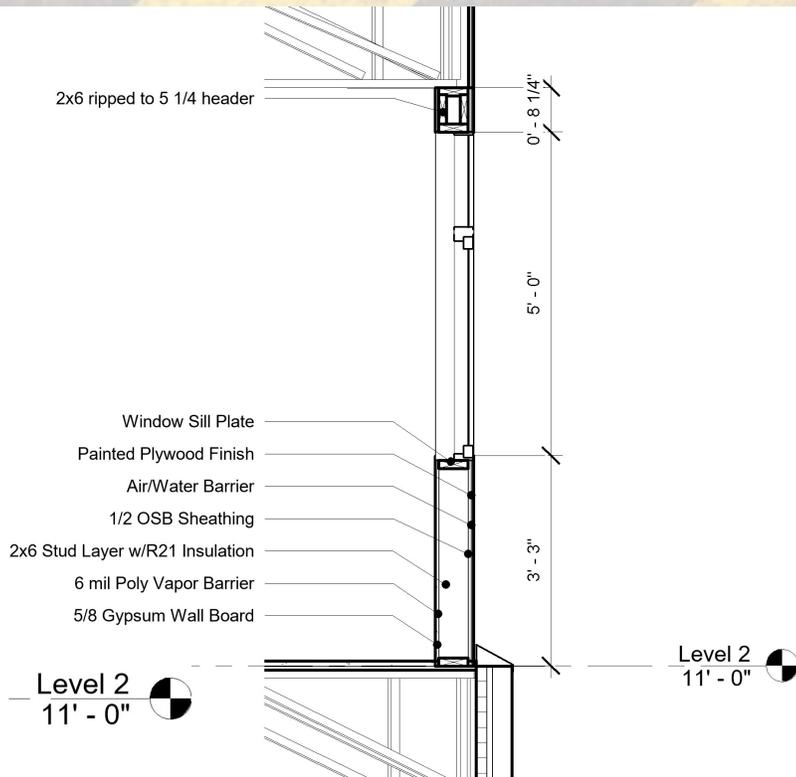


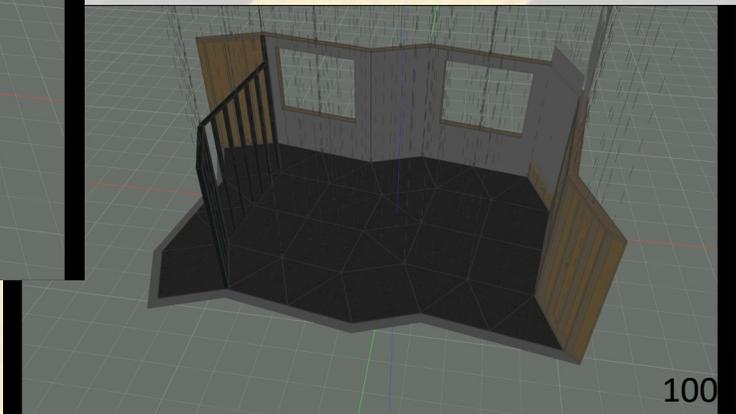
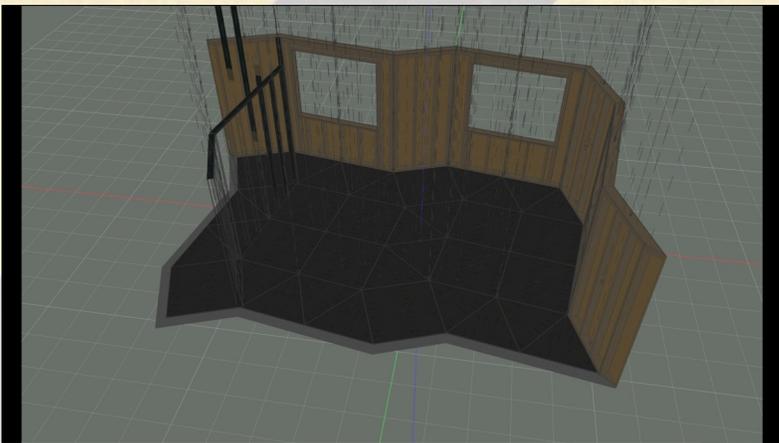
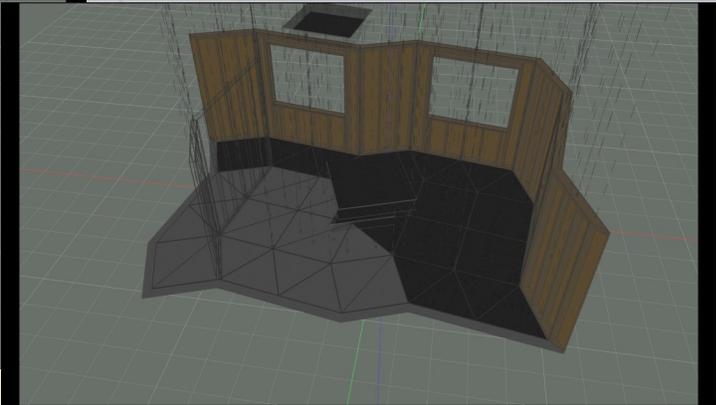
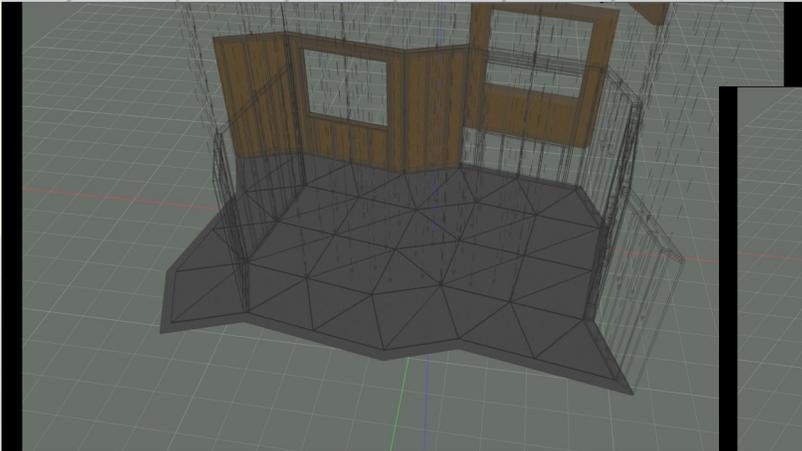
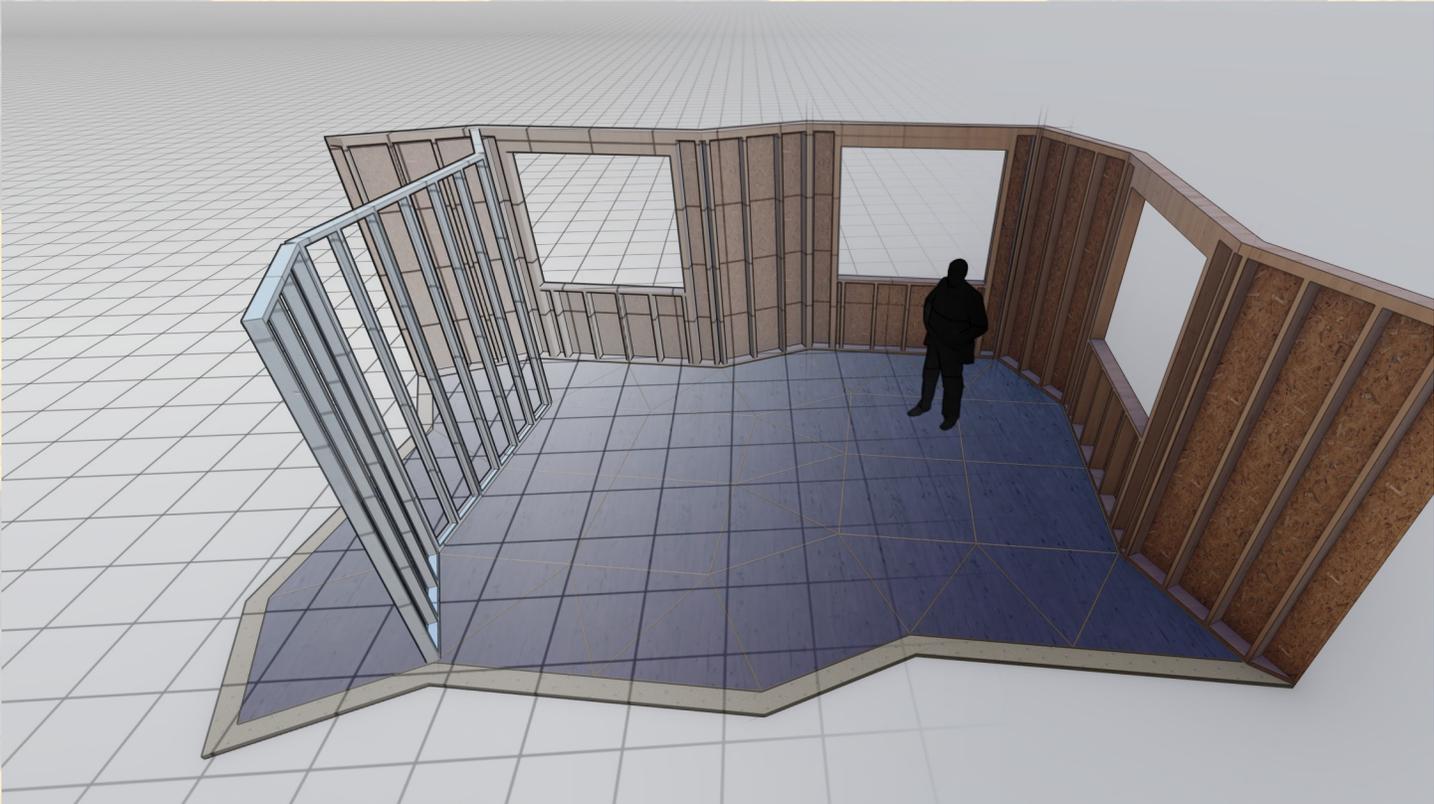












Performance Analysis

Response to Site

The site chosen is in Hawley, Minnesota and so the project's reaction to the site was to fit into the surrounding buildings. The design uses brick with similar color to connect it to the surrounding area as well wood siding which allows it to take on a new style. The wood siding allows for growth of the downtown area by providing a new design solution. The reason is most of the buildings in downtown Hawley are only brick so the use of two materials keeps it connected while pushing the new style of building.

The other important aspect of reacting to the site is the addition of green space. The site originally had no plant life and the surrounding area lacks green space. The increase in plant life will promote a healthy environment and hopefully encourage future green development.

Response to Precedent Research

The design I went with draws very little inspiration from the precedent studies I researched. The most important things that could be taken away is the use of typology in a downtown setting and the use of geometry. Mixed use buildings can have a positive effect in heavily populated areas by giving bystanders an option to use the building rather than making it exclusively for residents. This activates the site and helps to generate income for the area.

The geometry in the studies are relatively simple but are effective at both reacting to the shape of the site as well as creating interesting spaces. My design comes from a grid system of geometric shapes and therefore creates unique spaces in a different ways. Looking back I think I could have drawn more inspiration from Pilestredet and People Belge.

Response to Project Emphasis

The emphasis of the project was creating something which is architecturally interesting but yet buildable. To achieve this goal I would actively talk with carpenters and supervisors at Roers Construction to work on a solution to my problem. The start of the project came with asking them what they thought of the grid system I created.

The initial response was negative with no support for such a project. Moving forward I gave them no option and asked for solutions. This sparked creative thinking which created the project you have seen. Over the course of weeks, I was able to come up with a way to build this project starting with the concrete basement and moving up to the prefabricated units of the upper levels.

At the end of the project I made an animation which I showed many of the people I had been working with. Mack Buck said, "I think that seems relatively simple to construct and it's very uniquely designed," and Justin Hoff said, "Looks good to me." I also showed the animation to a couple people who had not seen or heard of my project. Nick Folkedahl was one of those people and his response only had to do with the use of the plywood shapes. He believed the shapes would be a good use of scrap wood if that's what I intended otherwise it might be an extra piece of work.

Overall many of the guys had positive responses for the buildability of the project. The use of communication with builders while designing helped create a project which is buildable and interesting. Going to my thesis question I was also able to build a relationship of respect with the guys at Roers.