

HOW DESIGN INFLUENCES LIFESTYLE

BUILT VS NATURAL ENVIRONMENT

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ARCHITECTURE MASTERS PROGRAM

HOW DESIGN INFLUENCES LIFESTYLE

BUILT VS. NATURAL ENVIRONMENT

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THESIS ABSTRACT

Architecture has influenced human life from the beginning of time. There is no doubt that it changes the way we perceive the world and everything in it. The focus of this thesis research is the ability for architecture to change the way people live in the built environment.

“By creating a living environment of the highest quality we greatly improve the quality of our lives”

- How Architecture Changed the World by Maisie Rice at AAIS: All About Architecture

The built environment influences living conditions, hence lifestyle. One of the most astounding facts of architecture is its ability to be formed and interpreted differently around the world.

This thesis research strives to bridge the gap between the built environment and how inhabitants interact and are influenced by it. To study the ability for the built environment to positively influence the lifestyle and mindset of its inhabitants in the form of residential single-family homes. Correlation Research and Case Studies are to be highly utilized to determine the correlation of single-family homes in Scandinavian Countries such as Finland, Norway, Sweden, Denmark, and Iceland; and the Midwest Region of the United States. Additionally, Qualitative Research in the form of past and present interaction, experiences, and interviews will provide a solid foundation of research presented from the inhabitants themselves.

NARRATIVE OF THE THEORETICAL ASPECT OF THE THESIS

HOW DESIGN INFLUENCES LIFESTYLE

How can the built environment in which you live, influence your lifestyle and way of life?

CONTEXT

Consider the American dream, the dream of owning one's own home, working a good paying job, to support a family. It's no secret that there's money to be made in the residential home industry. That's why the typical/average residential homes built in the United States are based around low build costs and fast build times. "cookie Cutter" houses are prominent to the housing market in the Midwest and across the United States. A "cookie cutter", also known as Tract housing, refers to the type of housing developments where similar, if not identical house design plans are replicated and used on individual lots purchased by future homeowners to streamline the house building and selling process. The American dream of owning a home has grown into large square footage houses upwards of 3,000 square feet. At an estimated cost of \$80 - \$100 per square foot in the Midwest to build tract housing, the price tag to build or own a home seemingly starts at \$300,000. Quite the long-term investment for potential homeowners. It's important to get the most bang for your buck, hence the housing predicament presented. What's the problem? Homeowners are buying into homes that are built for profit. These homes aren't built to last, resulting in high repair bills down the road. Building materials and construction methods used greatly reduce time and money spent but do homeowners a disservice with the future of the home. The overall costs spent on residential homes today is one of many considerations that will play key roles in the thesis proposal of "how design influences lifestyle".

PREMISE FOR INVESTIGATION

The correlation between one's satisfaction of life and happiness would often not point to the built environment in which one lives. So what does it take to be the happiest? One of the primary considerations when it comes to understanding the proposed project topic is based on the annual World Happiness Report that has been published since 2013. Since 2013, all five Scandinavian countries (Norway, Denmark, Sweden, Finland, and Iceland) have been ranked in the top ten for being the worlds happiest places to live. An interesting source of information to consider when comparing climates between Scandinavia and the Midwest United States. Through the central parts of both Scandinavia and the United States, both share a humid continental climate. A climate in which has temperatures vary greatly from summer to winter and provide appreciable precipitation year-round. It may be important to mention now that while all five Scandinavian countries have ranked top 10 on the World Happiness Report 2020, the United States is just managing to break top 20. The United States as a whole was ranked #18 on the report. Although the World Happiness Report specifically analyzes more social and political aspects to determine overall country happiness rankings, I would like to analyze how the Scandinavian built environment is influenced.

NARRATIVE OF THE THEORETICAL ASPECT OF THE THESIS

HOW DESIGN INFLUENCES LIFESTYLE

How can the built environment in which you live, influence your lifestyle and way of life?

UNIFYING IDEA

The Unifying Idea of the project focuses on the simple, yet complex question, "How can the built environment in which you live, influence your lifestyle and quality of life?"

I am particularly interested in pursuing this unifying idea for a few main reasons:

- 1.) Varying climate extremes and quality of life Midwestern's endure in the United States compared to that of Scandinavian countries.
- 2.) The unrealistic reality of today's "American Dream" relating to housing expectation and social status paired with the outdated ideology and lack of choice of the Midwestern housing development industry.
- 3.) How correlation research from Scandinavian countries and the Midwest United States can be paired with the term of "Spatial Efficacy" to formulate a built environment solution to better promote a higher quality of life for Midwestern single-family homes inhabitants.

With varying climate extremes in the Midwest, living conditions need to be highly adaptable in how the built environment accepts these changes. With consideration to the harsh climate the Midwest presents it's questionable on why better built housing isn't a focus.

The lifestyle each person chooses to live is directly related to their built environment in which they live in. It seems all Midwestern's have the choice, but this is hardly true. The unrealistic reality of today's "American Dream" relating to housing expectation that qualify you to a visual "social status" based on the size of your home is directly affecting the overall quality and satisfaction of the built environment. The current housing industry business model is outdated with no affordable option for better built environment solutions with risk-adverse builders sticking to the old ways. Today's housing industries neglects the entry-level housing market for typical millennial couples that are drowning in student loans and low entry paying jobs, forcing majority to rent in less than desirable living conditions. Cities across the Midwest are scattered with old outdated houses typically requiring large amounts of repair and remodeling to create a desired place to live and even start a family.

NARRATIVE OF THE THEORETICAL ASPECT OF THE THESIS

UNIFYING IDEA - CONTINUED

It's important to try and understanding just what is being done to better serve humans in the built environment. Early research has brought me to the consideration of a new way of thinking of spaces built for living. I've developed a term that seeks to represent the path of which the bulk of my research will follow for the thesis proposal, Spatial Efficacy. The term Spatial, df. related to or occupying space and Efficacy, df. the ability to produce a desired or intended result. I like to describe Spatial Efficacy as how space influences people. The occupying of space defined as a human living condition, while the goal of the better designed and built environment strives to produce a more desirable lifestyle for humans. This direction of Spatial Efficacy may be better followed when considering how peoples movements influence the built environment itself.

Spatial Efficacy borrows inspiration with consideration of other influential terms having to do with humans interacting in the built environment such as Ergonomics, Feng Shu, or the Golden Ratio.

- o Ergonomics, defined as the study of people's efficiency in their working environment.
- o Feng Shu, a system of laws used in spatial arrangement and orientation in relation to the flow of energy.
- o Golden Ratio, being the perfect proportions of space with a natural balance and visual harmony. How the building feels in its entirety in regard to proper proportions.

These terms are powerful starting points to refer back to when furthering research into more tactile examples of micro and macro scale.

NARRATIVE OF THE THEORETICAL ASPECT OF THE THESIS

UNIFYING IDEA - CONTINUED

Can a human living environment influence their lifestyle? I believe yes, but it will take more than a convincing article. Take the Scandinavian country of Finland for example. Finland is most often rated the worlds happiest place to live. Did I mention that Finland also has more saunas than cars? There is no lie that Finland loves their saunas. They also love their natural materials and well-built housing. Finland residents greatly appreciate the use of materials in construction that improve the health and wellbeing, not harm it. They strive to creating better wall assemblies that promote energy efficiency and a healthier lifestyle. Finland hosts an annual event called the Housing Fair. Each year, a city is chosen to house the Housing Fair where a large number of houses are built and decorated for the general public to tour and enjoy for a month in the summer. The Housing Fair showcases the latest and greatest in the housing industry. After the houses are shown to the public, they are inhabited by the families who they were built for. The annual event adds to cities in Finland and allows for professionals to showcase their work. Construction methods are different to that of the United States. Finland focuses on reducing waste, increasing build quality, and boosting efficiency while using different construction methods such as pre-fabrication and modular design.

Scandinavian design is known for their unique projects that consider and balance the impacts on the environment with the experience of its inhabitants. Take the CopenHill project design by Bjarke Ingels Group located in Copenhagen, Denmark as a prime example. The architect was commissioned to design a waste-to-energy plant in the city and incorporated a year-round ski slope to sit atop it with a smokestack that puffs ultra clean smoke rings into the air.

While Scandinavian countries and the Midwest share very similar climates and seasonal changes, the chosen lifestyles and directions taken in the built environment vary drastically. Some questions to add to the list of paths this thesis project will take is how can the quality of materials used closely affect the occupants? It seems as if here in the United States, we overlook the quality of construction when it comes to a roof over their heads. Questions just like this one and many others directly relate to Architecture and are relevant since we can do something about it. Designers have the obligation to share their knowledge and influence others in positive ways when it comes to their lives. Design influences humans in more ways than one, especially in the built environments.

PROJECT TYPOLOGY

Shelter is one of the most crucial elements to human survival. To have a space to protect us from the harsh exterior environment. At this point in human history, shelter has evolved to be much more than means of survival from the elements. My design thesis will focus on the typology of single-family houses. The American Dream and the ability to own your own home is something many strive for and has been a driving factor in the development of the United States.

A single-family house is typically defined as a building that is to be used for living purposes containing a single dwelling unit. Almost always are homes occupied by one single family and used as a primary residence. There is no shortage of single-family houses being built across the United States. The future is demanding a change in the ideology of single-family homes to allow current and future inhabitants to reconsider the places they chose to live.

With the reconsideration of the built environment in the form of single-family homes, I hope to shed a new light on the development of future housing. To allow current and future homeowners to be educated in additional considerations when it comes to the spaces they inhabit and inevitably call home.

PRECEDENT RESEARCH

PRECEDENT RESEARCH OVERVIEW

Each case study listed is to be considered as being one of which influences the thesis proposal in a way to allow freedom of thinking and inspiration to break the mold of traditionally design midwestern housing. Each of the selected case studies below are analyzed based on three main factors:

1) PROJECT OVERVIEW

Details of the project and its context to its surroundings.

2) SPATIAL ELEMENTS & ANALYSIS

Analyzing the list of spatial elements used within the design and how they are integrated within the floor plan in relation to each other and as a whole.

3) MATERIALITY AND ENVIRONMENTAL IMPACT

The types of material chosen to be used for the built environment and what decisions were made to reduce its impact on the natural environment

CHOSEN CASE STUDIES

HONKA SAVUKVARTSI

LOCATION: VANTAA, FINLAND

SIZE: 1,570 SQUARE FEET

HONKA MARKKI

LOCATION: SEINAJOKI, FINLAND

SIZE: 1,800 SQUARE FEET

SKIGARD HYTTE CABIN

LOCATION: LILLEHAMMER, NORWAY

SIZE: 1,560 SQUARE FEET

FIGURE 02 | HONKA SAVUKVARTSI HOUSE, PHOTO CREDIT | HONKARAKENNE





PRECEDENT RESEARCH

HONKA SAVUKVARTSI

ARCHITECT: JAAKKO & ELEIZAVETA PARKKONEN

LOCATION: VANTAA, FINLAND

PROJECT OVERVIEW:

This beautifully designed Nordic house was introduced to the public at the Housing Fair 2015 in Vantaa, Finland.

“A modern eco-home for three generations” – Sanna Huovinen
The house is considered a new-generation log home and you would never guess with the modern feel and high level of craftsmanship presented. The house was designed to serve as two architects' private home they designed that is actually a duplex. The project as a whole is made up of two properties, the young family's residence and the grandparent's residence. Hence, three generational home.

PROJECT SPATIAL ELEMENTS:

The Family's Residence

The family's residence is 146 meters squared which is equivalent to 1570 square feet here in the U.S. This portion of the property is made up of 5 rooms, a kitchen, and a sauna. With an analysis of the interior ground and first floor plans the spaces are included per floor as listed.

Ground Floor: Kitchen, Dining, Living, a Half Bath, Minimal Circulation Space, and a two-story Atrium green space.

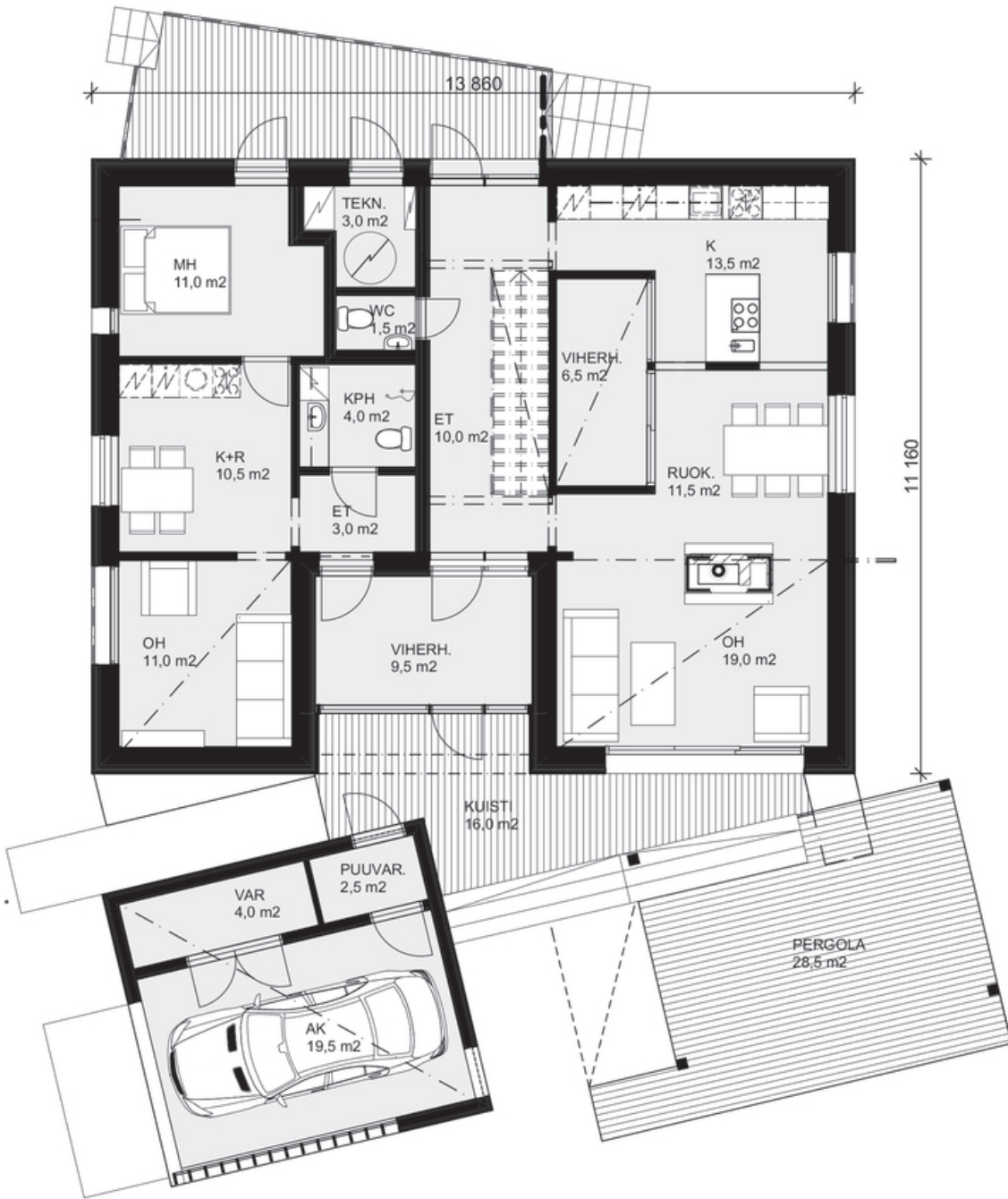
First floor: Bedroom, a Library, Laundry Room, Child Bedroom, an Office portrayed on plan as an additional bedroom, a detached Half Bath, Shower room, and a Sauna.

The Grandparent's Residence

The grandparent's residence is 46 meters squared which is equivalent to 495 square feet. This portion of the property is simply made up of 3 rooms. A living room, kitchen with dining room, and bedroom with a full bath and entry space all on ground floor.

GROUND FLOOR

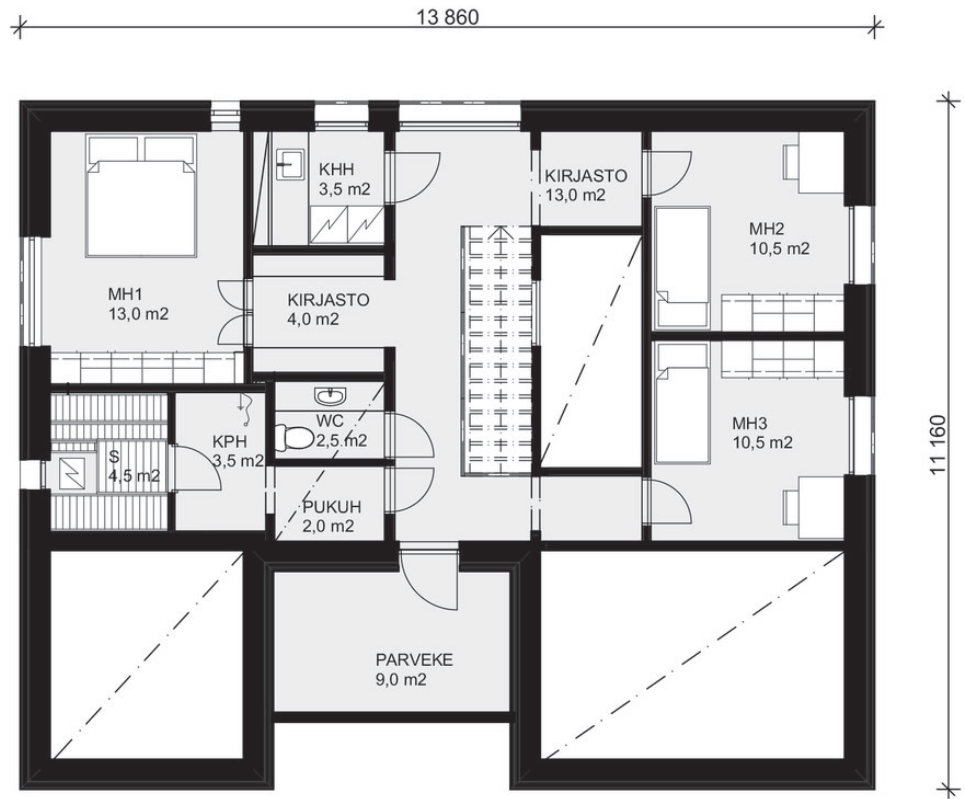
FIGURE 03 | GROUND FLOOR PLAN, PHOTO CREDIT | ARCH DAILY



1 KRS 1:125

FIRST FLOOR

FIGURE 04 | FIRST FLOOR PLAN, PHOTO CREDIT | ARCH DAILY



2 KRS 1:125



FRONT ELEVATION



REAR ELEVATION

FIGURE 05 | ELEVATION, PHOTO CREDIT | ARCH DAILY

FIGURE 06 | ELEVATION, PHOTO CREDIT | ARCH DAILY

SPATIAL PROGRAM ANALYSIS

The project overall interior layout and spatial arrangement is very intriguing and requires careful review and analysis. To understand the spaces and how they interact with each other presents an entirely different, while very similar, living arrangement than that of houses typical to the United States. One of the biggest disconnects to the plan that vastly varies from that of houses in the Midwest is the use of bathrooms within the house in relation to bedrooms. For the grandparent's residence, the shower room is a shared spatial entity for the entire unit and not connected to the bedroom. You are required to move out of the bedroom, through the kitchen, and into the entry circulation before reaching the shower room. This design decision in the floor plan may be justified for use with guests but seems excessively far if the space is designed for an older generation as well as the privacy issues between exterior and interior. As for the family's residence bathroom, this spatial arrangement is particularly interesting as well. The adult bedroom is not connected to a bathroom, nor does it have its own. All three rooms on the second floor share a ½ bath and a dedicated shower room that buffers between the sauna. The spatial arrangement of this layout seems to indicate design decisions that are based around their sauna.

This house is still very much traditional in a sense of its spatial room separations and privacy levels. Open concept is a very familiar and adopted design approach in the United States as we progress away from the traditional tight knit homes built over 100 years ago. For both portions of the property, the living, dining, and kitchen spaces are in line with each other. The family's residence layout between these spaces have distinctive room separations. The same goes with the grandparent's residence with the separation between kitchen/dining and the living room. Whether it be a separation with wall and openings or the use of the built-in fireplace. A large portion of the residences floor plan is dedicated to a green space separated interiorly by glass paneling. Both residences include a walk out deck space and the family's residence also includes a pergola for added exterior entertainment space.



FIGURE 7 | DINING, PHOTO CREDIT | ARCH DAILY



FIGURE 8 | LIVING ROOM, PHOTO CREDIT | ARCH DAILY



FIGURE 9 | OFFICE, PHOTO CREDIT | ARCH DAILY

MATERIALITY & ENVIRONMENTAL IMPACT

Honka Savukvartsi is labeled an eco-home for good reason. The house had one of the smallest carbon footprints at the Vantaa Housing Fair in 2015. It was rated highly for energy efficiency and also lends to the ideology of healthy living and sustainability.

In order to provide a healthy living environment, the house is built of natural, low-emission and recyclable materials. All materials in the house are easily maintainable and provide a warm natural feel throughout the project. Without the use of harmful materials that come with toxic off gassing, the indoor air quality is greatly improved.

With sustainability and energy efficiency in mind, the designers considered orientation of the design in regard to the roof pitch. They calculated the optimal angle in relation to the sun to greater utilize the roof mounted solar thermal collectors. The house is additionally heated by a water heating fireplace and underfloor heat. The exterior of the house is built of Honka Fusion Log with exterior insulation with wood fiber.

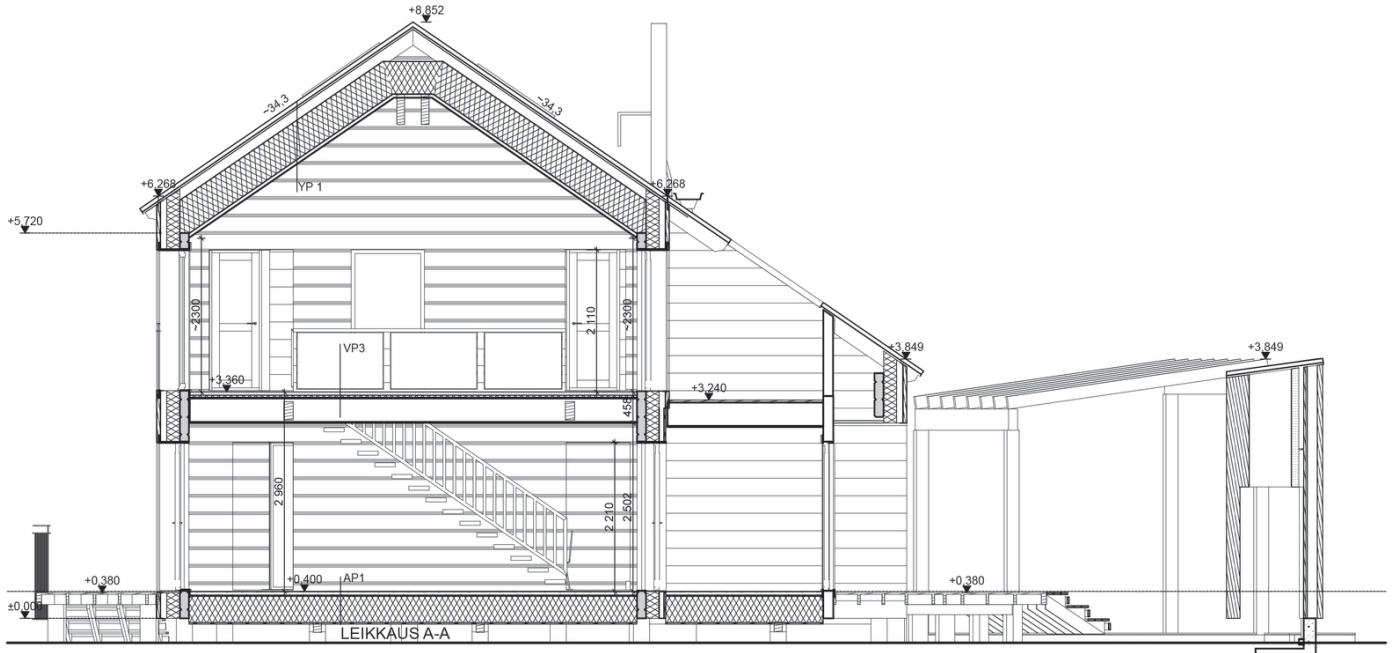


FIGURE 10 | BUILDING SECTION, PHOTO CREDIT | ARCH DAILY



FIGURE 11 | SAVUKVARTSI EXTERIOR, PHOTO CREDIT | MARULLA

PROJECT CONCLUSION

Honka Savukvartsi is a beautifully crafted and designed residence that deserve attention and admiration. The concept of integrating two residences at two very different scales is something that more homes should consider. Whether it be a grandparent's residence as the Savukvartsi house, or a rentable private entranced space for additional income.

The overall size of the entire project at just over 2,000 square feet, it's impressive to see the amount of space integrated within boasting four bedrooms, two living rooms, two kitchen/dining spaces, three bathrooms, and additional bonus spaces such as a library, interior green space, and a sauna! With the average size of a similar single-family home coming in at around 2600 square feet and not including any of the luxuries of the Savukvartsi house, the takeaway is clear. We can do better in the Midwest. One of the larger takeaways was the relation of spaces and separation between them. As open concept is so desired, this house does none of that and for good reason. The pictures of the interior allow the viewer to just feel the positive feels of the space. The overall spatial arrangement is impressive and so is its materiality and sustainability. The house uses natural materials to boost the indoor air quality and overall feel of the space while integrating solar collection and modern technologies.

The overall project takeaway places the Honka Savukvartsi house in high regards with its successful modern and comfortable build environment that influences a healthy lifestyle mentality while minimizing climate and environmental impact.





PRECEDENT RESEARCH

HONKA MARKKI 2-STOREY

ARCHITECT: ANSSI LASSILA

LOCATION: SEINAJOKI, FINLAND

PROJECT OVERVIEW:

The Markki was designed by Anssi Lassila, an award winning Finnish architect, for the 2016 Housing Fair in Seinajoki, Finland. The modern nordic log house was designed to fit a family of four with Honka's Fusion Logs to provide a strong and healthy building envelope. The house is accompanied by an additional side functional building. The two buildings on site are positioned to allow for a private and dynamic yard that is able to serve the family and all of the activities they may do.

PROJECT SPATIAL ELEMENTS:

The Main House

The main house features 167.5 meters squared which is equivalent to around 1800 square feet here in the U.S. This portion of the property is a 4 bedroom 1.5 bath with additional main floor storage space. With an analysis of the interior ground and first floor plans the spaces are included per floor as listed.

Ground Floor: Kitchen, Dining, Living, a Half Bath, Minimal Circulation Space, Laundry Room, and two rooms of storage.

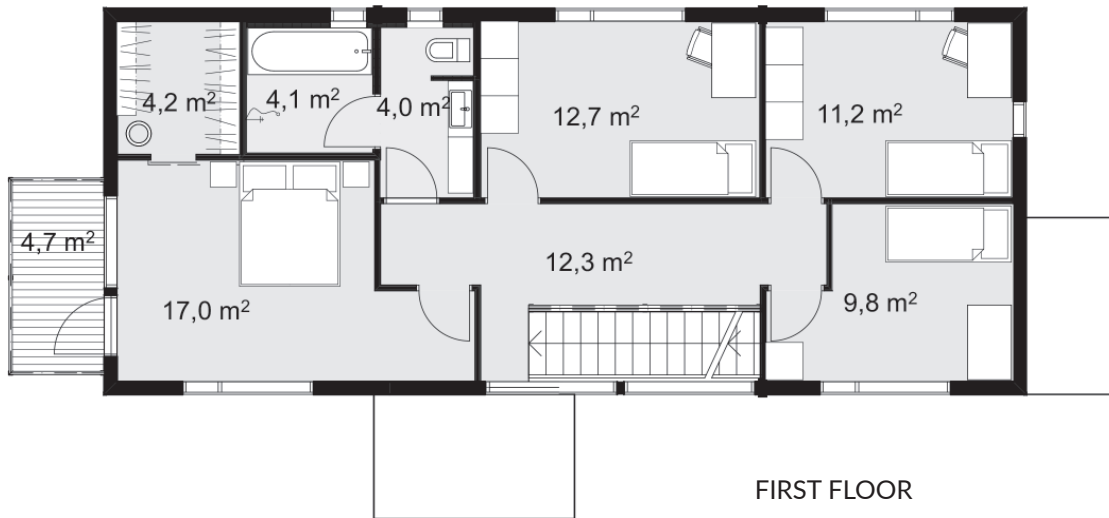
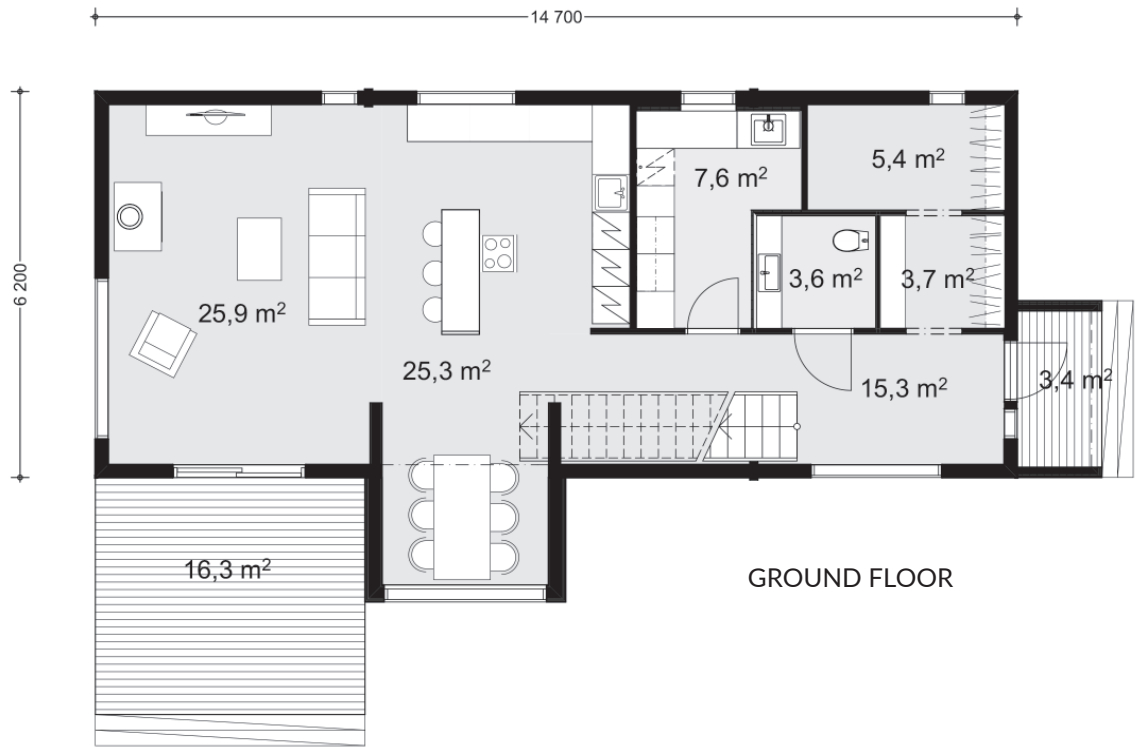
First floor: 3 bedrooms, a Master Bedroom, master closet, and a shared full bath.

The Outbuilding

An additional building was designed into the plan to serve as the family's garage, additional storage, the family's sauna, and a guest room!

FLOOR PLANS

FIGURE 13 | FLOOR PLANS, PHOTO CREDIT | HONKARAKENNE



EXTERIOR ELEVATIONS

FIGURE 14 | ELEVATIONS, PHOTO CREDIT | HONKARAKENNE



FRONT ELEVATION



SIDE ELEVATION



REAR ELEVATION



SIDE ELEVATION

SPATIAL PROGRAM ANALYSIS

The Markki is a very narrow rectangular shape with a traditional gable roof pitch. The simple house design was inspired by traditional Ostrobothnian housebuilding. The overall building design allows it to be nestled into urban environments and typical neighborhoods while standing out. With its narrow design, the spaces are tightly packed and arranged in a way that reduces the amount of wasted space with circulation. The living, dining, and kitchen are closely related and open up to its surrounding natural environment. The dining room steps off to the side of the kitchen separating itself from the living room. A large window frames the space from floor to ceiling to provide pristine views to the exterior while enjoying a meal. The main floor includes a functional laundry room to serve the four bedrooms on the first floor. A half bath is placed towards the entry way in order to provide privacy from the main spaces. The ground floor also includes two different storage spaces with hanging space. Minimal space is wasted on the ground floor for circulation with only a small entry and hallway shared by the stair leading to the first floor.

The spatial arrangement of the first floor is simple with only two main space uses. Tightly packed with minimal circulation space. Including 3 normal sized bedrooms and a larger master bedroom which has its own private closet and a walkout balcony. All bedrooms share a single full bath lit by two narrow modern windows.

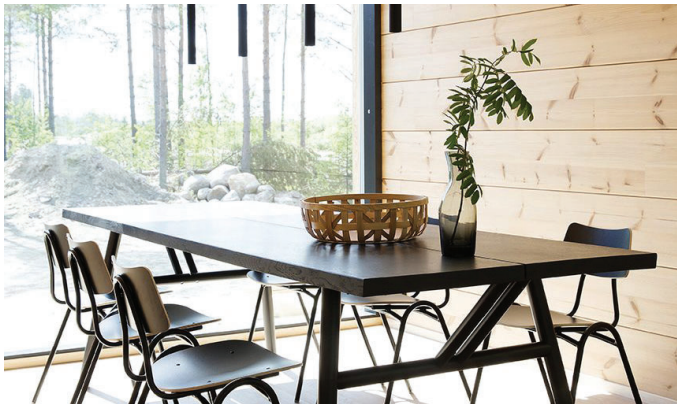


FIGURE 15 | DINING ROOM, PHOTO CREDIT | HONKARAKENNE



FIGURE 16 | KITCHEN, PHOTO CREDIT | HONKARAKENNE



FIGURE 17 | LIVING ROOM, PHOTO CREDIT | HONKARAKENNE



FIGURE 18 | BEDROOM, PHOTO CREDIT | HONKARAKENNE

MATERIALITY & ENVIRONMENTAL IMPACT

Honka Markki is constructed of Honka non-settling Fusion logs providing a strong and energy efficient exterior envelope. The Fusion logs provide a natural, close to nature, feel that provides a cozy, warm, and comfortable interior space. The natural building materials also provide the occupants with clean indoor air as it is not mixed with the toxic off gassing from harmful building materials.

With sustainability and energy efficiency in mind, the architect incorporated geothermal pump heating to drastically reduce the costs for heating by using the earth to provide a constant base temperature to begin from. Especially during cold winter months, the warmth from the earth below will allow the overall mechanical heating use of the house to be lowered drastically. Additionally, underfloor heating is integrated to radiate through the house and provide a very comfortable surface while circulating throughout the house.

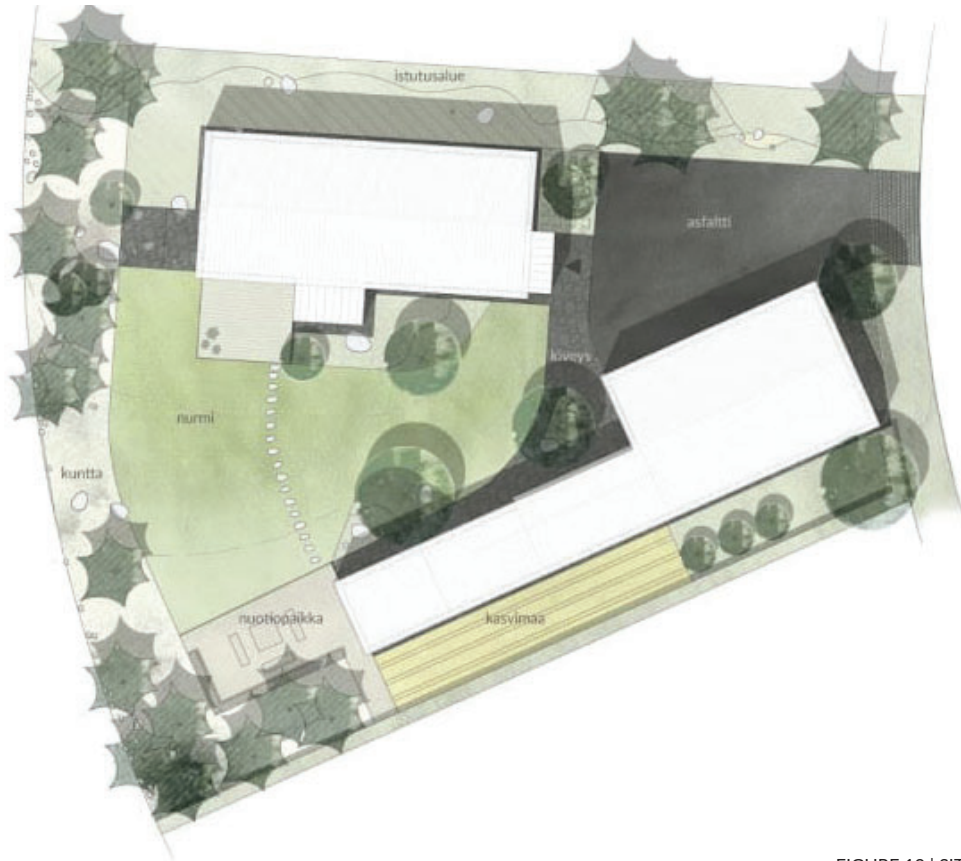


FIGURE 19 | SITE PLAN, PHOTO CREDIT | HONKARAKENNE



FIGURE 20 | MARKKI OUTBUILDING, PHOTO CREDIT | HONKARAKENNE



FIGURE 21 | MARKKI ENTRANCE, PHOTO CREDIT | HONKARAKENNE



FIGURE 22 | MARKKI OUTBUILDING, PHOTO CREDIT | HONKARAKENNE

PROJECT CONCLUSION

Honka Markki is a remarkable project that balances between traditional and modern design. The layout of the two buildings on the site allow for privacy, even in the most densely populated areas. The outbuilding is a unique and functional integration for the project that adds additional storage space and a useful guest room. The outbuilding also integrates a sauna for the family and guest room to enjoy.

This house is still very much traditional in a sense of its spatial room separations and privacy levels. With the narrow design of the overall building design allows for natural light to flood the interior spaces from all sides in order to provide a more comfortable interior experience.

The Honka Markki is a project that typically would be seen as a more secluded, private design. Instead, the designer was able to successfully integrate the project in an urban environment, showing just what is possible in comparison to the typical tract housing in the United States. Inspiration from projects such as the Markki house are sure to challenge the tract housing mold in the United States.





FIGURE 23 | SKIGARD HYTTE CABIN, PHOTO CREDIT | ARCH DAILY

PRECEDENT RESEARCH

SKIGARD HYTTE CABIN

ARCHITECT: MORK-ULNES ARCHITECTS

LOCATION: LILLEHAMMER, NORWAY

PROJECT OVERVIEW:

The Skigard Hytte Cabin serves as a getaway retreat for the family throughout all seasons. The site is high above the landscape, nearing the top of Kvitfjell mountain positioned 943 meters above sea level. The architects understood the seasonal requirements of the project and took careful consideration to make decisions that will allow the design to be versatile throughout the year. The cabin presents itself as a simple recognizable rectangular form with rough natural exterior cladding while the interior opens up to above with high vaulted ceilings and smooth natural interior wood cladded walls. All of which allow the cabin to become a safe haven of comfortability and warmth for the whole family.

PROJECT SPATIAL ELEMENTS:

The program of the long narrow designed form integrates both the required living spaces for the family to occupy while also providing a separate guest space disconnected from the main building by a corridor cut through the form. Totaling at around 145 meters squared, the house equals to around 1,560 square feet.

The Family's Residence

The family's residence is made up of a centrally located great room with a minimal kitchen, dining room table, and a narrow living room. Additionally, the program includes a child dedicated sleeping space closer to the entrance with two smaller bedrooms and a shared $\frac{3}{4}$ bath that also serves the great room. The master bedroom is placed furthest from the entry and integrates a sauna room and a $\frac{3}{4}$ master bath. The only additional space within the family's residence is the mudroom placed next to the entry with access directly off of the hallway.

The Guest Residence

The guest residence integrates a bed nook placed in the corner sharing the wall with a $\frac{3}{4}$ bathroom while also including a more formal living space.

BUILDING PLAN

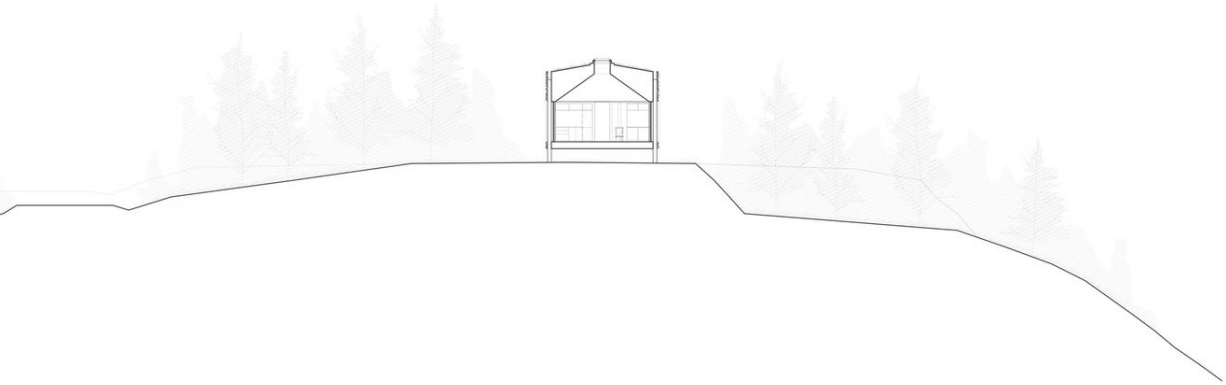


FIGURE 24 | SITE BUILDING SECTION, PHOTO CREDIT | ARCH DAILY

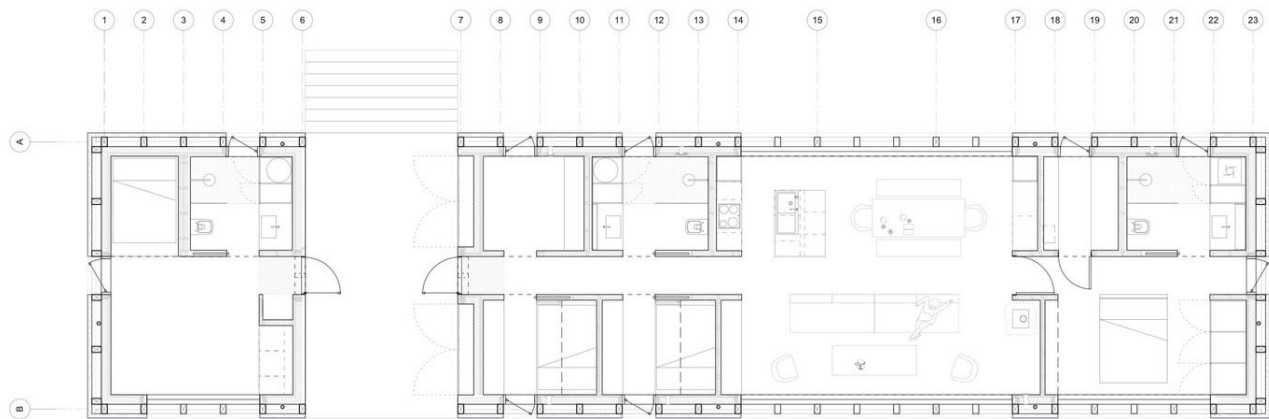


FIGURE 25 | FLOOR PLAN, PHOTO CREDIT | ARCH DAILY

BUILDING PLAN

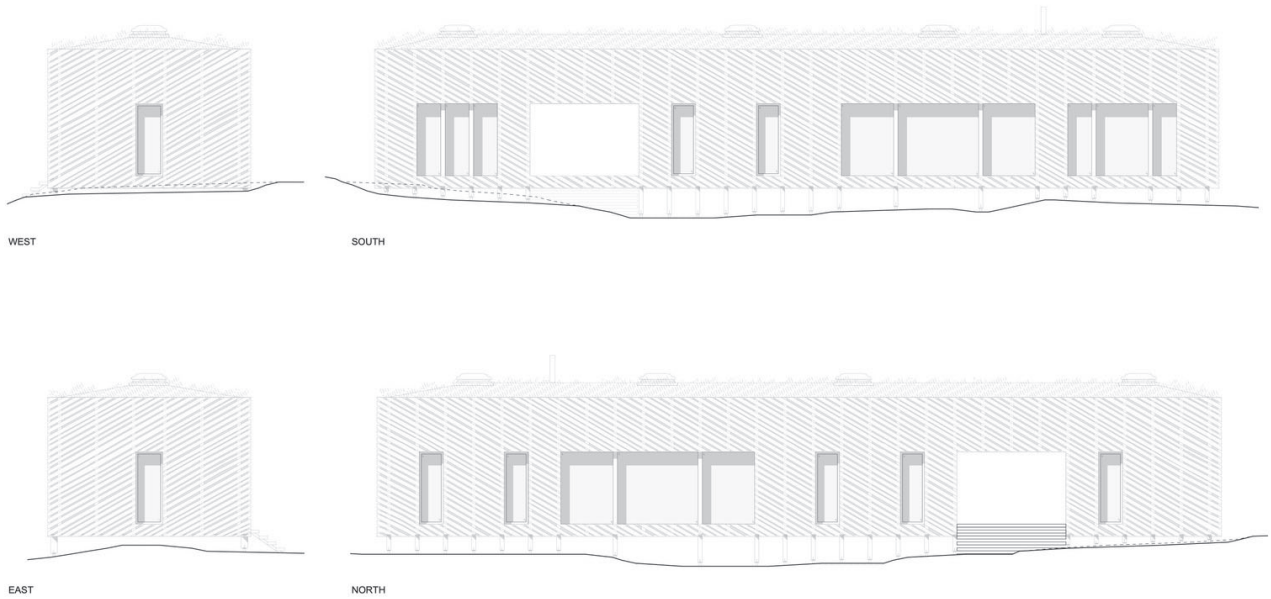


FIGURE 26 | BUILDING ELEVATIONS, PHOTO CREDIT | ARCH DAILY

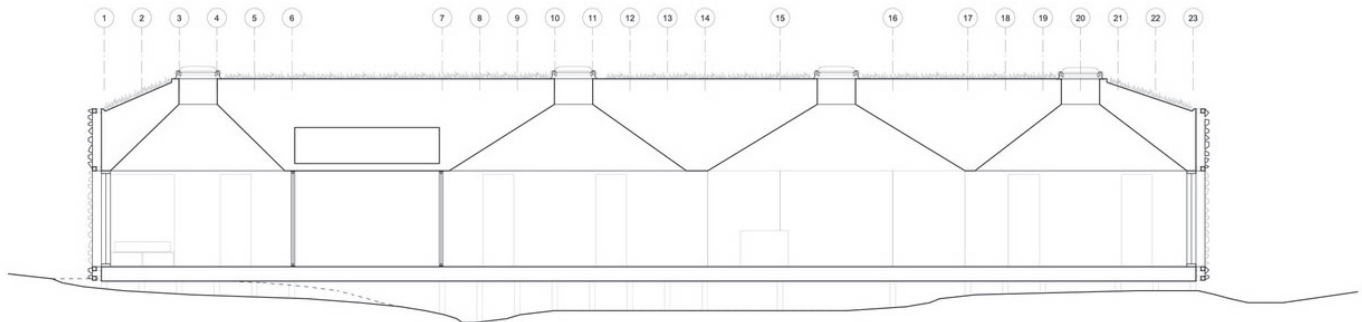
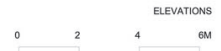


FIGURE 27 | BUILDING SECTION, PHOTO CREDIT | ARCH DAILY

SPATIAL PROGRAM ANALYSIS

The overall layout and positioning of the project on the site is majorly influenced by the views of the landscape. All bedrooms within the family's residence are placed to have views to the exterior on the side of the back side of the house overlooking down the mountain side. All besides the guest suite which utilizes these views for the common space. The bathrooms, mudroom, and sauna room are placed facing the front of the house. The great room is very tightly packed with the kitchen, dining, and living. The total space used for the great room would typically serve the average Midwestern United States house as solely a living room. With the narrow form, all spaces are able to be reduced in size to provide a tightly related area for the family to gather. Both sides of the building address the immaculate views of the surrounding landscape and allow plenty of natural light into the space through large floor to ceiling windows.

The family's residence bedrooms are modestly sized. The child's bedrooms are only sized to be large enough for a smaller bed such as a twin or full. This is the first of the case studies to integrate an attached bathroom to the master. One of the more interesting findings to the spatial program analysis is the sauna being attached to the master bedroom privately. The other case studies had placed the sauna in an area to be used by the whole residence. Entry into the master in order to access the sauna may pose issues with the children and provides no access to the guest.

The decision to integrate a guest suite is something that all previous case studies have shown to include. The ability to separate guests providing a new dynamic to the overall design in terms of privacy. The guest residence is far more spacious than most with its bed nook placed in the corner sharing the wall with a $\frac{3}{4}$ bathroom. Additionally, open space is provided within the guest residence for a more formal living room with fantastic views opening to the exterior. Although the guest suite does not include a kitchenette to be able to be utilized by unfamiliar guests for Airbnb, it would be typical to see the guest to be known by the family allowing for them to utilize the great room during the day.



FIGURE 28 | INTERIOR, PHOTO CREDIT | ARCH DAILY



FIGURE 29 | INTERIOR, PHOTO CREDIT | ARCH DAILY



FIGURE 30 | INTERIOR, PHOTO CREDIT | ARCH DAILY

SPATIAL PROGRAM ANALYSIS

One of the most interesting spaces to the design is the exterior covered entry that passes through the entire design. This space provides separations between the family's residence and the guest residence as well as giving the occupants a place for additional storage. The ability to be separated from the harsh environments on the site is crucial when it comes to the seasonal changes throughout the year. It is important to touch on the uniqueness of the interior spaces when it comes to the ceilings. From the outside, the form presents a seemingly flat green roof, although it slopes minimally to shed the weather. All four zones of the design have interiorly high pitch ceilings that reside at four roof lights that splay natural light throughout the space from above. With the combination of high

MATERIALITY & ENVIRONMENTAL IMPACT

The Skigard Hytte Cabin features a few major design decisions that majorly reduce its environmental impact on the site. The cabin is placed on piers to elevate the building off of the site, reducing the amount of earthwork required. This decision to elevate the building off of the site was also made to reduce the effects of the snow drifting in the winter. The elevation allows for snow to drift and build up around the perimeter of the cabin without blocking windows or doors. The top of the cabin integrates sod just as the traditional Scandinavian rural log houses which reduces the amount of heat gain from the sun. The cabin is clad with Skigard, a 3-meter-long quarter cut log that was traditionally used by Norwegian farmers as fencing. With the use of Skigard, the modern form is softened by the roughness of the wood while the interior of the cabin is made up of natural non painted smooth pine paneling. The use of natural materials provides the occupants with a comfortable living space and a healthy interior environment.

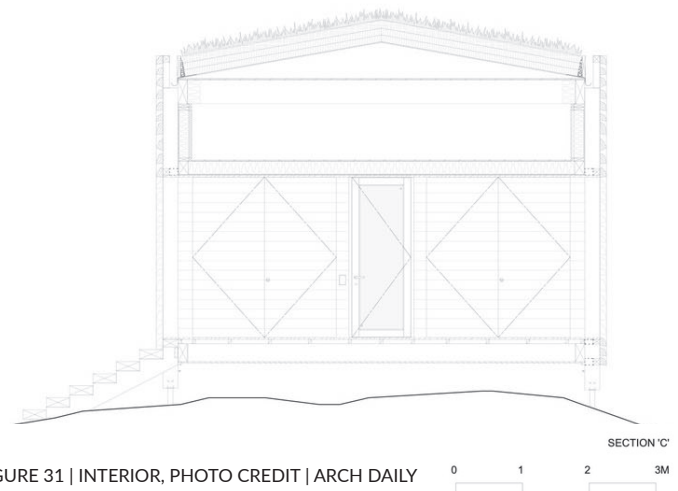
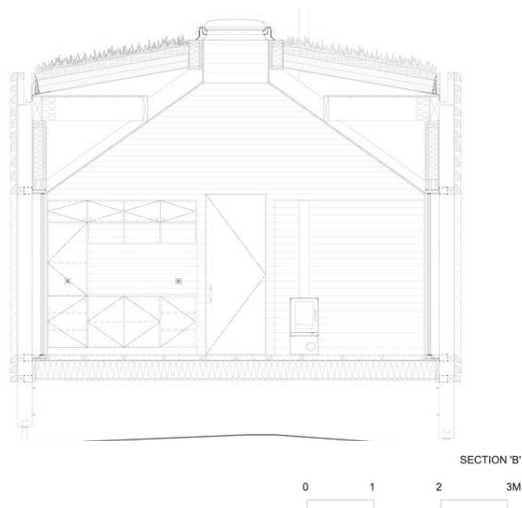


FIGURE 31 | INTERIOR, PHOTO CREDIT | ARCH DAILY



FIGURE 32 | SEASONAL EXTERIOR, PHOTO CREDIT | ARCH DAILY



FIGURE 33 | SEASONAL EXTERIOR, PHOTO CREDIT | ARCH DAILY

PROJECT CONCLUSION

The Skigard Hytte Cabin is a prime example of how a residence can be designed to effectively nestle itself within its surroundings landscape with the use of naturally sourced materials. With the use of sod on the roof and Skigard for the primary material on the exterior, the house blends with its environment. The form is rough but resembles a very present and modern solution to living. The minimal environmental impact of the cabin lends its success to nature with careful consideration on how it can be a driving force on the site. The cabin is designed with the seasonal changes in mind allowing for it to be especially utilized in the winter while still providing a comfortable line where the interior and exterior spaces meet.

I am particularly impressed with how the architects approached the design with its traditional rectangular space while providing a unique interior spatial experience. With the cabin being a fairly long form, it's important to provide enough height to make the form feel uniformly balanced. By doing this, the designers were able to vault the interior spaces and allow for additional natural light in through the roof.

The project in its entirety is the perfect solution for the occupants and the site. It is beautifully crafted and designed to stand out while allowing nature to be the center of attention. It blends with its natural environment and changes with the seasons effectively. The Skigard Hytte Cabin is an inspirational example of how the past can play a primary role in design decisions that help to effectively blend between built and natural environments.

MAJOR PROJECT ELEMENTS

Bedroom, a furnished place for people to sleep.

Closet, an enclosed space dedicated to the storage of things.

Bathroom, a room used for personal hygiene.

Kitchen, a space used for the preparation of food.

Pantry, an enclosed space similar to a closet, for the storage of kitchen related items such as food.

Dining Room, a space dedicated as a place to eat.

Family Room, a non-formal gathering space, for family.

Living Room, a formal gathering space, for guests.

Office, a room dedicated as a primary workspace.

Bonus Spaces (Nook, Den, Game Room, Movie Room, etc.), rooms or spaces dedicated to additional uses outside of the basic requirements.

Sauna, a room designed for relaxation experience with dry or wet heated sessions with steam made from water and high heat.

Interior Green Space, a space integrated within the program dedicated to an accessible/inaccessible space for nature and/or greenery.

Entry Way, a space that acts as a formal entry point to separate interior from exterior.

Mudroom, an informal multi-use entry space.

Laundry, a room or space within a room such as the mudroom dedicated for washing clothes.

Mechanical Room, a room dedicated for the use of mechanical equipment required for the house.

Garage, a large space, attached or detached from the main house, to park cars or storage additional items.

Driveway, an exterior space that is used for the circulation and/or parking of vehicles on the site.

Yard, any space on the site not covered by building, typically covered in grass or landscaping.

USER / CLIENT DESCRIPTION

The project will be based around human occupants inhabiting single-family homes. While the inhabitants will occupy a personal space, the project has the possibility to be solely owned or owned by another for the purpose of being used by another. Users/Inhabitants of the project can range from a single user to a family or number of groups at undetermined amounts varying by project.

Most users will have peak usage during the mornings (getting ready for work) and in the evenings (after work). We must consider the reality of life and the recognition of having a 9am – 5pm job. Within work hours, a house will hardly be used Monday through Friday. On weekends, figuring inhabitants will not be working, peak usage could be considered for Saturdays and Sundays. Peak usage will also need to be considered with region against time of year and season. (ex. Peak usage will happen more in the cold midwestern winters than summers. In the summer, or warmer times of the year, the occupants are more inclined to be outdoors.)

Parking requirements will be defined by the user and project. Depending on the number of users, parking requirements will increase and demand additional parking accommodations or garage space, if chosen. A minimum number of two street parking spots is often required per city code and may be considered too for others such as guests.

The thesis research will consider the integration of minimalistic lifestyle as a driving factor of the built environment. Not all users live the same, but generally require the same spatial requirements such as bedrooms, bathrooms, etc. The project will focus around generally utilized social and cultural factors for existing single-family homes in the hopes to maintain a baseline for ending comparison and correlation between what is currently accepted and what is being proposed in the end result of the project.

THE SITE

The site location chosen to pursue the integration of this proposal resides in the northern region of the Midwest United States. I have decided to use the Midwest region of the United States in considerations of its harsh climate and unique landscapes varying throughout the region. The city I have chosen to locate my thesis project is further north in the Midwest. A river city by the name of Fargo, ND. Fargo is located along the Red River and has historic buildings throughout the city. Fargo is known for its industrialization and thrives as a sprawling area today.

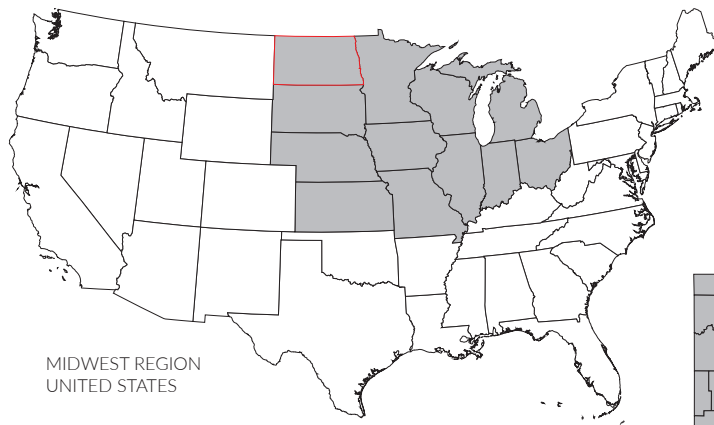


FIGURE 34 | UNITED STATES, FILE CREDIT | FREE VECTOR MAPS

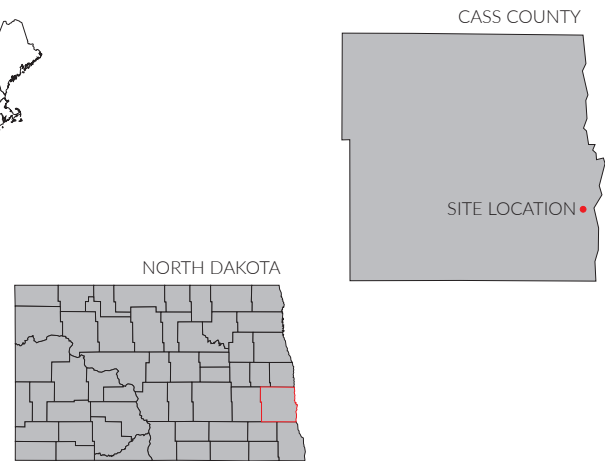


FIGURE 35 | STATE/COUNTY, FILE CREDIT | FREE VECTOR MAPS

SITE SELECTION

The site presented was chosen for its replicable dimensions that are seen throughout all of the newer neighborhood developments. Choosing a site located in Fargo, ND area solidifies the implementation of a model home design solution due to the booming residential home construction economy. The model house design can then be replicated as all other houses currently are with a new face of development.

THE SITE

SITE ZONING

The Fargo Residential Code Requirements zones the parcel as an SR-4 Single Family Dwelling. Dwelling: Single Family: Any building that contains one dwelling unit used, intended, or designed to be build, used, rented, leased, let or hired out to be occupied, or occupied for living purposes.

SITE AERIAL PERSPECTIVE



FIGURE 37 | DRONE AERIAL SITE PERSPECTIVE

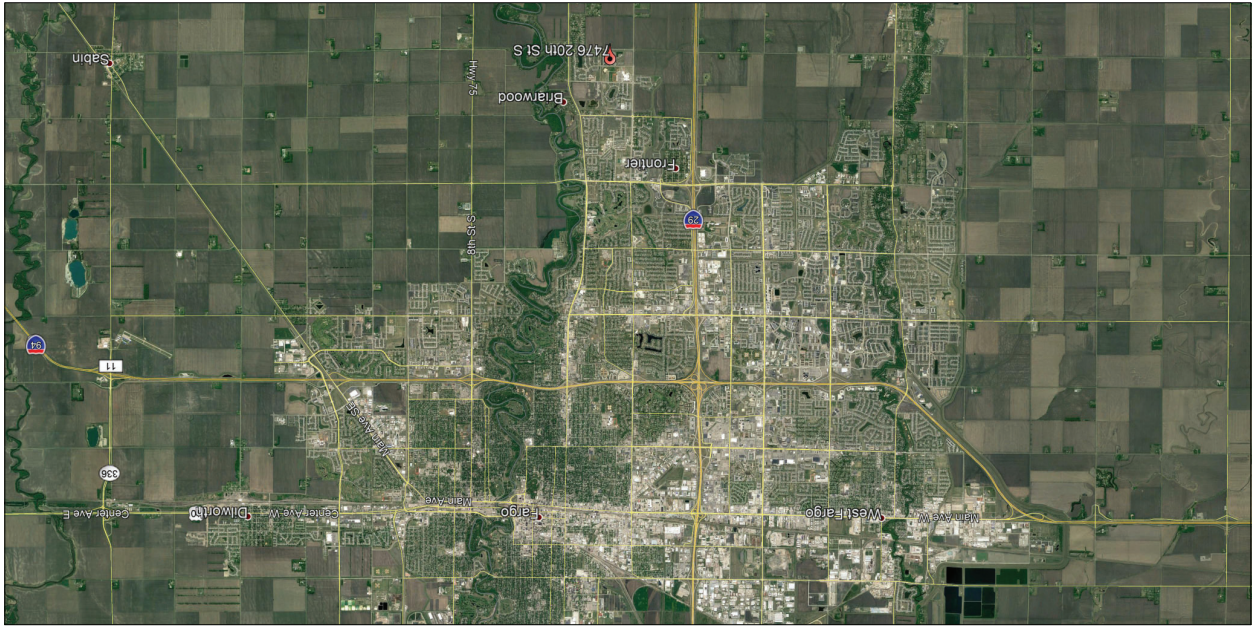
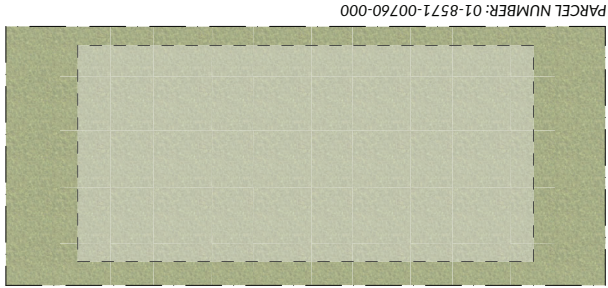


FIGURE 36 | SITE LOCATION, PHOTO CREDIT | GOOGLE EARTH



PARCEL NUMBER: 01-8571-00760-000

FIGURE 38 | PARCEL GRAPHIC
PARCEL OUTLINE

PROJECT EMPHASIS

The project emphasis is put forth to focus on a few particular areas within the thesis proposal that I would like to see developed the most. The proposal is meant to display itself as a simple presentation of ideas while as the project furthers development and into research, I hope to employ further complexities in order to fully dive into the topic presented. The areas of emphasis below are listed in order from least to most important:

1) *Correlation of regional climate similarities between the United States and Scandinavian countries.*

I would like to put initial emphasis on the correlation of climate between the two regions. Narrowing research of seasonal changes and how both the Midwest and specific regions of Scandinavian countries closely mimic each other to provide a baseline of design expected of each region in terms of climate.

2) *Integration of nature, sustainable materials, and environmental design decisions to inform better design and healthier living environments.*

The ability to integrate nature, sustainable materials, and environmental design decisions all play a key role in providing a healthier living environment for inhabitants that can influence better lifestyle.

3) *Analysis of Scandinavian single-family homes in regard to their chosen spatial elements, spatial arrangement, and overall size of the project.*

Scandinavian single-family homes are smaller in size and must utilize interior spatial elements differently than that of the U.S. Analysis of these single-family homes will present different culturally accepted spatial arrangements and how they relate. By providing this baseline of analysis I will be able to thoroughly analyze different Scandinavian homes to reveal what a traditionally modern day designed plan looks like. It is important to understand that most modern-day Scandinavian homes are highly influenced by their history. The study of Scandinavian housing history may be able to add a new dynamic on educating the why. From there a correlation study between typical Midwestern homes and Scandinavian homes can be conducted to analyze the differences and how Scandinavian design can influence better design in the Midwest.

4) *Analysis and integration of required spatial elements with desired spatial arrangements in regard to the correlation of Scandinavian and Midwestern U.S. design to inform better designed floor plans.*

This emphasis will allow me to specifically study each and every major project element to be able to discover typical required spatial requirements such as size, shape, orientation, and the relation to other spaces. The goal is to inform better designed and efficient floor plans that create the ideal spatial plan to fit the users' needs, both present and future.

GOALS OF THE THESIS PROJECT

- 1) *Blending residential Scandinavian architecture with traditional Midwestern single-family houses.*

The primary goal of this thesis project is to educate myself of the culture, lifestyle, and built environments of the Scandinavian countries of Denmark, Norway, Sweden, Finland, and Iceland. To blend my experience of life in the Midwest United States with the findings of Scandinavian life to inform a better built environment in the form of single-family houses. With my current knowledge and experience of the Midwestern housing market I plan to integrate Scandinavian design into a new direction of Midwestern housing design that is meant to influence a better, healthier lifestyle. Utilizing the built environment to directly influence change in the Midwestern lifestyle.

- 2) *Understanding the requirements of designing the most effective built living environment for a single-family home and how users efficiently interact with it to influence a better lifestyle.*

I plan to utilize this project to become the leading expert in the Midwestern region in how humans interact with their built living environments in the form of single-family homes. I will explore the human preferences on what makes a living environment most suitable. To determine what we require from a built environment to help each and every one of us have a healthy mindset and vision for the world and its future. Being the leading expert will require me to have extensive knowledge on the topic and a research background provided by this thesis to give me the credibility that will in turn be used to fuel a career of passion for what I love to do. I will strive to use this thesis project to provide a pathway into my career of helping others in the ways of architecture and design. To be able to convince others that a well-tailored built living environment can provide a way to a better, healthier and happier, lifestyle. Allowing them to enjoy the spaces they inhabit and the natural environment around them.

A PLAN FOR PROCEEDING

DEFINITION OF RESEARCH DIRECTION

Upon completion and submittal of the Thesis Proposal I will begin the Thesis Research portion of the project. The process will be guided by the Unifying Idea stated within the Narrative of the Theoretical Aspect of the Thesis while also closely following the project emphasis and stated goals of the thesis project. With a cohesive understanding of the Unifying Idea, all of these components will allow me to stay on track with relation to my research direction and its success.

One of the first aspects of the thesis research I will explore is the site analysis of the chosen location. I will be traveling to the site to document all of the required categories of study. I am providing myself three days in Duluth to ensure proper exposure to the site and surrounding environment. The site will be documented with a series of photos and video from a phone as well as a drone. The combination of ground and aerial perspective will allow me to bring back perspective analysis that would not be accomplished from google earth or similar methods of analysis. I will be analyzing the data from the visit and organizing it into its proper categories. As I progress through the thesis project, I hope to revisit the site in the spring for any further analysis and documentation required as the project development furthers.

After the initial site visit is completed, I want to begin the research phase of the project by digging into the specific project typology and historical context of Scandinavian countries and Duluth, MN. In order to fully understand the scope and direction of the project I will need to dig into the correlation between the two regions. To successfully integrate the two together in a cohesive manor for the project development phase. I will need to research the history of housing in both regions. I will further study the current and additionally added case studies of Scandinavian house design to gauge the programmatic requirements needed to push the project forward. The analysis of these case studies and their relation in terms of the overall floor plan will be crucial to understand with the combination of Spatial Efficacy research. Spatial Efficacy research has already been begun but will require further correlation studies to provide a specified and detailed analysis for integration later on.

One of the more important portions of the overall research direction data to mention includes the hands-on experience of Scandinavian housing and culture. This portion of the research will be conducted in the form of a three-week research trip to Scandinavia for the Harlyn Thompson Travel Scholarship awarded to me in the spring of 2020. The project proposal submitted for the Harlyn Thompson Travel Scholarship lends itself to be used for my thesis while also serving its own project requirements. The mention of the trip to Scandinavia has been minimal throughout the thesis proposal due to a low probability of it successfully happening. With travel restrictions still highly enforced due to Covid-19, the trip was initially planned for the August of 2020. I have rescheduled it for Christmas break in the hopes of updating my thesis research with hands on experience.

A PLAN FOR PROCEEDING

DEFINITION OF RESEARCH METHODOLOGY

I will use the process listed below to channel my research in a cohesive manor, providing a successful end result and conclusion within integrated design decisions for the end design solution. The goal is to reach a solution that integrates the overarching Unifying Idea within the final design solution. As the research develops, I hope to provide clarity and a focused path for the design process. The methodology will take the form of text, graphics, and experiential recorded data in the form of photos, videos, or voice recordings. The list is guided by the use of Quantitative and Qualitative Data as well as utilizing the Concurrent Transformative Strategy:

- 1) Unifying Idea Guided Proposed Topic Research
- 2) Existing Project Case Studies
- 3) Immersive Personal Experience Study
- 4) Cohesive Integration of Research with Initial Project Design Decisions
- 5) Formulation of an Informed Design Solution

A PLAN FOR PROCEEDING

DOCUMENTATION OF THE DESIGN PROCESS

As the Thesis Research portion of the project is submitted, I plan to continue updating research until the last allowed week before spring break. Continuing research will allow the design process to develop at a higher level. The design process will be highly influenced by the results and constant study of the thesis research and be seen as a uniform process of findings. Documentation of the process will take the form of written and spoken text, graphics both hand and computer aided, and physical formulations of information.

Medium for Documentation of Design Process:

Scanned Physical Documentation

Hand Sketching

Hand Modeling

Computer Representation

Software Used for Development:

Sketchup Pro

Autodesk AutoCAD

Autodesk Revit

Autodesk Infraworks

Software Used for Representation:

Adobe Photoshop

Adobe Illustrator

Adobe InDesign

Lumion

Enscape

Design Preservation Methods:

Continual backup of digital data via Google Drive and/or External Hard Drive

Multiple saved backup files and working drawings.

Design Presentation Methods:

Thesis Presentation Boards, Digital or Physical

Public Spatial Display

Publication of Material:

Allocation of the completed project Final Thesis Book to be used by NDSU as a PDF or Physical Hardcover Book Formats.

A PLAN FOR PROCEEDING

ESTABLISHED PROJECT SCHEDULE

The established project schedule provided below is an overview of the breakdown week by week for the remainder of the fall semester. The spring semester portion will be added once introduced to the new curriculum. The established project schedule is laid out to be used as a reference as to what will be required and what is to come to guide a successful process all the way to project completion. Weekends will not be assessed within the schedule unless specifically planned for with aspects of the project such as a site visit. The project schedule will begin on October 14th and developed on a week by week basis as such:

Week 1 | October 14th – 16th

****October 16th – 19th | Site Visit and Analysis***

- Trip Planning and Site Visit Preparation

Week 2 | October 19th – 23rd

- Documentation and compiling of data from Site Visit
- Further Site Analysis
- Case Study Development

Week 3 | October 26th – 30th

- Unifying Idea Research | Historical, Social, and Cultural Context of Thesis (Unifying Idea Reasoning #1 & #2)
- Case Study Development

Week 4 | November 2nd – 6th

- Unifying Idea Research | Historical, Social, and Cultural Context of Thesis (Unifying Idea Reasoning #1 & #2) – Continued
- Unifying Idea Research | Correlation Research (Unifying Idea Reasoning #3)

Week 5 | November 9th – 13th

**** November 11th (No Class – Veterans Day & My Birthday)***

- Unifying Idea Research | Correlation Research (Unifying Idea Reasoning #3) – Continued
- Major Project Elements & Spatial Efficacy Development

A PLAN FOR PROCEEDING

ESTABLISHED PROJECT SCHEDULE

Week 6 | November 16th – 20th

- Major Project Elements & Spatial Efficacy Development integration with Correlation Research Data.
- Literature Review & Project Justification Assignment Development Overview

Week 7 | November 23rd – 27th

***Tuesday, November 24th | In-Class Assignment #1 – Project Justification**

***Thursday, November 26th | Literature Review Assignment Due**

- Research Development / Preparation Review for Project Justification and Literature Review Assignment Deadlines

Week 8 | November 30th – December 4th

- Further Development for Major Project Elements & Spatial Efficacy.
- Review of Research Development in regard to the Project Emphasis.

Week 9 | December 7th – 11th (Dead Week)

***Tuesday, December 8th | In-Class Assignment #2 – Performance Criteria**

***Thursday, December 10th | In Class Assignment #3 – Space Allocation Table**

***Friday, December 11th | Last Day of Fall Classes**

- Research Development / Preparation Review for Performance Criteria and Space Allocation Table Assignments.

Week 10 | December 14th – 18th (Finals Week)

***Thursday, December 17th – Thesis Research Final Due**

- Project Research Preservation
- Updating of Thesis Table of Contents, List of Tables & Figures, and Appendix Reference List
- Project Organization
- Scandinavian Research Trip Planning

THESIS APPENDIX

PREVIOUS STUDIO EXPERIENCE

2nd Year | Fall 2016

Studio Professor: Darryl Booker

Tea House

Location: Fargo, North Dakota

2nd Year | Spring 2017

Studio Professor: Cindy Urness

Small Dwelling Project: *Marfa Residence*

Location: Marfa, Texas

3rd Year | Fall 2018

Studio Professor: Mark Barnhouse

Wood Project: *The Tamarac National Wildlife Refuge Entomology Laboratory*

Location: Rochert, Minnesota

Masonry Project: *Fargo Industrial Design Firm*

Location: Fargo, North Dakota

3rd Year | Spring 2019

Studio Professor: Regin Schwaen

Steel Project: *Modern Renaissance Renewal Bridge*

Location: Fargo, North Dakota

Concrete Project: *Native American Art Museum*

Location: Moorhead, Minnesota

4th Year | Fall 2019

Studio Professor: David Crutchfield

High Rise: *Mayaimi*

Location: Miami, Florida

4th Year | Spring 2020

Studio Professor: Amar Hussein

Marvin Windows Competition: *Marvin Windows Competition House*

Location: Fargo, North Dakota

THEORETICAL PREMISE / UNIFYING IDEA RESEARCH

HOW DESIGN INFLUENCES LIFESTYLE

How can the built environment in which you live, influence your lifestyle and way of life?

LITERATURE REVIEW

INTERIOR DESIGN PRACTITIONER MOTIVATIONS FOR SPECIFYING SUSTAINABLE MATERIALS: THEORY OF PLANNED BEHAVIOR TO RESIDENTIAL DESIGN

Sustainability in the design profession is increasingly growing in importance as the world is moving towards environmental disaster. The research article chosen to be reviewed visits the interior design profession and the motivations for specifying sustainable materials. More specifically, Allen, Kim, and Lee apply the Theory of Planned Behavior to residential design in the hopes of providing clarity on how more sustainable decisions can be made and influence present and future buildings. The literature review will focus on a few key points discussed throughout the article such as an overview of sustainability and how it plays a role in the design profession, the implementation of the Theory of Planned Behavior and Methodologies used in the research studies, as well as an overview of findings. I believe that not only interior designers, but all designers should be specifying sustainable materials to positively influence overall environment and interior environment health.

Sustainable design has become one of the major concerns in the design profession. More specifically, the article focuses on Interior Design. An interior designer is typically in control of a project's interior with materials and furnishings. The interior design profession is particularly important with the ability to influence interior spaces through design decisions that may influence the space both positively and negatively. Although sustainable design is a major concern, there is a limited amount of implementation in real practice. This particular article visits the correlation between interior designers, sustainable material choices, and the application of the Theory of Planned Behavior in regard to residential design. Focus is put towards sustainable flooring materials for residential use. The article provides key supporting research information in the development of the thesis narrative. While it focuses on interior design, the fundamental findings can be implemented in the architecture profession as well.

According to the U.S. Environmental Protection Agency (EPA, 2009; EPA 2013a), indoor pollutant levels may be two to five times higher than outdoor levels. The average American spends an immense amount of time indoors which can be harmful to health if indoor pollutants aren't considered properly. Harmful effects of the indoor environment can be mitigated when sustainable materials are implemented. The ability to produce a more desired interior environment should not just focus on the overall health of its inhabitants, but their well-being. Off gassing from non-sustainable materials within an interior space such as flooring, paints and coatings, adhesives and ceilings, wall coverings, and additional used materials pose massive health risks. Healthy indoor environments need to become a focus of designers, more specifically interior designers as undesirable

THEORETICAL PREMISE / UNIFYING IDEA RESEARCH

HOW DESIGN INFLUENCES LIFESTYLE

How can the built environment in which you live, influence your lifestyle and way of life?

LITERATURE REVIEW

INTERIOR DESIGN PRACTITIONER MOTIVATIONS FOR SPECIFYING SUSTAINABLE MATERIALS: THEORY OF PLANNED BEHAVIOR TO RESIDENTIAL DESIGN

indoor environments may result to “sick building syndrome” where inhabitants are exposed to building-related illnesses while inhabiting these spaces for extended periods of time. There are two primary considerations for sustainability. Building design and construction play key roles in implementation of sustainable practices. The implementation of sustainable materials within the interior environment creates a desired space to inhabit while those sustainable materials also need to be considered when it comes to minimizing waste from construction and demolition. Traditionally, sustainability is viewed as a pathway to benefiting the earth and climate change. It’s often forgotten that these decisions improve occupant health and satisfaction the same. The article provides a great perspective from the Global Development Research Center (GDRC, 2008) that defines sustainable development as “maintaining a delicate balance between the human need to improve lifestyles and feeling of well-being on one hand, and preserving natural resources and ecosystems, on which we and future generations depend” (para, 1). It’s been too long where we have overused and wasted resources. The design and construction industries have seen an increase in sustainable buildings, but not at a particular desired rate for residential that the commercial market has seen. Residential projects are often not developed at the scale at which commercial projects are posing issues with significant barriers for sustainability such as high initial costs. For most homeowners, the long-term financial rewards aren’t enough to justify the higher upfront costs of implementing sustainable practices at the residential scale. Often, designers and homeowners alike are not informed enough and don’t possess the proper understanding of all of the benefits of sustainable residential buildings. The article chooses to focus on flooring material due to the large amounts of released pollutants from off gassing that can influence negative health outcomes of inhabitants.

“To promote the benefits of sustainable residential design for the environments as well as for the well-being of residents, it is imperative to further encourage interior designer adoption of sustainable materials in actual practice.” (Lee, A. (2013)

The Theory of Planned Behavior was proposed by Ajzen (1985) and extended the original theory of reasoned action (TRA), by Fishbein and Ajzen (1975). (Lee, A. (2013) The article utilizes the Theory of Planned Behavior (TPB) as the theoretical framework for its research studies to understand what is and can be done to influence designers to choose to make more sustainable decisions. The TRA explains that people are more likely to participate in a certain behavior driven by behavioral intentions (1) when they have more positive attitude toward

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- the behavior and (2) when they perceive their significant others want them to perform the behavior. (Lee, A. (2013) The three determinants of the TPB are attitude, subjective norm, and perceived behavioral control. Attitude refers to a person's positive or negative evaluation of a relevant behavior. (Lee, A. (2013) Someone is more likely to engage in a certain behavior if they have positive attitudes towards it. If an inhabitant has a positive attitude towards lowering energy consumption in the house, they will most likely do more to not use as much energy in their everyday life. Similarly, if a designer has a positive attitude toward making sustainable design decisions, they will most likely make them. Subjective norm is defined as the social pressure to perform or not perform a particular behavior. "Referent individuals or groups are based on demographics (e.g., family, parents, and friends) and situations (e.g., client, supervisor, and co-workers)." (Lee, A. (2013) Lastly, perceived behavioral control refers to an individual's perception of ease or difficulty of performing the behavior (Ajzen, 1991). Someone is more likely to do something if it is easy. If sustainability is perceived to be easily implemented, then more would opt to do so. Unfortunately this isn't the case currently. The study hypothesizes and proposed model look to implement all three of the Theory of Planned Behavior determinants for consideration when analyzing results. Additionally, the TPB utilizes an expectancy-value model that specifies the relationship between beliefs and attitudes. "According to the expectancy-value model, an individual's overall attitude toward a behavior is determined by his or her accessible beliefs or subjective values regarding the outcomes associated with that behavior (Ajzen, 1991; Fishbein, 1963; Fishbein & Ajzen, 1975).

The article uses quantitative methodologies by utilizing interest surveys to gather information from over a thousand interior designers a part of the American Society of Interior Designers specifically practicing in residential design. A total of 1,875 surveys were sent to designers across the nation and only 225 were chosen to be used in the study. The survey asked a handful of questions that were categorized by questions pertaining to demographic information and questions based on the major determinants from the TPB. Each question was then answered based on a ranging scale from 0-7. The results from the study were overall positive and supported the initial statement. "Our findings support previous studies, demonstrating that interior designers' positive attitude toward the adoption of sustainable materials leads to their stronger behavioral intention to adopt sustainable materials." (Lee, A. (2013)

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In conclusion, the findings through surveys with the implementation of the Theory of Planned Behavior points towards awareness for present and future designers to develop built environments that positively benefit its inhabitants as well as the environment. When designers and inhabitants have an overall positive attitude towards sustainable decisions, they will be more inclined to make sustainable decisions. It's crucial to educate present and future designers to have a positive environmental attitude through formal and continuing education. Additionally, designers play a key role in educating others of the significant health and environmental benefits of the adoption of sustainable materials.

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The article visits the correlation between wood and human stress in the built indoor environment focusing on the key impacts that wood has on the inhabitant's well-being. This literature review will analyze major categories for the implementation of wood in interior spaces and its positive impacts in regard to wood sustainability, restorative benefits on human stress and psychophysiological responses, theories and measurement methods, as well as restorative environments and building design. I believe that the integration of wood within interior spaces benefits its inhabitants and adds a level of sustainability to both the space and project as a whole.

Majority of people spend an unfortunate amount of time in doors. Whether it be at work, at home, or for entertainment, the indoors provides a high level of comfort and protection from the exterior elements. With the large amounts of time spend indoors, these spaces should be created to provide a healthy environment and benefits for its inhabitants. The reality of this is that most spaces aren't designed to do this. With the importance of indoor environments designers should be considerate of the materials they ultimately choose. Wood is one of the best natural resources out there and is not only the best for building, but also reducing stress. It's no secret that natural environments outside positively influence people both mentally and physically. This is why implementing wood into our built environments can also improve the well-being of inhabitants since most of our time is spent Indoors. Wood is a widely used and accepted building material that makes up many products used in the market today. Wood is considered a sustainable building material that is manufactured by nature and the sun. The process that trees undergo as they grow is a huge example of how carbon is stored. After conversion to building products (e.g., lumber, wood-based panels), wood has only a minute amount of embodied energy compared to other building materials and increases the pool of stored carbon in the built environment creating a positive impact on climate change (Sinha et al. 2013). Sustainable material choices are the future of building design and construction. It's only recently that people are becoming more aware of climate change and the environmental concerns that accompany it. Most perceive sustainable decisions as a way to help the world by reducing energy usage, water consumption, and recycling being some of the primary examples that come to mind. These primary examples are incentivized on a small scale within households that also can understand the cost savings on their energy bill. Larger dedications to sustainability such as constructing a net-zero home that uses the same amount of energy yearly as it creates itself. These sustainable decisions have greater upfront costs that are paid back over the lifetime of the home. There are net-zero homes around the nation, but due to its high upfront cost most opt to not. Whether big or small, it's not often that people fully consider decisions

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that can ultimately benefit their well-being while also helping the earth! While it's important to understand the positive impacts that these decisions do for the earth, the article focuses on the benefits and well-being for inhabitants. Indoor wood applications can be used throughout construction, for aesthetic purposes, and even for furniture. Wood has a wide range of applications that are seen throughout design trends. Ultimately, there's not much understanding of what benefits and what doesn't. Due to this, majority of people also have high levels of disconnection with nature.

If you were to ask someone how to make an interior space healthier one of the primary answers would be to add greenery, more specifically, plants. Just as mentioned earlier, the close relationship that humans and nature share from the beginning of time drives the question, why don't we surround ourselves with it more? Wood is highly recognizable just as a plant is. Ultimately, it may come down to the education of homeowners and providing information to allow people to make these decisions.

Each designed project has a list of goals and requirements to ultimately develop a successful end product. The well-being of occupants is often overlooked when it comes to health. The needs of inhabitants are fully understood spatially, but it's disheartening see design decisions that don't consider overall mental and physical benefits. The article seeks to develop a better understanding of human stress and restoration. Restoration theories are primarily used through psychology but can be adapted to design and implementation of wood in built environments. Emphasizing occupant health, nature and sustainability. Increasing wood use will allow inhabitants to reap the benefits of more conscious design implementation and sustainable material decisions. Hartig (2004) defines restoration as a process of renewal that replenishes a depleted social, psychological or physical resource. These resources can be depleted while striving to adapt to the specific environment. Psychophysiological stress both physically and mentally has been a primary topic of restoration theories and focuses on the restoration from forms of stress. Focus on the outdoor environments play a key role in majority of these research theories. "For example, a recent study examined the effect the presence of plants in an office-like environment has on attention capacity and found participants performed better in the presence of plants after performing a task approximately 25 min in the test room, but not upon entering the test room (Raanaas et al. 2011)." (Burnard, K. (2015) These findings of stress and psychophysiological responses to plants are similar to that of wood. These studies use nature as a primary focus of restoration recovery while utilizing different methods of monitoring and measuring human stress. Researchers have used a list of different indicators such as

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- monitoring the nervous system, blood pressure, release of hormones, salivary cortisol levels, etc. The article reviews these methods throughout several studies and concludes with the understanding that although there have been few studies done with examining the psychophysiological effects wood has on inhabitants, results show that wood has an overall positive effect. Past studies ultimately provide proof that humans experience positive health benefits and greater impact when exposed to wood in their indoor built environments. It's also found that the amount of wood within a space may affect different inhabitants differently based on preference. Wood has shown to not negatively impact any tests, but either be non-effective or positive.

Restorative environments and building design paradigms play key roles in psychophysiological stress recover. The natural environment has proven through many studies to positively benefit people. According to Kaplan (1995), there are four primary components of restorative environment.

1. Being away – the sense of being in a different environment
2. Fascination – when one's attention is effortlessly focused on something
3. Extent – feeling an area to be larger
4. Compatibility – the natural affinity humans seem to have for nature

The article points towards biophilic design to provide guidance on the incorporation of these components into a successful building design. Biophilic design is the incorporation of the principles of biophilia into building design (Kellert 2005, 2008). Those six guiding principles are best described by Kellert (2008):

1. Environmental features—making design choices, which reflect readily recognizable as aspects of nature. These features may range from views of nature, to water features within the building, to including a wide variety of indoor plants.
2. Natural shapes and forms—using elements of the built environment to replicate naturally occurring elements (such as trees).

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3. Natural patterns and processes—using elements of design (such as materials, spaces, lighting, etc.), which through visual recognition, touch, scent, or sound remind occupants of growth, life, natural motion, and other elements of nature.
4. Light and space—diversity of color, natural light, and variability in lighting levels are reminiscent of nature. Further, difference in size and shape of spaces in the built environment also remind us of nature.
5. Place-based relationships—connections to cultural and ecological elements linking geographically distinct locations with the built environment.
6. Evolved human relationships with nature—the connections humans have developed throughout the evolutionary history. For example, natural settings, such as forests, have provided shelter and safety, food and materials for survival.

Restorative Environmental Design (RED) attempts to promote a stronger connection between building occupants and nature, in order to inspire and motivate people to care for the environment. (Burnard, K. (2015) RED strives to reduce environment impact while providing inhabitant with healthy benefits and a stronger connection to nature. Wood is an ideal material for these desired requirements as it is sustainable and once was a part of nature and is nature. Wood is abundantly available and if forests are properly managed, it will always be. Wood is an excellent building material because of its excellent strength-to-weight ratio and the variety of forms in which it can be used (e.g., in log form, lumber form, in fibre form, and in combination with other materials) (Kretschmann 2010; Stark et al. 2010). Wood is the primary chosen building material for residential homes across the United States due to it being cost effective and having a great strength-to-weight ratio. Wood is used for far more than structural elements in framing, but for flooring, ceilings, walls, etc.

The article strives to educate and convince readers to choose wood as a primary building material with the hopes of increasing overall interior built environmental quality having to do with occupant health and wellbeing. Wood has been studied and proven to reduce stress in occupants by providing a closer relationship to nature in the interior environment. Wood is a great sustainable material choice and is relatively cost effective across all implementation methods. Wood integration is a big step in the right direction, but additional factors need to be considered when it comes to overall interior quality.

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The importance of nature for a human is unmatched. Whether exterior or interior, nature provides inspiration for life and provides many health benefits. The summary will review each chosen article and how they relate to each other as well as tying into the proposed theoretical narrative and unifying ideas.

Both articles reviewed have direct relation to the theoretical premise/unifying idea presented in the thesis proposal. Similarly, both articles are highly related to each other promoting sustainability in the design profession. Summarizing the literature review of each article in correlation with the proposed unifying idea will present a thorough understanding for use in implementing into final design decisions as well as reinforcing research elements proposed. Sustainability should be highly integrated into every built project utilized throughout the profession.

Sustainable choices in real practice endure limitations when it comes to actually implementing them in real world projects. The articles both strive to invite designers to create better built environments for inhabitants. While the first article focuses more on the interior design profession, they do state in the article that the research findings hope to serve useful for other professions. The use of non-sustainable materials have the ability to create a toxic interior living environment that is two to five times worse than exterior air. It's important to understand the amount of time spend indoors in order to make decisions that benefit the user. These interior pollutions levels can prove harmful to inhabitants and affect respiratory and digestive systems. Sustainable choices for design professionals are available and need to be taken advantage of. Promoting for healthier interior environments will increase inhabitant satisfaction.

Both of these articles can be highly integrated into the existing thesis project considerations. Scandinavian design and lifestyle philosophies drive the project program and inspiration for the upcoming design integration. Scandinavian design trends are well known throughout the world and influence a high level of simplicity and visual aesthetics. Previous research and understanding of the design trend points to major influence of lifestyle philosophy. Nordic residents have a higher level of life satisfaction and require a healthier living environment for mental and physical health. In the United States, this lifestyle philosophy is sadly missed. Without the philosophy to drive lifestyle choices average Americans are settling for low end interior environments. Sustainable healthy materials are slowly become more and more cost effective but ultimately are much more expensive than traditionally accepted materials. Traditional residential living environments are constructed with materials that off gas toxic fumes that harm its inhabitants while Nordic homes are often built with higher quality natural materials. The Nordic region is known for their white wall and wood ceilings and floors. Typically the white walls can even be wood as well. The second article focuses on the implementation of wood throughout the built environment.

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The first article strives to bring awareness of sustainable design decisions and sustainable materials from the Interior Designer perspective. The article focuses on sustainable flooring materials for residential use to reduce the negative impacts of off gassing in the interior environment. In order to grasp understanding of why sustainable decisions aren't more readily implemented into the design profession, the Theory of Planned Behavior is used as a theoretical framework to study findings on how the relation of attitude and beliefs influence decisions. The study used internet surveys to target interior designers working on residential projects in the United States. Their results successfully reinforced their initial targets showing that majority of the surveyors' beliefs about environmental outcomes are highly influenced by their attitude towards sustainable material adoption. One of the biggest results found by this article presented that a larger amount of people may accept sustainability integration more if properly educated. Most people have a positive attitude when it comes to the environment. Traditionally many would look towards reducing energy and water consumption and recycling. It's highly unlikely that the average American would have much knowledge of sustainable materials. It is the job of designers through the perspective of both articles to implement sustainable decisions to better serve the inhabitant. If designers have easier access to sustainable material and education the profession can begin to drive better healthy design while educating others.

In conclusion, both articles promote sustainable design with the use of psychological methods of research to present information that influences positive understanding of sustainable implementation in the design profession.

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The 2020 World Happiness Report is a great resource to review to gain further understanding of what criteria each country is rated on when it comes to their place. The United States was rated number 18 on the list while all Scandinavian countries were in the top 10. The 2020 WHR has taken a particular focus to the Nordic region due to their continual success in high rankings throughout the years. Chapter 2 in the WHR analyses the key factors taken into consideration for overall ratings for countries. These factors are not exhaustive by any means and also consider further correlation between other topics discussed in additional chapters. Although the six key factors in the WHR have little to do with architecture and more about social and political topics, the further analysis of additional considerations having to do with overall happiness can be closely related to it. Chapter 5: How Environmental Quality Affects Our Happiness presents a popular perspective on the desire to design with an integration of nature. Natural environmental connections are the key to a happier life. If that's the case, why isn't more of the United States adopting this ideology that has been around for a while. The WHR utilizes national survey data from the Gallup World Poll, a top survey organization reaching up to 99% of the world's adult population. An additional large contributing factor for data is the use of Mappiness, a smartphone app that randomly accesses users' feelings of happiness based on their location. Studies show, there is a genuine interest in the affects that the natural environment play on people well-being with most caring more for environmental protection over economic growth.

Perspective for a better world are greater covered in Chapter 6 with the analysis of the Sustainable Development Goals (SDGs), and people's current life evaluations. Sustainable Development Goals is the 2030 agenda for sustainable goals created by the United Nations to improve the planet and establish a positive future for all. There are 17 SDGs that act as guides for the population to effectively combat the largest issues in the world today. The WHR analyzed all 17 goals and found that Goals 4, 8, & 9 focus on Economics, Goals 1, 5, 10 are Social, Goal 16 is Law, Goals 2, 6, 7, 11, 12, 13, 14, 15 have a primary focus for the Environment, and Goal 3 is for Health. While most of the SDGs goals are out of reach for the architecture profession, there are a decent amount that can be influenced. There are a few goals that can be directly influenced by the residential architecture sector such as Goal 7 (Affordable and Clean Energy), Goal 11 (Sustainable Cities and Communities) and Goal 12 (Responsible Consumption and Production). Although all 17 SDGs are created benefit people and the planet alike, the WHR has found that not all positively influence the well-being of people. SDGs 12 (Responsible consumption and production) and 13 (Climate Action) are negatively correlated with human well-being. SDG 12 (Responsible consumption and production) is more focused on quantity over quality. Focusing more so on the quantity of waste created through consumption and production at varying scales. Instead, SDG 12 should be focusing on the proportion of responsible production and consumption. This SDG can be directly related to the architecture profession with considerations of construction and building materials. SDG 13 (Climate action) is based on

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the rate of which energy-related CO₂ emissions and other varying considerations that are not adjusted to consider the scale of economically developed countries producing more. The architectural profession can be related to SDG 13 with the reduction of energy usage in each household ultimately reaching net zero. Residential housing plays a major role in the usage of energy. Reducing energy loads for each residence will reduce CO₂ emissions based on energy creation. It's important to review the SDGs and see that there are a few that the architecture profession can influence by putting importance forward as businesses.

The World Happiness Report added an additional Chapter for 2020 that looks to explain the reasons of why Nordic countries are continually among the happiest countries in the world. Although the analysis of Nordic countries in Chapter 7 has more to do with social and political considerations such as welfare generosity and institutional quality, there is a large portion documented throughout the WHR that points to the importance of social environments. Particularly the focus on trust and social connections. The Nordic countries have a greater trusting society and this trust has allowed them to continue the quality of lifestyle and culture they have now. This trust has pushed their culture to the forefront of desired trends specifically in the United States. One of the most important pieces of the Scandinavian culture is a close relationship with nature and the outdoors. Chapter 5 in the WHR analyses just how a close relationship with nature directly influences a more positive well-being. The report brings up an interesting perspective on the relationship between humans and nature. Why do we expect nature to influence happiness? It seems selfish of the human population considering that we continually used nature to benefit progress while equally destroying the earth in our path just to expect nature to make us happy. I would say that whether or not we expect nature to make us happy is just a preconceived idea for believing we can control what's around us. The WHR presents the word Biophilia as a primary example from research pointing to why nature is so impactful on people's well-being. According to Merriam-Webster, Biophilia is "a hypothetical human tendency to interact or be closely associated with other forms of life in nature: a desire or tendency to commune with nature." Psychology studies show that exposure to nature improves overall mental well-being, also adding a list of positive benefits. When the thought of nature crosses our mind as people we think of outside. Similarly when thinking of outside we would often imagine a park or hiking among the trees. Natural environments positively influence people to have the desire to be outside. Which, in turn, influence people to participate in healthier exercise and social interaction. The stressful perspective on urban developments created by man create a divide between nature. Nature is a place free of this perspective and is often sought after as being a getaway. The WHR references a research article published by Nisbet and Zelenski in 2011 titled: Underestimating Nearby Nature: Affective Forecasting Errors Obscure the Happy Path to Sustainability. The report states, "Nisbet and Zelenski (2011) show that people systematically underestimate the well-being benefits of nature, potentially failing to maximize their well-being by spending more time in natural settings."

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Although this may be true the WHR found that the area of forest in the region in which you live has no significant effect on how people evaluate their lives. I would question whether or not the living location in relation to these forested areas would directly influence people's evaluation. A secondary question put forth by the report being, are people who live closer to nature happier? The WHR presents unique information provided by the Mappiness smartphone app to document users feelings compared to their geo-location data points. The Mappiness study presents a list of important study categories such as Weather and Daylight, Air Quality, Noise, and Outdoor Spaces and Activities. Outdoor Spaces and Activities describe two primary outdoor location categories of green and blue spaces. Green spaces describing parks, areas of tree cover, etc. Blue spaces describing ponds, lakes, canals, rivers, etc. The analysis shows that being outdoors around green or blue spaces significantly increases happiness levels. Similarly, activities done outdoors or near nature such as walking, hiking, biking, etc. are more enjoyable and have the largest effects on happiness both mentally and physically. This understanding of outdoor space and nature as a whole can be utilized when considering residential life. The WHR presents a perspective that, "there is a significant, positive relationship between the amount of green space around households and the happiness of household members." (Pg. 105) Residential life and where you live is important to consider when addressing weather and daylight. the rate of which energy-related CO2 emissions and other varying considerations that are not adjusted to consider the scale of economically developed countries producing more. The architectural profession can be related to SDG 13 with the reduction of energy usage in each household ultimately reaching net zero. Residential housing plays a major role in the usage of energy. Reducing energy loads for each residence will reduce CO2 emissions based on energy creation. It's important to review the SDGs and see that there are a few that the architecture profession can influence by putting importance forward as businesses.

Climate is a highly important environmental characteristic. Depending on the type of climate you live in, a particular weather condition may directly affect an individual's decisions to spend time outdoors and in natural environments. This would be the case for harsh winters in the Midwest forcing inhabitants to remain indoors for longer periods of time throughout the winter season. With the lack of outdoor green space available through most of the year, this would be a good point to argue why the integration of green spaces within residential homes, specifically in the Midwest and Scandinavian countries, would be beneficial to overall mental health. The proximity to nature both indoor and outdoors can influence air quality and noise alike. As the air quality can be negatively influenced with a lack of trees in an urban setting or positively influenced with an abundance of trees in the forest. Where high levels of noise are consistent, it is typical to see higher levels of air pollution particularly related to vehicular traffic.

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All considerations of environmental qualities seem to hold true in the overarching perspective of United States midwestern neighborhoods. Neighborhoods have done away with most nature in order to create a blank slate to develop new homes on. Effectively removing scarce amounts of locally sourced trees and replacing them with a consistent pattern of new saplings based on urban development. While the Scandinavian culture desires to have a closer relationship with nature, pointing towards an additional consideration on why Nordic countries remain the happiest places to live. By no means is the analyzed research from the World Happiness Report meant to be an exhaustive in-depth overarching summary. The goal of the analysis is to present research that points towards further understanding of Scandinavian lifestyle and culture.

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HISTORY ANALYSIS OF UNITED STATES HOUSING

To understand how better design can be integrated in current urban sprawl It's important to understand the timeline of history relating to the development of current acceptable developments. The way neighborhoods are today have not been developed over night, but for over the last 120 years. This research analysis documentation from a list of articles is used to increase the understanding of where urban sprawl started and how houses have developed from the past.

The history of United States housing can be traced far back before the 1900's. Based on chosen articles and a common understanding of current residential housing that still exists today is the analysis of development from the early 1900's to present. There may be the understanding that all houses were built by hand and from locally sourced materials in the area such as log cabins. Even back in the early 1900's the housing industry was quite developed and complex. Kit homes, or catalog homes, were all the buzz in the housing industry. Imagine being able to search through a catalog of homes and choose your favorite. Only to have it ordered and systematically itemized in the factory and shipped to the site via train. These kit homes were then assembled by the owner or hired builder. These kits came with everything from foundation material to the roofing and down to detailed trim work. There had to have been some slowing of home construction when the U.S. was involved in World War I between 1914 and 1918. There are dozens of companies that tried their hand in this revolutionary business, and some remained small, some failed, and some succeeded as all businesses do. Aladdin Kit Home Company was one of the first. Their homes were typically referred to as "Aladdin Redi-Cut Homes". These Redi-Cut homes were prominent between 1906 and 1981 where they were located in Bay City, Michigan. Aladdin had beat the more well-known Sears, Roebuck and Co. by a few years with Sears Catalog Homes, typically referred to as "Sears Modern Homes", appearing in the market between 1908 and 1940. It is said that over 75,000 homes were sold by Aladdin when they were selling in the early 1900's. Sears Modern Homes estimated to have sold around 100,000 catalog homes in the U.S. between 1908 and 1940. Sears set their business plan apart from others by offering accompany home mortgages to customers on their homes which typically costed upwards of \$5,000. Kit homes were entirely successful and make up most of the outdated residences in cities across the U.S. Sears reported to have their heaviest individual sales year before 1929 which was the start of the Great Depression following the Stock market crash in October of 1929. The Great Depression lasted up until 1939 when the United States was forced into World War II in September of 1939. The war efforts engulfed the U.S. and forced all efforts of production towards weapons, ammunition, supplies, etc. In April of 1942, the War Production Board Issues Order L-41 in which all non-war-related housing construction was to cease.

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How can the built environment in which you live, influence your lifestyle and way of life?

HISTORY ANALYSIS OF UNITED STATES HOUSING

The war served to extinguish any form of housing boom happening in the early 1900's and would not resume until shortly after the war in 1945. As the war ended, the thousands of soldiers began to return home. American production had been focused on the war for the last 4-6 years with nothing non-war related being produced which drove a shortage of housing for new families forcing the baby boomer era into undesirable living situations. All living opportunities were within the city which charged a large premium for rent with less than desirable living situations. Government backed loans for veterans drove the housing boom and enabled thousands of people to abandon city life. Mass-produced, "cookie cutter" homes in suburbia was born. Land was cheap outside of the city and so was building new construction houses. The Federal Housing Administration and the Servicemen's Readjustment Act of 1944. G.I. Bill fueled the housing industry. Easily affordable mortgages for returning members of the military. Government backed, low interest, fixed rate mortgages with zero or low-down payments and up to 30-year terms solidified the opportunity for soldiers to afford a new home and way of life that offered much cheaper monthly payments to work toward owning your own house versus renting in the city. By 1950, suburban growth was 10 times that of urban cities and 55% of Americans owned their own home.

In 1947, real estate development company Levitt & Sons brought mass production to suburban housing. Levitt and Sons took advantage of the government backed mortgages assuring credibility of new homeowners in order to increase placement within homes almost immediately. More than 17,000 modest cookie cutter homes at 750 sf with two bedrooms and an unfinished attic on a 60'x100' plot of land. A car port and a tree out front. Levitt built the template for a new kind of American community and referred to himself as the "General Motors of the housing industry." These large amounts of homes were named Levittown's. Levittown was built using the principles of the assembly-line based on the war efforts of production and Ford's automotive industry. Houses were constructed in 26 (or 27) distinct steps with the exact same floor plan. Levitt utilized non-union workers in order to train each worker to perform a single task to accomplish as they moved from house to house and paid each for completing each job versus an hourly wage. Early constructed houses only costed around \$7,000. Houses were made quickly, cheaply and abundantly. Concrete slab on grade foundations were chosen over digging a basement, materials could be bought in bulk, cut to size and shipped to the building site which resulted in less waste and bigger discounts. On top of that, Levitt also bought up all of the subsidiary companies he relied on for providing necessary building materials for each home such as nails and windows. This ensured a smooth process of material delivery with little fuss.

HISTORICAL, SOCIAL & CULTURAL CONTEXT OF THESIS

HOW DESIGN INFLUENCES LIFESTYLE

How can the built environment in which you live, influence your lifestyle and way of life?

HISTORY ANALYSIS OF UNITED STATES HOUSING

As families raced to move into Levittown, regulations on the newly developed communities coined Levittown's very existence as "an rare act of American socialism." The first families that moved in were given an owner's manual on how to maintain their property. You had to take care of your lawn. You couldn't use clotheslines as to not block neighboring views. You couldn't install yard fencing and above all, Whites Only. Later on, majority of the houses were immediately remodeled and changed by the new homeowners to add uniqueness going against regulations. However, the neighborhoods were designed with the typical family in mind. Majority of the adults being under 30 with children under 5. Streets were curved to slow traffic and schools were within walking distance under a mile as well as integrating community chosen churches and shopping malls. There are three Levittown suburbs that were built in New York, New Jersey, and Pennsylvania. Levittown serves as a crucial reminder of the man who built suburbia, William Levitt. Houses lacked originality and were indistinguishable from the rest of the neighborhood with a sameness to them. Although the homes built by Levitt left more to be desired in the modern-day perspective, these were houses for a generation that lived through the Great Depression and World War II and "represented unimaginable luxury." The American dream of having kids, a dog, and a house with a white picket fence had begun.

It's no surprise that suburban sprawl across the United States has hardly changed from the efforts of William Levitt. The man provided the necessary housing for incoming soldiers and helped to evade another housing crisis. Not all bad has come from the integration of suburbia on the culture. I would view the analysis of information as proving to be the right solution for the time. However, it's 2020 and we ought to expect more from our living situations. Unfortunately, suburbia seems to be here to stay for the time being and the only way to combat the traditional 60'x100' plot established in Levittown's is to integrate a better design solution to provide all of the factors that suburban neighborhoods lack.

HISTORICAL, SOCIAL & CULTURAL CONTEXT OF THESIS

HOW DESIGN INFLUENCES LIFESTYLE

How can the built environment in which you live, influence your lifestyle and way of life?

HISTORY ANALYSIS OF SCANDINAVIAN (NORDIC) HOUSING

If this thesis looks to take valuable information from Scandinavian countries it will need to obtain a body of research and knowledge to provide a solid foundation in which to take from. The integration of both design and lifestyle philosophies will drive the program to develop in a beneficial way. This analysis will review the articles and information gather that brought me to my understanding of how to approach Scandinavian philosophies and how I plan to implement them within the final solution.

Just as I reviewed the history of housing in the United States to understand the origination of urban sprawl and suburban neighborhoods, I look to Scandinavian history to unveil the origination of their philosophies. Analysis of Scandinavian countries of Denmark, Norway, Sweden, and Finland looks to provide a path of research to the answers. Beginning with the consideration of World War II, I was curious to see how Nordic countries played a part. Scandinavian Countries of Denmark, Norway, and Sweden remained neutral during World War II and were taken advantage of by the Germans and Russians The Soviet Union attempted to invade Finland in the Winter War in 1939 to no prevail. Finland fought with Germany against the Soviet Union to win back their territories lost to the USSR. A peace treaty ended the war in March 1940 and Finnish kept their independence. This information looks to answer whether or not WWII had any particular impact on history of design or overall philosophies such as the U.S. had. I found no reason that WWII had directly impacted any of the countries.

Post WWII, Nordic countries were able to keep their independence and marked the movement towards social democracy as they are today. Within this change came the Scandinavian design movement. A new design style emerges that offers the approach for minimalistic, simple, functional, modern, and beautiful to be affordable for all. The minimalist style of Scandinavian design initially originated during the 1930s within the five Nordic countries of Denmark, Finland, Iceland, Norway and Sweden, the familiar term "Scandinavian design" originated from a design show that traveled throughout the United States and Canada between 1954 and 1957. At this point Scandinavian design trends hit the market and were instantly idolized based on their primary principals of simplicity, sustainability, quality, and overall affordability. The exhibition showcases in 1950's looked to influence design principles in Europe and North America. Promoting simplistic ways of living and pieces of work by Nordic designers. Great pioneers in early years of the Scandinavian Design movement include people such as: Alvar Aalto (Architect and Designer) Finland, Vern Panton (Furniture and Interior Designer) Denmark, Eero Arno (Interior Designer) Finland and arguably the most influential, Arne Jacobsen (Architect and Furniture Designer) from Denmark.

HISTORICAL, SOCIAL & CULTURAL CONTEXT OF THESIS

HOW DESIGN INFLUENCES LIFESTYLE

How can the built environment in which you live, influence your lifestyle and way of life?

HISTORY ANALYSIS OF SCANDINAVIAN (NORDIC) HOUSING

Design concepts by country vary but ultimately hold the same philosophies. Following the end of World War I, Danish designers abandoned ornamentation for form and function. After World War II, design had become a democratic movement for mass production of natural materials to provide comfort in every home upholding the ideology that good design should be available to everyone. Finnish design is highly involved in the integration of nature's designs into their everyday lives. While Norway embraces the simplicity of form and uncompromised durability paired with local craftsmanship and a strong minimalistic and functional approach. Sweden also embraces minimalism and functionality and serves as home of Ikea where all of the philosophies and design concepts are utilized throughout the store.

As I wrapped up analysis of several documents and gathered information on Scandinavian history, one of the largest questions came to mind. Does Scandinavian residential architectural design have a face, or is it simply a philosophy? To be completely honest, I began my dive into the research process as trying to understand the built environments first. Hoping to find a history of traditional Nordic designed houses that are highly mimicked today in the design profession. This is not entirely something that isn't a consideration but is minimally significant to the overall design philosophy.

From my overarching point of view, Scandinavian design is not influenced by the building form, but the building form is influenced by the philosophy. I'm not at all surprised by this finding as this is the reason that I chose to use Scandinavian design to influence the lack of design here in the United States. Scandinavian design is directly a form follows function design philosophy. This ensures decisions can be made to be functional, simplistic, and minimalistic ultimately influencing a form of the same philosophy. I'm convinced that the secret to successful Scandinavian design is not based on any particular design style, but the philosophies of both design and lifestyle.

PROJECT JUSTIFICATION

PERSONAL PROJECT IMPORTANCE

The chosen research project "How Design Influences Lifestyle" is a topic that has been in development throughout my architectural education without fully knowing it yet. During senior year of high school I began designing a tiny house on wheels in SketchUp and then constructed it with my own bare hands. The first year of college is always a big change for most, deciding to get a job and build a tiny house while striving to get straight A's for acceptance into the architecture program. The process taught me valuable design and build experience. Following freshman year, I lived in the tiny house for 3 years and loved every minute of it. With interior dimensions of 7'-6" Wide and 27' in Length, spatial requirements for the space are minimal compared to a typical apartment or house. Everything inside the house had been custom designed and built by hand to serve a purpose. If I were to characterize my lifestyle while living in the tiny house with one word, I would choose efficient. This was the first step in a direction that would soon, four years later, inspire me to set out on a path that is my thesis. The experience of living in such a small space has brought me to realize how much a space influences your lifestyle.

ACADEMIC & PROFESSIONAL PROJECT IMPORTANCE

It's interesting to think back to the beginning of architecture school, first, second, even third year. Fourth year was a year that was feared and misunderstood on how it was even possible to accomplish such daunting design tasks. Thesis was an even larger goal to accomplish that seemed impossible, but here I am. Fourth year was a huge success with a demonstration of all of the skills that have been developed since the beginning. Confidence is often seen by others as cockiness, but I see it as a trust and assurance in the skills you possess. There is an importance of reflecting on the past. Not to only understand the present, but to drive the future forward. This thesis project is the beginning, not the end. The chosen proposed project topic is something that reflects my passions and dreams for a life as a designer. Residential design is a passion that I've know about since the start of architecture school. With residential work there is an ability to design highly personal projects for others to capture their dreams and make them a reality. This project is a large learning opportunity that can be combined with my ever-growing knowledge and experience. At this stage in my academic development, the project reflects the future architect within. Reflecting on the past and the path taken to this point in my academic career while showing a path towards the future. This thesis project is a giant progression into my professional development. Not only an opportunity to study and pursue my design passion, but a test run into the types of projects I plan to develop while out of school with the integration of what is learned. This thesis project is a highly influential year of progression in both academic and professional development.

PROJECT JUSTIFICATION

KNOWLEDGE & PROJECT IMPORTANCE

The research and documentation required for the project as a whole is entirely necessary in establishing credibility for the project. The implementation of this research and documentation will shape the final design in ways unseen. Further documenting more research will only strengthen the thesis project to be a more focused, accurate, and successful design solution. The project will add irreplaceable knowledge and continue to train a set of skills that have been in the making since the first year of the program. My personal experience in the profession has been lacking the types of projects and ways of designing that I most deeply enjoy. There are many firms in the world that uphold these goals that I envision for my future of design and I lend an ear to learn from them. The chosen thesis project is not just highly important for the profession overall, but for the future of my profession. Of all of the research currently accomplished, it is very difficult to find any references or examples of how Nordic design is implemented in the design of houses directly. I've found that the Nordic countries are highly influenced by their lifestyle philosophies that in turn channel their design philosophies. I've come to realize that it's not just the understanding of these philosophies, but the integration of them within a built environment. Residential design in the United States is seeming to miss a certain spark of inspiration for design of better homes. There are hundreds of articles presenting how you can utilize Scandinavian design in the interior of your homes in the form of materiality. I have not yet found ways to utilize Scandinavian design in a spatial consideration. The study and implementation of these researched lifestyle philosophies will drive spatial requirements needed for the final project. These findings will expand the current understanding of Scandinavian design with the implementation of built projects all across the United States.

PROJECT JUSTIFICATION

PROJECT IMPACTS & JUSTIFICATION

The chosen thesis project program is based around the understanding of what the average homeowner can afford. The findings from research and development are to be implemented into the mold of a model house. Something that can be streamlined and easily constructed for maximized efficiency. Efficiency in both construction and costs. This project can be justified economically since it will be based around price point model houses currently offered in the Fargo/Moorhead/West Fargo area. The area is growing constantly growing and expanding with new neighborhoods developed every year. The chosen site location is based in one of the newer developments 5 miles south of Fargo's downtown district. These neighborhoods are filled with model homes that the final design will strive to compete with. The market is highly competitive and will need to boast maximum benefits while keeping cost in check. Implementing the project into a real built project can be justified with the ability to offer a better design solution that competes with the current options. Whether or not it's what is traditionally accepted currently, the final design is sure to entice future inhabitants of its benefits. At the scale of the project being a residential model home, funding is available whether it is personal financing or through a secondary private investor. The streamlined process for design and construction of the project will offer significant opportunities to cut costs which in turn will increase the return on investment. Total construction costs may run under half of the total sale cost depending on the chosen size and level of finishes. The project is not based on return on investment, but post-occupancy impact in relation to implemented design research of Scandinavian culture. While return on investment is entirely crucial to reality and overall feasibility of the project's entirety, the positive impacts on the inhabitants are the primary goal. A high level of design decisions are going to be not only just based on Scandinavian influence, but environmentally as well. The project is to be highly environmentally friendly with integration of natural and mechanical design decisions to create an overall healthy environment for the inhabitants with a low impact on the earth.

PROJECT JUSTIFICATION

SOCIAL & CULTURAL IMPORTANCE

One of the primary goals for this project is to inspire others to create a lifestyle that is more rewarding, healthy, and happier. Unfortunately, it will be almost impossible to convince the average American to change their lifestyles directly and this is something I have to consider initially. Instead, I will be exploring how design can help to sway others to live a more fulfilling lifestyle. Scandinavian countries are continuously chosen to be top 10 in the Worlds Happiness Report. While the report has more to do with social and political topics, the 2020 World Happiness Report includes chapters that can be directly related to the profession of architecture. Scandinavian culture is sought after by many, especially in the interior design world. This brings me to consider how much influence the Scandinavian lifestyle has on their chosen residences. My previous hands on experience and knowledge of living in a nontraditional space has increased the importance of the chosen project topic. The experience has taught me many things and I'd like to see how I can help other realize them as well. The project is even more important to our society. It seems as if everyone is continuously caught up with their self-image and life status, paired with the American dream of owning your own home, homeowners are choosing to build and buy the biggest homes they can afford. While purchasing what you can afford is beneficial, doing so with the cheapest quality of home construction is a step in the wrong direction. There is a very small amount of people who can afford a 4,000 square foot home with high end materials. This thesis is striving to reduce the overall square footage of residential homes in order to create a larger portion of the budget dedicated to important building materials such as insulation. The thesis topic will allow me to demonstrate my knowledge of residential homes and developed design skillset to develop a project to benefit others to make decisions that will greatly influence a better quality of life starting with the place they live.

SITE ANALYSIS

SITE ANALYSIS NARRATIVE

INITIAL CONSIDERATIONS

The site choice was initially decided to be one that is currently on the market for sale as well as being a typical new development shape. Providing a level of reality that the project will hopefully depict throughout its entirety. The chosen site was to be something affordable, not over the top expensive, but still have a desired location to surrounding context. The reality of building for most client budgets do not leave room for \$100,000 parcels. It's important to access the price of the land in relation to the surrounding neighborhood. Choosing land in an older developed neighborhood such as North Fargo could pose issues with a new construction as the surrounding house values would be skewed. As for a newer developed neighborhood with blank lots, all of the houses will be new construction and have a higher price range evaluation. It was determined that the chosen site should also be located in a developed neighborhood with typical replicated lots. With a typical lot, the house design will be able to fit most other developed neighborhoods and be used as a model house. This decision comes with the hopes of being able to utilize the project design throughout the area and in other parts of the country. This thesis project is to design a Scandinavian inspired home, but to also follow a realistic minimal project budget. The difficulties of choosing a site with these parameters are sure to add a level of realism and complexity to benefit the project in its entirety.

PROJECT SITE NARRATIVE

The chosen site is located just south of Frontier, North Dakota. Frontier is a smaller developed town that is located just south from the city of Fargo. The neighborhood is a newer development and is across the street from Davies High School as well as having a closer relationship with 52nd Ave that allows easy access to West Fargo's new developments. The close proximity to the school will be a beneficial consideration for new homebuyers and adding an extra bonus for sellers. Additionally, 52nd Ave provides quick access to I29 that will lead straight into Fargo and West Fargo as well as adjoining I94 to the north. Occupants of the future house designed for this site will be away from the busy life of the surrounding cities and in a well maintained and cared for neighborhood of Eagle Valley. The site is in close proximity of the Red River just to the east a mile.

SITE ANALYSIS

SITE ANALYSIS NARRATIVE

PROJECT SITE NARRATIVE - CONTINUED

The site was chosen based on the initial considerations set forth for site selection. It's at the outskirts of town in a newer developed neighborhood that still has a few dozen or more remaining lots to be built on. There seems to be around a half dozen homes built per year and the neighborhood will soon be full. Since the area is farther south and still surrounded by farmland, there is an abundance of room for expansion of new neighborhoods with the surrounding cities giving the project design a chance to be replicated throughout the area. It's just 3 miles to the nearest Cash Wise Foods and 4 miles to the nearest Walmart and restaurants. Even less for a gas station and fast food places such as Burger King and Dairy Queen. The site is flat and has no overlooking views or points of interest. The established minimal topography on the site will provide a premium canvas for a new design with ease of construction. It is easily accessible from 20th St. S and has connection to city sewer and water. There is no existing vegetation on the site as it is a bare developed lot. The parcel measures 54' wide by 125' deep, a typical rectangular lot seen in developments all around the area. A rectangular lot will provide predictable set back requirements that are easily upheld. At 6,750 square feet, the lot will allow a larger developed footprint. One of the primary considerations for the final design will be how its regulated based on the Eagle Valley homeowner's association (HOA). The HOA has a say in how the house should look in relation to the existing homes in the neighborhood. Providing a unique custom home may not be approved. However, the biggest goal of the project is to utilize Scandinavian design philosophies to develop a model house to compete with the existing model houses. The existing houses lack design and put an eye sore throughout neighborhoods. Tract housing is an affordable way of developing lower cost housing while also developing cities quickly. The issue is the lack of design and this site is going to host a change in tract housing to reflect design intent inspired by Scandinavian design philosophies.

In addition to currently being on the market for sale at a lower cost, the overall location and parcel dimensions match the initially desired outcome. The overall asking price for the parcel is just \$30,000, leaving a larger area in the budget for design and construction. This parcel is lower than most that are available currently, but as new neighborhoods are developed, low cost sites such as this one will be more common. A large consideration was to choose a site that doesn't require a specific builder. In order to successfully execute the house project a builder will have to agree to build it. If a specific builder is required, the builder would have greater leverage to deny the plans. If a builder is able to be chosen, there is a greater chance for overall project success.

While the site presents a more complicated canvas to construct a nontraditional tract house design seen around the area, it also provides a unique opportunity for the intended design of a minimal Scandinavian inspired home.

SITE ANALYSIS

QUALITATIVE ASPECTS

HEIGHTS & CHARACTER OF SURROUNDING LANDFORMS OR URBAN SPACE

The surrounding urban landscape is made up of other residential houses that are two stories in height with higher pitched roofs. The height to peak will approach upwards of 25'. The neighboring houses will reflect large amounts of shade to the adjacent houses. Consideration will have to be taken for the property line setbacks of only 5', making the total wall to wall distance between houses a minimum of 10'. There is currently no house to the north yet, but one adjacent to the south of the site. This house will reduce the infiltration of warmer low winter sun for most of the south wall.

WIND

The site is located at the end of the neighborhood. The flow of wind from the south of the neighborhood will channel through the yards and typically have a more distinguished path along the frontage road of 20th St. S.

LIGHT QUALITY

The light quality on site in regard to color, temperature, and intensity is typical for North Dakota.

HUMAN CHARACTERISTICS & VEGETATION

Due to the site being directly developed from farmland, the parcel is fairly raw with exposed soil and slight vegetation coverage. The extent of vegetation coverage across the site is limited to short grass native to the area as well as some portions of cockleburs plant. There are excess amounts of black dirt and rolls of sod piled on the rear of the site from neighboring site development. Towards the front of the site lay an arrangement of small landscaping rock piles, sod, and dirt clumps. All of which will be removed once the site is prepped and will not be anything to consider.

QUALITATIVE ASPECTS SUMMARY

The chosen site is lacking topography to generate any type of shade and shadow considerations to the surrounding area. However, the minimal side yard setback requirements will pose issues for privacy and sun exposure to the south. Light quality will need to be considered throughout the space when analyzing shade that can be cast on the project from the neighboring house. Wind should be considered for the front and back yard due to the length of open pathways for surrounding winds to channel through. While topography is lacking, so is natural existing vegetation on site. What exists will be removed during site prep and replaced with grass to match the existing yards throughout the neighborhood.

SITE ANALYSIS

QUANTITATIVE ASPECTS

SOIL

Fargo is a part of Cass County in North Dakota. Fargo and Moorhead are highly related sharing most of the Red River as a meeting point. Cass County borders Clay County in Minnesota which is named after its predominantly found soil engineering classification containing high levels of Silty or Clayey Sand. This soil engineering classification is comparable to that of the chosen site with its close proximity to the river and state county lines.

UTILITIES

Utilities are located along the entire length of frontage on 20th St. S. Water and Sewer will be required to be permitted in order to be dug and connected to the existing utilities at the street. Power is available on the site to the north side adjacent to the neighboring bare parcel.

VEHICULAR TRAFFIC

Vehicular traffic is fairly light and only sees cars from neighborhood houses. With the parcel being the second house at the south end, most traffic will be traveling north towards the school and Frontier.

PEDESTRIAN TRAFFIC

The neighborhoods are lined with decent sized sidewalks on both sides of the streets. However, the integration of typical model homes has created a barren wasteland and a feeling of uncomfortability due to the repetition of similar houses. Pedestrian traffic is minimal and neighborhood children will frequent in the front yards or driveways.

NOISE

There are low amounts of noise throughout the neighborhood. Most residences keep to themselves and do not display any forms of entertainment aside from a casual grill out on the deck. The program understands this lack of privacy and will utilize design methods to counter noise from within the site aside from battling noise from external elements. Methods such as natural greenery, soundproof fencing, floor plan undulation, etc. A handful of different methods can be implemented to allow for the project inhabitants to enjoy their space indoor and out without the fear of bothering the neighbors, if they can help it.

SITE ANALYSIS

QUANTITATIVE ASPECTS

TOPOGRAPHIC SURVEY

No topographic survey required due to the existing parcel being fully graded flat. Slope analysis would classify the parcel as under 1% which will result in a lack of drainage at its current state. The constructed house would require the site to be graded accordingly to slope watershed away from the house.

TOPOGRAPHY AND AIR MOVEMENT

Air movement can be considered in the front and rear of the property due to the large expanse of unblocked area from the road and backyards. This air movement may be beneficial for natural ventilation in warm months.

SLOPE AND CLIMATE

Slope and Climate have little correlation having to do with the implementation of the project program. There is little to no existing slope and some sloping will be required away from housing foundations and floor slabs. Slope has little impact to benefit the use of sun orientation and penetration.

SHADING

Shading should be considered for the months when the sun is highest. Further study can be taken when implementing a design solution to determine if there is any benefit to designing to try and accept low angle sun rays for additional heating in winter months. The two-story neighboring house will pose issues with low sun angles but not protect from high summer sun angles.

QUANTITATIVE ASPECTS SUMMARY

The chosen site provides adequate buildable area for the future design implementation. Side lot setbacks are at a minimal 4'-0" per city code requirements. This is far too close if the neighboring house was 4'. However, the neighboring house to the south seems to have 10' setback which allows some wiggle room in between the two on the side yard. Predicting that the site to the north may use a closer setback requires allows the design to adapt to future situations. Utilities are easily accessed from the site. Vehicular and Pedestrian traffic are minimal in the current neighborhood and should focus the design more on private usability. With the minimal amounts of traffic benefits the design with a minimal amount of noise. The noise of the project will be considered from the inside out. However, design elements are to be utilized to boost curb appeal and a sense of neighborhood. Benefitting both of these categories in the future when neighborhoods are designed with these style model homes will provide an overall more inviting block of houses. Climate data presents helpful information pointing to some primary considerations such as the lack of sun and frigid winters. Design elements inspired by Nordic countries have been researched to positively influence these considerations and provide a better wholesome house year-round.

SITE ANALYSIS

PROPERTY INFORMATION

PARCEL NUMBER

01-8571-00760-000

LEGAL ADDRESS

7476 20TH ST S FARGO, NORTH DAKOTA 58104

LOT WIDTH (FRONT)

54'-0"

LOT WIDTH (REAR)

54'-0"

LOT DEPTH (SIDE)

125'-0"

LOT DEPTH (SIDE)

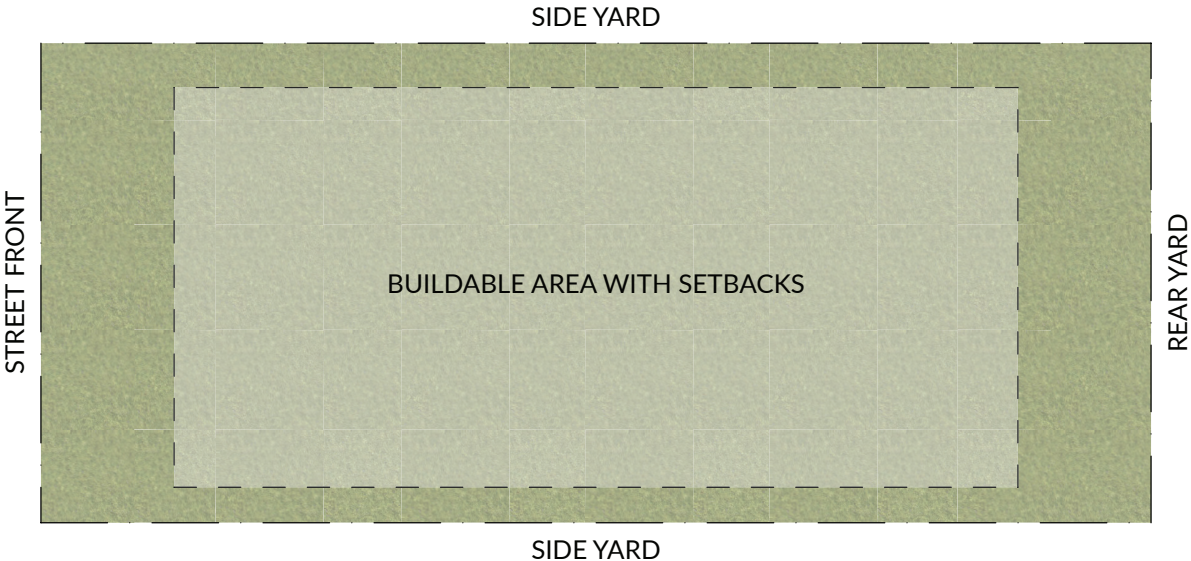
125'-0"

LOT AREA

6,750 SQUARE FEET

LAND APPRAISED VALUE

\$36,000



PARCEL PROPERTY & BUILDING SETBACK LINES

SCALE: 1" = 20'

FIGURE 39 | PARCEL GRAPHIC

SITE ANALYSIS

DIMENSIONAL STANDARDS PER FARGO MUNICIPAL CODE

Dimensional Standard	Zoning District										
	AG	SR-0	SR-1	SR-2	SR-3	SR-4	SR-5 [5]	MR-1	MR-2	MR-3	UMU
Maximum/Minimum Density (UPA - Units per Acre)	0.1 Max.	1.0 Max.	2.9 Max.	5.4 Max.	8.7 Max.	12.1 Max.	14.5 Max.	16.0 Max.	20.0 Max.	24.0 [1] Max.	18.0 Min.
Minimum Lot Size											
Area (Sq. Ft.)	10 Ac	$\frac{1}{2}$ Ac	15,000	8,000	5,000	3,600	3,000	5,000	5,000	5,000	2,420
Width (Ft.)	200	120	80	60	50 [3]	34 [3]	25	50 [3]	50 [3]	50 [3]	50 [3]
Minimum Setbacks(Ft.)											
Front	50 [4]	50	35	30	20	15 [5]	15 [5]	25	25	25	10
Interior Side [6]	25	25	15%/15	10%/5	10%/5	4	4	15%/25	15%/25	10	5
Street Side	25 [7]	25	17.5	15	12.5	10	10	12.5	12.5	12.5	10
Rear	50	50	25	25	15	15	15	20	20	20	15
Watercourse Setback	[10]	[10]	[10]	[10]	[10]	[10]	[10]	[10]	[10]	[10]	[10]
Max. Building Coverage (Pct. of Lot)	NA	25	25	35	40	45	50	35 [8]	35 [8]	35 [8]	75
Minimum Open Space (Pct. of Lot)	NA	NA	NA	NA	NA	NA	NA	35	35	35	NA
Maximum Height (Ft.)	35	35	35	35	35	35	35	35	45	60	60

FIGURE 40 | DIMENSIONAL STANDARD TABLE, CREDIT FARGO MUNICIPAL CODE

FIGURE 41 | DRONE AERIAL PARCEL DIAGRAM GRAPHIC



FIGURE 42 | DRONE AERIAL PARCEL DIAGRAM GRAPHIC

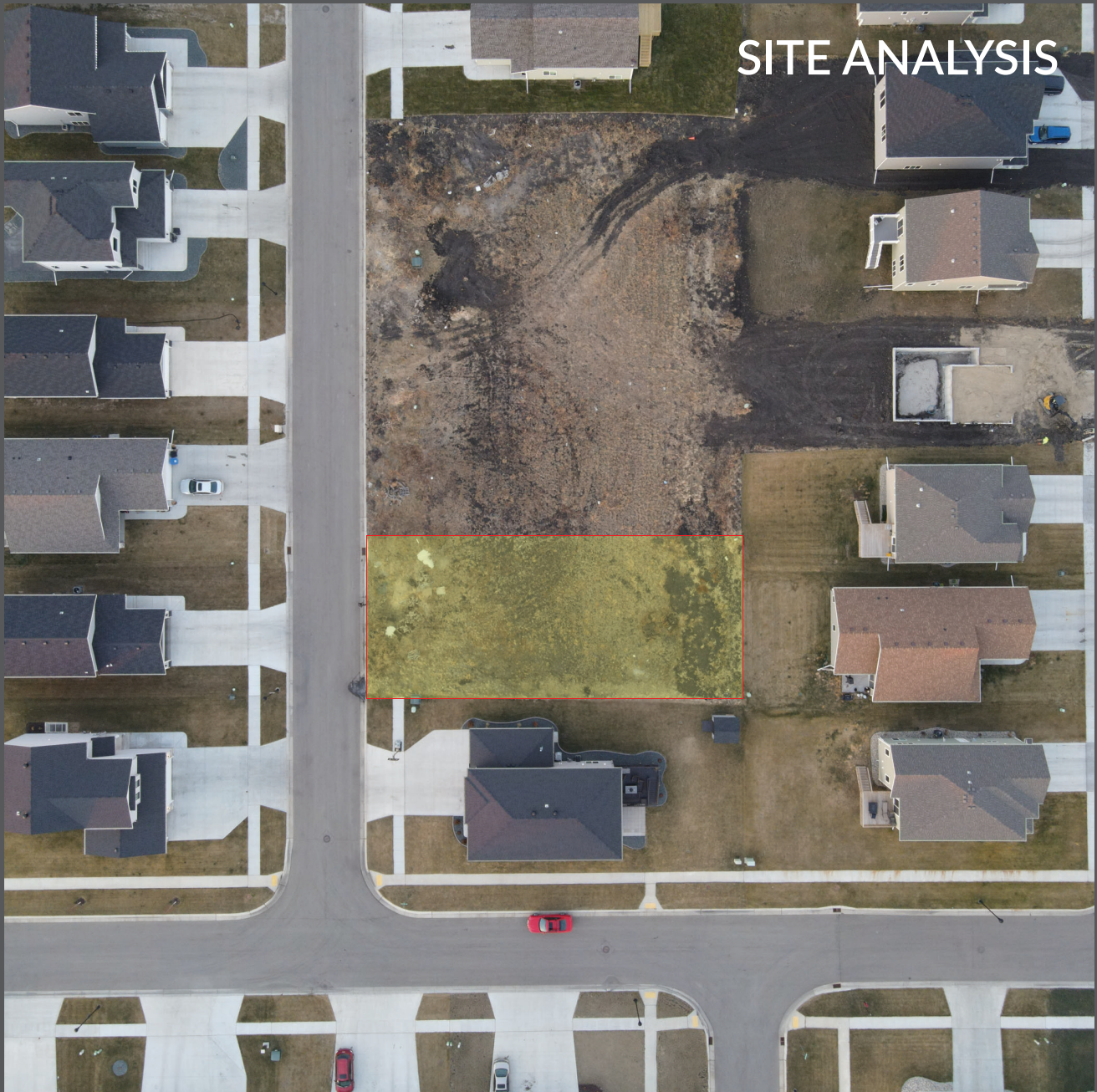


FIGURE 43 | DRONE AERIAL PARCEL DIAGRAM GRAPHIC

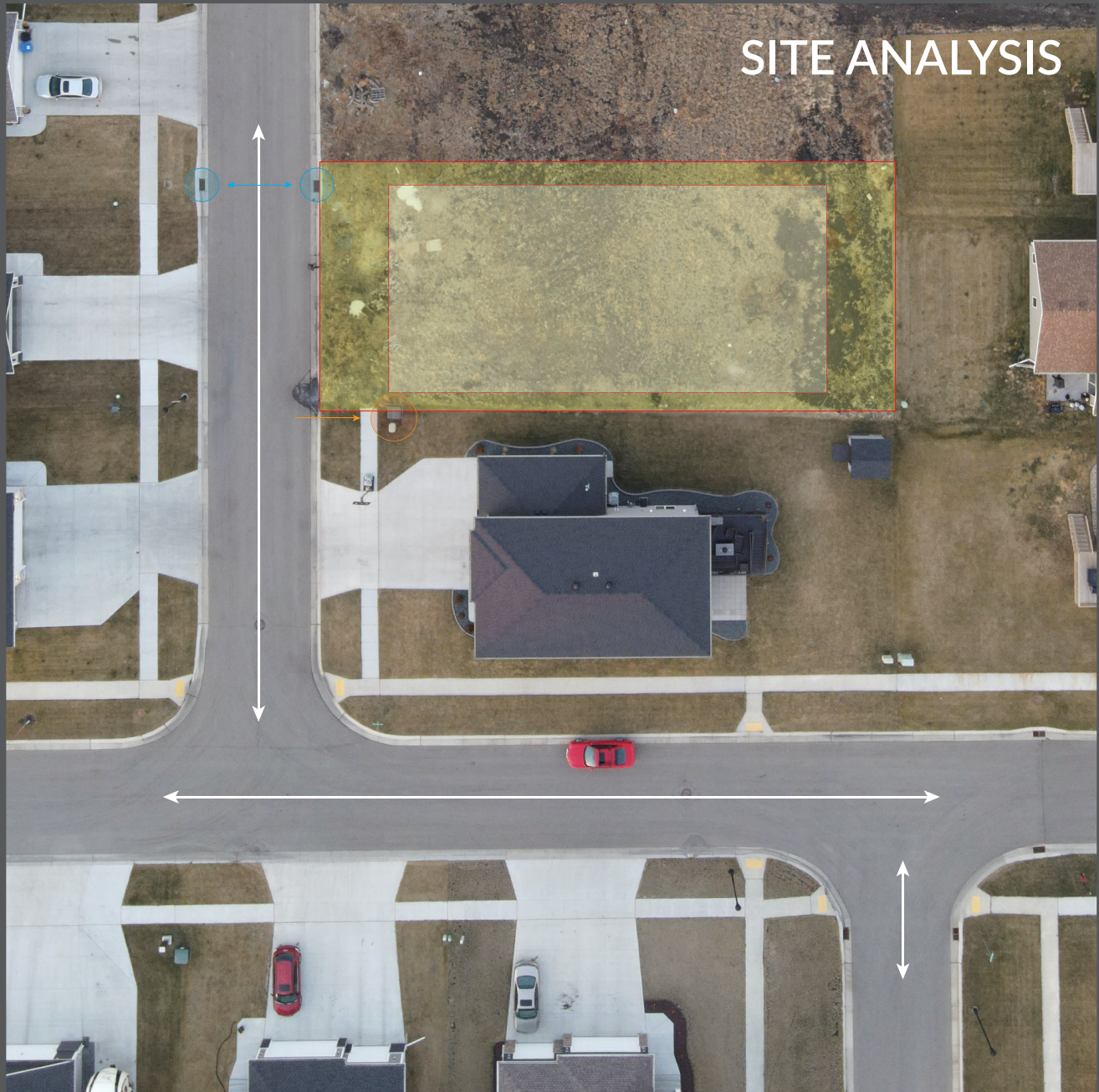


FIGURE 44 | PHOTOGRID DIAGRAM GRAPHIC



FIGURE 45 | PHOTOGRID DIAGRAM GRAPHIC

SITE ANALYSIS



FIGURE 46| PHOTOGRID DIAGRAM GRAPHIC



FIGURE 47 | PHOTOGRID DIAGRAM GRAPHIC

SITE ANALYSIS



SITE ANALYSIS

CLIMATE DATA - HELSINKI, FINLAND

TEMPERATURE

The warm season lasts for 3 months, from June 3rd to September 3rd, with an average daily high temperature above 62 degrees F. The hottest day of the year is July 21st, with an average high of 71 degrees F and high of 27 degrees F.

The cold season lasts for 3.8 months, from November 25th to March 19th, with an average daily high temperature below 36 degrees F. The coldest day of the year is February 7th, with an average low of 17 degrees F and a high of 27 degrees F.

AVERAGE HIGH & LOW TEMPERATURES

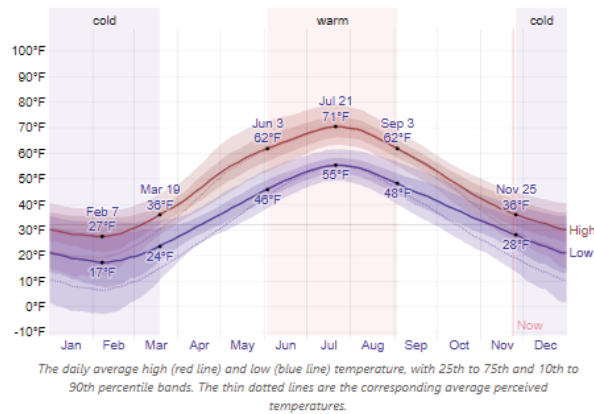


FIGURE 48 | HELSINKI TEMPERATURE DATA, CREDIT | WEATHER

AVERAGE HOURLY TEMPERATURES

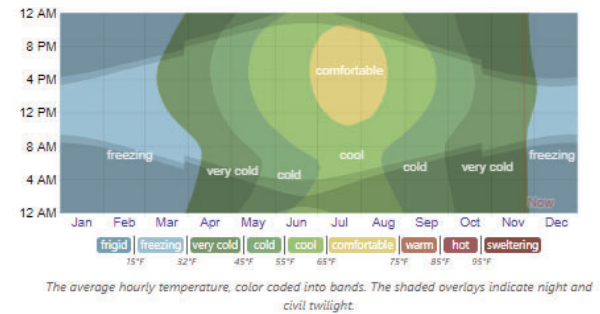


FIGURE 49 | HELSINKI TEMPERATURE DATA, CREDIT | WEATHER

HUMIDITY

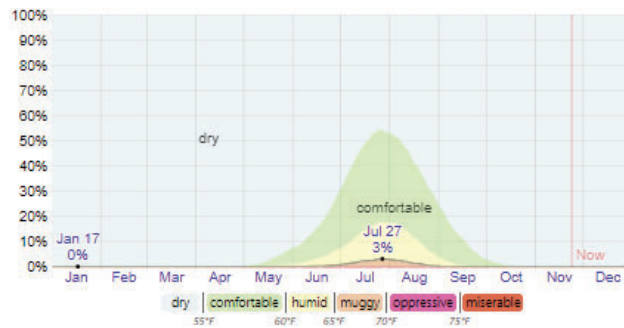


FIGURE 50 | HELSINKI HUMIDITY DATA, CREDIT | WEATHER SPARK

SITE ANALYSIS

CLIMATE DATA - FARGO, NORTH DAKOTA

TEMPERATURE

The warm season lasts for 4.1 months, from May 15th to September 18th, with an average daily temperature above 70 degrees F. The hottest day of the year is July 23rd, with an average high of 83 degrees F and low of 64 degrees F.

The cold season lasts for 3.3 months, from November 26th to March 4th, with an average daily high temperature below 31 degrees F. The coldest day of the year is January 15th, with an average low of 2 degrees F and high of 19 degrees F.

AVERAGE HIGH & LOW TEMPERATURES

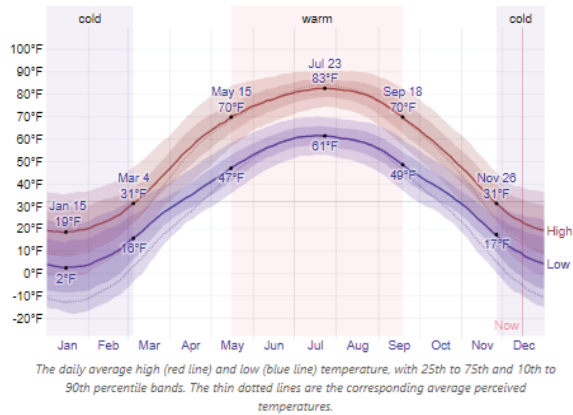


FIGURE 51 | FARGO TEMPERATURE DATA, CREDIT | WEATHER

HUMIDITY

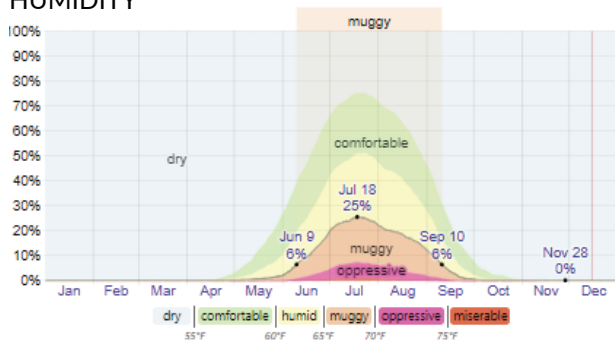


FIGURE 53 | FARGO HUMIDITY DATA, CREDIT | WEATHER SPARK

AVERAGE HOURLY TEMPERATURES

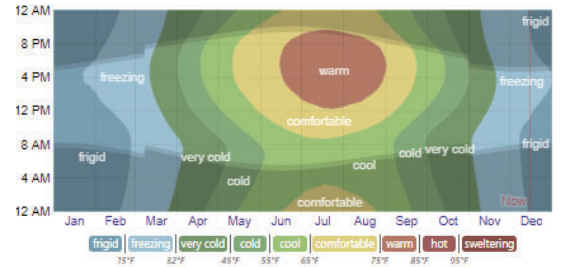


FIGURE 52 | FARGO TEMPERATURE DATA, CREDIT | WEATHER

SITE ANALYSIS

CLIMATE DATA - HELSINKI, FINLAND

PRECIPITATION

The wetter season lasts 7.4 months, from June 13th to January 25th, with a greater than 25% chance of a given day being a wet day. The chance of a wet day peaks at 32% on November 20th.

The drier season lasts 4.6 months, from January 25th to June 13th. The smallest chance of a wet day is 17% on February 28th.

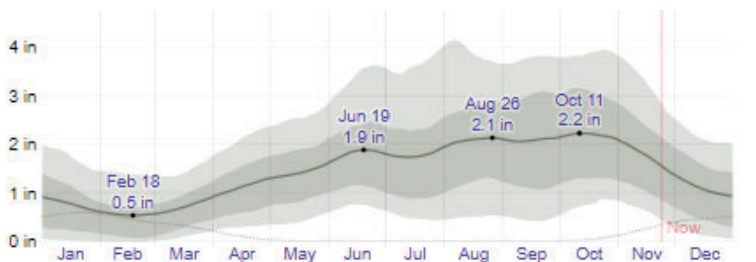
DAILY CHANCE OF PRECIPITATION



The percentage of days in which various types of precipitation are observed, excluding trace quantities: rain alone, snow alone, and mixed (both rain and snow fell in the same day).

FIGURE 54 | PRECIPITATION DATA, CREDIT | WEATHER SPARK

AVERAGE MONTHLY RAINFALL



The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the corresponding average liquid-equivalent snowfall.

FIGURE 55 | PRECIPITATION DATA, CREDIT | WEATHER SPARK

SITE ANALYSIS

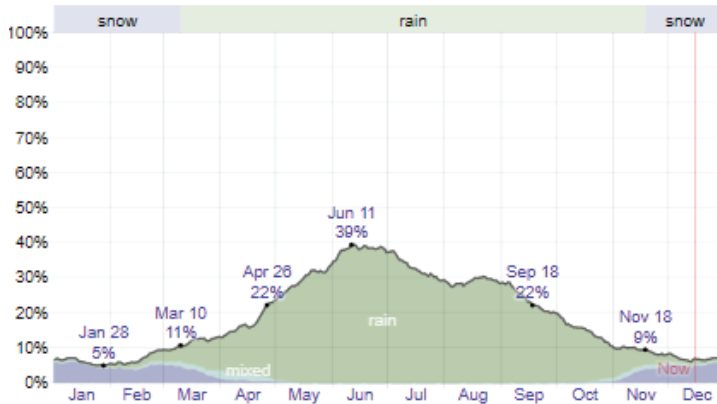
CLIMATE DATA - FARGO, NORTH DAKOTA

PRECIPITATION

The wetter season lasts 4.7 months, from April 26th to September 18th, with a greater than 22% chance of a given day being a wet day.

The drier season lasts 7.3 months, from September 18th to April 26th. The smallest chance of a wet day is 5% on January 28th.

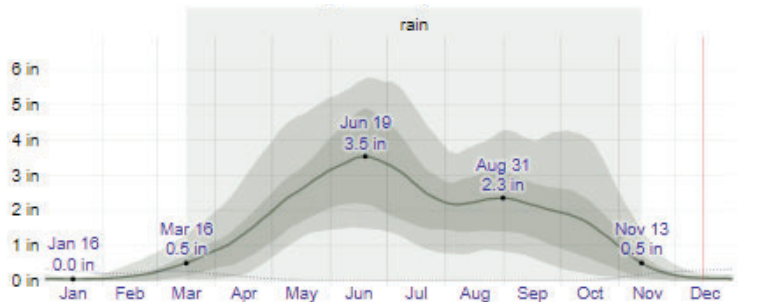
DAILY CHANCE OF PRECIPITATION



The percentage of days in which various types of precipitation are observed, excluding trace quantities: rain alone, snow alone, and mixed (both rain and snow fell in the same day).

FIGURE 56 | PRECIPITATION DATA, CREDIT | WEATHER SPARK

AVERAGE MONTHLY RAINFALL



The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the corresponding average liquid-equivalent snowfall.

FIGURE 57 | PRECIPITATION DATA, CREDIT | WEATHER SPARK

SITE ANALYSIS

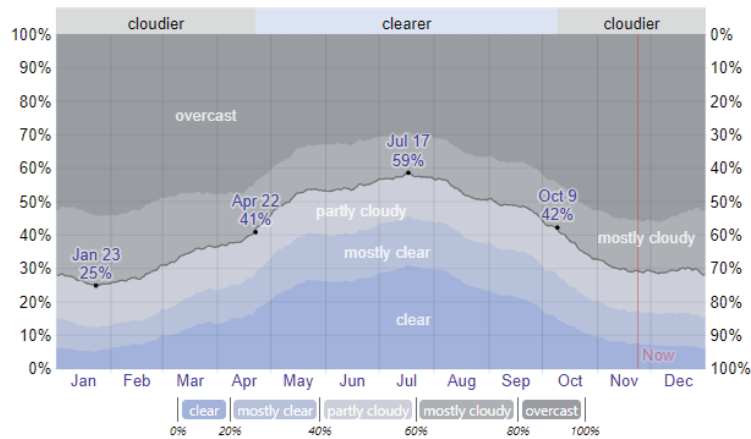
CLIMATE DATA - HELSINKI, FINLAND

CLOUDS

The clearest part of the year in Helsinki begins around April 22nd and lasts for 5.6 months, ending around October 9th. On July 17, the clearest day of the year, the sky is clear, mostly clear, or partly cloudy 59% of the time, and overcast or mostly cloudy 41% of the time.

The cloudier part of the year begins around October 9th and lasts for 6.4 months, ending around April 22nd. On January 23rd, the cloudiest day of the year, the sky is overcast or mostly cloudy 75% of the time, and clear, mostly clear, or partly cloudy 25% of the time.

CLOUD COVER CATEGORIES



The percentage of time spent in each cloud cover band, categorized by the percentage of the sky covered by clouds.

FIGURE 58 | HELSINKI CLOUD DATA, CREDIT | WEATHER SPARK

SITE ANALYSIS

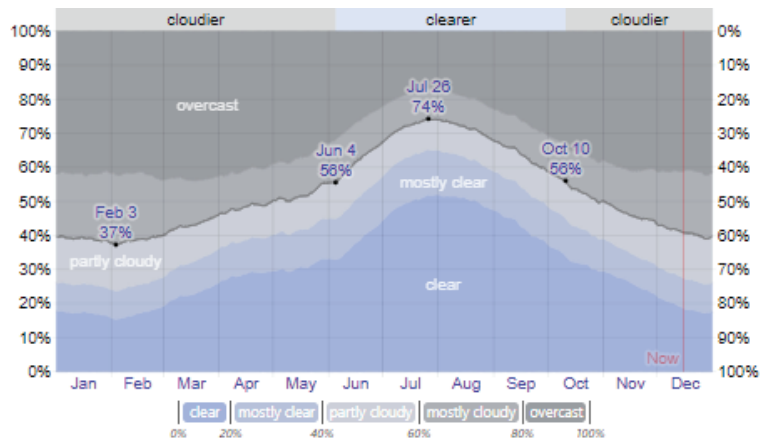
CLIMATE DATA - FARGO, NORTH DAKOTA

CLOUDS

The clearer part of the year in Fargo begins around June 4th and lasts for 4.2 months, ending around October 10th. On July 26th, the clearest day of the year, the sky is clear, mostly clear, or partly cloudy 74% of the time, and overcast or mostly cloudy 26% of the time.

The cloudier part of the year begins around October 10th and lasts for 7.8 months, ending around June 4th. On February 3rd, the cloudiest day of the year, the sky is overcast or mostly cloudy 63% of the time, and clear, mostly clear, or partly cloudy 37% of the time.

CLOUD COVER CATEGORIES



The percentage of time spent in each cloud cover band, categorized by the percentage of the sky covered by clouds.

FIGURE 59 | FARGO CLOUD DATA. CREDIT | WEATHER SPARK

SITE ANALYSIS

CLIMATE DATA - HELSINKI, FINLAND

WIND

The windier part of the year lasts 5.7 months, from September 16th to March 6th, with average wind speeds of more than 9.2 miles per hour. The windiest day of the year is December 12th, with an average hourly wind speed of 11.3 miles per hour.

The calmer time of year lasts for 6.3 months, from March 6th to September 16th. The calmest day of the year is July 2nd, with an average hourly wind speed of 7.1 miles per hour.

AVERAGE WIND SPEED

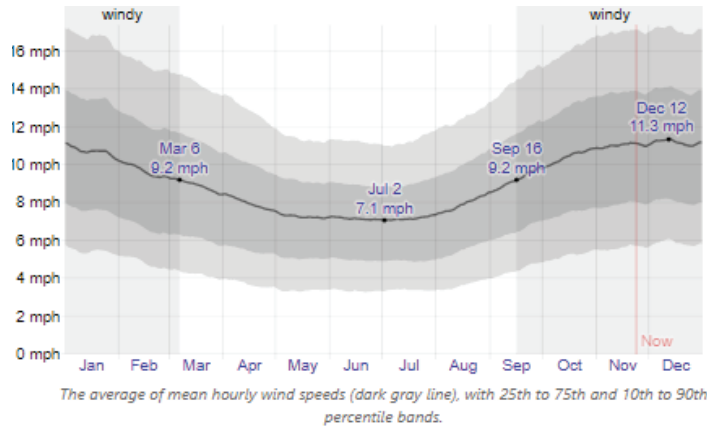
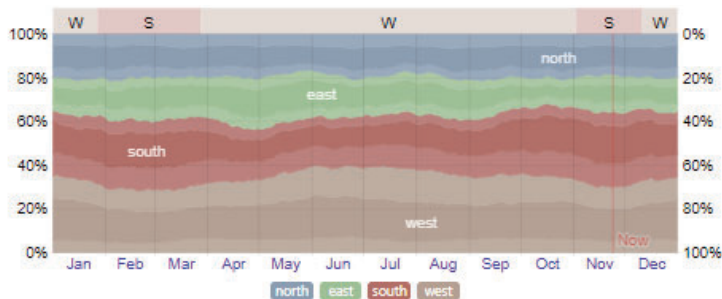


FIGURE 60 | HELSINKI WIND DATA, CREDIT | WEATHER SPARK

WIND DIRECTION



The percentage of hours in which the mean wind direction is from each of the four cardinal wind directions, excluding hours in which the mean wind speed is less than 1.0 mph. The lightly tinted areas at the boundaries are the percentage of hours spent in the implied intermediate directions (northeast, southeast, southwest, and northwest).

FIGURE 61 | HELSINKI WIND DATA, CREDIT | WEATHER SPARK

SITE ANALYSIS

CLIMATE DATA - FARGO, NORTH DAKOTA

WIND

The windier part of the year lasts 8.4 months, from September 17th to May 31st, with average wind speeds of more than 10.8 miles per hour. The windiest day of the year is March 31st, with an average hourly wind speed of 12.6 miles per hour.

The calmer time of year lasts for 3.6 months, from May 31st to September 17th. The calmest day of the year is July 26th, with an average hourly wind speed of 9.1 miles per hour.

AVERAGE WIND SPEED

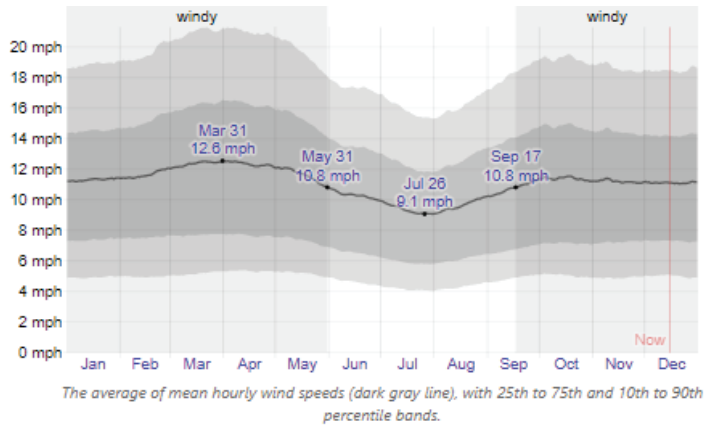


FIGURE 62 | FARGO WIND DATA, CREDIT | WEATHER SPARK

WIND DIRECTION

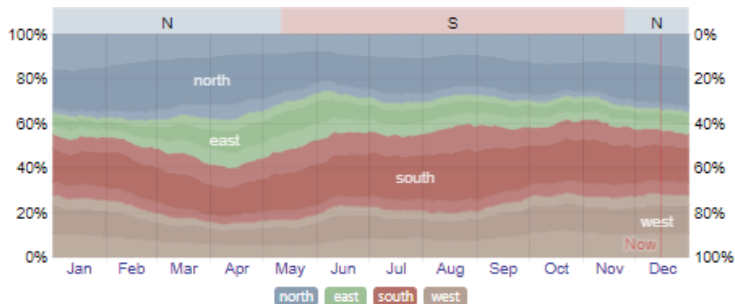


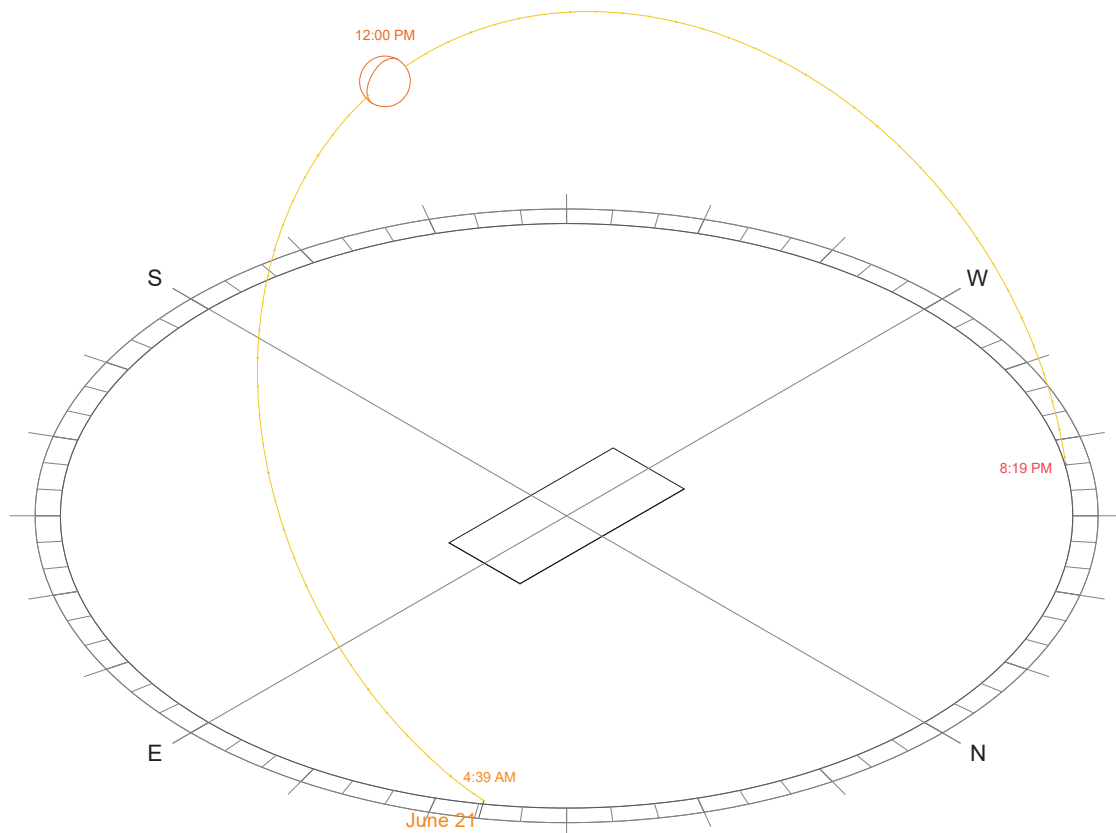
FIGURE 63 | FARGO WIND DATA, CREDIT | WEATHER SPARK

SITE ANALYSIS

SUN PATH - FARGO, NORTH DAKOTA

SUMMER SOLSTICE SUN PATH DIAGRAM

The summer solstice diagram reflects the high point of the sun over the chosen site on June 21st at 12 Noon. Sunrise and Sunset will be further to the northeast and northwest of the site. With consideration of the suns altitude, sun shading can be considered for the summer months to reduce the amount of heat infiltrating the space to reduce required mechanical cooling loads.



ISOMETRIC VIEW FROM NORTHEAST

SCALE: 1" = 100'

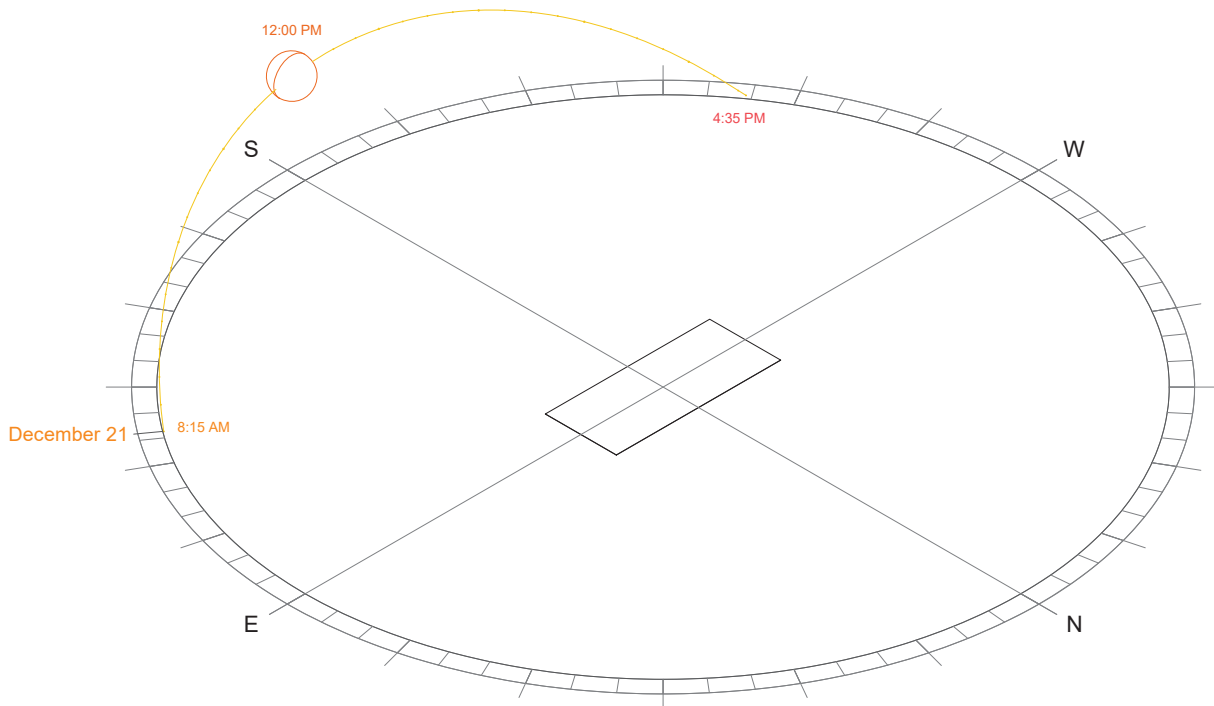
FIGURE 64 | PARCEL SUN DIAGRAM, CREDIT | REVIT

SITE ANALYSIS

SUN PATH - FARGO, NORTH DAKOTA

WINTER SOLSTICE SUN PATH DIAGRAM

The winter solstice reflects the low point of the sun over the chosen site on December 21st at 12 Noon. The days are much shorter in the winter months which is shown in the locations of sunrise and sunset. Infiltration of low angle winter sun can be used for passive heating in the winter that will help reduce mechanical system loads.



ISOMETRIC VIEW FROM NORTHEAST

SCALE: 1" = 100'

FIGURE 65 | PARCEL SUN DIAGRAM, CREDIT | REVIT

SITE ANALYSIS

SUN PATH - FARGO, NORTH DAKOTA

SUN ELEVATION ANGLES BY SEASON

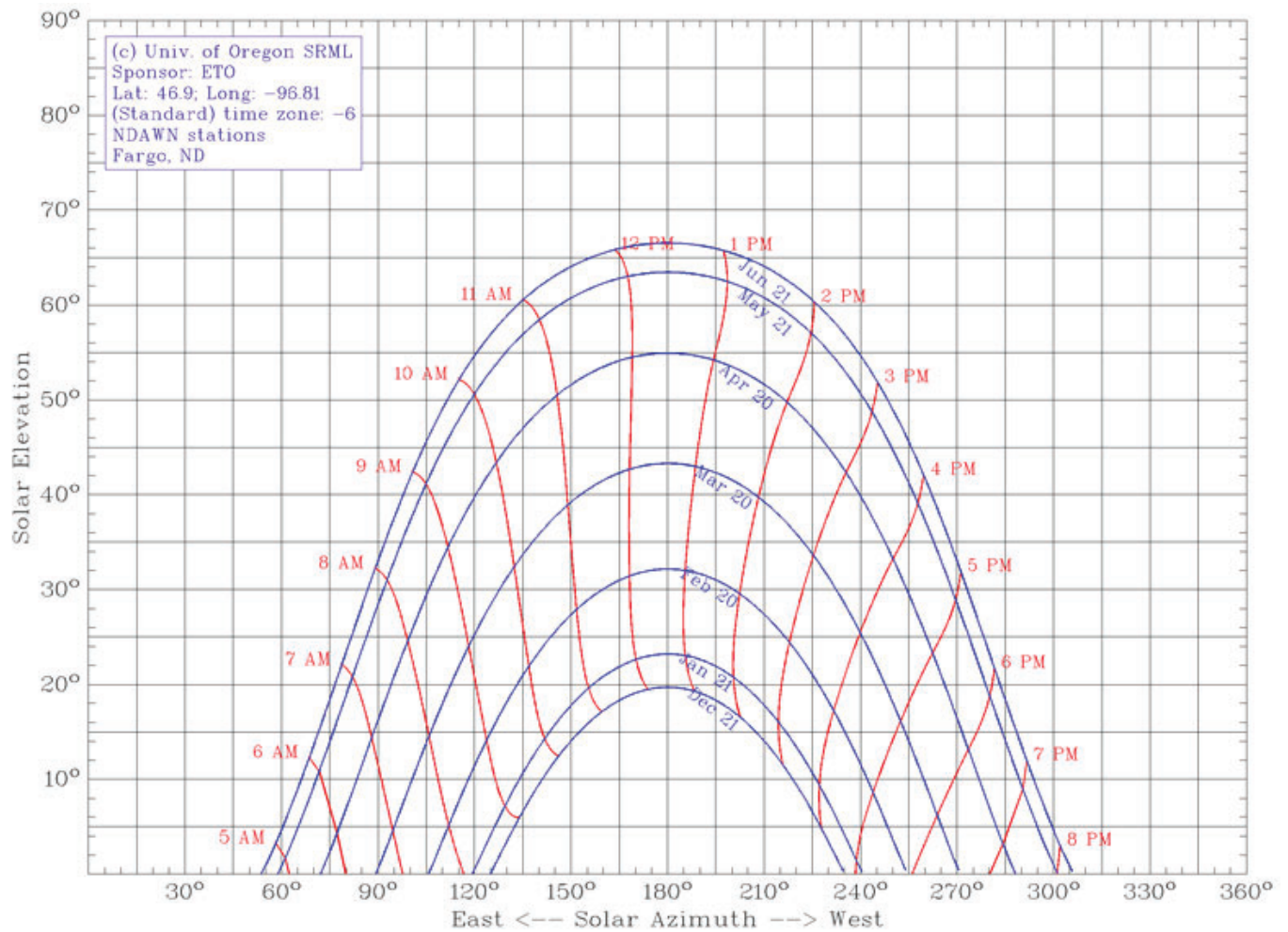


FIGURE 66 | FARGO SUN ELEVATION CHART, CREDIT | NDSU

SITE ANALYSIS

SUN PATH - FARGO, NORTH DAKOTA

SUN ELEVATION ANGLES BY SEASON

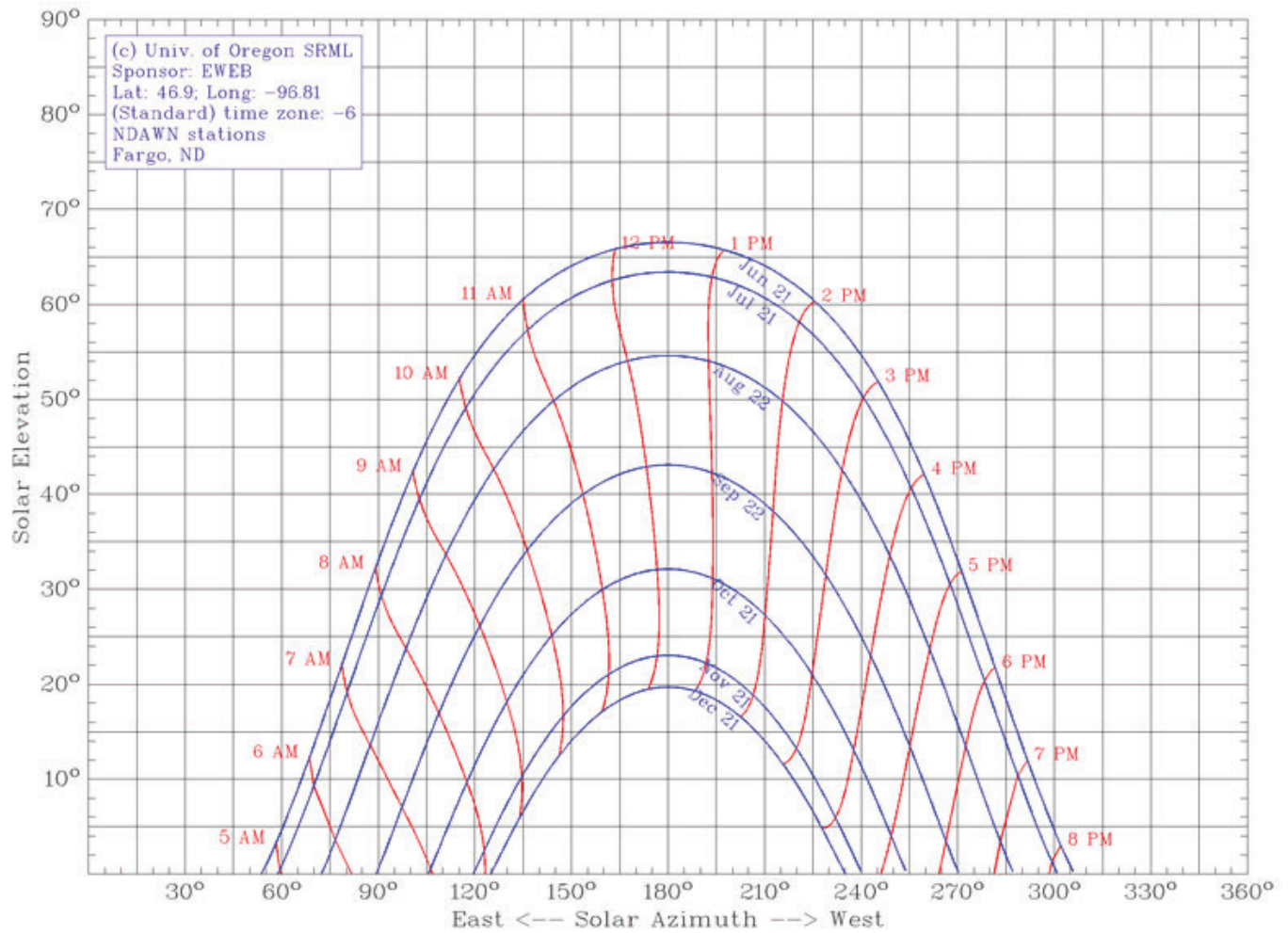


FIGURE 67 | FARGO SUN ELEVATION CHART, CREDIT | NDSU

PERFORMANCE CRITERIA

PERFORMANCE MEASURE

The overall performance of the design will be measured for multiple different performance categories. In order for the project to succeed in relation to the performance criteria there are considerations to be taken and planned for in which the project will be accessed after completion. In this preparation there must be initial understanding of what cannot be measure or recorded. Unfortunately, there are a few such as Behavior Performance and Psychological Impact that the project will be unable to measure due to the lack of post-occupancy review. These categories can be assumed through the process of design but not specifically recorded. The remaining categories have the ability to be measured after completion in order to verify successful integration.

PERFORMANCE JUDGEMENT

Performance Categories will be analyzed and measured with building information modeling (BIM) software. The design process is highly integrated within computer-aided design (CAD) and BIM software creating a streamlined design process to ensure that all performance criteria is met. All categories will be implemented throughout the project timeline and have the ability to be referenced later in the project.

PERFORMANCE CRITERIA

PERFORMANCE MEASURE SOURCE & ANALYSIS

Space Allocation is to be reviewed and measure by its total square footage based on the major project element requirements. This will ensure that the final design has accurately implemented pre-determined spatial requirements from the Space Allocation Table. These values will be measured based off of meeting minimum spatial requirements as it is sometimes necessary to increase the size of any space based on various reasons. Energy Consumption can be measured by the total number of Killowatt-hours used in a year and or the compilation of anticipated loads from mechanical equipment within house such as appliances, lighting, etc. The amount of natural gas used must also be considered based on gas based mechanical equipment such as a furnace and hot water heaters. The project will not be able to consider realistic data based on the inhabitants' schedule, but this can be assumed with a simulated living schedule and preferences. Something that would be fairly complicated may need to be considered in relation to environmental categories. Energy Consumption is in direct correlation with Environmental Performance categories and will be influenced positively or negatively based on decisions made. The largest consideration when it comes to Environmental Performance for this particular project will boil down to the chosen floor, roof, and wall assemblies. The important unit of data to be considered is the assemblies R-value which is a unit for insulation. Additionally, Environmental Impact is also directly in relation to both Energy Consumption and Environmental Performance. If the project were able to reach net zero, then the house would be using just as much energy as it makes itself. This outcome would leave the project having little to no Environmental Impact throughout its lifetime.

Code Compliance will be a category similar to Space Allocation in how each has a specific set of pre-determined guidelines. Code will shape what is allowed in a larger scale that will directly affect space allocation if not considered and reviewed. Code Compliance is far stricter when it comes to its implementation within the project. Examples such as zoning and building setbacks will both locate what can be built on a specific lot as well as how far away from the property lines the building must be set back. There are dozens of additional considerations for code and if not implemented properly could ruin the project. Code Compliance is the first step in any project and continues from beginning to end. Having a comprehensive understanding of this performance category will ensure project success and be measured by the ability to comply with required city and international code.

The project is based on a preliminary budget that will influence design decisions to guide the project on a realistic path. The primary performance measurements to be used will be dollars per square foot in relation to building costs as well as total square footage for the project. Balancing the total size of the project with the anticipated dollars per square foot to build the project will directly relate to the budget. If these categories are not closely monitored there is a chance that decisions could be made to jeopardize the anticipated budget.

PERFORMANCE CRITERIA

PERFORMANCE CATEGORIES

SPACE ALLOCATION

Space allocation is a crucial category in the development of the intended design. It will be influenced by research of traditionally found Scandinavian design residential single-family houses. Case studies have been done to study and analyze the overall design of the projects. Each project case study considers the overall form, orientation, and the site plan with how spaces are related. The floor plan is one of the primary considerations in order to study the spatial requirements and the details of each room in relation to total square footage. Space allocation from other built projects will guide the future design to utilize traditionally used spatial elements in the Nordic countries.

ENERGY CONSUMPTION

Energy consumption is an additional category that has been highly important when analyzing past Scandinavian case studies of residential single-family homes. The Scandinavian culture upholds a high standard of living for themselves and their built environments. Houses typically utilize sustainable choices whether natural or mechanical. Energy consumption is a primary performance category that will push the project forward to become a more sustainable design solution that is better for the environment.

ENVIRONMENTAL IMPACT & PERFORMANCE

The environment must be considered with every designed project no matter the size. With the project being a single-family home, the impact is far less than that of a high-rise structure. Although this may be the case, the amount of effort at this scale done across the world can compound into a far greater impact than relying on a big solution. Environmental performance is highly integrated with energy consumption to design a sustainable solution to positively influence the inhabitants and the environment. The design will strive to increase thermal performance with the implementation of a thicker exterior envelope with more insulation. Specifically focusing on exterior insulation solutions to reduce thermal bridging and provide a better insulated and airtight envelop to keep the exterior elements out and the interior in. Highly efficient lighting solutions are to be used to continue to reduce energy loads.

BEHAVIORAL PERFORMANCE (USAGE PATTERNS)

Behavioral performance is in a sense a large portion of Spatial Efficacy considerations. Understanding the usage patterns of the typical inhabitant and or client. Orientating the floor plan and overall spatial orientation to relate spaces effectively and efficiently to each other. Behavioral performance will specifically be difficult to determine realistically without any post occupancy studies or feedback. This category will be used as a top priority with environmental and energy performance categories to not only produce a design that is efficient for the environment, but for the inhabitants. Understanding the desired behavioral performance categories will drive the project to develop design solutions that aren't

PERFORMANCE CRITERIA

PERFORMANCE CATEGORIES

PSYCHOLOGICAL IMPACT

The psychological aspects of the project are highly influenced by Scandinavian design and lifestyle philosophies. I've come to realize that Scandinavian design is not influenced by the building solutions, but the building solutions are influenced by the philosophies. Scandinavian design is directly a form follows function design philosophy. This ensures decisions can be made to be functional, simplistic, and minimalistic ultimately influencing a form of the same philosophy. A primary example of this would be a Scandinavian designer using form follows function to make decisions, but to use inspiration of a historic cabin used a century ago based on its extremely durable and simple form. I'm convinced that the secret to successful Scandinavian design is not based on any particular design style, but the philosophies of both design and lifestyle. The design is highly inspired by Scandinavian culture to strive for minimalism that is simple, modern, and beautiful yet functional and affordable for all. Interior materiality choices can be highly effective in influencing the well-being of its inhabitants. Nordic homes use a large amount of wood, typically throughout the entire house. Wood brings warmth and belonging while presenting a soft familiar aesthetic to sooth psychological impact versus the traditional harsh material choices. The overall influence of a Scandinavian inspired interior will add high levels of aesthetic and sensory benefits to positively influence the inhabitants and create a more desirable place to live.

CODE COMPLIANCE

Code compliance is extremely important in relation to land development and building code. Understanding the reality of developing a project and considering all of the decisions that have to be made. The project will closely follow both the city ordinance and international building code to develop an acceptable solution for later implementation into neighborhoods.

COST

The cost of the project will be relating to built projects in the surrounding area. These projects give the design solution the ability to compare total building costs that would typically be acceptable within the chosen site location neighborhood. Developing a program that meets the requirements set by the surrounding houses in the neighborhood. The understanding of a realistic cost figure will guide design decisions to be aware of the realities of designing a home. Without a cost category, the project would be seemingly unrestricted to allow for over the top custom design and high-end materials that would not be chosen otherwise.

PERFORMANCE CRITERIA

INTRO & EXECUTIVE SUMMARY

The performance criteria is developed based on a few primary larger categories of Quantitative, Qualitative, and Technical Information. It's important to clarify that this document is by no means exhaustive and further documentation will be added for the final research submittal and changes will be developed throughout the next semester.

The analysis and development of all performance criteria categories shows just how immersive the design solution will need to be to balance itself. The end solution will benefit the environment and people who inhabit it. One of the primary goals for this project is to develop a better interior space for inhabitants so they can live healthier lives. One of the challenging aspects of this whole project is having the ability to read between the lines. To perceive the challenge at hand and develop enough information to integrate it within a completely different scenario. Scandinavian design is widely talked about throughout the profession. There are articles all over the internet explaining how to decorate with Scandinavian style, but hardly any about true design integration spatially. The ability to channel all of the Nordic philosophies of both their lifestyles and design is challenging but worth doing.

PERFORMANCE CRITERIA CATEGORY SUMMARIES

Quantitative Information is especially important as it pertains to the spatial understanding of the studies from Scandinavian residential design and analyzing the floor plans. Initially, a fundamental understanding is documented in regard to spatial dimensions and requirements of these spaces. Major project elements for the thesis project are listed within the proposal and include all typical required spaces within a midwestern house with the exception of a sauna. However, the typical required spaces are much different in comparison. This is where the Space Allocation table will play a key roll in the development of Scandinavian inspired spatial requirements to be integrated into the future design solution. One a size is understood for major project elements it will be important to develop an Interaction Matrix/Net to understand which spaces are better suited in certain locations and which relate better to each other. The interaction matrix/net will be something that is briefly touched on a further developed to be more concrete as schematic design begins.

Qualitative Information pertains more to the understanding of Scandinavian lifestyle and design philosophies. Understanding these topics are vital in the successful integration into a typical midwestern house. Additional information will be provided to describe more in-depth research that will be utilize throughout the integration in the design.

Technical Information begins with an understanding of efficiency and all of the different paths it can take. The document considers the primary categories and will have a large impact on how the project can reduce time, save money, and increase chances for success. The environmental aspects of the design are fully relying on technical information to influence design decisions to develop a better environmental design that reduces its energy use and carbon footprint. Materiality is another huge portion of this section, understanding what will go into the house itself to benefit the overall project. Higher quality materials typically mean higher prices. This section demonstrates different categories of information that will need to be considered in order to develop a successful project.

PERFORMANCE CRITERIA

PRELIMINARY BUDGET

PROJECT BUDGET BREAKDOWN

Existing neighborhood homes values on 20th street range in price from a low of \$215,000 and a high of \$350,000 with a median value of \$260,000. The desired project budget will be around \$200,000 - \$300,000.

The project program will influence design decisions to reduce size of typical spaces in order to lower total square footage of home while increasing quality of wall construction and chosen materials to develop a healthier more efficient housing solution.

PARCEL PRICE ON MARKET (REALTOR) (\$):	\$29,900
CLOSING COSTS (5% OF TOTAL PURCHASE PRICE):	\$1,495
FINISHED LOT COST (INCLUDING CLOSING COSTS):	\$31,395
LOW TARGET TOTAL PROJECT COST (\$):	\$235,000
ANTICIPATED CONSTRUCTION DOLLARS PER SQUARE FOOT (\$/SF):	\$100
DESIRED HOUSE SQUARE FOOTAGE (SF):	1,800 SF
PROJECTED TOTAL CONSTRUCTION COST (SF):	\$180,000
10% PROJECT CUSHION (\$):	\$21,139.50
CALCULATED TOTAL PROJECT COST (\$):	\$232,534.50

FIGURE 68 | PRELIMINARY BUDGET

PERFORMANCE CRITERIA

PRELIMINARY BUDGET

PROJECTED TOTAL CONSTRUCTION COST (SF): \$180,000

CONSTRUCTION COST BREAKDOWN:	% OF TOTAL	COST
SITE WORK	6.2%	\$11,160
FOUNDATION WORK	11.8%	\$21,240
FRAMING	17.4%	\$31,320
EXTERIOR FINISHES	14.1%	\$25,380
MAJOR SYSTEMS ROUGH-INS	14.5%	\$26,100
INTERIOR FINISHES	25.4%	\$45,720
FINAL STEPS	6.8%	\$12,240
OTHER	3.8%	\$6,840
TOTAL	100%	\$180,000

FIGURE 69 | CONSTRUCTION COST BREAKDOWN

PERFORMANCE CRITERIA

MAJOR PROJECT ELEMENTS

Bedroom, a furnished place for people to sleep.

Closet, an enclosed space dedicated to the storage of things.

Bathroom, a room used for personal hygiene.

Kitchen, a space used for the preparation of food.

Pantry, an enclosed space similar to a closet, for the storage of kitchen related items such as food.

Dining Room, a space dedicated as a place to eat.

Family Room, a non-formal gathering space, for family.

Living Room, a formal gathering space, for guests.

Office, a room dedicated as a primary workspace.

Bonus Spaces (Nook, Den, Game Room, Movie Room, etc.), rooms or spaces dedicated to additional uses outside of the basic requirements.

Sauna, a room designed for relaxation experience with dry or wet heated sessions with steam made from water and high heat.

Interior Green Space, a space integrated within the program dedicated to an accessible/inaccessible space for nature and/or greenery.

Entry Way, a space that acts as a formal entry point to separate interior from exterior.

Mudroom, an informal multi-use entry space.

Laundry, a room or space within a room such as the mudroom dedicated for washing clothes.

Mechanical Room, a room dedicated for the use of mechanical equipment required for the house.

PERFORMANCE CRITERIA

SPACE ALLOCATION TABLE

Case Study Interior Space Allocation Table - Scandinavia

Space	Small (SF)	%	Median (SF)	%	Large (SF)	%
Kitchen	70		115		160	
Dining Room	80		105		130	
Living Room	150		215		280	
Family Room	NA		NA		NA	
Primary Bedroom	120		150		180	
Primary Bedroom Closet (Built-In)	8		15		22	
Primary Bedroom Closet (Walk-In)	20		40		60	
Other Bedrooms	55		100		145	
Other Bedroom Closet (Built-In)	8		15		22	
Office	50		80		110	
Sauna	40		50		60	
Mud Room	35		50		65	
Laundry Room	35		55		85	
½ Bath	20		30		40	
¾ Bath	40		55		70	
Full Bath	80		105		130	

FIGURE 70 | SPACE ALLOCATION TABLE - SCANDINAVIA

Notes:

*Based on Case Studies located in Nordic Countries

*SF (Square Foot)

PERFORMANCE CRITERIA

SPACE ALLOCATION TABLE

Space Allocation Table – United States

Space	Small (SF)	Average (SF)	Large (SF)
Kitchen	50	160	240
Dining Room	121	154	192
Living Room	130	216	300+
Family Room	192	280	350+
Primary Bedroom	168	280	384
Primary Bedroom Closet (Built-In)	8	12	16
Primary Bedroom Closet (Walk-In)	24	36	48
Other Bedrooms	120	168	252
Other Bedroom Closet (Built-In)	8	12	16
Office	80	168	252
Sauna	NA	NA	NA
Mud Room	30	48	80
Laundry Room	18	48	80
½ Bath	16	25	36
¾ Bath	54	70	96
Full Bath	54	70	96

FIGURE 71 | SPACE ALLOCATION TABLE - UNITED STATES

Notes:

*Based on typical search for accepted sizes for the United States.

*SF (Square Foot)

PERFORMANCE CRITERIA

SPACE ALLOCATION TABLE

Space Allocation Table – United States – Jordahl Custom Homes Fargo, ND

Space	Small (SF)	Median (SF)	Large (SF)
Kitchen	115	130	145
Dining Room	100	120	130
Living Room	150	160	170
Family Room	130	320	510
Primary Bedroom	155	170	185
Primary Bedroom Closet (Built-In)	9	12	15
Primary Bedroom Closet (Walk-In)	20	40	60
Other Bedrooms	110	155	200
Other Bedroom Closet (Built-In)	9	12	15
Office	NA	NA	NA
Sauna	NA	NA	NA
Mud Room	NA	NA	NA
Laundry Room	24	32	40
½ Bath	NA	NA	NA
¾ Bath	NA	NA	NA
Full Bath	35	50	65

FIGURE 72 | SPACE ALLOCATION TABLE - JORDAHL CUSTOM HOMES

Notes:

*Based on three model homes varying from smallest available floor plan to larger.

*SF (Square Foot)

PERFORMANCE CRITERIA

SPACE INTERACTION MATRIX - SPATIAL ADJACENCY

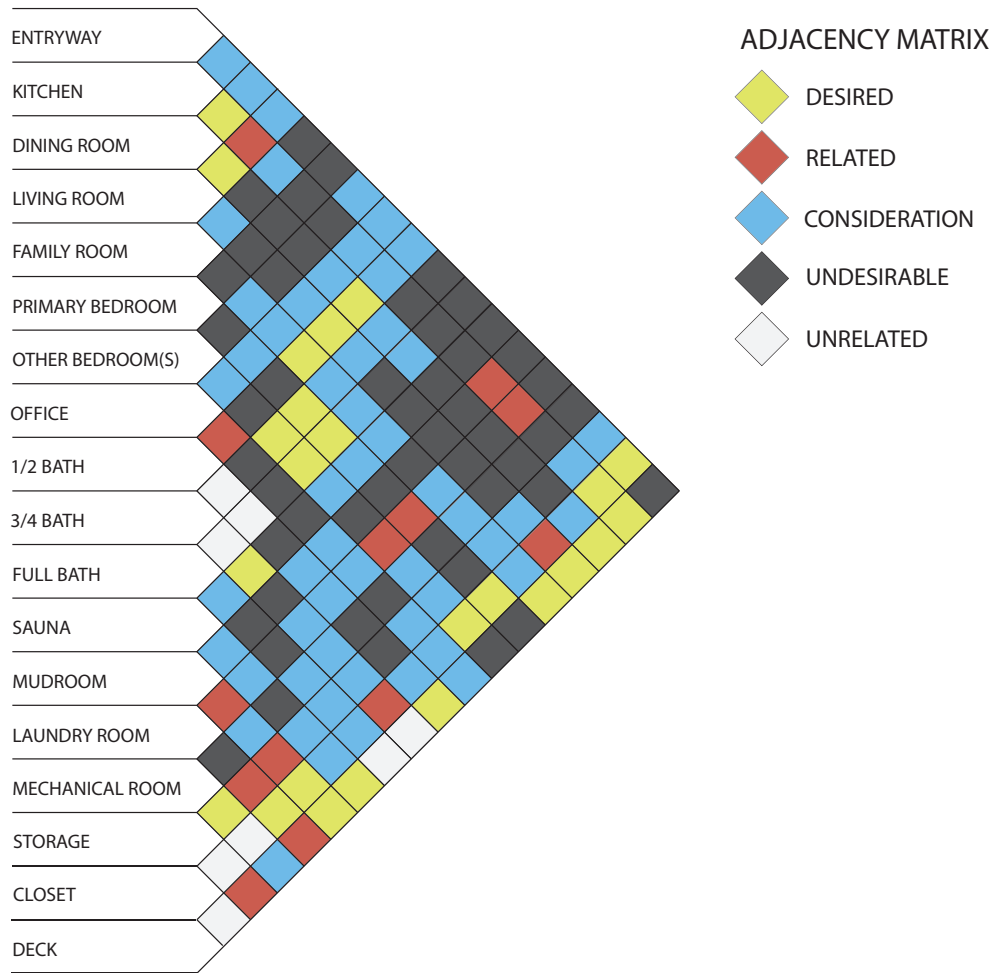


FIGURE 73 | SPACE INTERACTION MATRIX

PERFORMANCE CRITERIA

SPACE INTERACTION MATRIX - PUBLIC & PRIVATE SPATIAL ADJACENCY

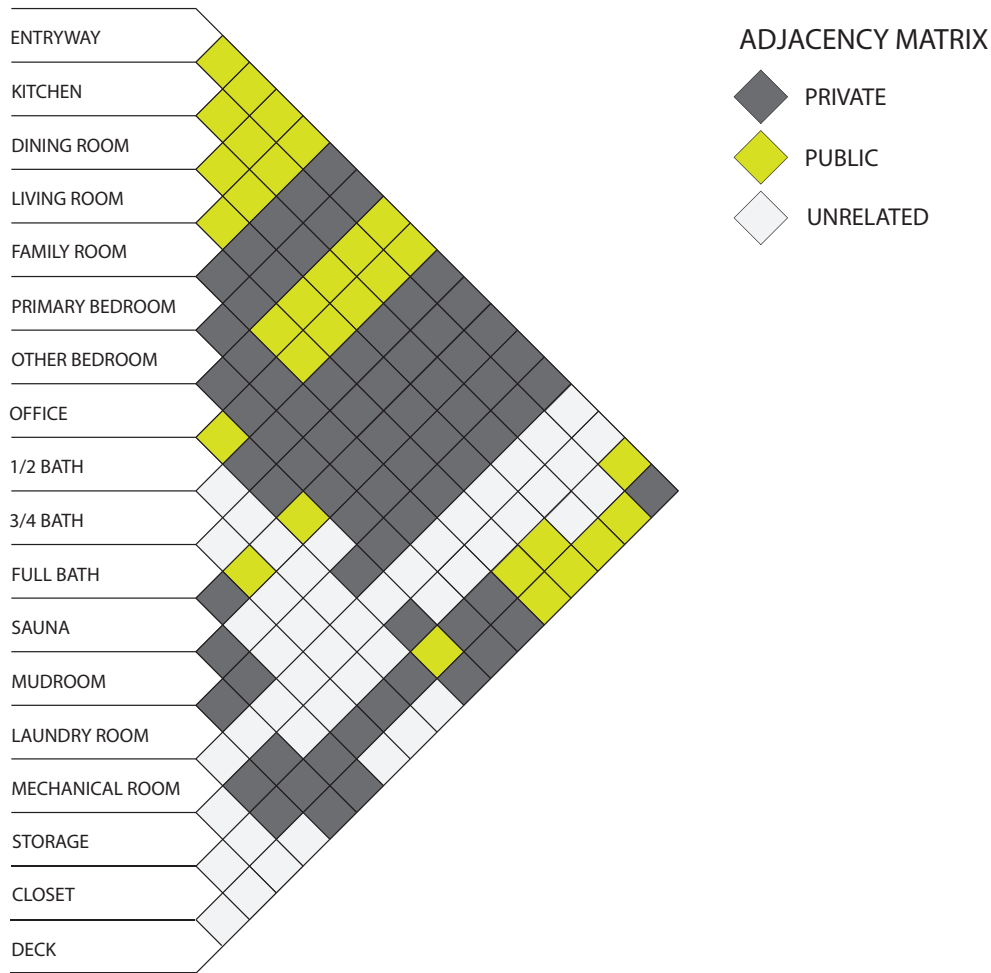


FIGURE 74 | SPACE INTERACTION MATRIX

PERFORMANCE CRITERIA

SPACE INTERACTION NET - FIRST FLOOR

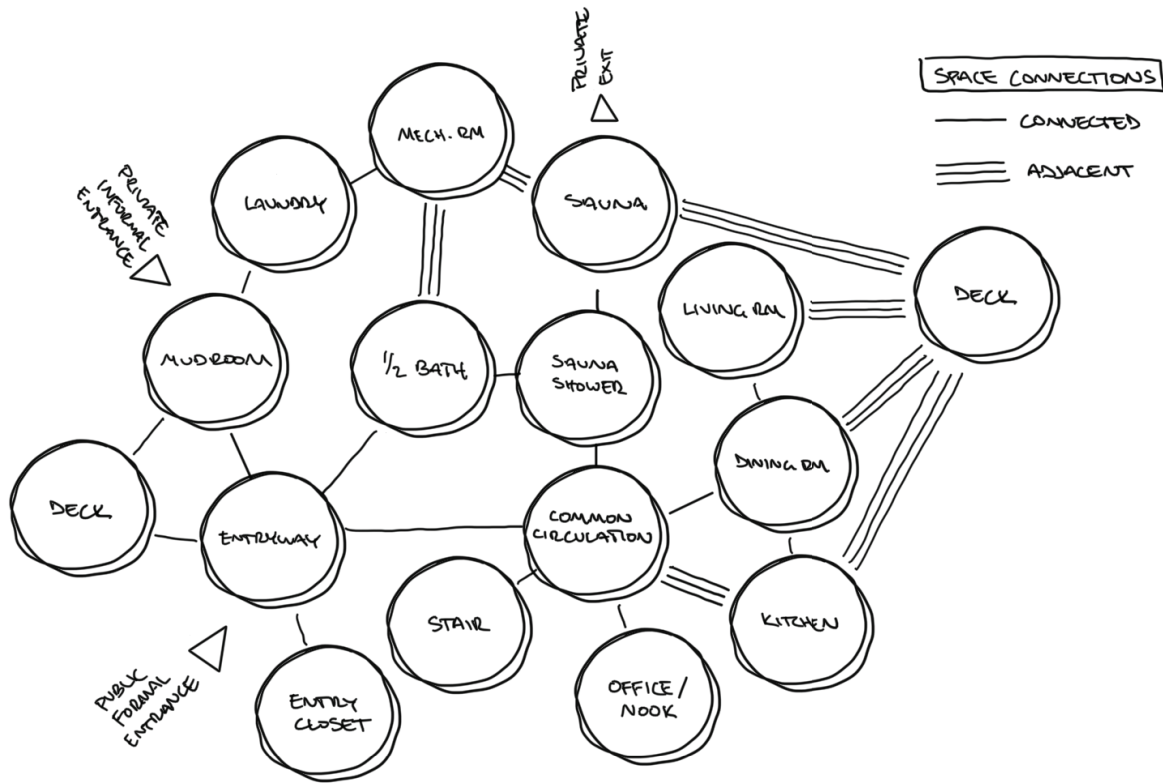


FIGURE 75 | SPACE INTERACTION NET

PERFORMANCE CRITERIA

SPACE INTERACTION NET - SECOND FLOOR

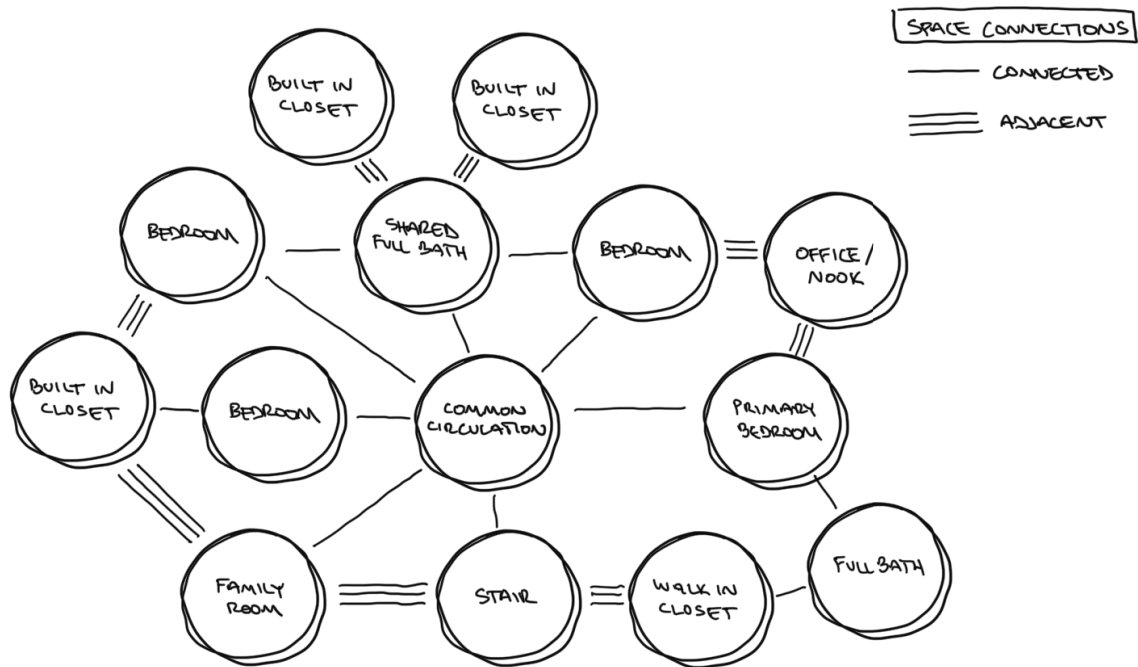


FIGURE 76 | SPACE INTERACTION NET

THESIS RESEARCH APPENDIX

INTERVIEW - MATIAS KAIJOMAA

I had the opportunity to interview a man by the name of Matias Kaijomaa. Matias lives in Helsinki, Finland and is native to the country. Matias came to the U.S. in 2015 as a foreign exchange student to experience our culture and he attended Moorhead High School. I've been lucky enough to keep in contact with him and develop a friendship that has now translated into this academic opportunity. I wanted to interview Matias since he is a Fin himself and the primary correlation for this thesis project is between the U.S. and Scandinavian Countries such as Finland. Matias has provided some great information to a list of questions ranging from culture, to lifestyle, to design elements.

One of the first discussions Matias and I had was about the World Happiness Report. The WHR was an article used for the Historical, Social and Cultural Research section where I reviewed the document to find some translation to architecture. All Scandinavian countries top the list of worlds happiest countries every year. More specifically, Finland has topped the chart at #1 for the last three years. The document focuses on social, political, and economic variables that ultimately gauges happiness. I asked Matias was familiar with the World Happiness Report in which he answered, "I've heard of it; I know Finland is usually somewhere on the top, but we don't necessarily follow that specifically. Like you have it there, Finland has been in the first spot the last 3 years in a row which is quite interesting if you know the Fins I know." His responses to the choices made by the WHR also extended to commenting on just why he thought this was the case saying, "Scandinavian countries, Sweden, Norway, and Finland for the most have high tax rates. With those taxes we can get free schooling and good healthcare that can be big influence for the overall rating. With high taxes you get a lot of privileges that may not be available in other countries. ". His thoughts resound with the overall conclusion of the article. However, the primary focus of the article was on selected chapters having to do with the Environment, Sustainable Development, and Nordic Exceptionalism. All of which I wanted to document firsthand perspective from a Finnish resident themselves.

THESIS RESEARCH APPENDIX

INTERVIEW - MATIAS KAIJOMAA

The primary focus of the interview revolved around Finnish culture and how it relates to the WHR as well as other primary research having to do with Scandinavian design implementation. I asked Matias if there is a greater importance to being near nature in Finnish culture? He added, "What really comes into mind when we talk about nature is that Finnish people explicitly focus on personal space. They need personal space. If you consider the typical block in the United States where the houses are continuously placed, I feel like that would never work. Some Finnish people need that personal space and bringing nature provides that and lets you connect better. For example, people don't want to cut trees because they block vision. A lot of large trees are protected, there's a tree in our backyard that if we were to cut it, we would be able to see the ocean perfectly, but we can't because it's protected by some rights and would cost a lot of money. Nature is just embedded in my culture since we've always been so close to it. Two benefits that come to mind are providing privacy and its ability to calm you down. Personal space is a big reason why we need nature close." This was something that I particularly found interest in as deforestation is a common conversation across the world. Maintaining nature for the benefit of the earth as well as the benefit of the people. Fins culture is directly connected to nature and it serves multiple different purposes for them. In consideration of the lack of nature here in the Midwest due to the geographic location being in the great plains, trees are a bit of a luxury, yet protection of native trees is nonexistent. Unlike Finland where the country is covered in trees. Matias added, "Finland is a very green country. We have around 10 trees for every person in the world." and "No matter where you are in Finland, if you travel for even short distances of 20-30 minutes it's unlikely that you wouldn't see large groups of trees or forest. We are very close to nature to be able to get away." I asked him about the reasoning behind the protection of trees since this is typically unheard of here in the U.S. He added, "I would primarily say people, but more specifically, they're protected by the city. You can find a map on the cities website that shows the protected areas throughout the city. My teacher once told us about the time he was looking to move somewhere, but he looked and saw that in 4 years his backyard view that would have been a forest with nice calming views would turn into a construction site and a kindergarten. There has to be a notion to cut them down and permission from the city." This conversation on the conservation of nature within the city sparked my interest considering how nature can be more integrated into the Fargo areas. Trees and other forms of natural vegetation can be planted to better serve newer developed neighborhood communities.

THESIS RESEARCH APPENDIX

INTERVIEW - MATIAS KAIJOMAA

Its clear to see that the Finnish culture is significantly interest in maintaining their closeness to nature. This made me wonder how being raised with the mentality of protecting nature influences their view on climate change. Matias said he hasn't been involved with much discussion of climate change, but he was fairly certain that Finland actually has a fairly high carbon footprint. In 2019, the average carbon footprint per person in the U.S. was 16 tons while Finland residences were only half that at 8 tons. I continued to ask if the Finnish culture has an overall healthier mindset in regard to climate change. Matias spoke of an observation that he had upon arriving and living as a foreign exchange student. "When I came to America, I was quite surprised that you don't recycle. When I go to throw out my trash in Finland there are bins for Glass, Metal, Carbon, Plastic, General Waste, Bio Waste, and Electronics. Generally people recycle a lot and my mom has always been very specific about that as well. You don't necessarily focus on it, but within our culture it comes more naturally. People like to be clean and healthy. " This is just a small example of how the United States does little to benefit not just global, but the local environment.

When you think Finland, you may think Sauna! Sauna is one of the primary major project elements that will be integrated in the newly design model homes for the area. It is said that Finland has more saunas than cars. I asked Matias, "I would say that is definitely true. Even if you live in a general city area such as Helsinki, apartments have saunas. Usually apartment buildings either have a shared sauna that you can reserve a time privately or you have one in your apartment. " He also mentioned that most families have a cottage home in addition to their primary residence, both having saunas. Sauna is of great importance within the Finnish culture. Matias explained, "The thing about saunas in Finland is that it's more of a cultural thing for sure. It goes way back as a general necessity through history in our culture where women gave birth in saunas and people were hosted in saunas and people bathed in them. Small houses, big families. They provide health benefits such as clearing up your sinuses and boosting your metabolism." The culture has such rich history with sauna, and it was very interesting to hear about. He also mentioned how sauna is utilized throughout the year aside from daily use, "We have cultural holidays with traditions such as have a bonfire, go to sauna, and swim in the lake. There are many different designs when it comes to sauna and they can either be gas or sauna." It was important for me to understand what he personally though in regard to sauna. I asked him how important it is for him to have a house with a sauna, especially when he begins a family in the future. Matias explained, "Socially, it's like going out and drinking, getting in the sauna is also a social event. There's a feeling of togetherness. I would definitely be more upset if I didn't have a sauna when I wanted it compared to not using it when I can." Ultimately, sauna will serve as one of the most important project elements in order to focus inhabitant experience to form habits that will positively benefit their lifestyles.

THESIS RESEARCH APPENDIX

INTERVIEW - MATIAS KAIJOMAA

The last portion of our conversation had to do with the built environment. The built environment of Finnish culture as well as his experiences and perspective on American environments that he experienced during his time in the U.S. as a foreign exchange student. I asked him if he noticed any significant differences from his experiences in the United States versus Finland. He mentioned, "First thing that comes to mind is that Finnish people don't wear shoes inside. We also don't have full floor carpets here. I haven't seen a single house in Finland with full floor carpet. We have wood floors." As well as talking about furnishings of his host families house, "Another thing I noticed is that my host family had older furniture that was from a different era. Our furniture in Finland is much more modern." This made me curious as to how he perceived interior spatial differences. He mentioned that kitchens always seemed the same and that our refrigerators seemed larger. Some elements of our housing that he found interesting was the amount of designated seating areas. "It seemed like when they were designing the houses that whenever they had additional free space, they put seating. It was interesting in my host families house the amount of seating areas. When I think about my dad's house there is a kitchen, living room, a sauna with showers, and bedrooms." He also found particular interest in basements since it was where his host room was located. "It was interesting that you had basements. We typically have garages on lower floors but no housing space. We go up more than you go down. We mostly never have any floors below the ground."

The interview was highly successful, and Matias provided me with crucial information on his Finnish perspective on the challenges I'm trying to solve here in the U.S. The information will benefit the implementation of design decisions to develop a successful project solution.

THESIS RESEARCH APPENDIX

INTERVIEW - JUSTIN JUNTUNEN

I had the opportunity to interview a man by the name of Justin Juntunen. Justin is the CEO and Founder of Cedar Stone & Sauna based out of Duluth, MN. I was lucky enough to run into him on the shores of Duluth where he has a tiny house sauna on wheels used for private sauna sessions for a true Finnish sauna experience. I was able to return to Duluth a few months back and booked a session with Justin. The sauna was a unique guided session by an experienced host. Cedar Stone & Sauna was the closest Finnish sauna experience you can have without actually visiting Finland. I was only able to interview Justin for a short 35 minutes but got a bunch of great information.

“In many ways we’re educating people on the practice, wellness benefits, and the history and culture” said Justin. Justin and his team focus on true Finnish sauna quality of experience and construction. “When there’s not a lot of vocabulary around this type of building structure. What happens is, you get poorer quality versions of the thing.” They provide the highest quality version of the thing, which is sauna.

We spoke about the benefits of sauna when implementing it into our everyday lives. There’s a large body of research surrounding traditional sauna. Justin mentioned an article, “The big study you’d want to look at if you do want to dive into the wellness benefits of sauna is published by the Mayo Clinic in 2018 by Dr. Jari A. Laukkanen, MD, PhD from Finland. They followed 20 years’ worth of data for people actually living in Finland. They studied what sauna actually did for their lives. They looked at the end of people lives, what did it do, did they live longer, did they live better? What they found is that mortality rate dropped by 27 percent for people that used the sauna 1-3 times per week. People that used it 4-7 times a week, the daily users, dropped to 40 percent.” Additionally, Justin added, “They found better heart health, lowered anxiety and stress, lowered inflammation, better sleep, better immune systems, all stuff that we associate with a healthier lifestyle.” Quite remarkable information coming from a trusted and well recognized organization such as the Mayo Clinic. It’s no lie that exercise becomes harder as you age. “Sauna is a passive exercise” said Justin. I can attest to this with my own experience in the sauna. I’m in fairly great shape and the sauna had my heart racing! “Part of sauna isn’t just the endurance of heat, it’s not just a workout, it’s a practice.” The practice is quite effective and it’s no wonder why doctors and research hold sauna to a high standard. “We always call it this cycle of hot, cold, rest, rehydrate, repeat. Anytime you’re using a sauna correctly you’re actually walking through that cycle 3-5 times”

THESIS RESEARCH APPENDIX

INTERVIEW - JUSTIN JUNTUNEN

One of the other primary portions of information had to do with the design and build of saunas. “To do something high quality, to do something high quality, often means you build it correctly, you use the right design principals, and good materials to be used well.” This led him to educate me on the best form of heat and more specifically, the heat source. The stove is the heart of the sauna and the spot you want to invest first. The more thermal mass, the better. “If you get a stove that heats a lot of thermal mass, a lot of rock. The heat in that room feels really smooth, really slow, really dense. It’s great in the winter and you just need to warm up.” There are two primary stove methods when it comes to a successful sauna. The traditional wood fire stove or an electronic element. I asked what he thought about efficiency and the convenience factor between the two. He brought up a consideration for clients, “What are you going to use more or enjoy more.” This is ultimately up to the clients, but due to the lack of time average Americans think we have to spend means that a sauna that requires a lot of effort to create a fire and maintain will often not be utilized fully. However, an electronic element stove that can be controlled from your phone adds a huge convenience factor. “You want a space that people use regularly. You want a space that people invest in, it benefits them, they know why, and it’s easy for them to use.”

When it comes to design of the space it is important to consider the extremes that a sauna endures. High temperatures and high humidity. These are to be considered when implemented within a house as to not damage the house. Ventilation is also super important and good fresh air is crucial to a healthier, cleaner, more enjoyable space. Justin explained a little about the implementation of different levels in the sauna. “While you’re in the room, you want to think about how you’re going to interact with the space. You want multiple layers of heat. Top benches that have higher invigorating heat and low benches for a smoother heat.” This is something that I experienced myself in my sauna session. I asked Justin about the spatial arrangement and integration of saunas within a house. Figuring that a sauna can either be private or public Justin added, “The sauna is a communal place and also a place of silence. Often times there is a deep connection to nature. It isn’t just tucked away in the basement, it’s in the backyard, by the lake, has a window with a view.” When the sauna is placed within the household, I feel that everyone should have access to share the benefits. Justin agreed, “I think sauna should be a place that isn’t just private. It should be accessible to the whole home.”

Justin is highly knowledgeable in his field as he was raised in a sauna family here in the United States. His knowledge is used to educate and increase the overall wellbeing of others. Sauna is the future of American lifestyle. Whether it’s something that others will have zero interest in or is just waiting to be discovered. The health benefits that come along with the use of sauna are sure to spark interest and will allow the future of housing to positively influence lifestyle of its inhabitants in their everyday lives.

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FINAL SOLUTION
HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

HOW DESIGN
BUILT VS NATURAL EN

CONNER RILEY

ENVIRONMENT INFLUENCES LIFESTYLE

FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

HOW CAN THE BUILT
INFLUENCE YOU

LT ENVIRONMENT IN WHICH YOU LIVE,
OUR LIFESTYLE AND WAY OF LIFE?

THEORETICAL NARRATIVE

OVERVIEW

Striving to bridge the gap between the built and natural environment, and how they are influenced by it.

Focus on the built environment's ability to provide a sense of place for its inhabitants within the typology of single-family housing.

Correlation of Culture, Lifestyle, and Residential Typology in Finland, Norway, and Denmark.

THREE PRIMARY FOCUS POINTS

Regional climate similarities between the Mediterranean and Northern European regions.

Analysis and integration of Scandinavian single-family housing typology and overall size to inform better overall design.

Integration of nature, sustainable materials, and green design to create healthier living environments.

uilt environment and how inhabitants interact with and are

positively influence lifestyle, overall health, and the mindset
single-family homes.

ences of the Midwest and Scandinavian Countries of

Midwest and Scandinavian Regions

single-family home's spatial elements, spatial arrangement,
design solutions.

ls, and environmental design decisions to inform better

PREMISE FOR INVESTIGATION

PERSONAL PERSPECTIVE

Desire to provide additional housing options

Opportunity to develop a solution that is not

Driving factor for a future of entrepreneurship

THESIS PERSPECTIVE

Lack of option in the housing market for home

Regional climate similarities between the Mid

World Happiness Report

ON

ons to the region.

not available currently.

ship and design build practice.

omeowners.

Midwest and Scandinavia.

WORLD HAPPINESS REPORT

Are you familiar with the World Happiness R

- Finland at #1 Spot last 3 Years in a row.
- All Nordic Countries Top 5 or Top 10 ever

THREE PRIMARY CHAPTERS

1. How Environmental Quality Affects Our H
2. Sustainable Development and Human W
3. The Nordic Exceptionalism: What Explains
Constantly Among the Happiest in the Worl

RT

s Report?

w.

very year.

r Happiness

n Well-Being

ains Why the Nordic Countries are

World

FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

HOW DOES SC
INFLUENCE

SCANDINAVIAN LIFE & CULTURE
E THEIR BUILT ENVIRONMENT?

FINNISH CULTURE & LIFESTYLE

DESIGN PHILOSOPHIES INFLUENCED BY LIFE

SCANDINAVIAN LIFESTYLE PHILOSOPHIES

- Connection To Nature
- Simplicity
- Trust & Community
- Healthy Lifestyle

REINFORCED BY FINLAND RESIDENT

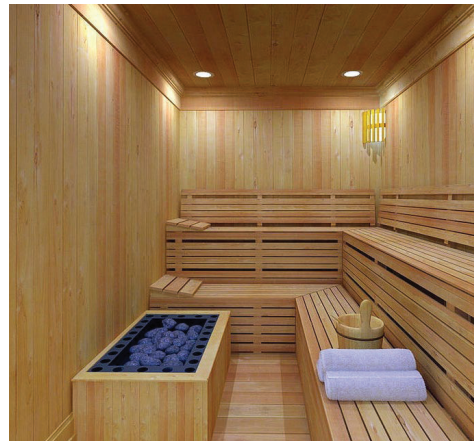
YLE

LIFESTYLE PHILOSOPHIES

ES



NATURE &
ENVIRONMENT HEALTH



SAUNA

FOCUS ON FINNISH RESIDENCE

DESIGN PHILOSOPHIES

INTERIOR DESIGN ELEMENTS

- Wood, Wood, Wood
- Light, Muted Colors
- Natural Light
- Connection To Nature (Greenery)
- Function Layout And Less Wasted Space

ANNUAL HOUSING FAIR OF FINLAND

ENCES



FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

PRIMARY FOCUS – RESIDENTIAL

SCANDINAVIAN RESIDENTIAL



HONKA SAVUKVARTSI – VANTA, FINLAND



HONKA

ENTIAL DESIGN

ENTIAL DESIGN



HONKA MARKKI - SEINÄJOKI, FINLAND



HONKA HUOMEN

FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

PRIMARY FOCUS – RESIDENTIAL

MIDWESTERN RESIDENTIAL M



CRAFTSMAN RAMBLER – WEST FARGO, ND



TRADITION

ENTIAL DESIGN

MODEL HOMES



TRADITIONAL 2-STORY – WEST FARGO, ND

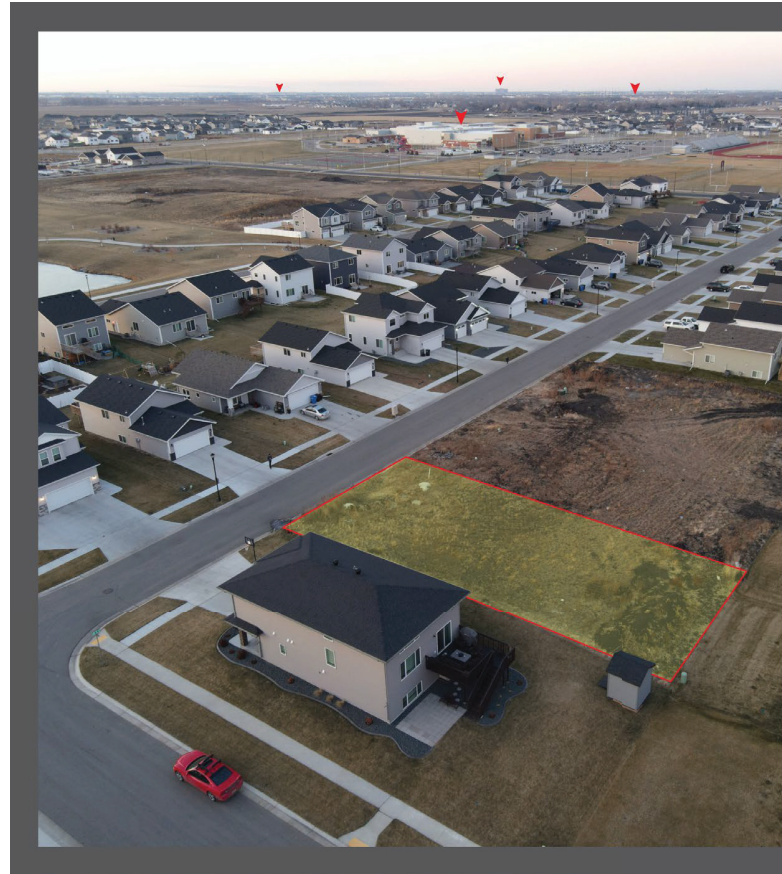


TRADITIONAL BI-LEVEL – WEST FARGO, ND

FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

CURRENT SITE & NEIGHBORHOOD



RHOOD



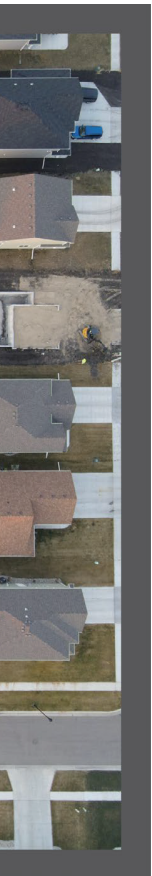
FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

CURRENT SITE & NEIGHBORHOOD



RHOOD



SOLUTION

OVERVIEW

4 Bedroom 3 Bath

Finished: 2,300 Sf

Unfinished: 290 Sf

Garage: 610 Sf

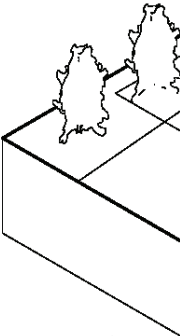
AREAS OF FOCUS

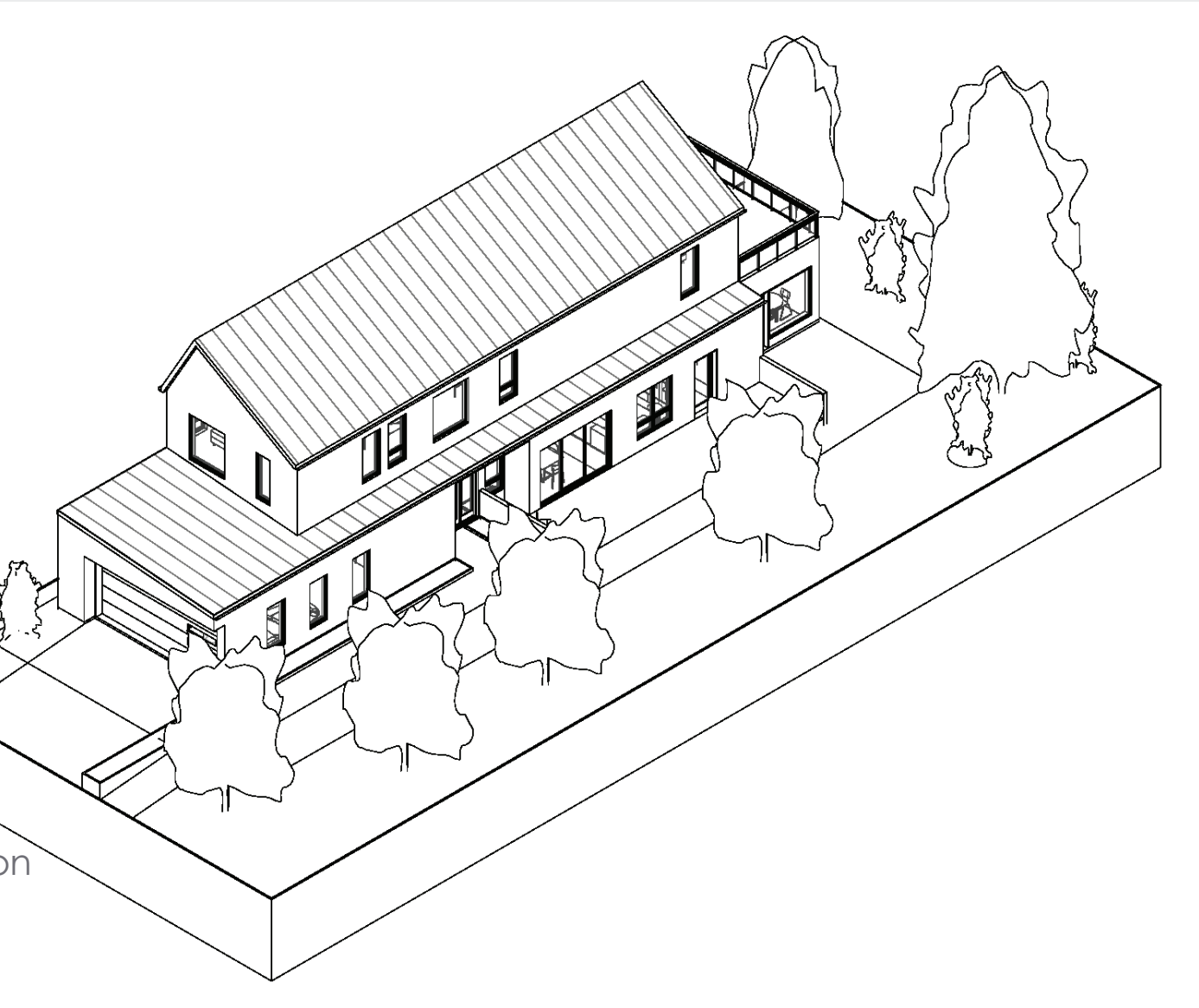
Private Sauna

Interior & Exterior Greenery

Grandparents Suite - Addition Option

Oversized Garage & Storm Shelter





FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

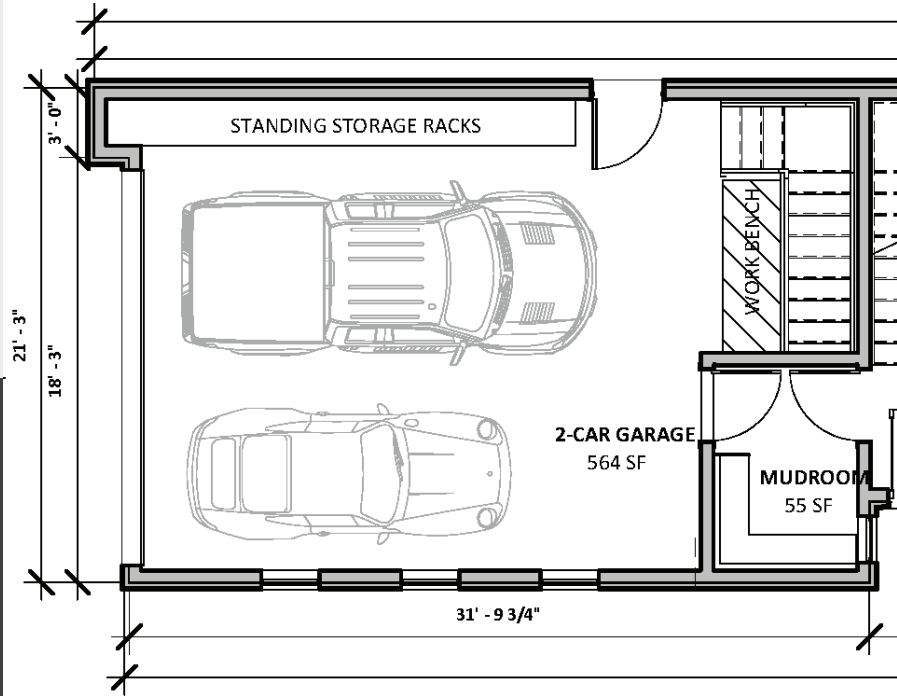


PRIMARY RENDER



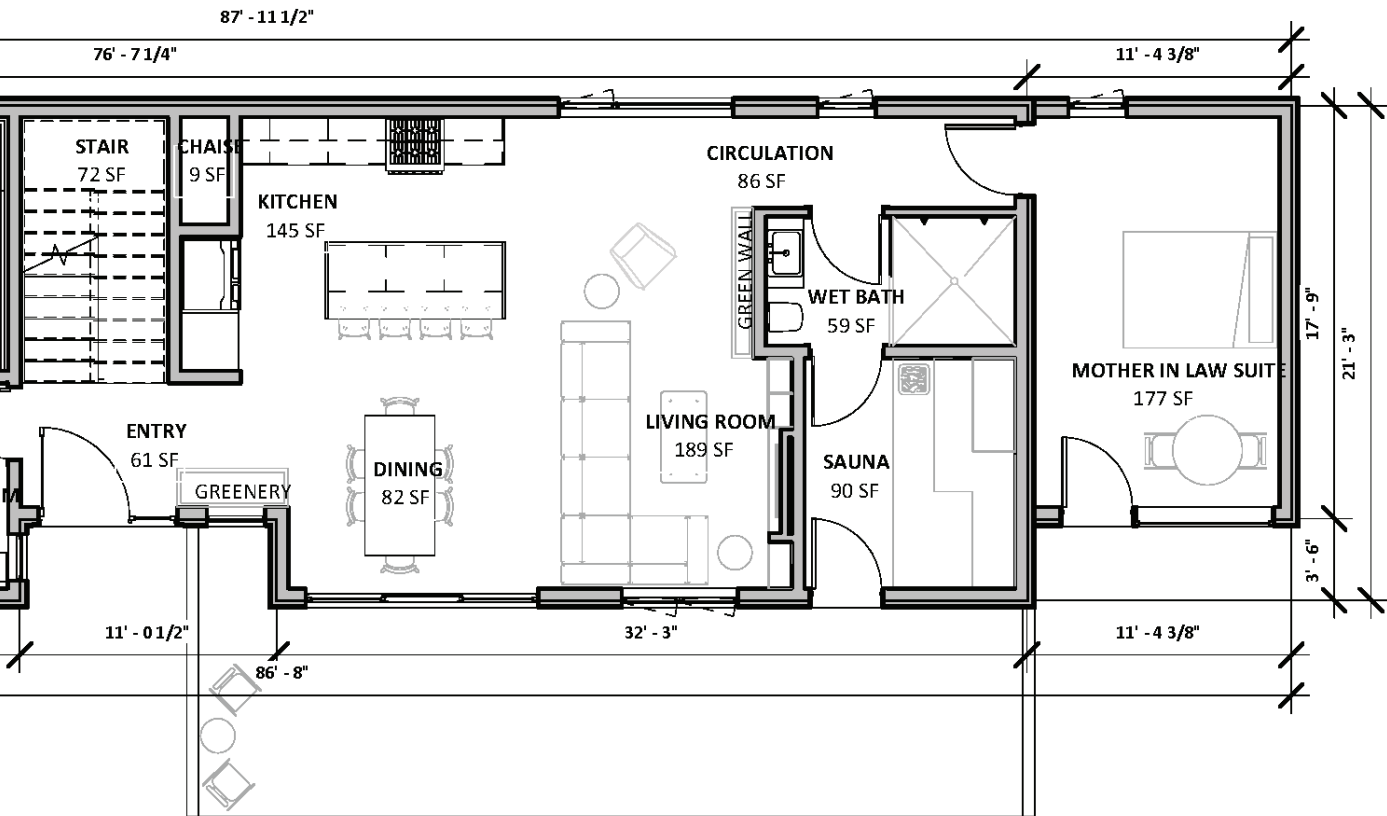
FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT



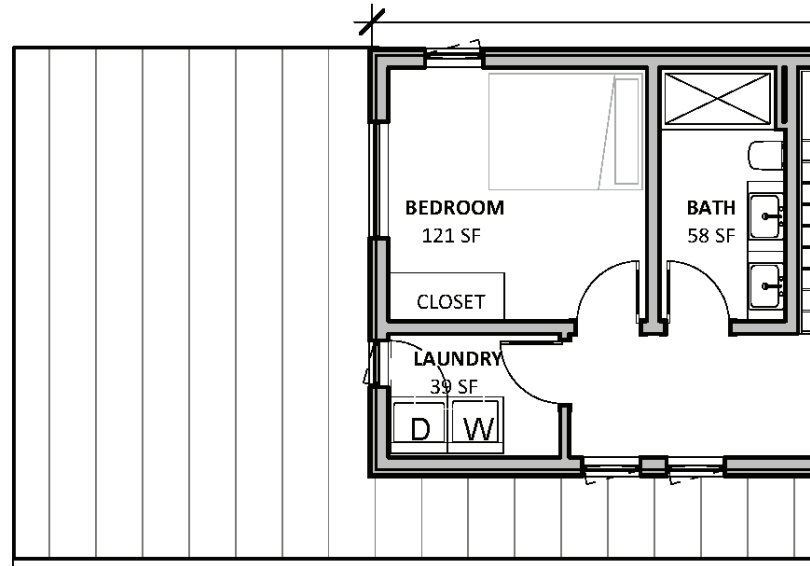
1,155 SF – FINISHED GROSS AREA

MAIN LEVEL



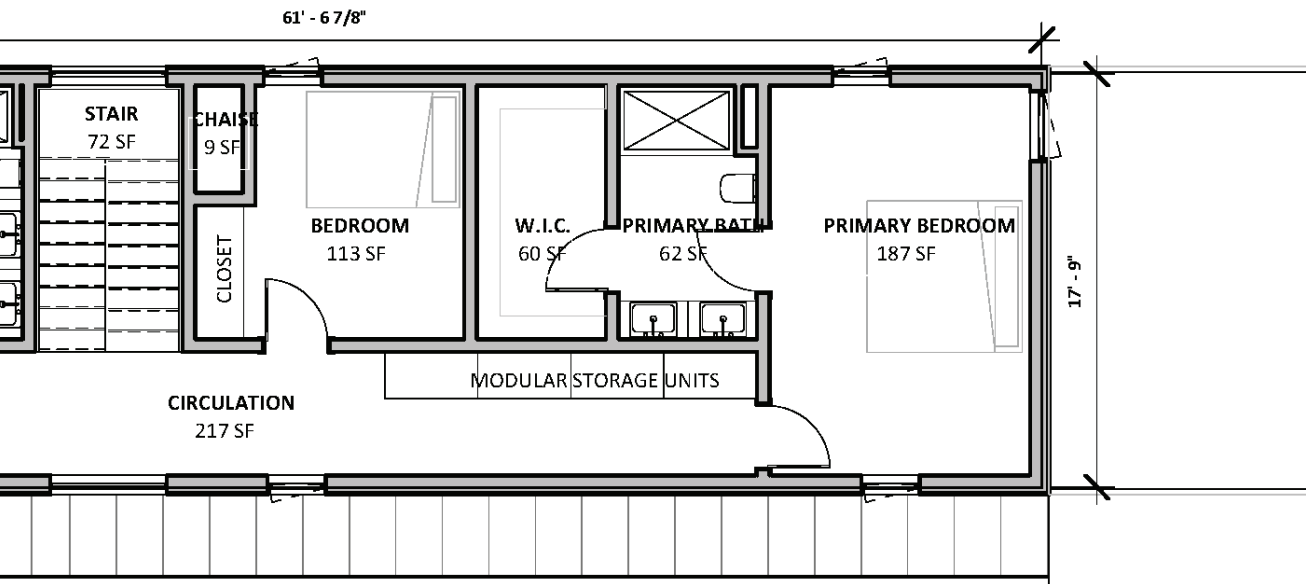
FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT



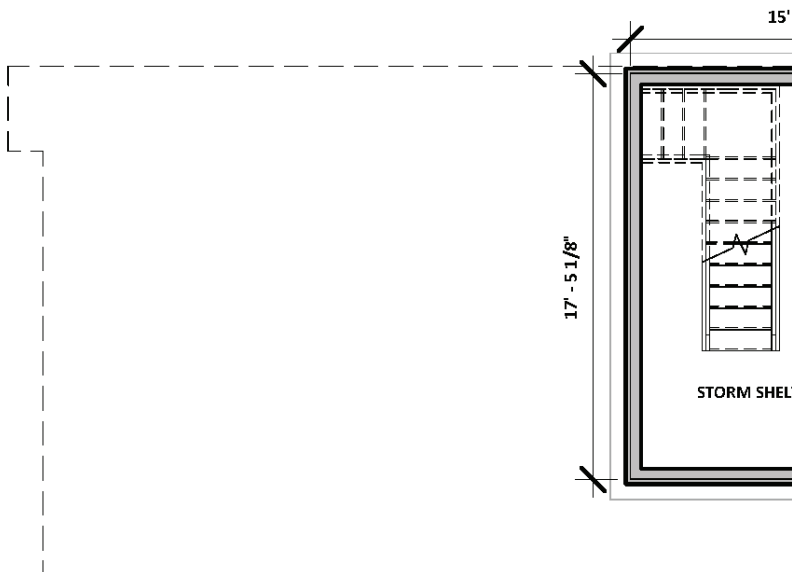
1,145 SF – FINISHED GROSS AREA

UPPER LEVEL



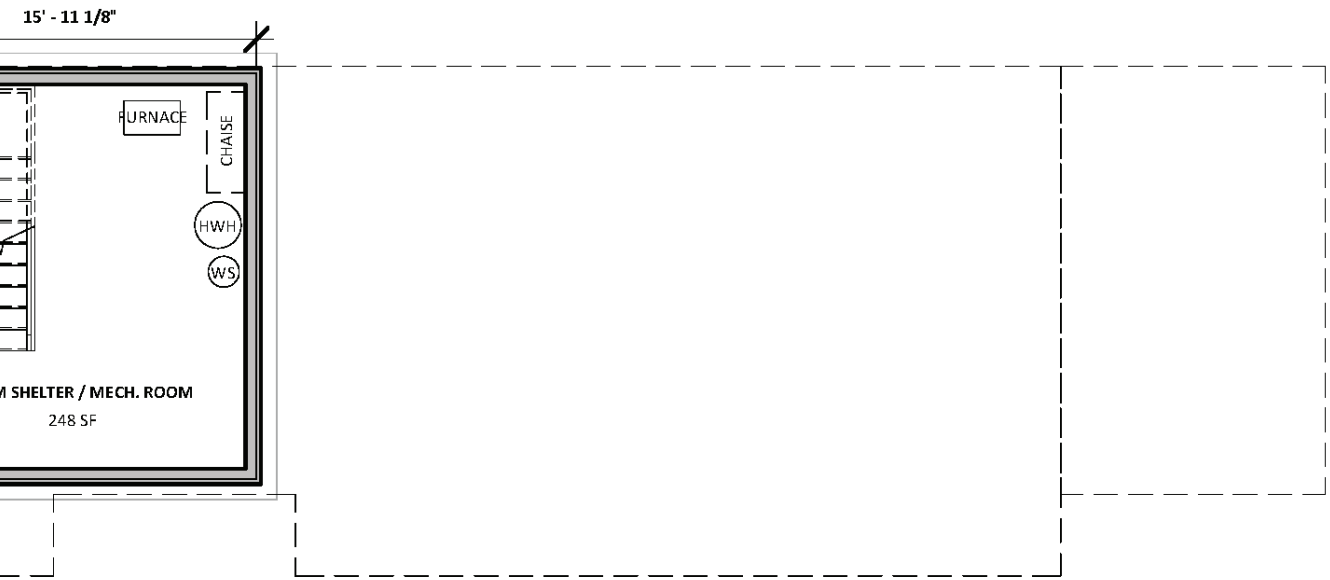
FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT



290 SF – UNFINISHED GROSS AREA

SUB LEVEL

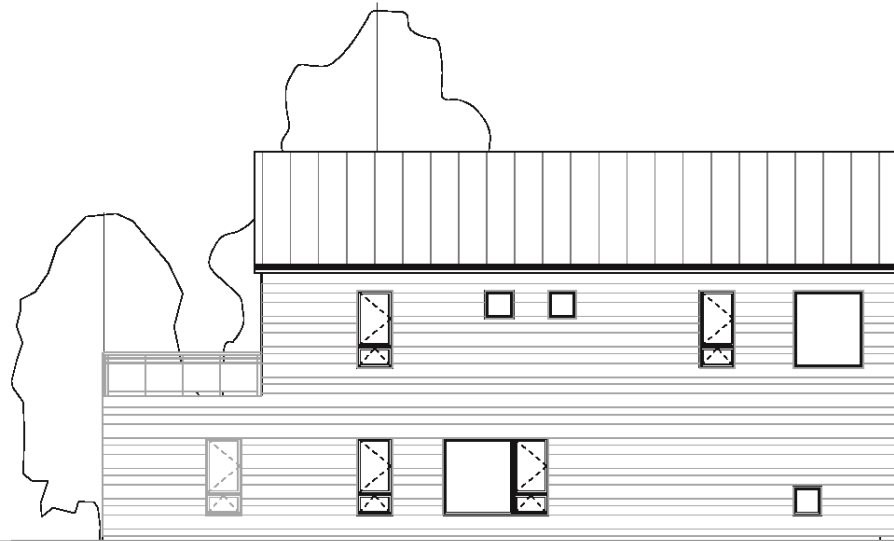


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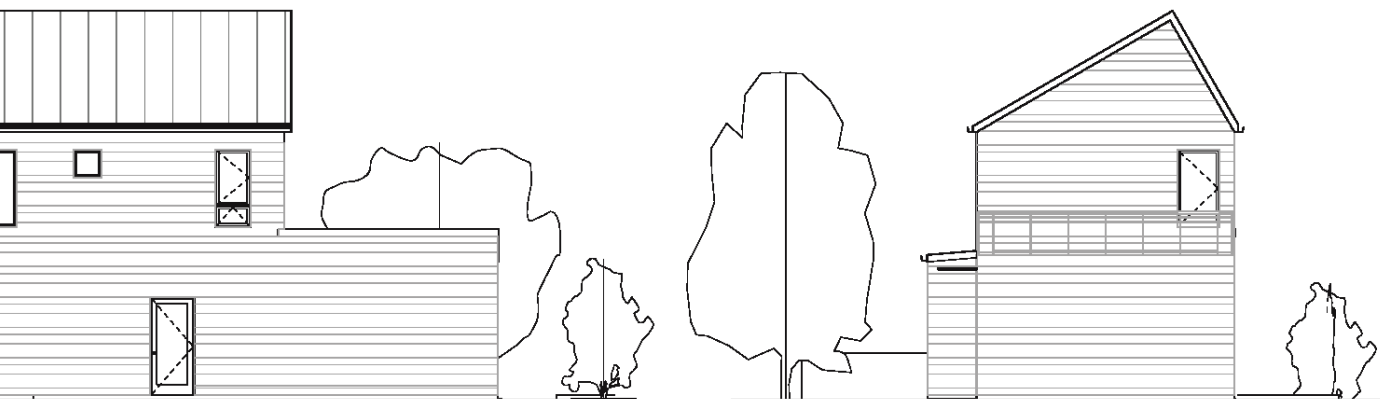
FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

EXTERIOR ELEVATIONS



NORTH



EAST

FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

EXTERIOR ELEVATIONS



SOUTH

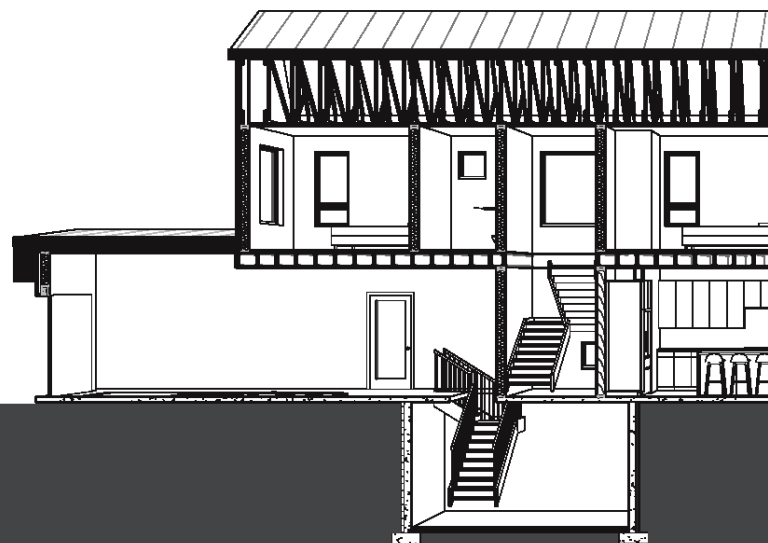


WEST

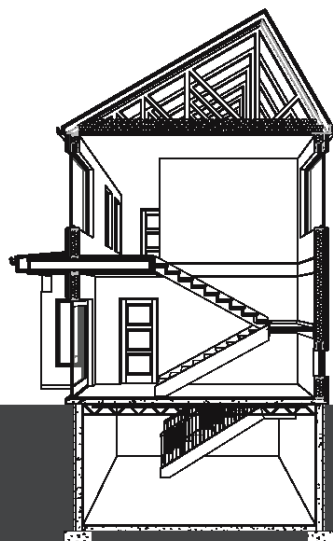
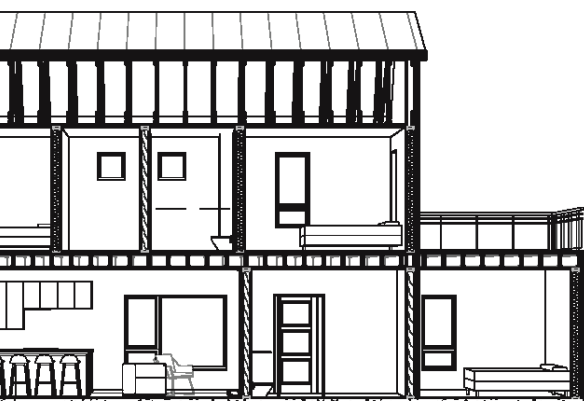
FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

LONGITUDINAL & TRANSVERSE



VERSE SECTIONS



SITE PLAN & EXPLODED DIAGRAM

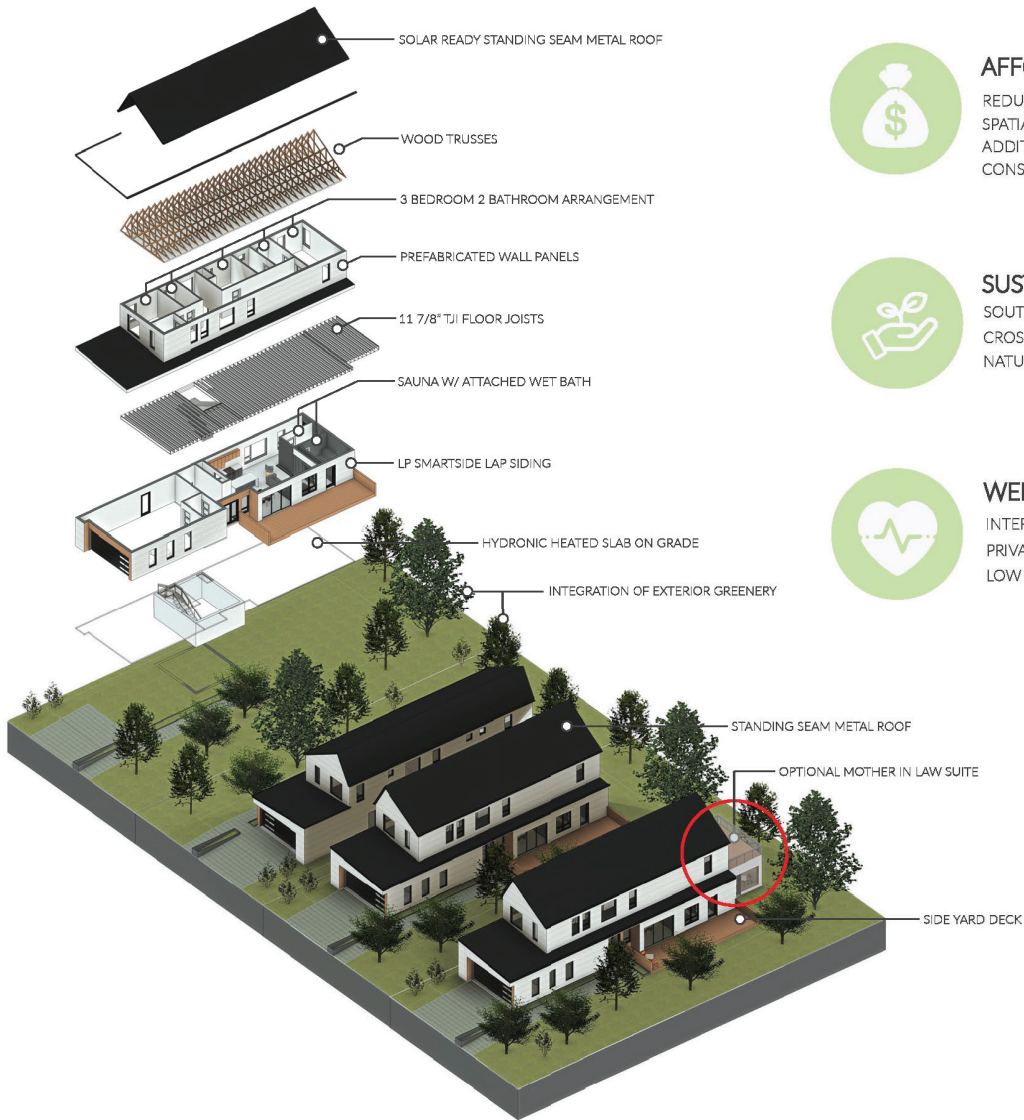
MULTI PARCEL INTEGRATION

FOCUS ON THREE PRIMARY CATEGORIES

COST BREAKDOWN

\$300,000 BUDGET

HOUSE SQUARE FOOTAGE	2,140 SF	GARAGE SQUARE FOOTAGE	
\$105/SF FINISHED FLOOR AREA	x	\$50/SF CONSTRUCTED FLOOR AREA	
TOTAL HOUSE COST:	\$224,700 @ \$105/SF	TOTAL GARAGE COST:	\$31,500 @
PARCEL COST	\$35,000		
TOTAL PROJECT COST	\$291,200		



AFFORDABILITY

REDUCED SQUARE FOOTAGE
 SPATIAL EFFICIENCIES
 ADDITION POTENTIAL
 CONSTRUCTION METHODS



SUSTAINABILITY

SOUTHERN EXPOSURE
 CROSS VENTILATION
 NATURAL LIGHT



WELLNESS

INTERIOR & EXTERIOR GREENERY
 PRIVATE SAUNA
 LOW VOC MATERIALS

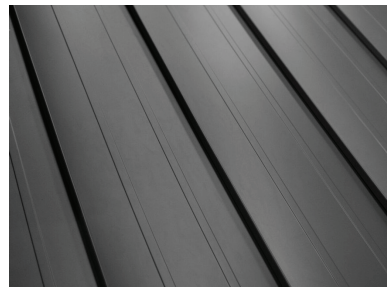
EXTERIOR MATERIAL FIN



LP LAP SIDING



BOARD & BATTEN



METAL STANDING SEAM

NISHES



G SEAM

ENVELOPE AND SYSTEMS

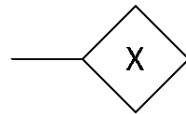
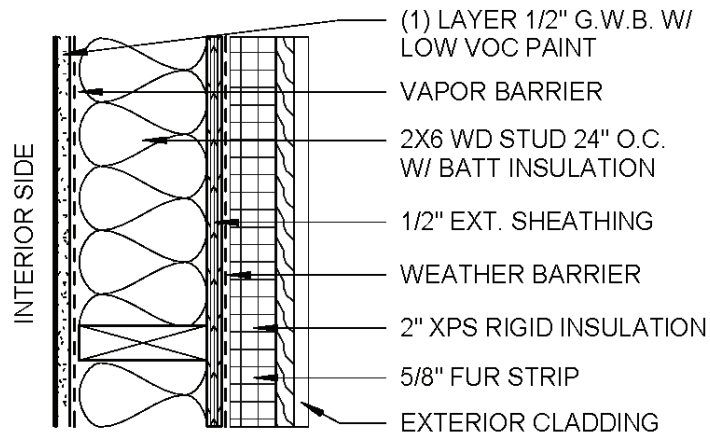
NATURAL SYSTEMS

- CROSS VENTILATION
- SOLAR EXPOSURE
- DAYLIGHTING

MECHANICAL SYSTEMS

- HEAT RECOVERY VENTILATOR
- HIGH EFFICIENCY FURNACE
- OPTIONAL SOLAR PANELS

EXTERIOR ENVELOPE



EXT. WALL TYPE

FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

INTERIOR RENDERS



ENTRY



GREAT ROOM

INTERIOR RENDERS



PRIVATE SAUNA



EXTERIOR DECK

INFLUENCING LIFESTYLE

INTERIOR

- Abundance of Natural Light
- Operable Windows to maximize Natural Ventilation
- Integration of Interior Greenery
- Private Sauna

All interior factors influence the inhabitant's lifestyle by providing a healthier interior environment year-round increasing both physical and mental wellbeing.

EXTERIOR

- Efficient use of side and backyard area
- Integration of Greenery (Tree and Planted Vegetation)

All exterior factors influence the inhabitant's lifestyle by providing more communal and private space to enjoy being outdoors.

HOW CAN THE BUILT ENVIRONMENT IN WH

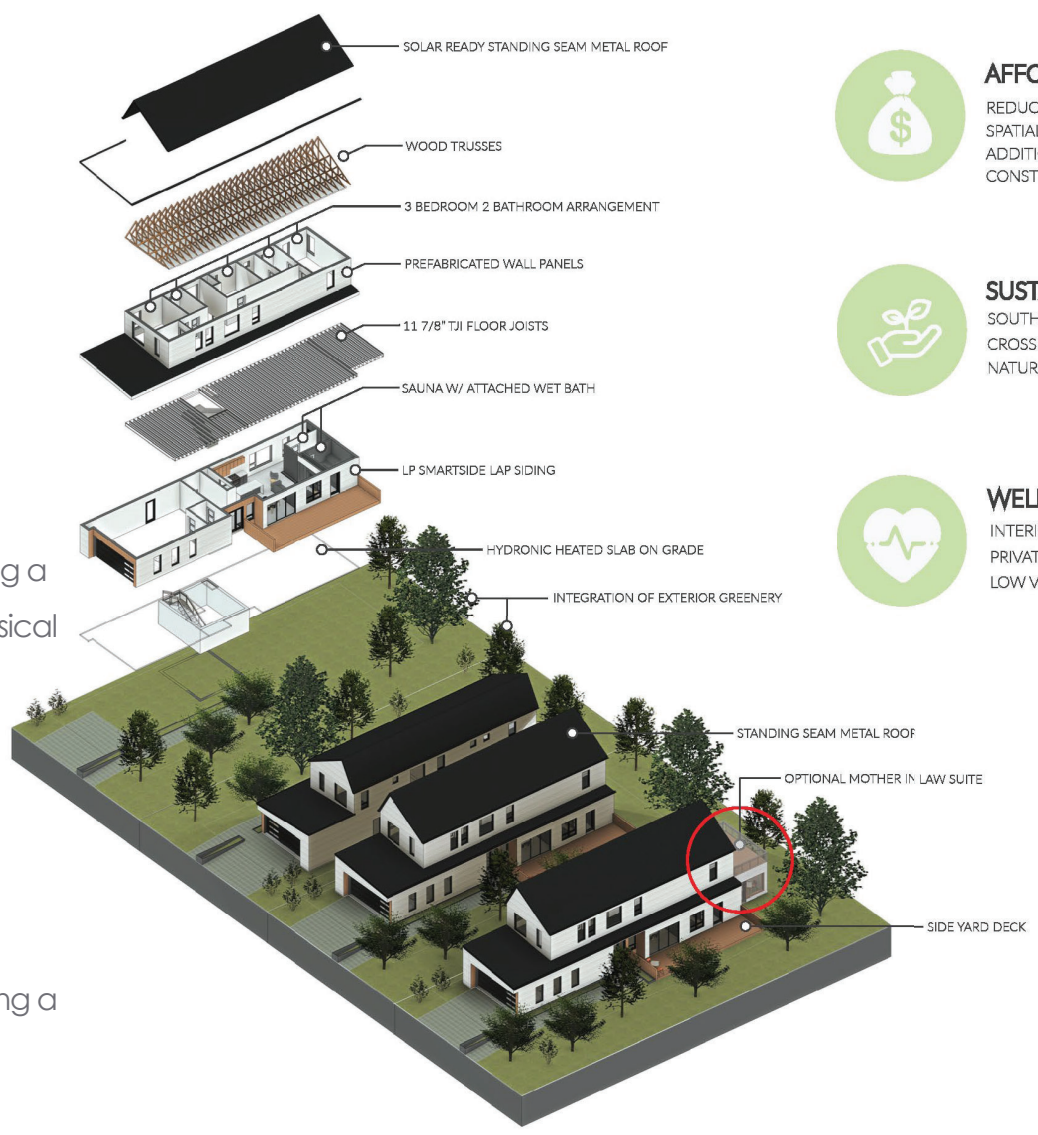
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outside.



AFFORDABILITY
 REDUCED SQUARE FOOTAGE
 SPATIAL EFFICIENCIES
 ADDITION POTENTIAL
 CONSTRUCTION METHODS



SUSTAINABILITY
 SOUTHERN EXPOSURE
 CROSS VENTILATION
 NATURAL LIGHT



WELLNESS
 INTERIOR & EXTERIOR GREENERY
 PRIVATE SAUNA
 LOW VOC MATERIALS

WHICH YOU LIVE, INFLUENCE YOUR LIFESTYLE AND WAY OF LIFE?

FINAL SOLUTION

HOW DESIGN INFLUENCES LIFESTYLE | BUILT VS. NATURAL ENVIRONMENT

HOW DESIGN INFLUENCES LIFESTYLE BUILT VS. NATURAL ENVIRONMENT

UNIFYING IDEA

HOW CAN THE BUILT ENVIRONMENT IN WHICH YOU LIVE, INFLUENCE YOUR LIFESTYLE AND QUALITY OF LIFE?

THEORETICAL NARRATIVE

Architecture has the ability to influence the way people live in their built environments. This thesis strives to bridge the gap between the built environment and how individuals interact with and are influenced by it.

It aims to study the ability of the built environment to positively influence lifestyle, overall health, and the extent of its influence within the topology of residential single-family homes.

Research and case studies have been highly utilized in determining the correlation of culture, lifestyle, and residence with the emphasis of four main points.

1) Correlation of regional climate similarities between the Midwestern Region of the United States and Scandinavian Countries.

2) Analysis of Scandinavian single-family home's spatial elements, spatial arrangements, and overall site.

3) Integration of nature, sustainable materials, and environmental design decisions to inform better design and healthier living environments.

4) Analysis and integration of regional spatial elements and spatial arrangements based on correlation studies of Scandinavian and midwestern U.S. residential architecture to inform better overall design solutions.

POST OCCUPANCY GOALS

Being theoretical, it is unknown if the solutions and ideas implemented within the project will actually affect occupants in the finished years. Although unknown, I firmly believe that the implementation of these researched and chosen methods will ultimately achieve the goals that were set.

SITE LOCATION



MIDWEST REGION



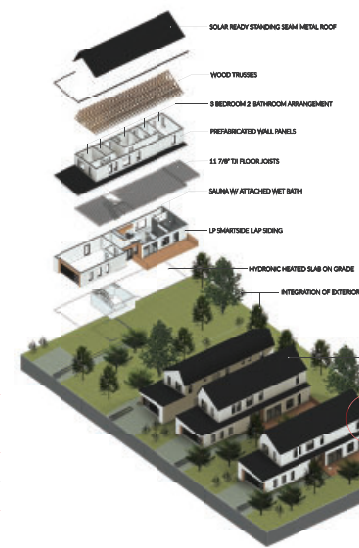
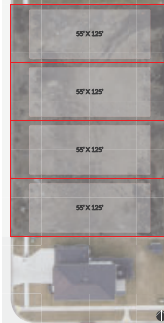
NORTH DAKOTA



FARGO, ND



CASS COUNTY, ND



- AFFORDABILITY**
REDUCES SQUARE FOOTAGE
SPRINKLERS
ADDITION FORBIDDEN
CONSTRUCTION METHODS
 - SUSTAINABILITY**
SOUTHERN EXPOSURE
CROSS VENTILATION
NATURAL LIGHT
 - WELLNESS**
INTERIOR & EXTERIOR GREENERY
FRIDGE SALINA
LOW-VOC MATERIALS
- GROSS FLOOR AREA**
FINISHED 2,140 SF
UNFINISHED 295 SF
GARAGE 680 SF



PREMISE FOR INVESTIGATION

The United States is known for its cheap and quickly built "cookie cutter" neighborhoods. The Fargo/ND market was in contractor driven providing affordable, but cheaply built and inefficient homes that do nothing for the wellbeing of its occupants or community. Present day homeowners are buying into homes that are built for profit. The American dream of owning your own home has been denied and focuses more on the size of the house than the quality of construction and interior. Houses are on average 3000 square feet and up.

This perspective brought me to question why these types of homes have been so readily accepted with the hands create we live in. Varying climate similarities and quality of life midwestern's climate can be compared similarly with that of Scandinavian countries such as Finland, Denmark, and Norway. In these countries, homes are smaller, more efficiently built, and better serve their occupants. The World Happiness Report rates all Scandinavian countries in the top five every year while the United States never manages to go above 10th. While the WHO is more focused around social and political analysis of countries, the 2020 report focuses on Scandinavian success over the years. It's important to note that the research findings within the WHR had nothing to do with architecture or the built environment. However, these findings presented a clear understanding of what midwestern housing can learn from it.

The built environment in Scandinavian countries is highly shaped by its inhabitants lifestyle and culture. It would be difficult to lean on midwestern's suburbs changing their lifestyle to adapt better building environments. Bringing us to the overarching unifying idea.

How can the built environment in which you live, influence your lifestyle and way of life?



COST BREAKDOWN			
\$800,000 BUDGET			
HOUSE SQUARE FOOTAGE	2,140 SF	GARAGE SQUARE FOOTAGE	680 SF
\$205/SF FRESHED FLOOR AREA	x	\$320/SF CONSTRUCTED FLOOR AREA	x
TOTAL HOUSE COST:	\$224,700 @ \$105/SF	TOTAL GARAGE COST:	\$81,600 @ \$120/SF
PERMIT COST:	\$95,000		
TOTAL PROJECT COST:	\$391,300		