Designing for Connection to Alleviate Urban Stress

DESIGNING FOR CONNECTION TO ALLEVIATE URBAN STRESS

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

Completed by Courtney Skare

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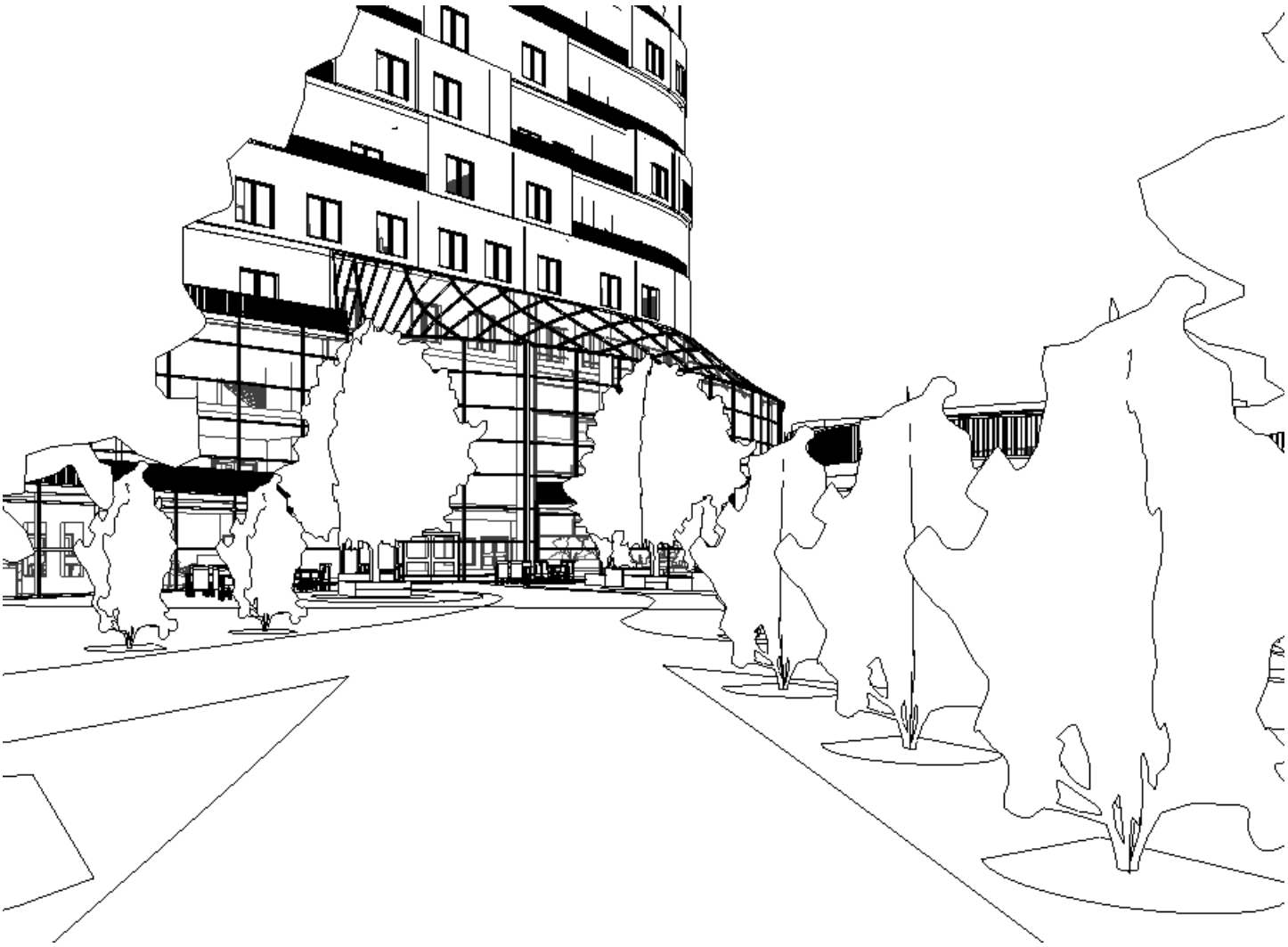


Proposal

Abstract

Today, it is estimated that over half of the world's population are living in urban areas. With the ever-rising totals of the human population locating to the urban environment, the effects that the built environment has on well-being is more relevant now than ever. While urbanization has been a positive force in economic growth & opportunity, living in such dense areas also poses major social ramifications such as the manifestation of "urban stress".

Urban stress can lead to uncomfortable living conditions & greater risk of health problems. Some causes of this phenomenon include but are not limited to the absense of green space, lack of access to services & activities, & poor quality housing which can lead to feelings of overcrowding, social deprivation, depression.

This project focuses on the stress-reduction that may be achieved through different avenues of community-based activity: living, learning, working, & socializing. Another key aspect to this building's design is the integration of green spaces throughout. It is through these connections to community & nature that people may destress, re-energize, & re-focus.

Narrative

Stress can disrupt major systems of the body & can often cause digestive issues, headaches, anger, sadness, irritability. Prolonged exposure to stress can even lead to higher risk for serious health issues such as heart disease, high blood pressure, diabetes, and mental illness (National Institute of Mental Health, 2020).

Speaking from a personal standpoint, I have loved ones & family members that suffer from chronic stress & mental illness. These are people whose lives are make harder due to the burdens carried around with them everyday. It greatly affects not only the lives of those afflicted but also those around them. It is because of these loved ones that I share a fascination & concern for the topics of stress & how to reduce it.

Additionally, my passion for architecture itself comes from two major reasons: to be able to create something physical that is worth leaving behind me & to be able to positively impact users. If through this research & project I am able to better the lives of other, then I have achieved something very important to me.

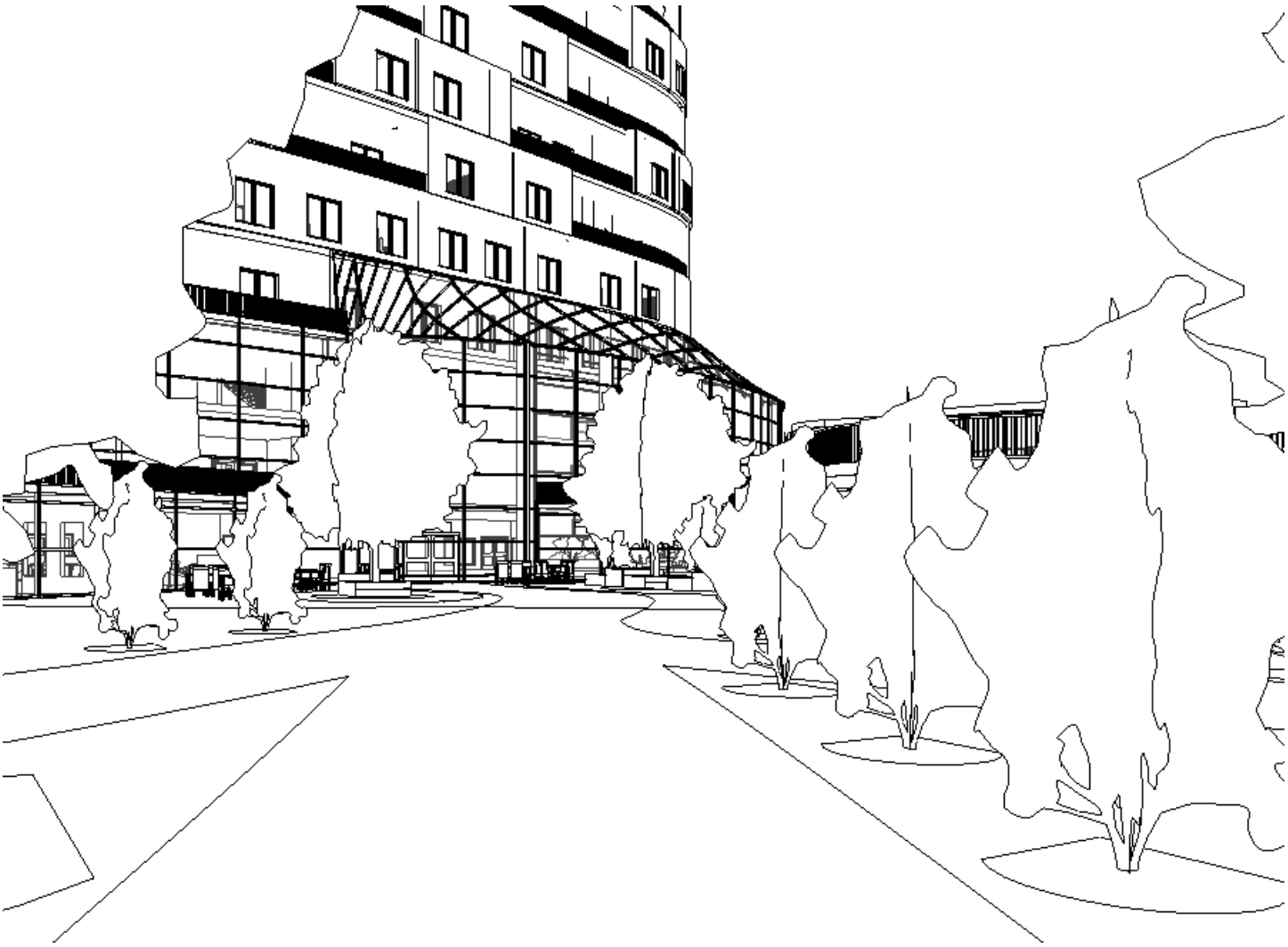
Typology

The building typology for this project is a mixed use building, incorporating retail & commercial spaces with residential spaces.

This is ideal for the Downtown Minneapolis, contributing to the character of the area, the walkable culture of Downtown, & the business side of the area.

Hennepin Avenue, Minneapolis

Typological



Research

Case Study

Rotterdam Markthal

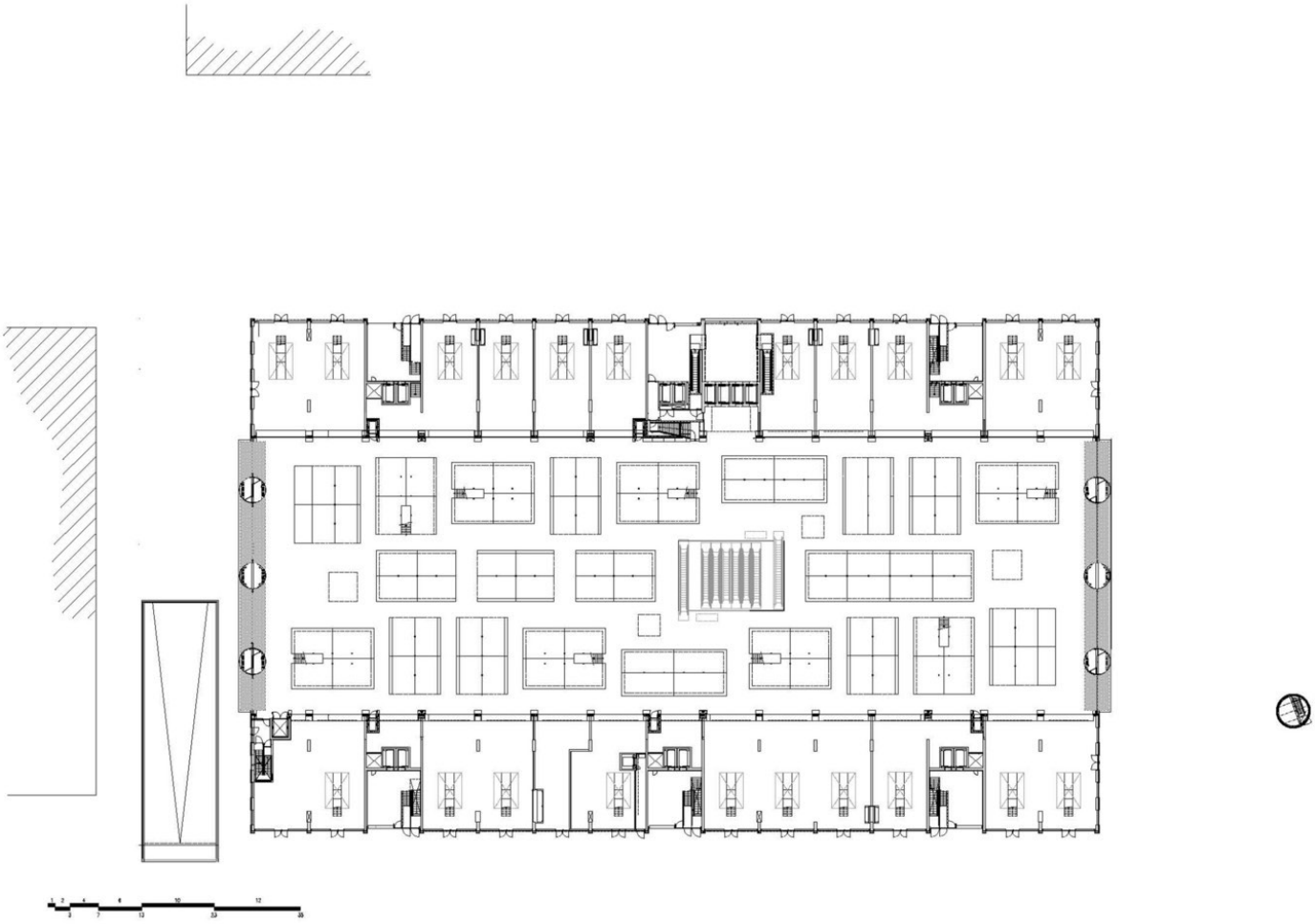
Architect: MVDVR
Typology: Mixed Use Residential
Location: Rotterdam, Netherlands
Size: 100000 m2

Rotterdam Markhal Exterior Shot

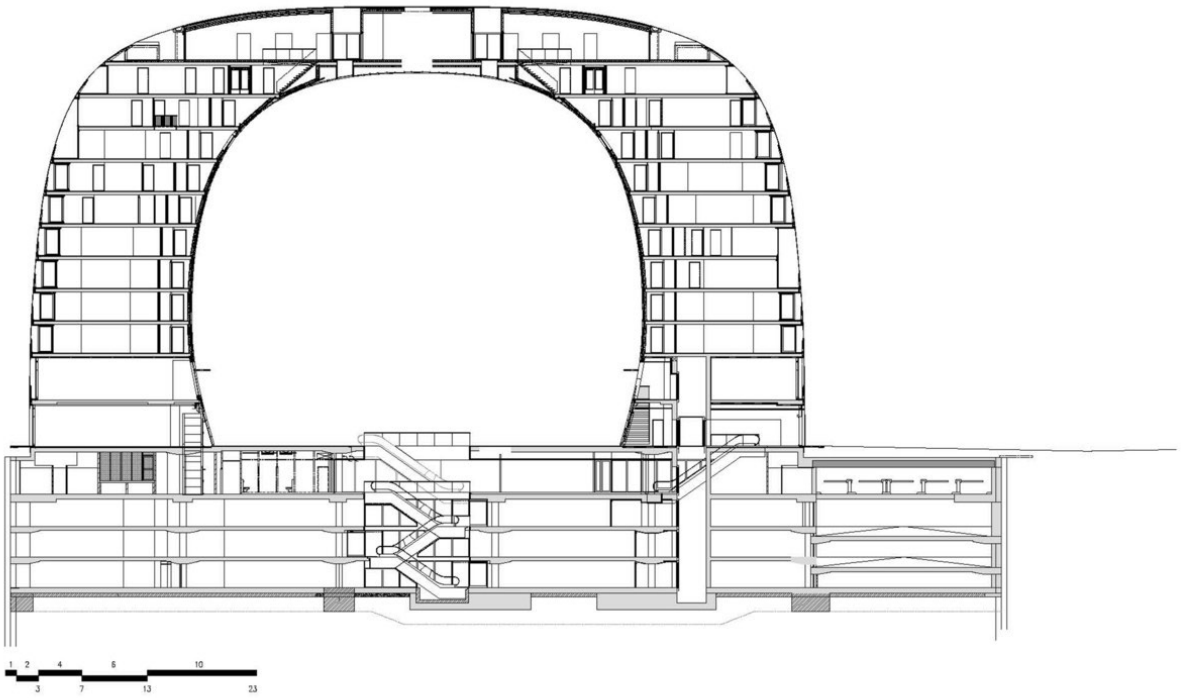
Rotterdam Markhal View of Market

Major Characteristics:
The first covered market in the Netherlands, the structure consists of an overarching system of apartments that towers over the market below. This major structure stands out due to its shear size, unique horseshoe form, & its colorful, lively interior.

Project Elements:
- Apartments
- Food shops
- Restaurants
- Supermarket
- Retail
- Underground Parking



Rotterdam Markhal Floor Plans



Rotterdam Markhal Section Cut

Key Takeaways:

- First of its kind to combine apartment living with market hall scheme
- Creates connections in the neighborhood
- Highly public building with good accessibility
- Designed to appear as open as possible in order to attract visitors
- Building uses sustainable strategies such as natural ventilation, etc
- Market-side windows are triple glazed to reduce noise
- Broad choices of living space types
- Predominantly glass & concrete structure

Case Study

MicroCity Het Platform

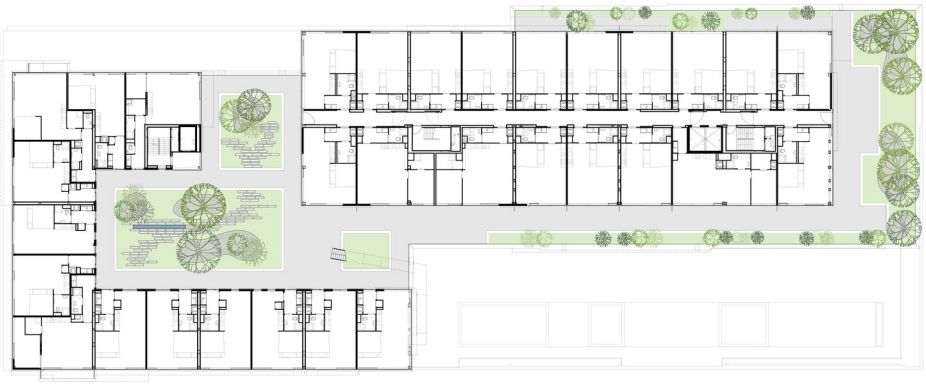
Architect: VenhoevenCS
Typology: Mixed Use Residential
Location: Utrecht, Netherlands
Size: 170 m2

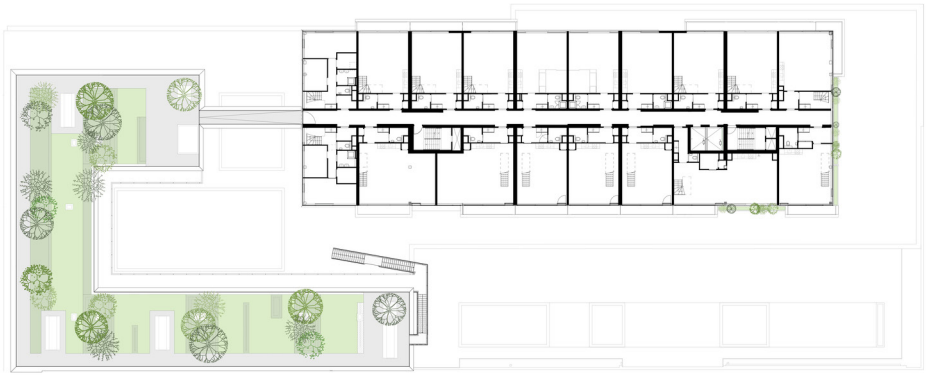
MicroCity Het Platform Exterior Shot

MicroCity Het Platform Outdoor Space

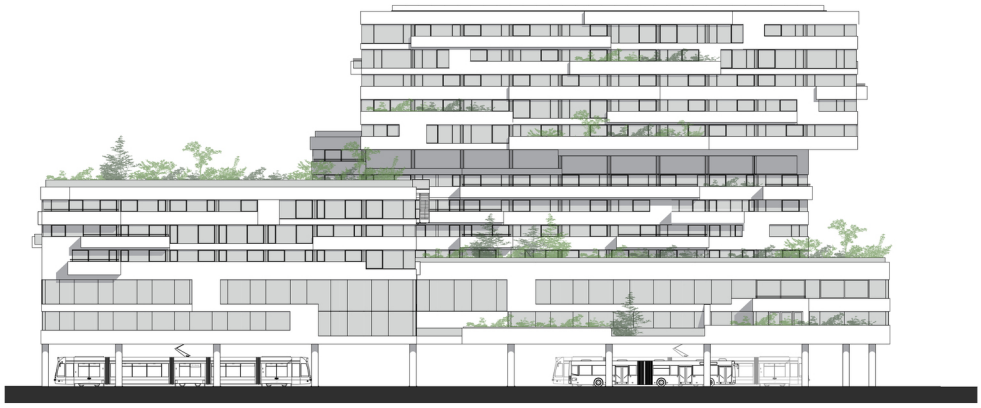
Major Characteristics:
Designed for “living, working, & playing”, this mixed-use building creates harmony between apartments, office, & retail. With this host of many different functions, the MicroCity seeks to be self-sufficient to a certain extent. It also aims to reduce need for mobility, in part due to its location adjacent to a major transport hub.

Project Elements:
Apartments
Offices
Restaurant
Commercial spaces
Outdoor spaces
Greenery
Bicycle parking





MicroCity Het Platform Floor Plans



MicroCity Het Platform Floor Plans

Key Takeaways:

- Situated next to public transport hub
- Form utilizes stacked system to help create flourishing outdoor spaces while also providing desirable vistas
- Public pathways in conjunction with outdoor spaces encourage visitors to stop by & enjoy--concept of “urban living room”

Case Study

SK Yee Healthy Life Centre

Architect: Ronald Lu & Partners
Typology: Healthcare
Location: Hong Kong, China
Size: 380 m2

SK Yee Healthy Life Centre Exterior Shot

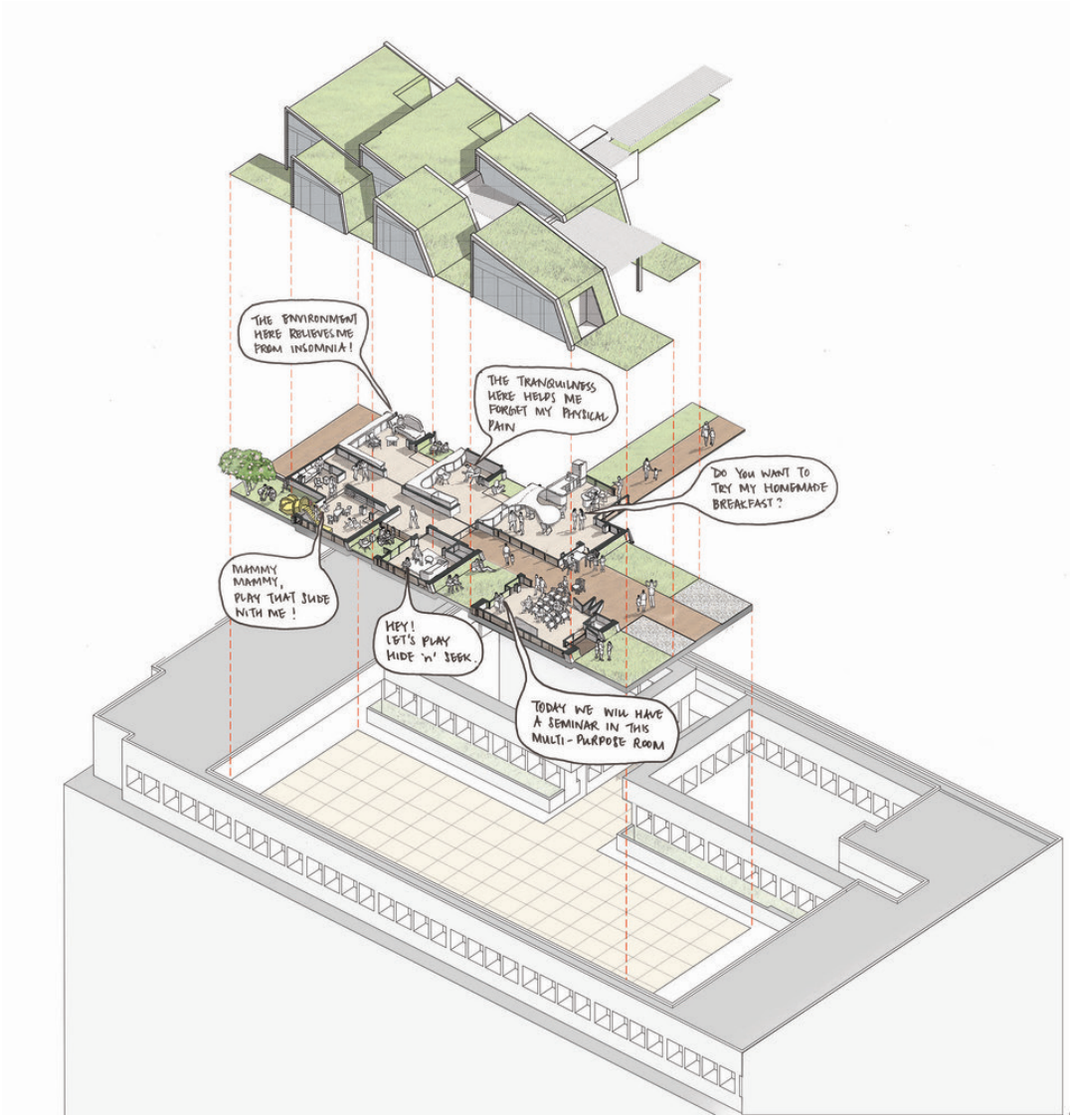
SK Yee Healthy Life Centre Green Space

Major Characteristics:
A modest project that seeks to heal through the combination of greenery & natural lighting. The design weaves together living spaces, green spaces, & play areas, also integrating a system of green roofing at a ratio of 57% coverage.

Project Elements:
Living areas
Counselling spaces
Playgrounds
Gardens
Green roofing

SK Yee Healthy Life Centre Floor Plan

SK Yee Healthy Life Centre Spatial Breakdown

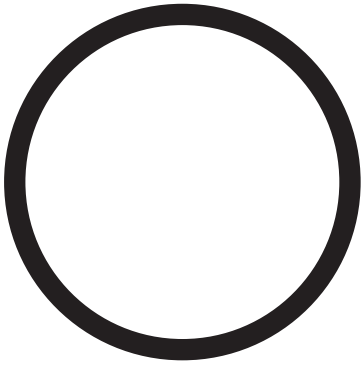


SK Yee Healthy Life Centre Exploded Diagram

Key Takeaways:

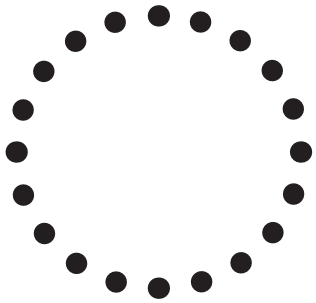
- Light-weight steel, wood, & concrete construction
- Design creates indoor-outdoor experience through the connection of counselling rooms with green spaces
- Building is 100% naturally lit & cross-ventilated--allows inhabitants a certain level of control & comfort
- Healthcare professionals were actively involved in the design process to create a healing environment

Major Project Elements



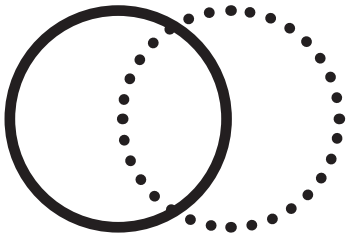
Private

Residential Spaces
Apartment Units
Community Spaces
Lounges
Fitness Center
Leasing Office
Mailroom



Public

Retail/Commercial Spaces



Combined

Parking Garage
Plaza Space
Mechanical Space
Public Restrooms

The Site

Region

Minnesota is located in the Upper Midwest of the United States; it is landlocked by several U.S. states, two Canadian provinces, & a Great Lake. With a population of 5.7 million, Minnesota ranks 22nd largest in population among the States.

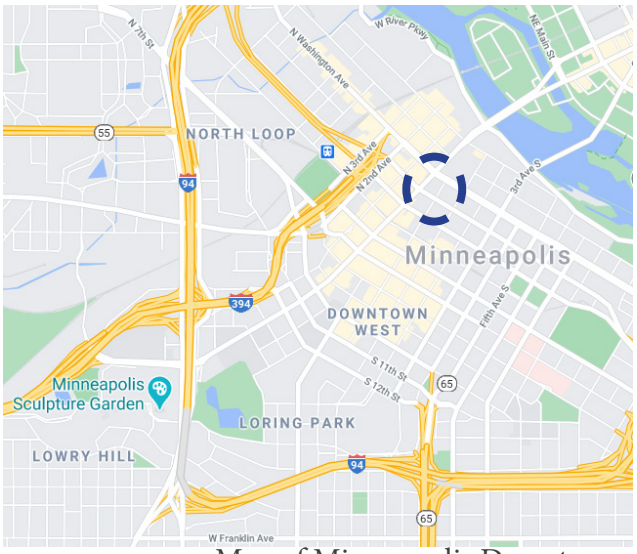
Land Area: 79,626 square miles
Population/Square Mile: 66.6
Demographics: White: 83.33%
Black/African American: 6.19%
Asian: 4.75%
Two or more races: 2.85%
Other race: 1.77%
Native American: 1.07%
Pacific Islander: 0.04%

Map of Minnesota

City

Minneapolis is located in Minnesota on the banks of the Mississippi River. With a population of 3.7 million, Minneapolis is the largest city in Minnesota & 9th largest city in the Midwest.

Land Area: 57.49 square miles
Population/Square Mile: 8, 094
Demographics: White: 63.79%
Black/African American: 19.36%
Asian: 6.13%
Other race: 4.67%
Two or more races: 4.64%
Native American: 1.40%
Pacific Islander: 0.02%



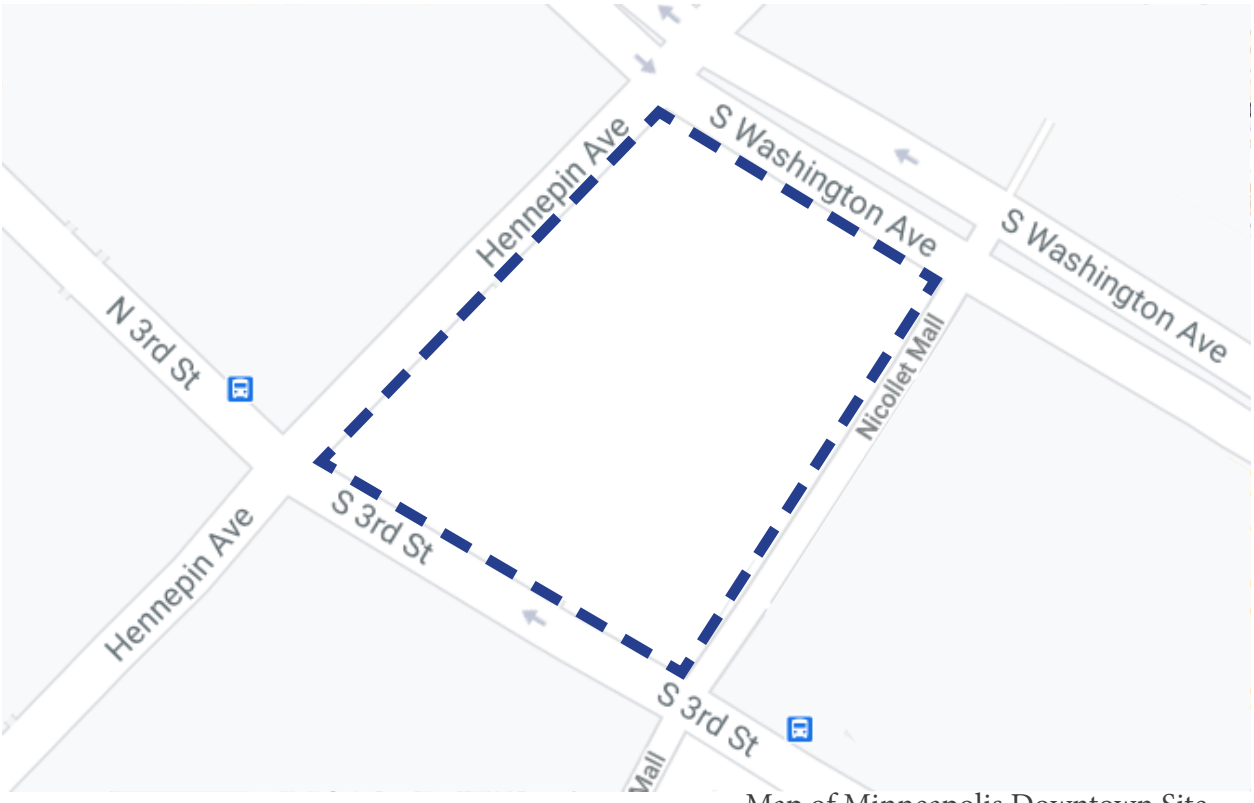
Map of Minneapolis Downtown

The Site

Site:

Hennepin Ave, Minneapolis, MN 55401

The project site is located on the corner of Hennepin Avenue & South Washington Avenue in Downtown Minneapolis. This site was chosen due to it's proximity public transportation, local businesses & restaurants, public green spaces, etc.



Map of Minneapolis Downtown Site

The Users Description

The Residents
Primary users of the building live on site in residential units & take advantage of community spaces.

The Customers
Secondary users of the building are the patrons of the retail & commercial spaces.

The General Public
Teritary uses of the building are those that utilize the parking garage & plaza.

Project Emphasis

Reduce Stress
My thesis project seeks to create knowledge & spaces that reduce the effects of urban stress on inhabitants.

Create Healing Spaces
In addition to the reduction of stress, this thesis project will strive go a step further to create spaces that relax & heal users.

Build Community
This thesis project also aims to foster community involvement through the integration of public & lounge space.

Enhance the Fabric of the City
Furthermore, this thesis project aspires to improve upon the city experience, adding to the culture of the Downtown Minneapolis area.

Thesis Goals

Greater Understanding

- Shed light on the relationship between human psychology & the built environment
- Provide flexible spaces to accommodate self-reflection & human interaction

Stress Reduction

- Integrate design strategies that create a critical balance between feelings overcrowding & feelings of isolation
- Design quality housing options that help to alleviate stress in users
- Address a lack of green space in residential buildings to create restorative effect

Sense of Community

- Create community spaces, public & private, that help to build meaningful social connections amongst users
- Support wide range of users in both residents & non-residents

Natural Intervention

- Employ daylighting strategies, maximize sunlight
- Design interiors & exteriors that integrate balanced green spaces

Plan For Proceeding

Research Methodology

The research for my Thesis Question (can urban stress be addressed through residential & community spaces?) will be conducted through the following avenues:

- Qualitative research
- Typological research

These research sources will primarily be in the form of case studies, peer-reviewed journals & studies, & site analysis.

Design Methodology

The design for my Thesis will be carried out through comparative studies of the aforementioned sources to determine the best possible methodology for creating spaces that reduce overall stress in an urban environment.

Design Documentation

Documentation of the Thesis research & design project will be recorded through electronic means, such as through the use of pictures, sketches, documents, literature, etc.

Studio Experience

2ND Year Studio | 2017-2018

Milt Yergen - Tea House Project & Boathouse Project

Charlott Greub - Dwelling Project & Mixed-Use Project

3RD Year Studio | 2018-2019

Regin Schwaen - Wood Project & Masonry Project

Emily Guo - Steel Project & Concrete Project

4TH Year Studio | 2019-2020

Cindy Urness - Miami Highrise Project

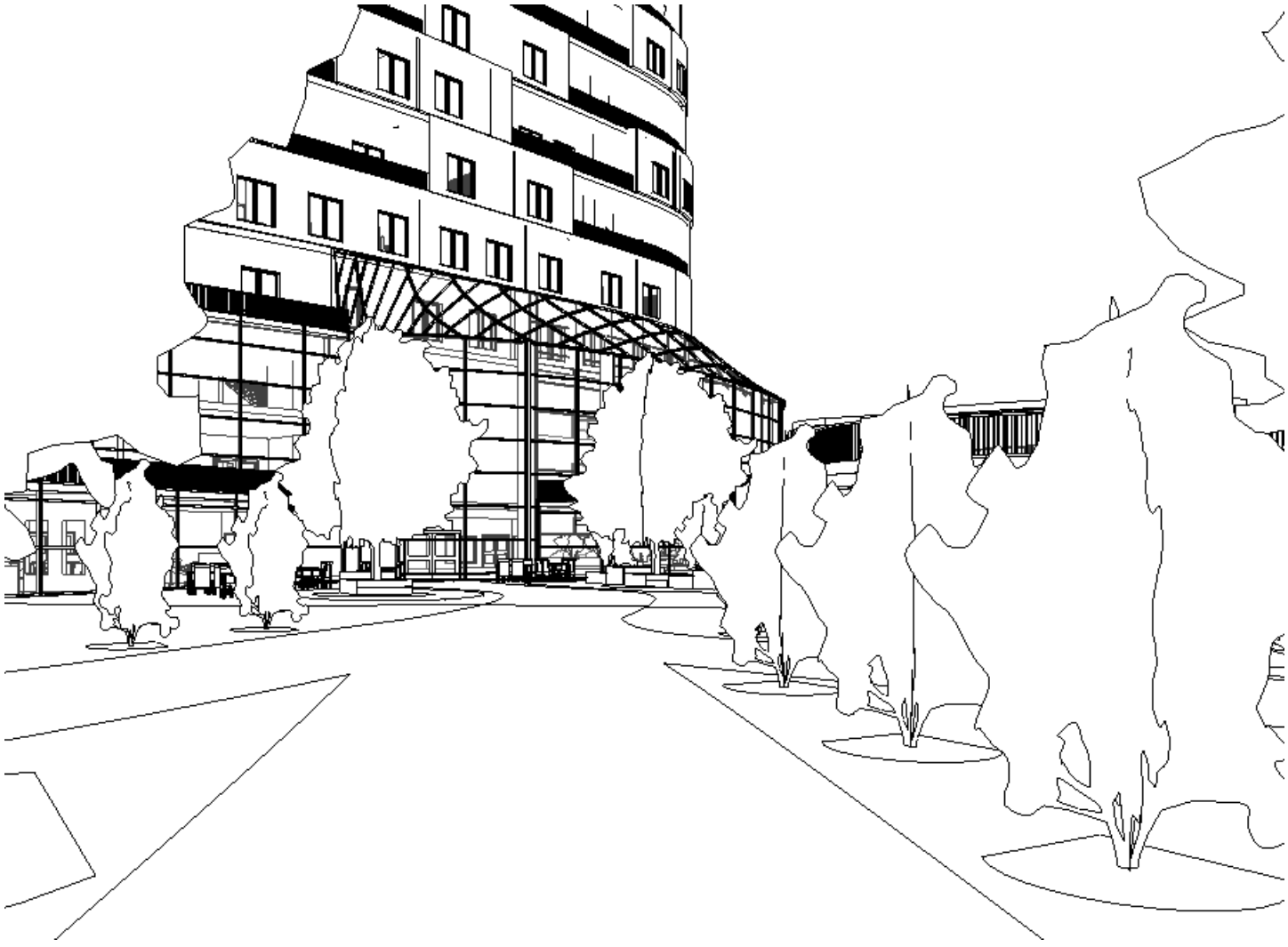
Amar Hussein - Marvin Windows Project & Urban Design Project

5TH Year Studio | 2020-2021

Ganapathy Mahalingam - App Design

Jennifer Brandel - Thesis Project

The



Research

Research Results

Mini Case Studies

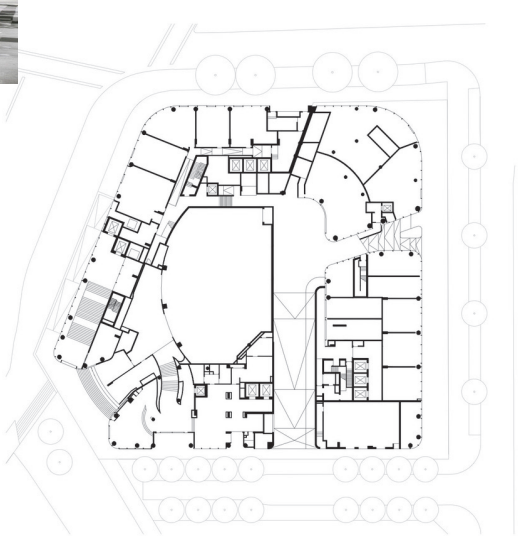
Infinity Exterior Perspective

Project: Infinity Residential Building

Architect: Koichi Takada Architects

Location: Zetland, Australia

Typology: Mixed-Use Residential



Infinity Floor Plan

- Comprised of 20-stories, includes over 300 apartments, over 70 hotel rooms, conference centre, & wide range of retail, food & beverage spaces.
- Design to accommodate daylighting & natural ventilation strategies
- This helps to improve air quality, thermal comfort, & energy consumption
- “Fluid form” allows greater access to sunlight for surrounding public spaces year-round
- Inclusion of communal gardens for social interaction

Muse Exterior Perspective

Project: The Muse Residential Tower

Architect: Barcode Architects

Location: Rotterdam, The Netherlands

Typology: Residential

Muse Exterior Balconies

- Building program prioritzes user comfort in inner-city living conditions
- Facades with smaller openings allow for both daylighting & privacy
- Three-layer parking facility above ground hidden behind apartments
- Green roof garden on fifth floor connects the two towers of the building
- “Densification is a solution, but sky-high anonymous volumes, in which residents hardly know their neighbours or experience a sense of community, are a drawback.”

Fenix I Exterior Perspective

Project: Fenix I Warehouse Renovation

Architect: Mei architects and planners

Location: Rotterdam, The Netherlands

Typology: Mixed-Use Residential & Retail

Fenix I Exterior Perspective Street View

- “Steel structure built through the existing monumental warehouse”
- contains over 200 lofts
- boasts highly flexible size and layout of residential spaces
- large courtyard garden to encourage social interaction & sense of community
- Includes roof gardens, vertical green courtyard facades, & high-performance solar control glazing
- sustainability is major part of design

Literature Review

Title: When Buildings Don't Work: The Role of Architecture in Human Health

Author: Gary W. Evans & Janetta Mitchell McCoy

Abstract

The effects of architectural elements on human health, ambient environmental stressors aside, is a topic that is worthy of greater thought. This article seeks to categorize specific dimensions of interior design & determine how these elements challenge human coping mechanism, resulting in stress on users.

Topics Discussed

The article outlines a set of dimensions of interior spaces that categorically impact the stress levels (& therefore health) of the users: stimulation, coherence, affordances, control, & restorative.

Views

Evans & McCoy break down the separate sections of architectural dimension for discussion in a way that facilitates easier understanding of the material while also allowing each section to mingle somewhat with the others. As, of course, none of these concepts occur in a vacuum. In fact, the recurrence of certain design elements in other sections served to stress just how impactful these truly were in an interior setting, emphasizing the fine line that exists between executing a successful design or not.

Beginning first by addressing stimulation, I agree that this dimension of the built environment is highly influenced by visual exposure to intensity, complexity, novelty, mystery, light, color, etc. The effects associated with stimulation can, in excess, lead to disruption of focus & sensory overload. Additionally, people are averse to large amounts of change & welcome a certain degree of familiarity; too much of what is established as "routine", while contributing positively toward the coherence of a space, can also serve to under stimulate & bore users. This highlighting the fine line between success & failure.

Coherence, on the other hand, dealing with the legibility of a space's organization & orientation, would seem to reiterate the importance of the complexity of a space: rather suggesting repetition & predictability in a space in order to give users a greater sense of navigational awareness. Similarly, the section on affordances also points out the importance of understanding a space, specifically in regard to the function of a space & its elements. Indeed, in the case of an ambiguous interior, it would seem that both coherence & affordances suffer almost equally. These, I feel, may be difficult dimensions to master.

In the control section of the article, Evans & McCoy explain that being able to change one's surroundings or regulate one's privacy can be important for the reduction of stress in users. Generally, I agree that maximizing choice for users would not only be a pleasant feature but could also be a vital tool for helping to combat the feelings of either crowding or isolation. This may be achieved through the usage of spatial hierarchy or moveable arrangements of spaces such as with furniture of a common area.

Lastly, I'll touch on the restorative section of the article, which is described as being therapeutic in nature, functioning actively to reduce stress in users as well as "heal". This overlaps slightly with the privacy aspect of the control section, citing more intimate spaces of solitude as potentially restorative in nature. In addition to these private nooks, spaces that integrate greenery or that "fascinate" (such as a window with a view or some other display) are also touted as being restorative in nature. Each of these techniques, I agree, will be helpful in combating mental fatigue creating greater interest in the overall design as well.

Conclusion

Upon evaluating this article, I came to find a number of design strategies that I believe will have a major impact on how I design my residential building to combat stress. In fact, having a greater understanding of the aforementioned dimensions of space will help me to create a built environment that combats some of the symptoms of urban stress in particular: low quality housing, overcrowding/isolation, & lack of green space.

Firstly, designing a higher quality of living will require me to employ a strong unifying theme throughout my building in order to avoid overstimulation or incoherence. Furthermore, I will need to carefully consider the spatial organization & orientation of the built environment, creating circulation patterns that intrigue without confusing & making the functions of spaces clear—this will help with affordances &, once again, coherence.

Additionally, to combat feelings of neither overcrowding nor isolation, I will seek to create community & lounge spaces that exhibit some manner of flexibility. In this way, I can deliver spaces to foster a sense of unity amongst residents while also provides smaller, more intimate seating spaces that allow for moments of respite. This will both help with the stimulation, control, & restorative dimensions of my design.

I plan not only to incorporate moveable furniture layouts (& possibly moveable partitions) in the building but green spaces as well. Whether through the integration of greenery in the interiors of the building or through providing views of exterior plaza & green space. These design decisions are made primarily with the restorative design dimension in mind.

Title: From Urban Stress to Neurourbanism: How Should We Research City Well-Being?

Author: Jessica Pykett, Tess Osborne, & Bernd Resch

Abstract
Through the lens of neuroscience, research is being conducted on the health & well-being of urban dwellers. The resulting neurourbanism seeks to combine psychophysiological findings with the technologies of smart cities to promote this well-being, although it seems that little is currently being done to restructure our "future cities" to face this challenge head on.

Topics Discussed

This article examines the research methodologies employed by the following fields: neuroscience, epidemiology, & psychophysiology. The merits & reliability of tactics such as the use of biosensing data & narrative data is discussed through the lens of many disciplines.

Views

Pykett, Osbourne, & Resch argue from several perspectives about the effectiveness of quantitative, biological evidence & qualitative, emotional research, concluding (essentially) that one existing without the other may be reductionist & therefore create an incomplete picture. I generally tend to agree with this statement.

Some of the stressors of the built environment include but are not limited to the following: noise, crowding, housing quality, light, etc. This matches up relatively closely with some of my research outside of this article, so I am inclined to agree with this. The authors continue on to state that the methodologies used so far to evaluate these stressors lack the consideration for social, cultural, economic, & political aspects of subjects. I believe that these are, indeed, key pieces of evidence that have yet to be properly analyzed, factors that I will keep in mind in my continued research of the topic of urban stress.

Conclusion

This article provided much insight into the methodologies that could be used to evaluate the urban stress of current cities, offering a wealth of knowledge in regards to both biological & phenomenological methods that have been used in the past. The primary use of this article's information would be to evaluate the effects of my building on potential user's. That being said, I anticipate I will more heavily rely on qualitative evidence in the performance evaluation of my project as I may have significantly less access to the equipment with which to measure the biological responses to the design.

Some of the methods I may employ includes interviewing participants that have either been subjected to observing 2-D or 3-D representations of my building (whether in the form of presented images or in a virtual-reality format. The stress & well-being survey following the observations made by participants would not only include questions regarding feedback about the built environment but would also inquire about the backgrounds of these subjects. It is in these surveys, as well, that I may include qualitative questions alongside of short answer questions, asking participants to rank numerically in response. To contrast these observations & answers, I may also ask participants to provide additional feedback on a more traditional residential building—that which has not taken the issue of urban stress into consideration—in order to compare the data sets.

Title: Factors in Urban Stess

Author: Ian Burton

Abstract

From changes in health patterns to the causes & effects of stress to the pursuit of stress management, the article seeks to examine the urban stress of developed countries.

Topics Discussed

The article begins with a discussion of the changing health patterns of developing nations over the years, explaining that these “new” issues are anything but; rather they are issues that have simply had to co-exist unchecked alongside the more prevalent diseases of the times. Once the issues of urban stress at last seized some much needed attention, it became apparent that the a singular cause or solution would be undoubtedly difficult to ascertain if not impossible, citing instead a myriad of conditions that unite to create the issue at hand. The author continues on to highlight the difficulties of defining urban stress (let alone stress itself), instead indicating a host of environmental stressors that contribute to a greater understanding of the issue. Furthermore, it is explained that it is difficult to manage these stressors adequately when studies conducted often lack a broader scope.

Views

Over years of research, it has been found that there are many different factors to & symptoms of urban stress, the resulting solutions of which remain elusive & just out of grasp. I find myself in agreement with the assertions that these issues of stress & their medical ramifications are much more complex & far-reaching than we intially gave credit for. In fact, as research continues, we find a convoluted web of cause & effect, the likes of which bring us more questions than of answers.

That the cost of urban stress to society is not only a physical burden (on the ill) but a financial one at that (one a grand scale) is a sentiment that I can fully agree with. As more cases of ill-health develop due to urban stress, so too does the stress on the health care system itself increased & strain on a country's resources. That these issues cause such a ripple effect & yet have gone largely unchecked for so long architecturally-speaking is an interesting if not disheartening revelation.

I agree wholeheartedly with the author's assertions that it is not enough to attempt to remove environmental stressors, that there is much more that can be done not only to combat but to prevent (to a certain extent) major stressors from taking place. While the complete removal of stressors is ill-advised as well as impossible, one must strive to improve the overall conditions, that we--from policymakers to designers--must make drastic changes to how we build & live in urban areas.

While I agree that stress studies with too singular a scope are not as helpful to policymakers in the long run, I understand the difficulty in broadening the scope of these studies, often yielding confusing results. How may this be remedied? The article makes some suggestions--for instance, the possibility of a more rigourous comparitive study amongst groups of individuals--but does not cite a definitive answer.

Conclusion

This article primarily served to explain some of the difficulties surrounding the definition of & discussion regarding urban stress. So how, in the grand scheme of things, will this factor into my project? First, it establishes a base line for my understanding of the subject matter. Secondly, it highlights the issues with previous studies of urban stress, enlightening me to the struggle between singular & group study. Additionally, this article helps to justify the existence of my project in the first place, pointing out the extents of the health problems associated with urban stress. All of these factors will help to guide me not only through the thoughtful designing of my building but also through the evaluation of the completed project.

Summary

The assortment of articles selected for this literature review each examine urban stress from varying perspectives. The first reviewed article discussed an architectural perspective to urban stress, detailing the design strategies that could be used to combat certain types of stressors in the built environment. The second & third reviewed articles, on the other hand, took more scientific perspectives to urban stress-- the second review densely sifting through the different methodological approaches to evaluating urban stress while the third review took a more general approach to the definition of urban stress itself.

Generally, I found these articles to be helpful in different ways.

The third article, for instance, gave me greater insight into how struggling to define a term or struggling to narrow a study can make finding the solution to an issue more difficult. Comparitatively, the second article covered in much greater depth the struggles of selecting the "best" methodologies with which to evaluate urban stress, citing many more varying disciplines in the process. While this specificity aided the reader of the second article in identifying & considering the effectiveness of each method, it nearly becomes an overload of information; by contrast, the third article takes a more generalized approach to the distribution of information, covering first the changes to health patterns before attempting to define urban stress & a means of study. Where the second article attempts to throw as many methodologies as possible "at a wall to see what sticks" & ultimately concludes that a mix of methods must be utilized, the search of the third articles seems to rouse more questions than it does answers.

On the other hand, the first article takes a more simple approach to both identifying potential stressors & finding architectural solutions to these. Although the stress discussed within the article is a more generalized form, it is clear to see how the straightforward applications of architectural theory could also be used to combat urban stress. Indeed, it would seem that if one is aware of some of the major symptoms of urban stress, a designer could be able to apply some of the reasoning & techniques to create a built environment that address at least a few aspects of urban stress.

All of that being said, how do these articles specifically impact the work done on my project?

Beginning with the first article, this information will help the more with the conceptual & schematic design of the project, supporting the myriad of design strategies that may be used to realize my built environment. Similarly, the second & third articles help to inform some of these design decision as well, forcing me to more closely consider the more specific causes & effects of urban stress. For the most part, however, the second & third articles help to shape my project justification & performance criteria--identifying the health risks & other burdens associated with urban stress while also providing a wealth of information about how to potentially evaluate my project upon completion.

With each article taking a somewhat different approach to the discussion of stress, each of them proved to have given me valuable information with which to build my project. While one article discussed the usage of design elements to combat stress, the other two articles debated the defintion of & methodologies for evaluating stress. All in all, this research will greatly effect the outcome of my project.

Project Justification

Personally, this project is important to me due to of my fascination for the subject matter & due to my drive to help others, especially if I can improve the lives of others through the means of architecture. Academically, on the other hand, this project is important at this stage in both my educational & profession development considering that it takes me from the action of gathering knowledge to the natural evolution of creating valuable knowledge itself. This transition is achieved because it will enlighten me to the effects of architecture on the health & well-being of its users. In fact, this project will add to my particular set of skills by
teaching me beneficial techniques with which to create thoughtful architecture that deeply considers the well-being of users.

Furthermore, this project is important not only due to its effects on myself but also due to the ramifications to society as a whole. For instance, the world is seeing a major increase in urban populations– addressing the issue of urban stress is long overdue & is, therein, important for the consideration of the architecture profession. Societally, the implementation of more philosophical practices in the architecture field could only stand to benefit members of the general public, essentially raising the quality of living for the many. Indeed, the importance of implementation lies with the creation of positive living communities & the reshaping of how people live in an urban environment.

It is here, then, with this reasoning that I insist that this project is imperative rather than an optional inquiry.

Historical, Social, & Cultural Context

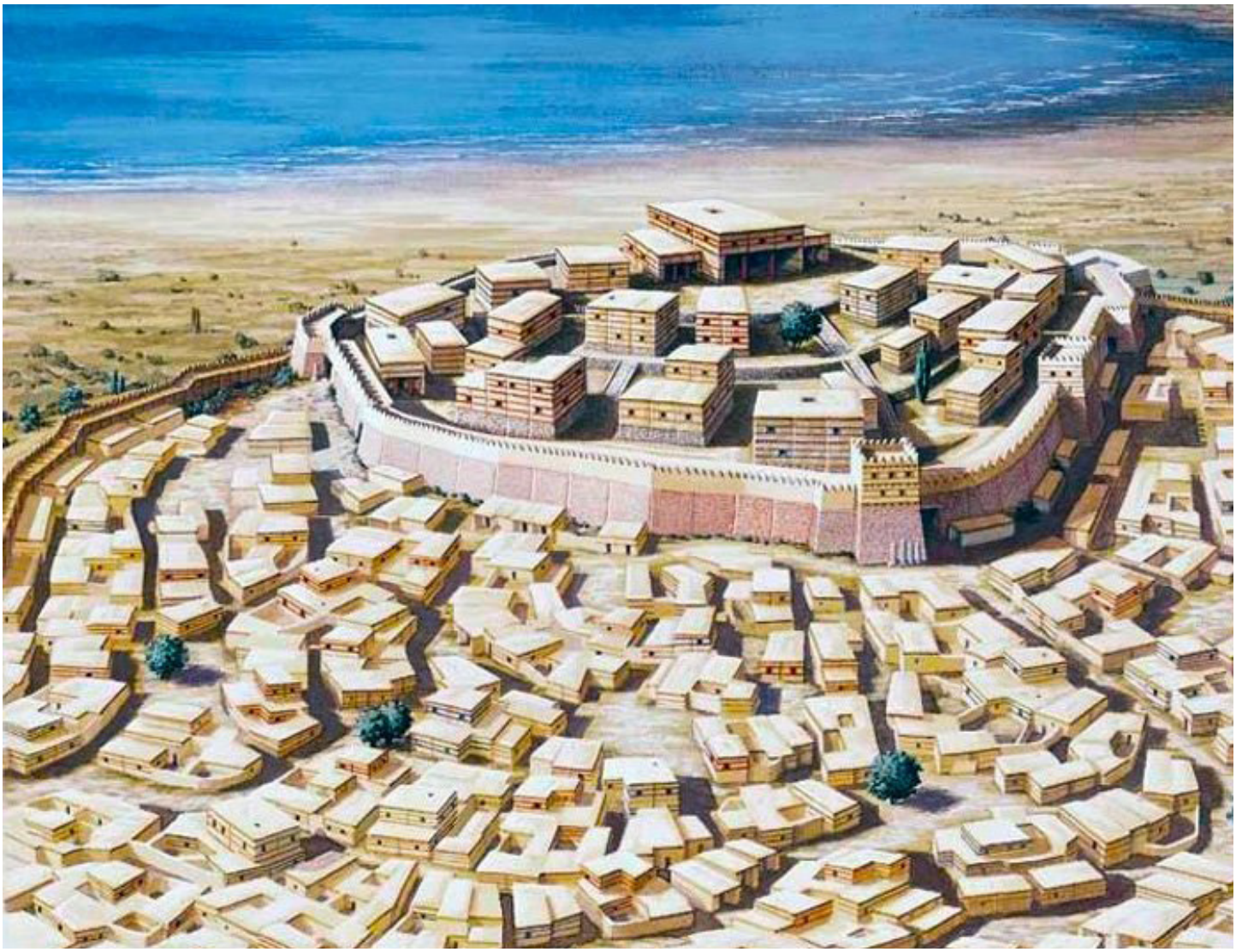
Stress is not a new concept, it has been around for as long as man.

What about *urban stress*? This form of stress has paralleled the rise of the urban dweller. This, too, is not a new concept--in fact, some of the mega cities of the ancient past, such as Troy or Babylon. The major difference between then & now are the current populations in the tens of millions (though ancient cities were still of notable size to be sure). Indeed with the increase in the shear size & number of cities, so too has the urban stress of these areas risen significantly.

Prolonged exposure to stress has been long observed to have an effect on people's health, the same is true for the stress of urban living. As a matter of fact, this stress can disrupt major systems of the body, often causing digestive & emotional issues. This stress can even get to the point of higher risk for serious health issues such as heart disease or mental illness.

Depending on the culture, issues of stress & mental illness are treated differently. In some cases, people may even avoid seeking treatment for these things due to a stigma. Indeed, there are those uniformed persons that are entirely dismissive, even, of these very serious matters (again, the likes of which can lead to even worse conditions).

In the scientific community, urban stress is a concerning subject that, it would seem, eludes a hard definition or umambiguous causes & effects. This being said, the search for effective methodologies of evaluating urban stress continue, evolving with time to account for a greater range of contributing factors.



Ancient City of Troy

As we continue forward, the important issue of identifying & combatting urban stress becomes more of a focal point for discussion amongst designers. Now more than ever we are examining & re-examining the built environments of the future & past, respectively, to determine what design strategies much be used in order to create spaces of reduced stress. Each architectural element & design decision carries this weight--tactful designers that consider these kinds of ramifications are very much needed as we shape the future of our cities.

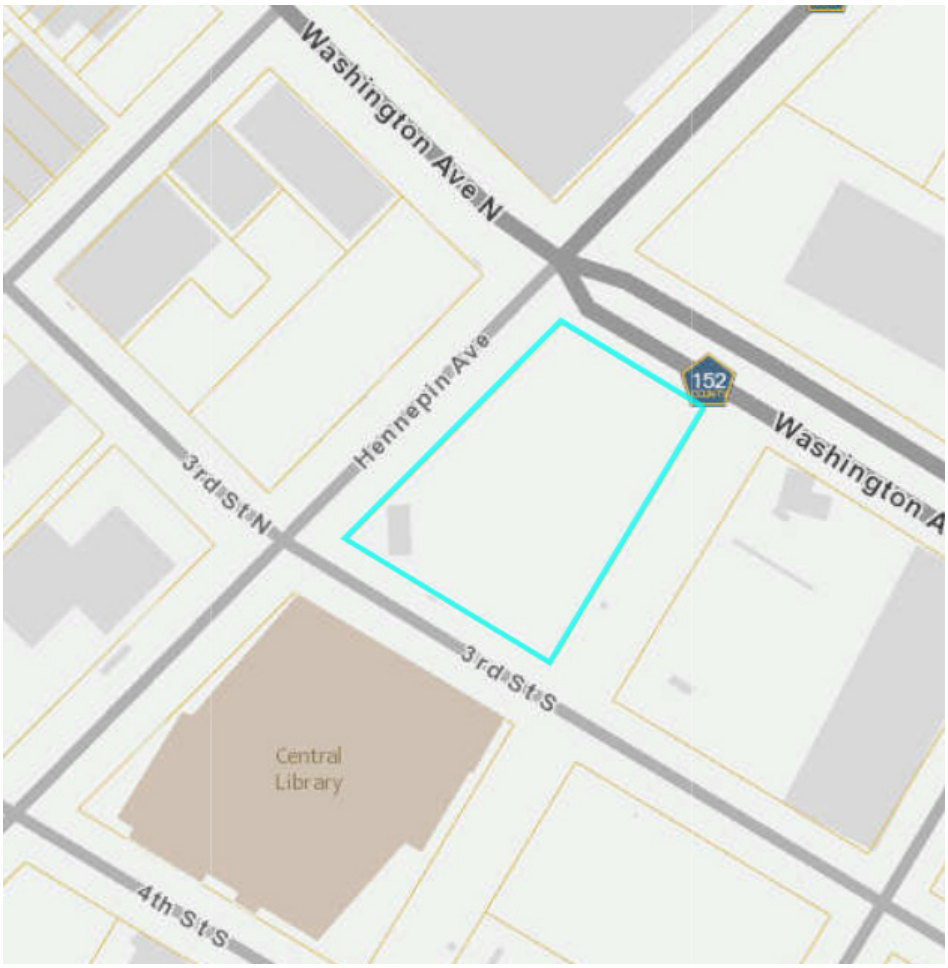
Site Analysis

Narrative

Located in Downtown Minneapolis, my site is situated at the corner of Hennepin Avenue & Washington Avenue North. The historic nature of the area is thanks in large part to Hennepin Avenue, a major street in Downtown which has become iconic in Minneapolis culture, also being one of the city's oldest roads. The area known as the Gateway District is also centered on the site, extending to the Mississippi River, the Cedar Lake Trail, the railroad tracks to the northwest, Fifth Avenue South, & Fourth Street South.

Over the past two decades, the site has been used as a parking lot or, occasionally, a space to store construction equipment. The parking lot, had been previously been used between 1873 & 1912 as an early courthouse and city hall, housed within a triangle-shaped building. In the late 1950s, however, much of the history of the area was lost due to the Urban Renewal act. The Gateway District itself became a target for developers & planners, resulting in the construction that the site is currently under.

During previous "virtual visits" to the site, I was able to observe the general disrepair & eroded nature of the parking lot. Though it was still very much in use, functioning even as a paid parking lot, it was clear that the site had seen better days. Upon more recent "visits" to the site, I made the discovery that a construction project was already taking place--this building project, it would turn out, was very similar in nature to my proposed building (that being a mixed use tower containing residential housing).



Map of Downtown Minneapolis Site

Construction or no construction, the area the site is located in boasts a very walkable score, aided in part by the multiple transit stops such as the Metro BLUE & GREEN Line as well as the Northstar Commuter Rail nearby. Additionally, the site is a neighbor to both the Minneapolis Central Library & the Marquette Plaza; the plaza & other neighboring lot provide some much needed green space, adding greater value to the site itself. The area also boasts a variety of restaurants & cafes, giving patrons a wide range of choices.

Recent History of Site

Aerial View of Downtown Minneapolis Site

2000

2009

Aerial View of Downtown Minneapolis Site

Aerial View of Downtown Minneapolis Site

2012

2018

Aerial View of Downtown Minneapolis Site

Views from Site

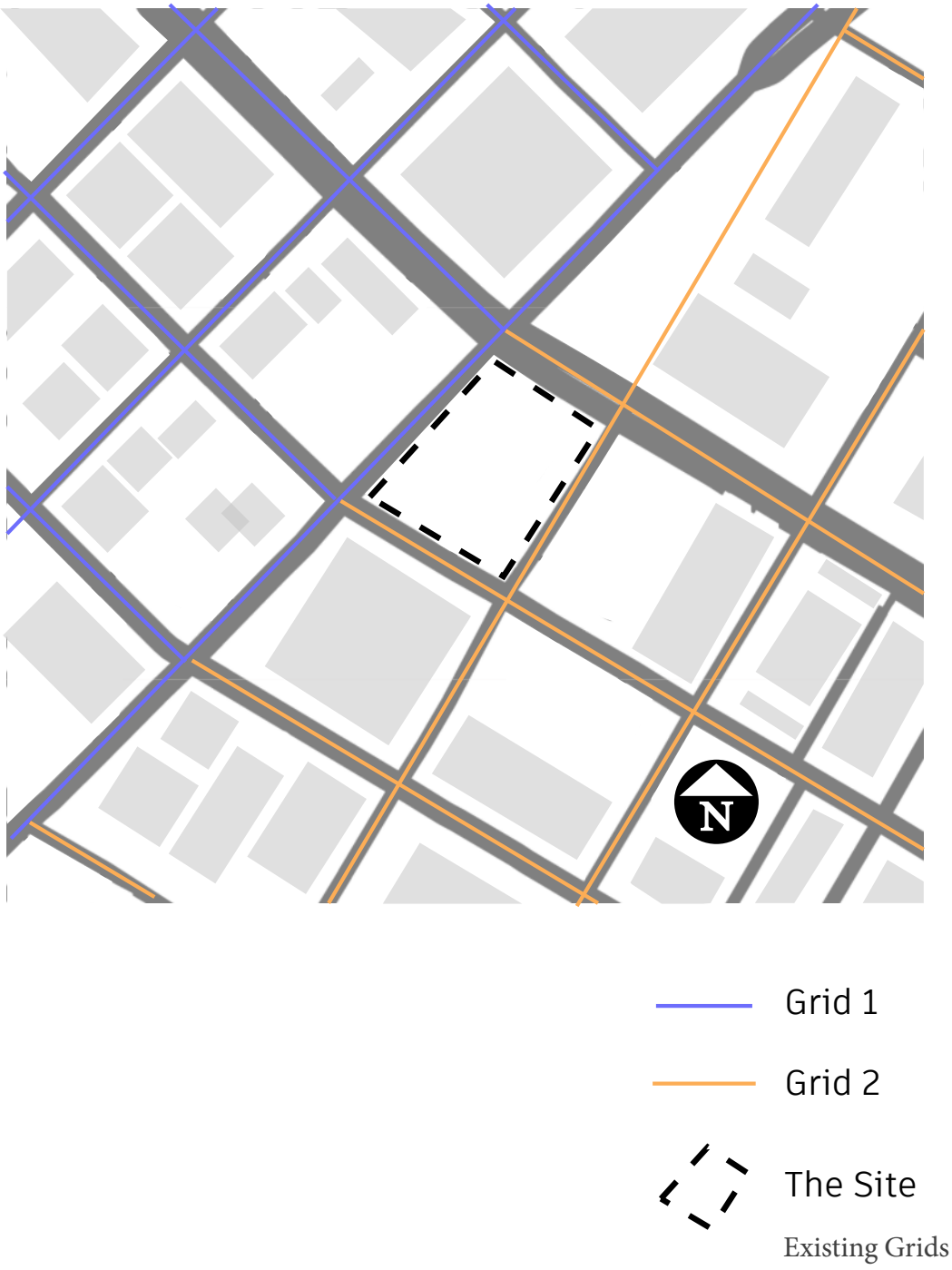
View to the north of the site.

View to the east of the site.

View to the south of the site.

View to the west of the site.

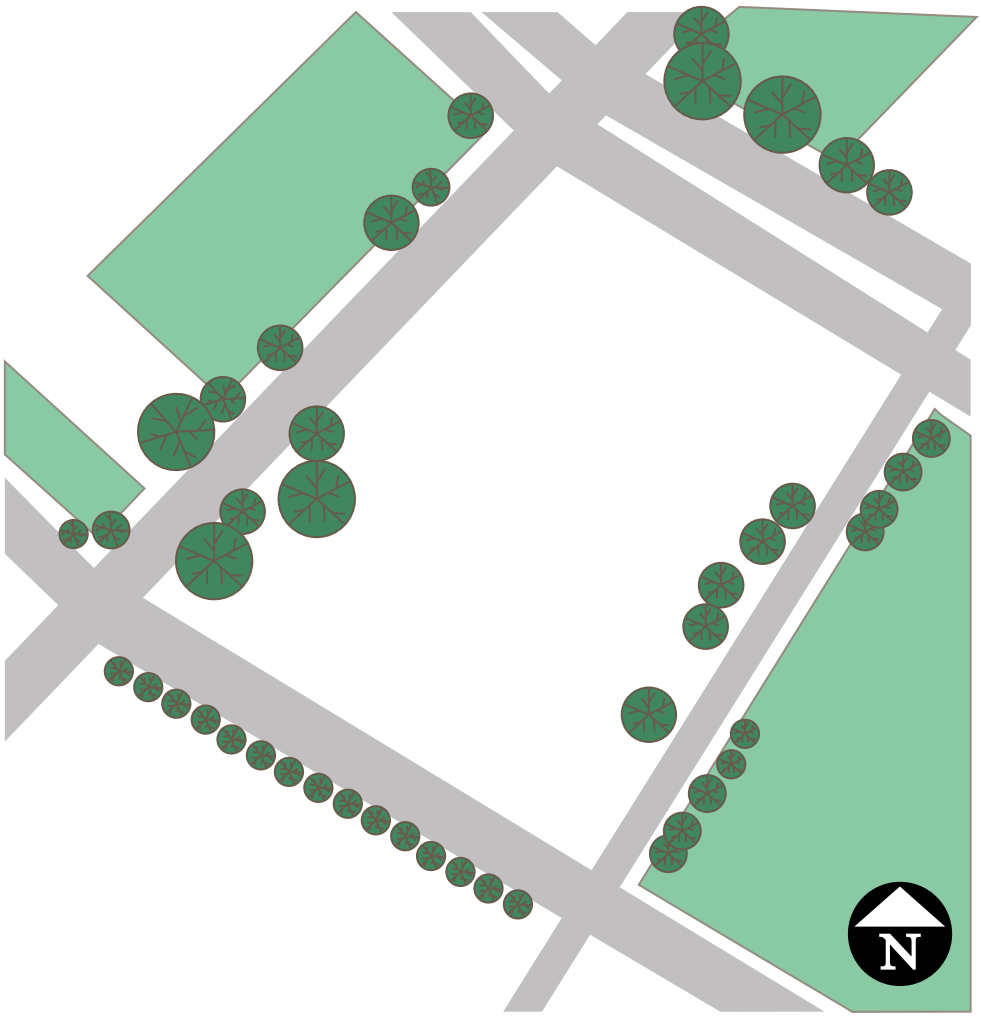
Existing Grids



Existing Grids

This area of Downtown Minneapolis seems to be comprised of two major competing grids as shown in the figure above. The site in question is an amalgamation of the blue & orange grid.

Plant Cover & Vegetation



Existing Vegetation

Though there are only a few trees on the site itself, addition of trees & vegetation from the neighboring would help to make the area more pleasant to live on.

Human Characteristics

Previously, the site's primary usage has been as a parking lot. This is largely the extent to which humans interact with this area. At the moment, the greatest degree of human involvement on the site revolve around construction.

View of Parking Lot on Site

Distress

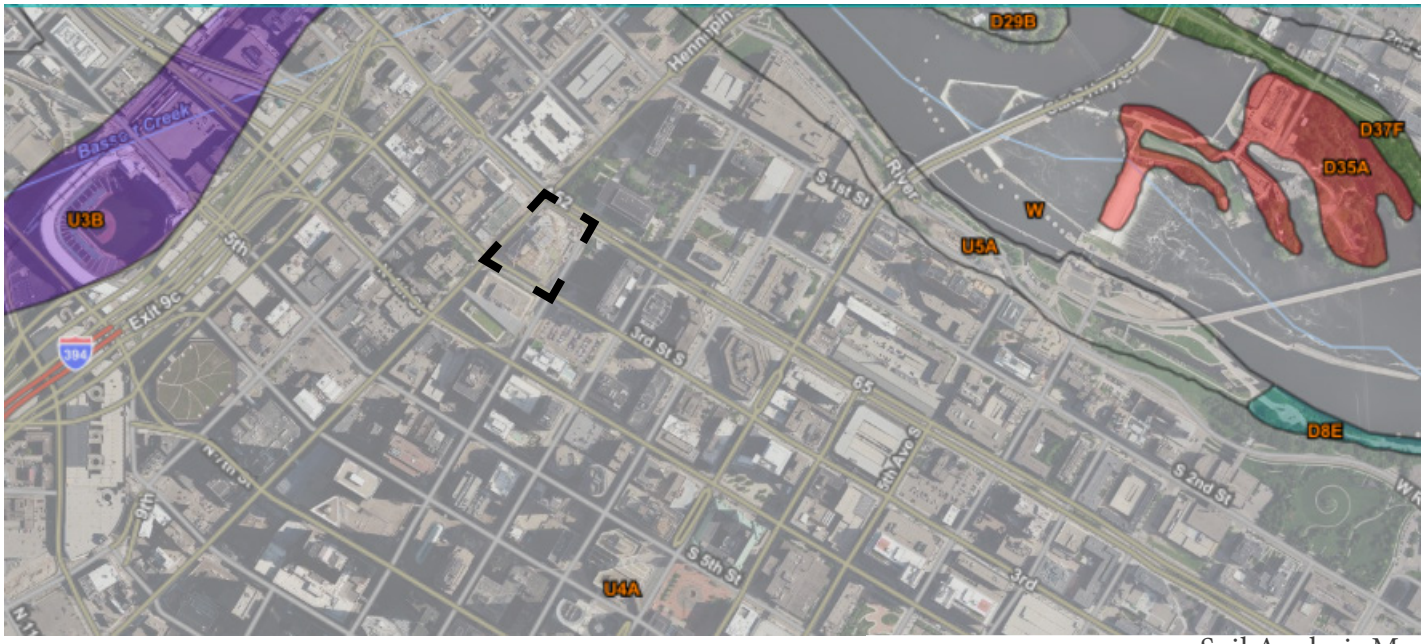
At the time of “virtual visit”, the site shows signs of distress in the cracks, crevices, & worn paint lines of the asphalt parking lot that had previously dominated the space. Currently, the asphalt has been dug up & removed due to the construction taking place.

View of Parking Lot on Site

Soils

U4A | Urban land-Udipsamments complex | Slope 0-2%

The site is a “cut & fill” type of soil material which can be significantly changed human-transported materials or human-altered materials. The resulting soil contents are gravelly & sandy that is well-drained.
The depth to restrictive material is greater than 80 inches.

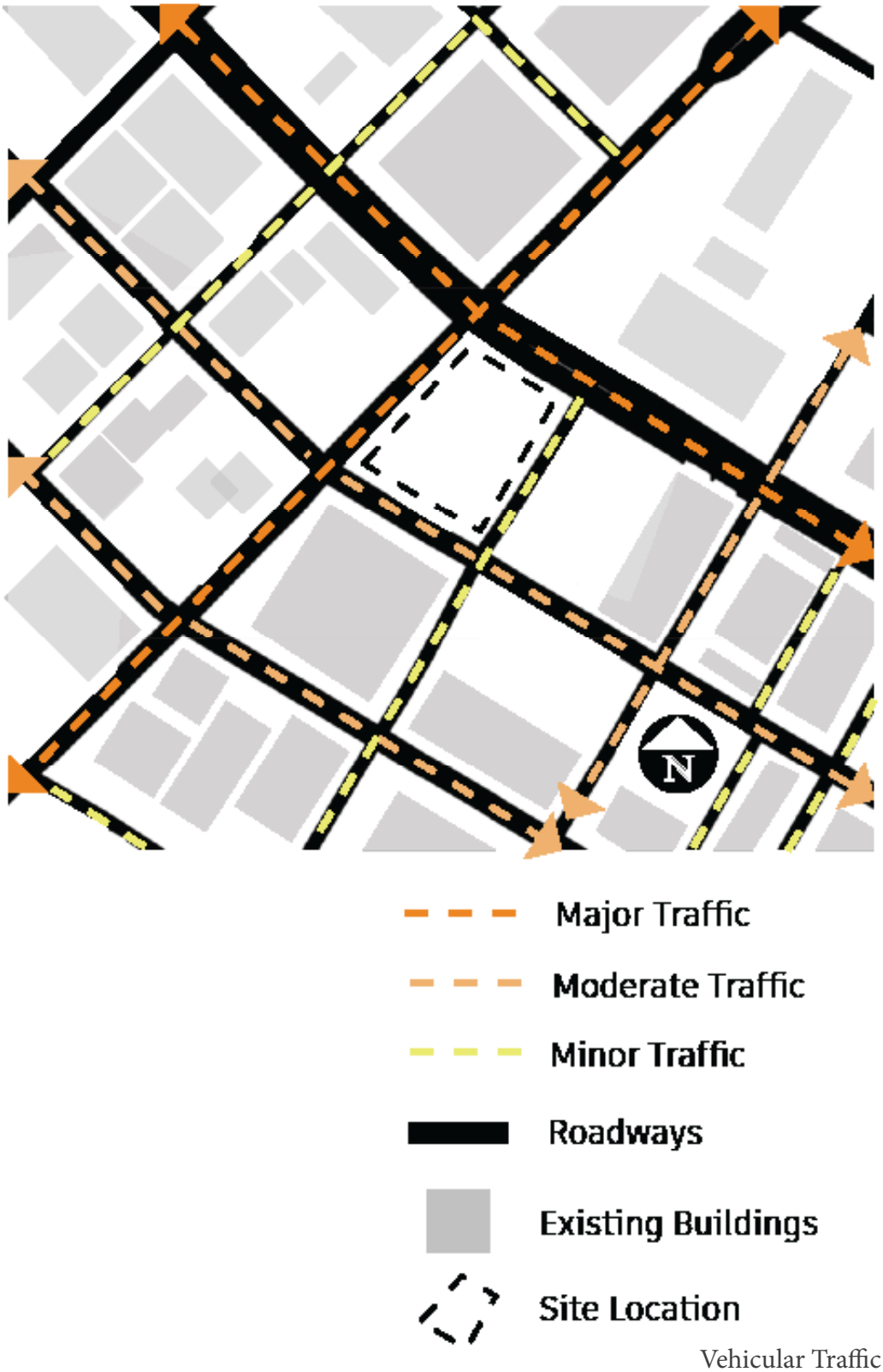


Soil Analysis Map

Watertables

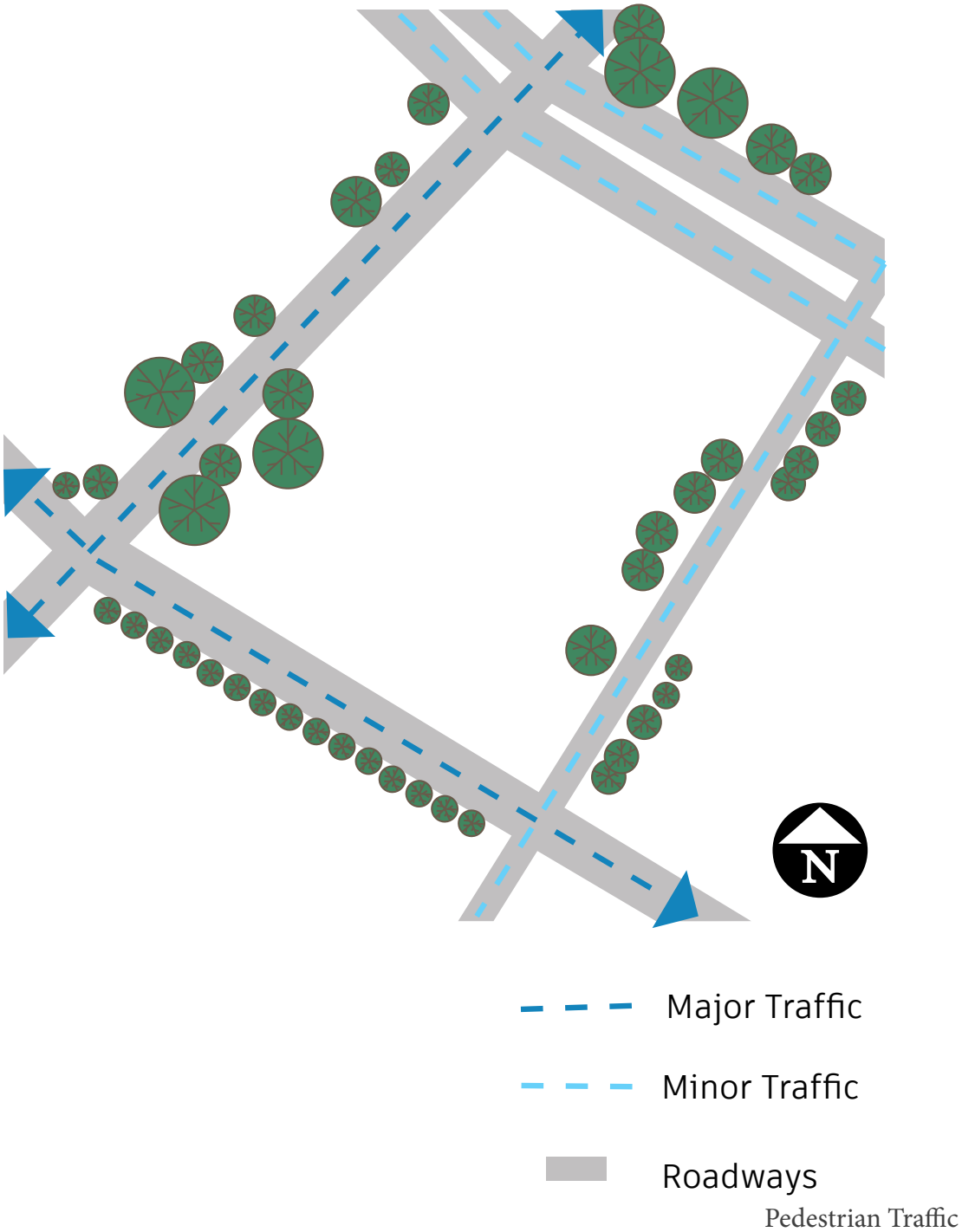
The depth to watertable is greater than 80 inches.

Vehicular Traffic



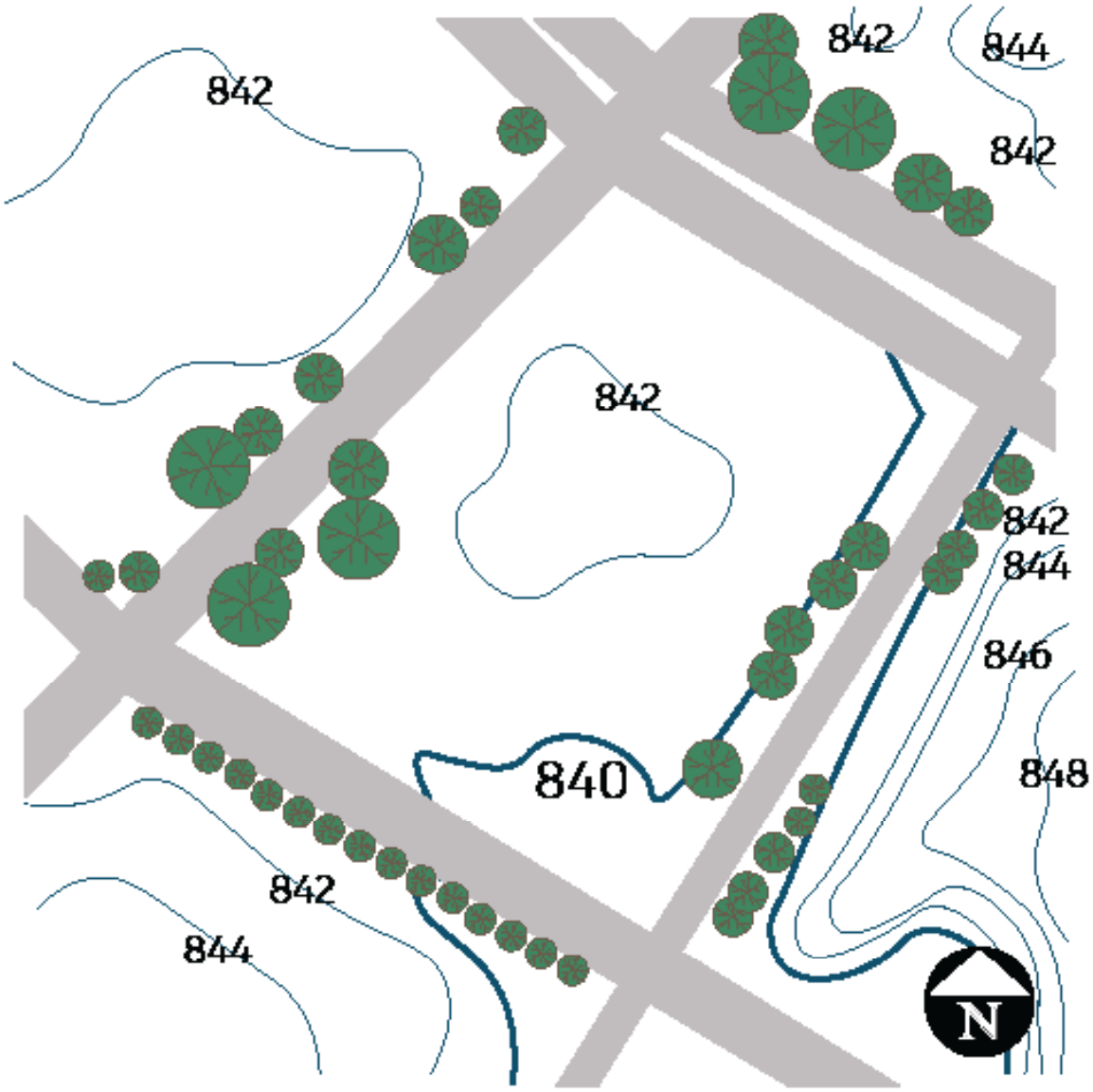
Vehicular Traffic

Pedestrian Traffic



Pedestrian Traffic

Topographic Survey



Topography

While the site itself is relatively flat in nature (only about 2% in slope, at most) the greatest change in elevation occurs on the neighboring lot to the east. Could this create issues with water run-off & drainage?

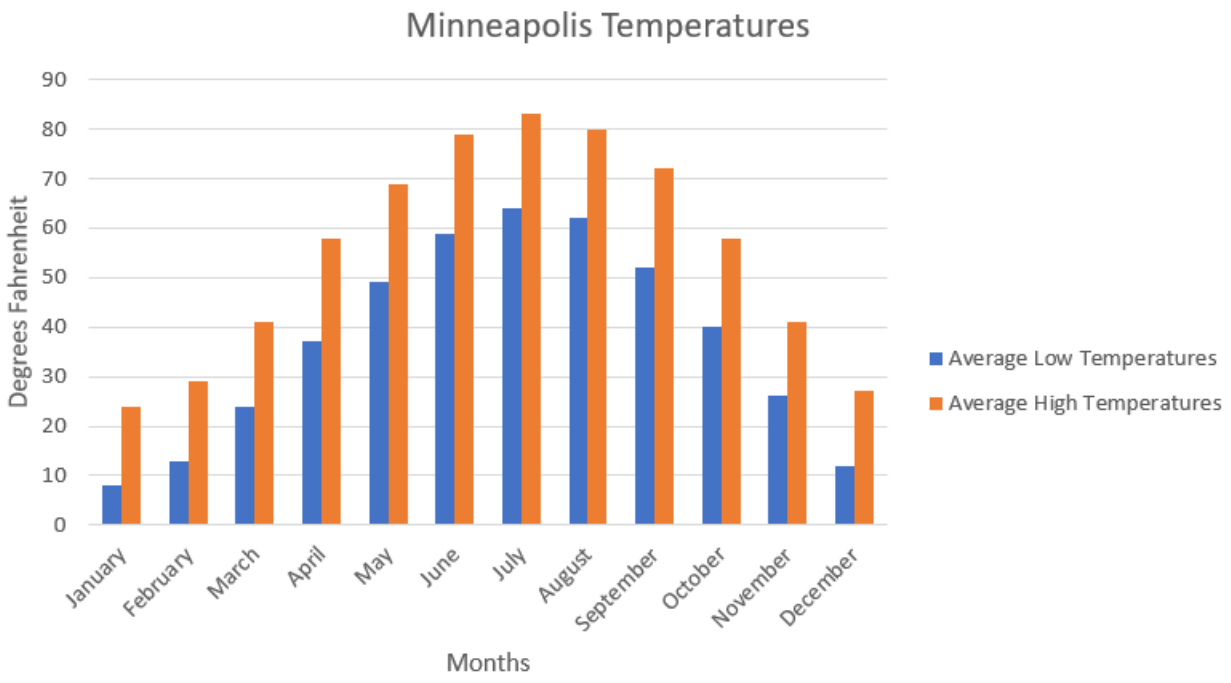
Site Character

The majority of the site was dominated by a large parking lot that serviced the surrounding area. As both Hennepin & Washington Avenue are relatively busy streets, noise pollution from traffic washes over the lot, buffered little by the few trees on the site. The quality of the asphalt shows signs of distress, cracks & erosion obsuring the worn paint lines of each parking spot. The site, generally, is quite flat in nature, its somewhat rough texture disrupted by here & there by crevices & fissures.

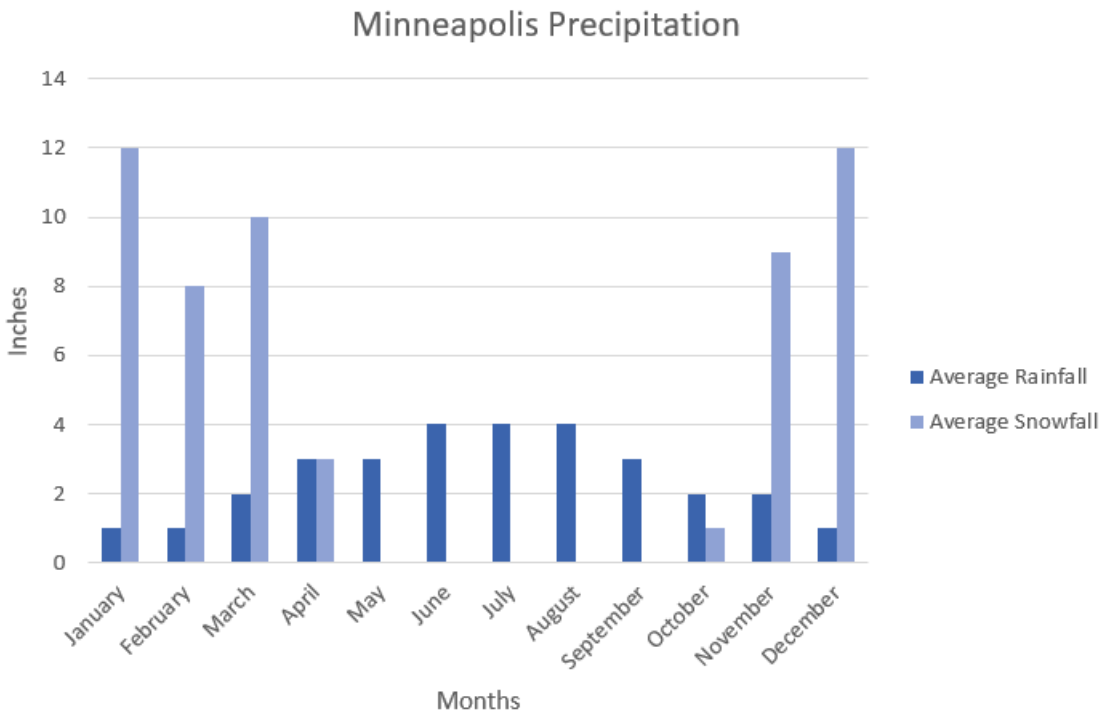
Currently, the entirety of the site is in a state of construction. As such, photos of the land area can vary greatly depending on time of “virtual visit”.

View of Parking Lot on Site

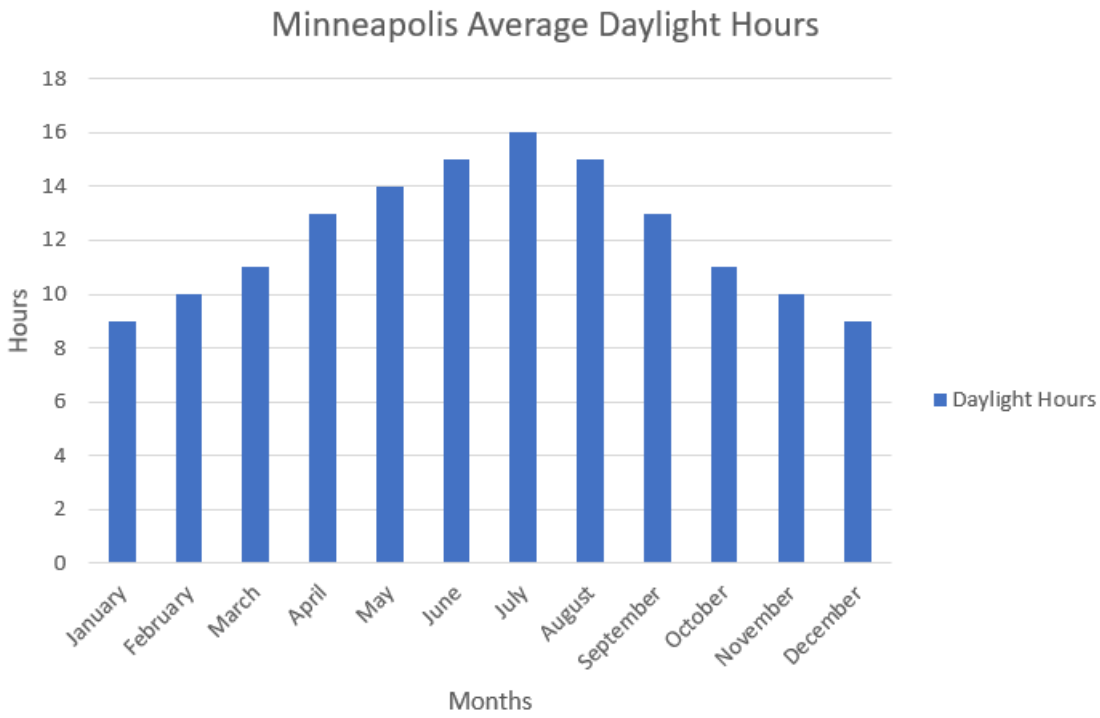
Climate Data



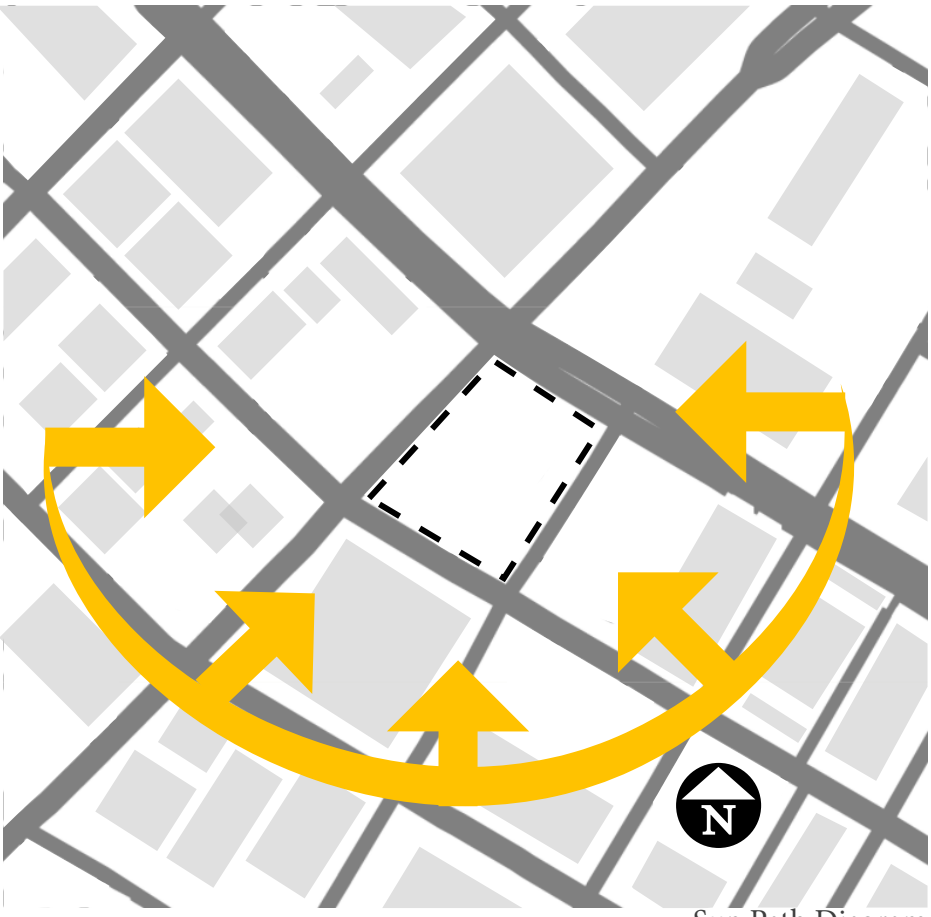
Minneapolis Average Temperatures



Minneapolis Average Precipitation

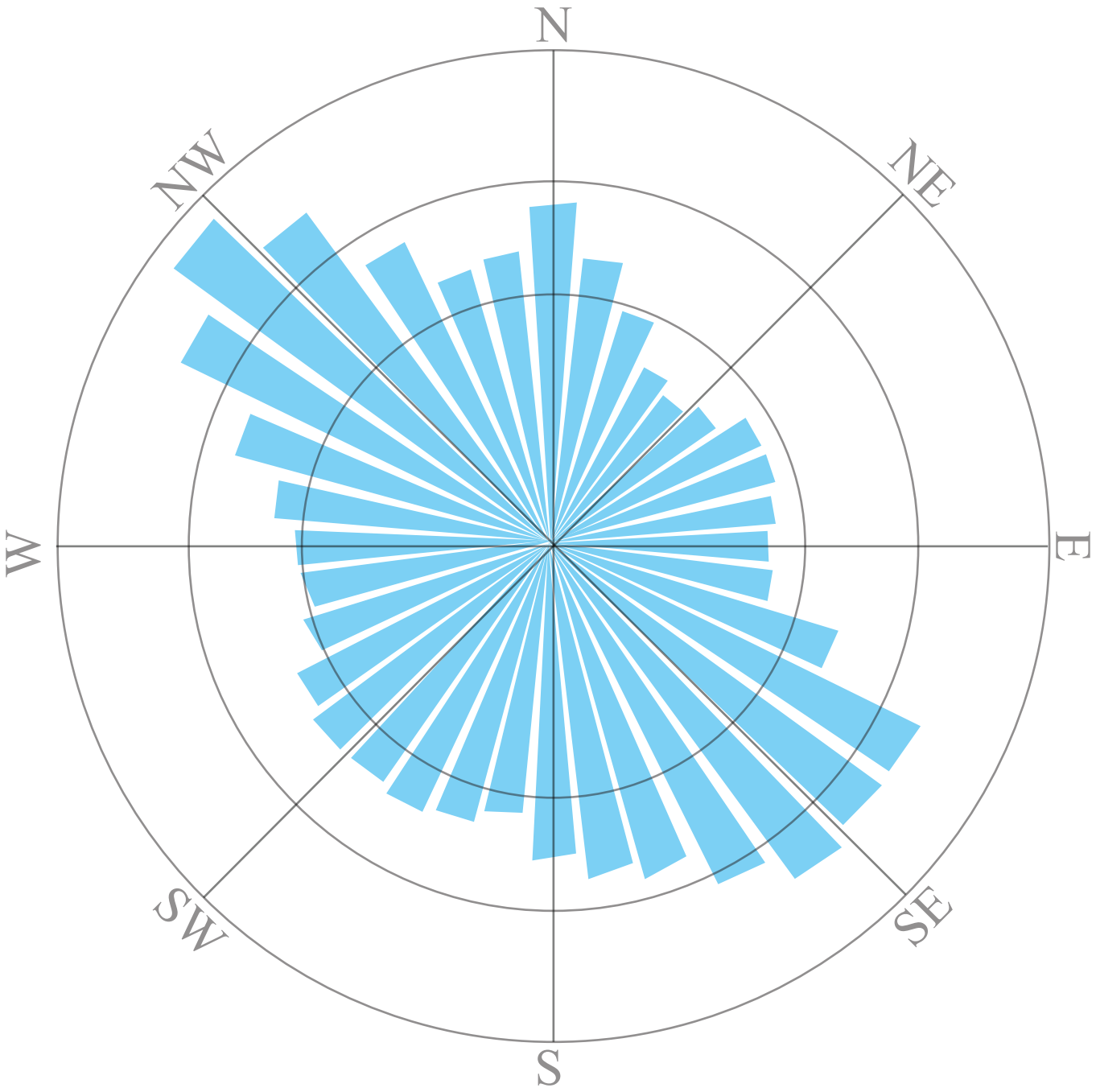


Minneapolis Average Daylight Hours



Sun Path Diagram

Wind



Minneapolis Wind Rose

Average wind speed is 9 MPH, prevailing winds originating from the northwest & southeast, primarily; this largely remains a constant throughout the year (wind rose for the entire year pictured above).

Performance Criteria

Behavioral Performance

Similarly, the behavioral performance for my project will be partially based on case studies & other qualitative research such as that from books or journals; additionally, the space allocation tables & diagrams will have impact on the usage patterns of the building. To further analyze this performance criteria, a mix of computer simulation & other user feedback may be required. This will all be judged based on the resulting usage patterns & how they compare with earlier projections.

Psychological Impact

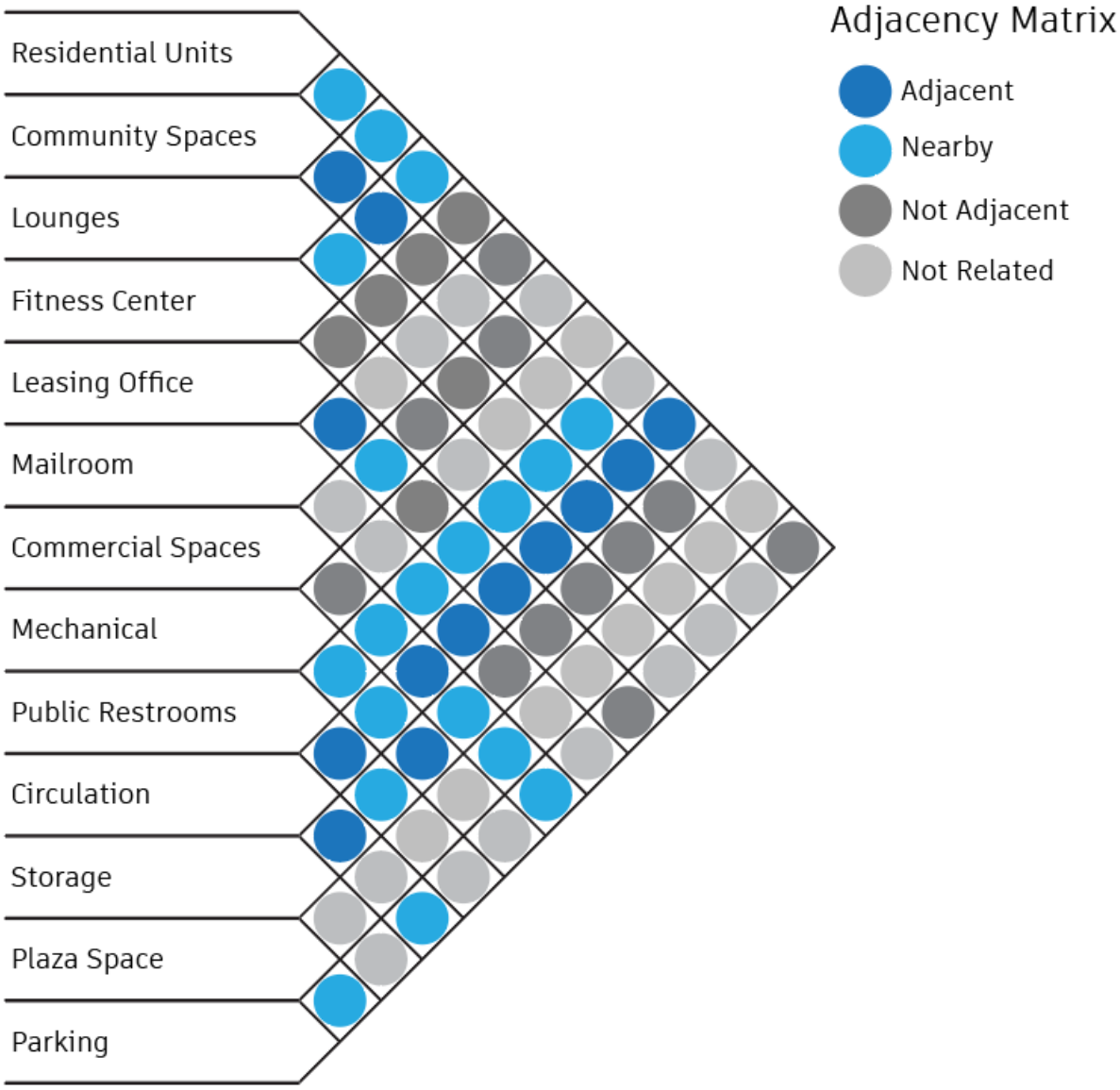
The last of the performance criteria that I will be focusing on will be the psychological impact of the project. This criterion will be based on the qualitative research done through books, journals, etc., & will be used to shape a projected user experience of the project. Similarly to the behavioral performance criteria, further analysis & judgement will be conducted through the use of computer simulation & user feedback (& how this compares with predictions).

Space Allocation

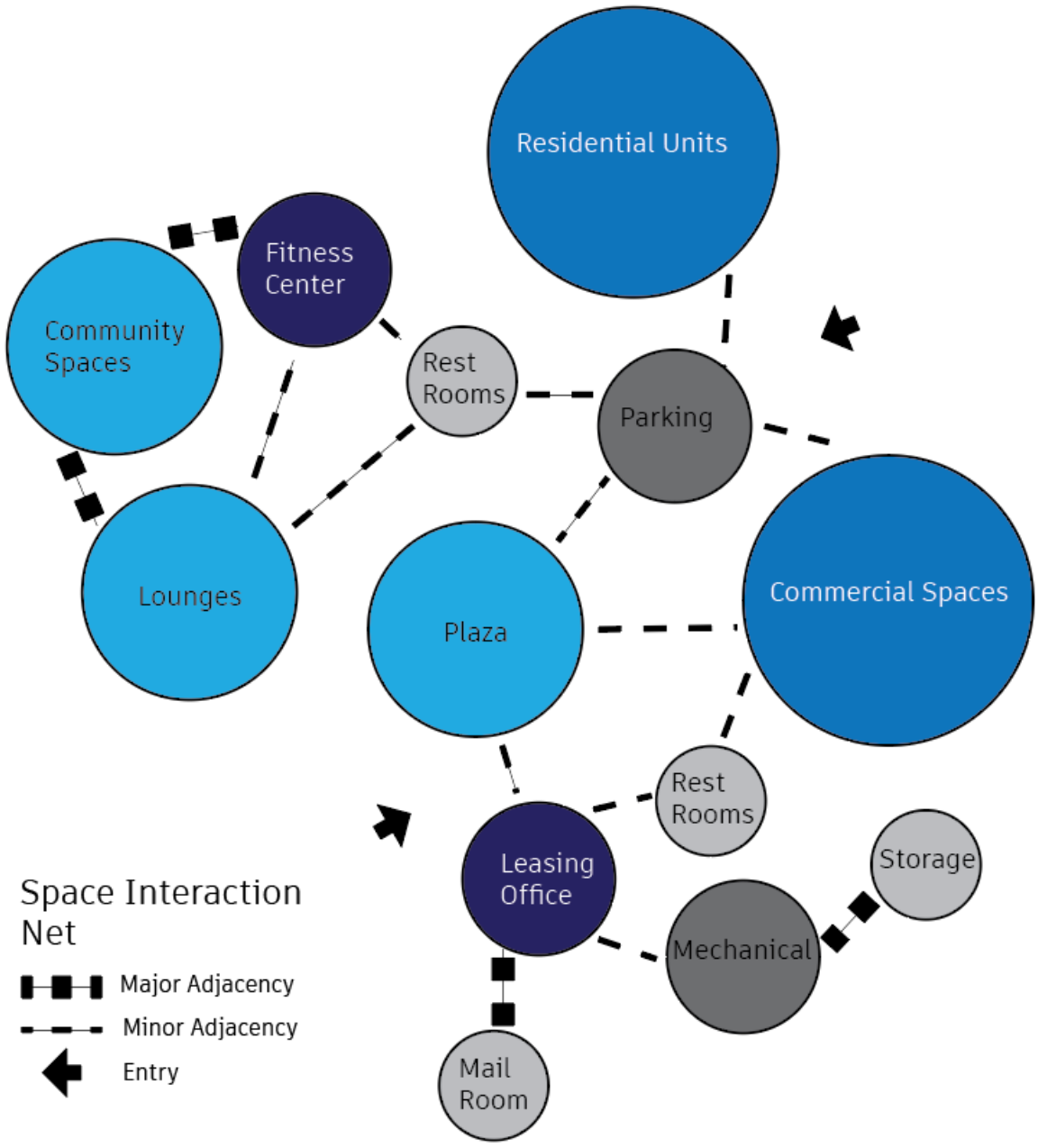
One of the performance measures for my project will be the allocation of spaces. The source of this information will primarily be through the investigation of case studies through sets of drawings, pictures, etc. This information will help to shape the decisions made on the sizing & organizing of spaces which will be further analyzed with tables & diagrams. This performance criteria will be judged through comparisons to the aforementioned tables & diagrams, specifically how the building did or did not meet the same expectations.

Space	%
Residential Units	65
Commercial Spaces	6
Community Spaces	3
Lounges	6
Fitness Center	2
Leasing Office	0.5
Mailroom	0.1
Restrooms	0.5
Mechanical Space	0.5
Storage	0.4
Plaza	3
Parking	13

Space Allocation Table



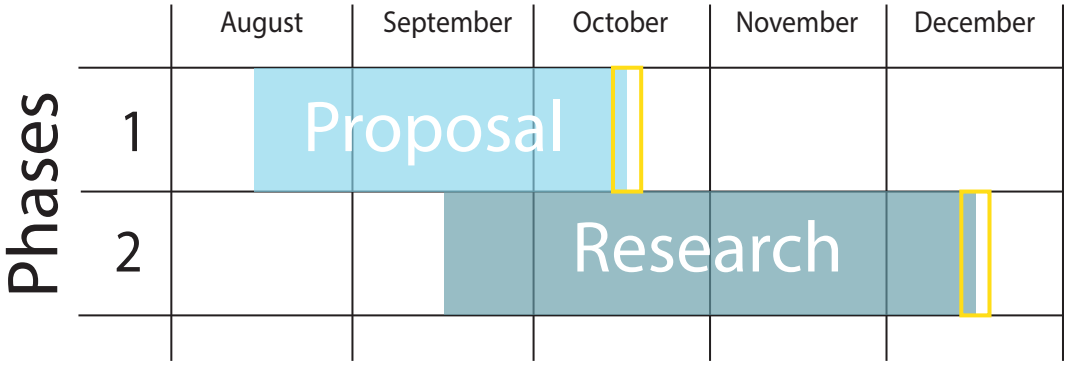
Adjacency Matrix Diagram



Space Interaction Net

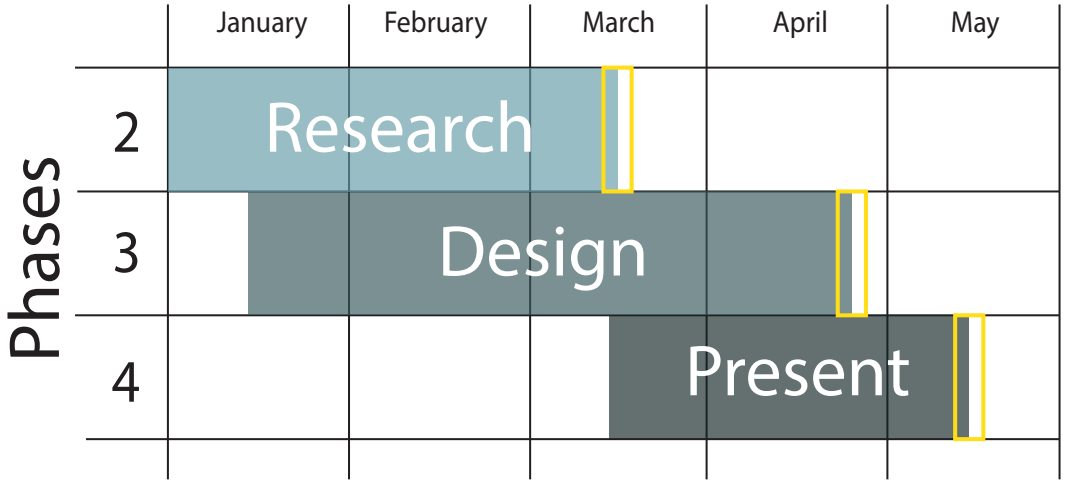
Project Schedule

Fall Semester 2020



Phase 1: Proposal due October 13th
Phase 2: Research Document due December 17th

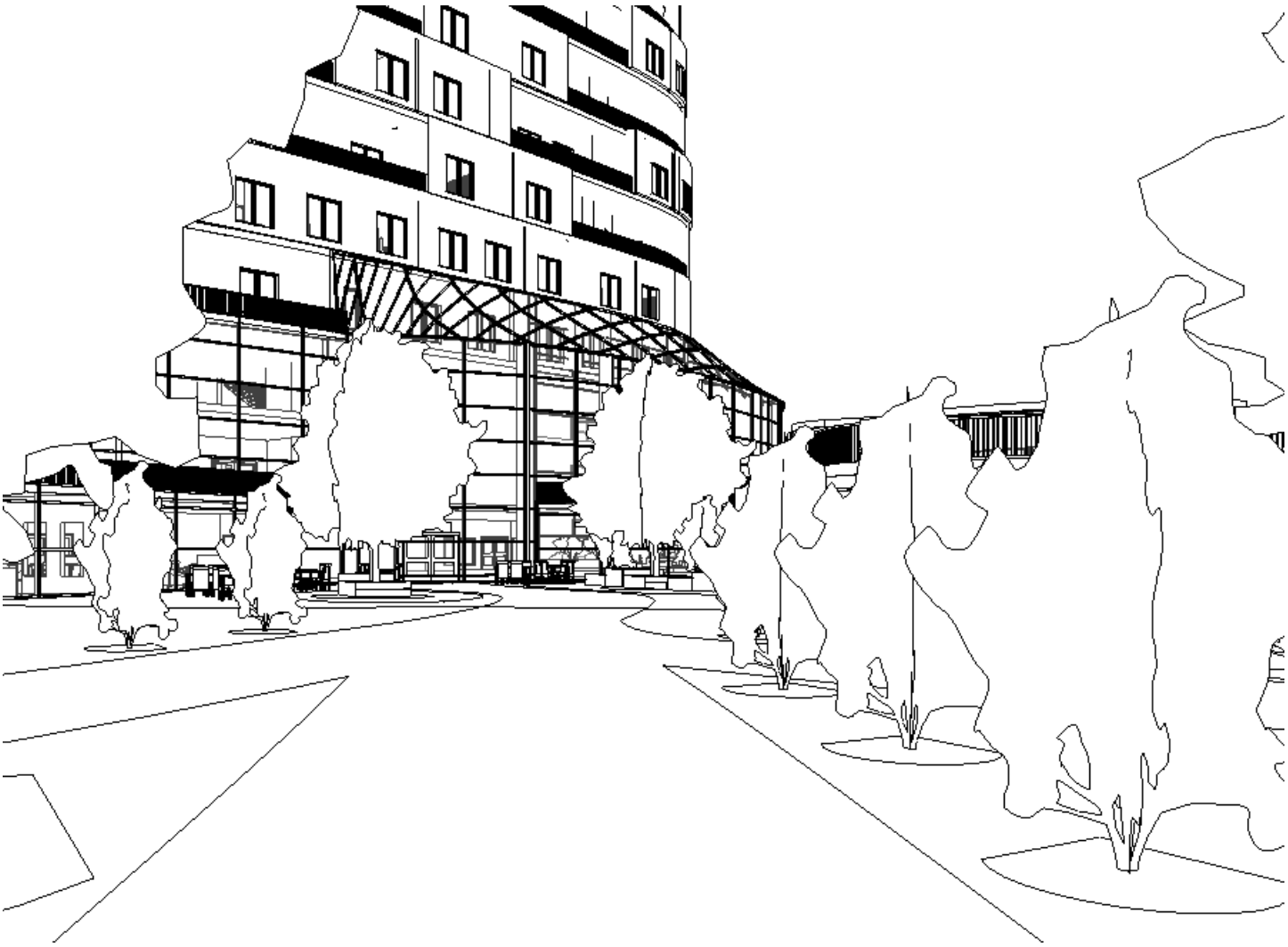
Spring Semester 2021



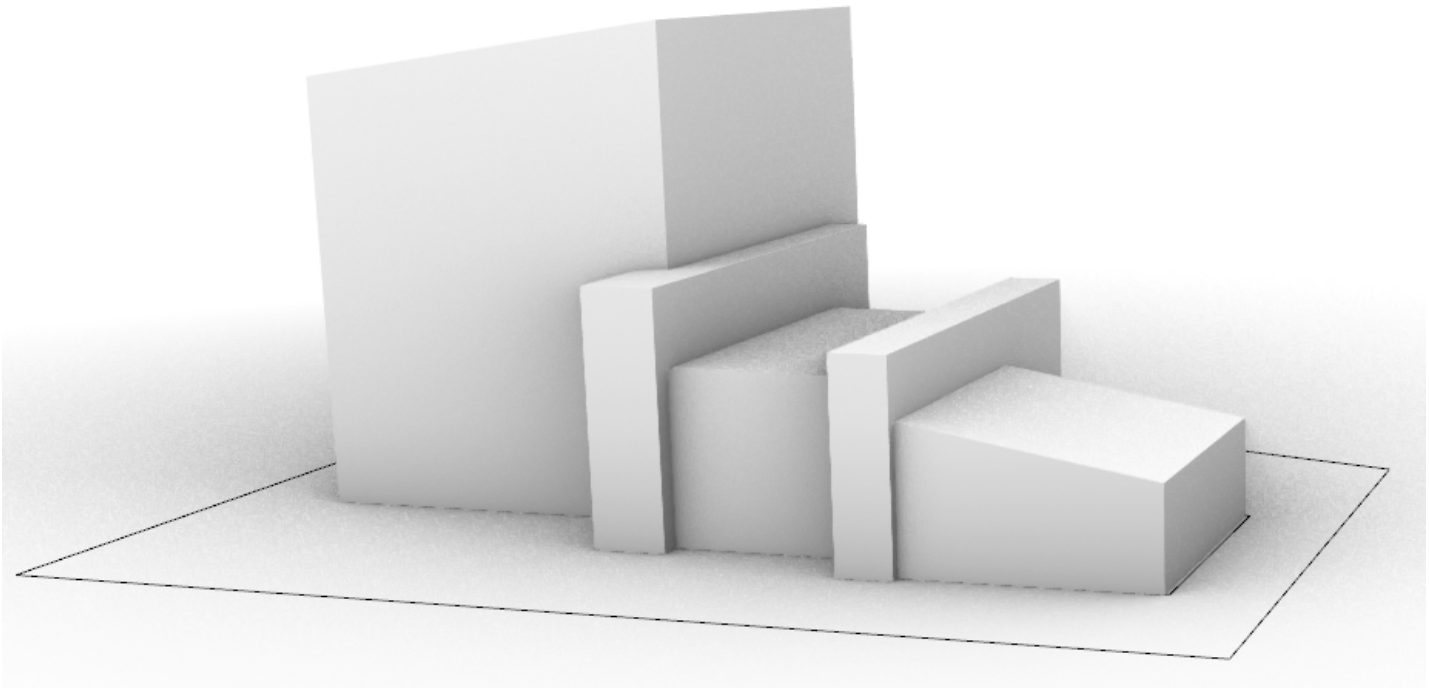
Phase 2: Research Document Final due March 12th
Phase 3: Thesis Design due April 23rd-26th
Phase 4: Presentations due May 10th-14th

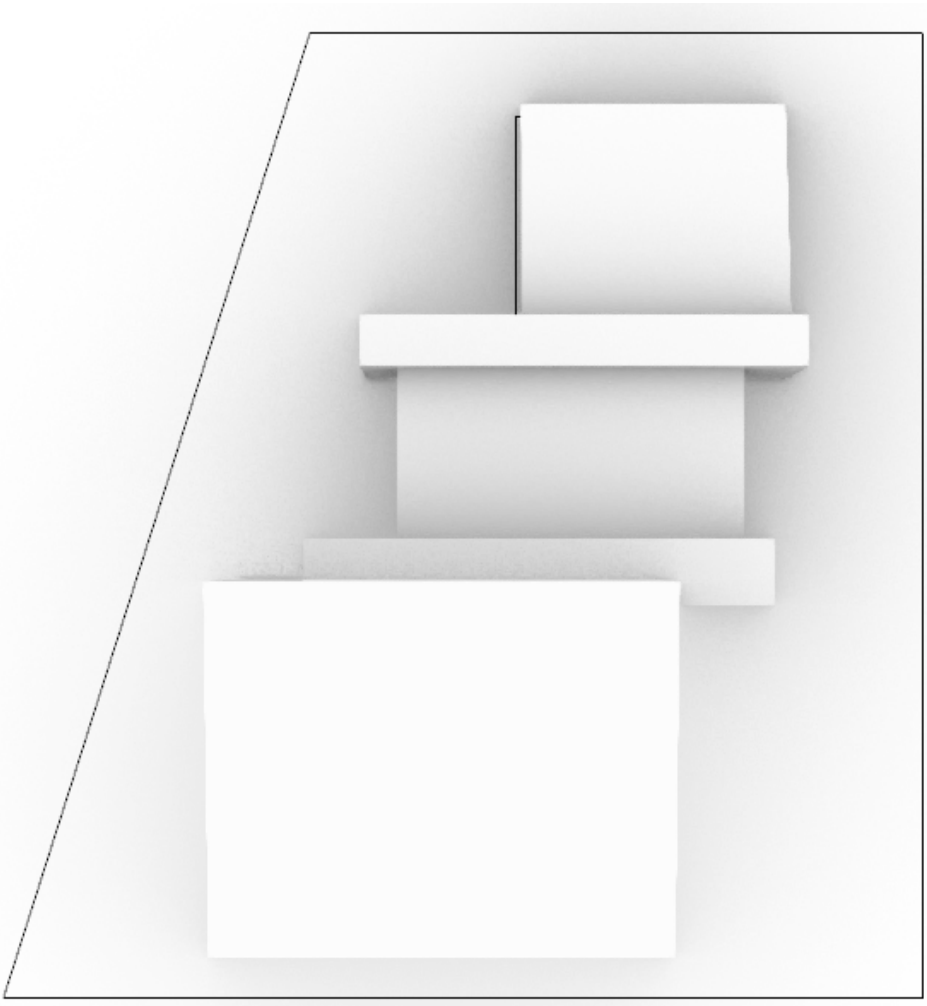
Project Schedule

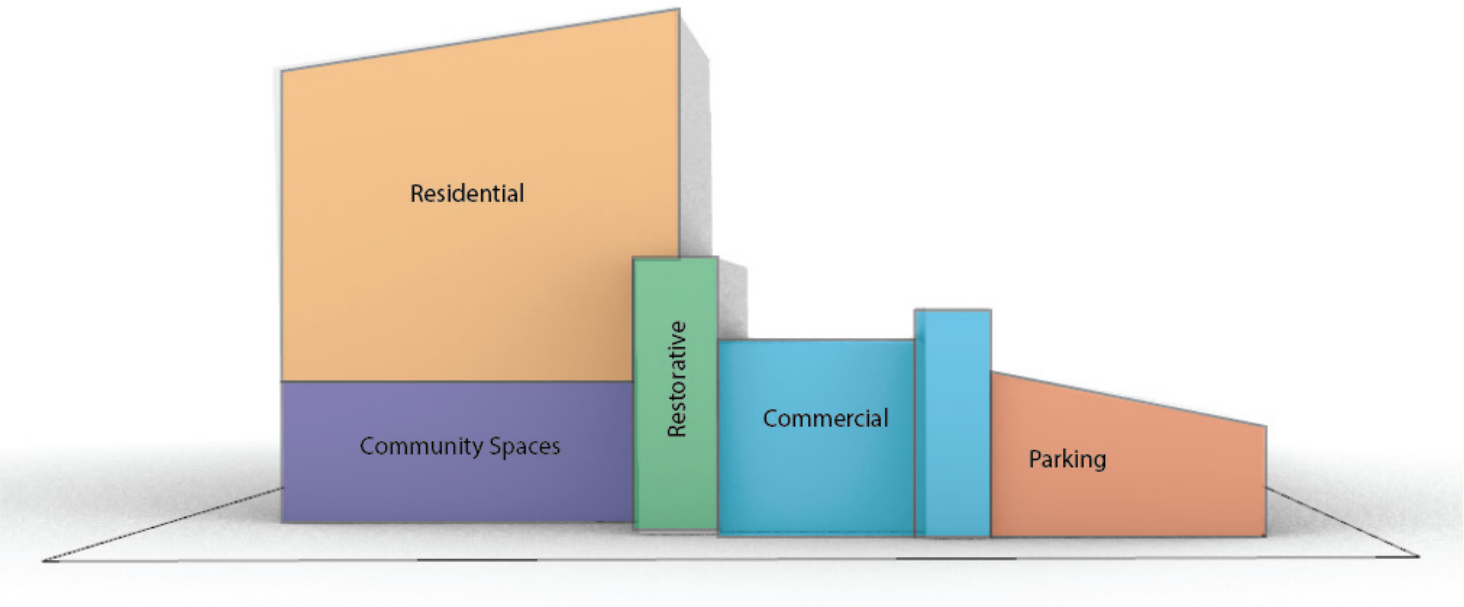
Process



Documentation



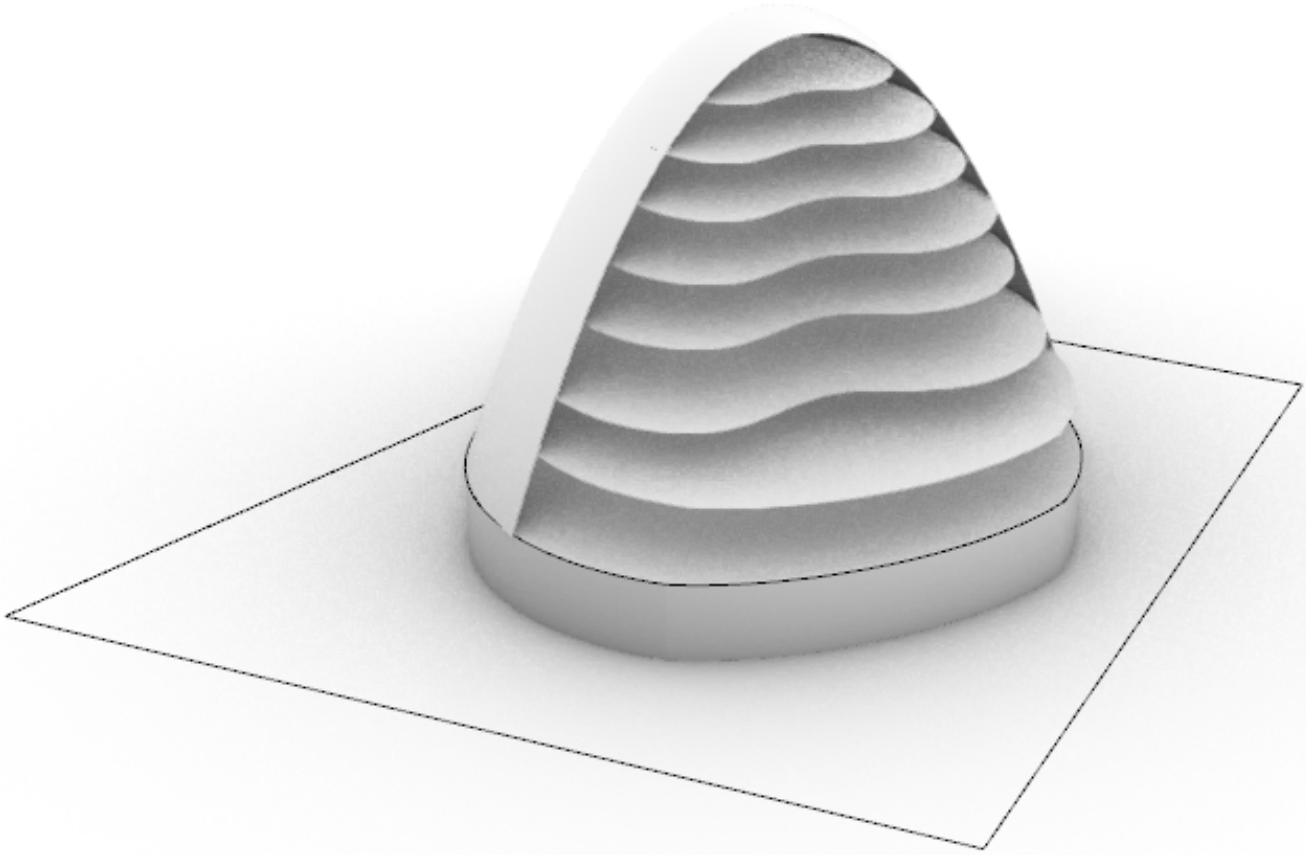


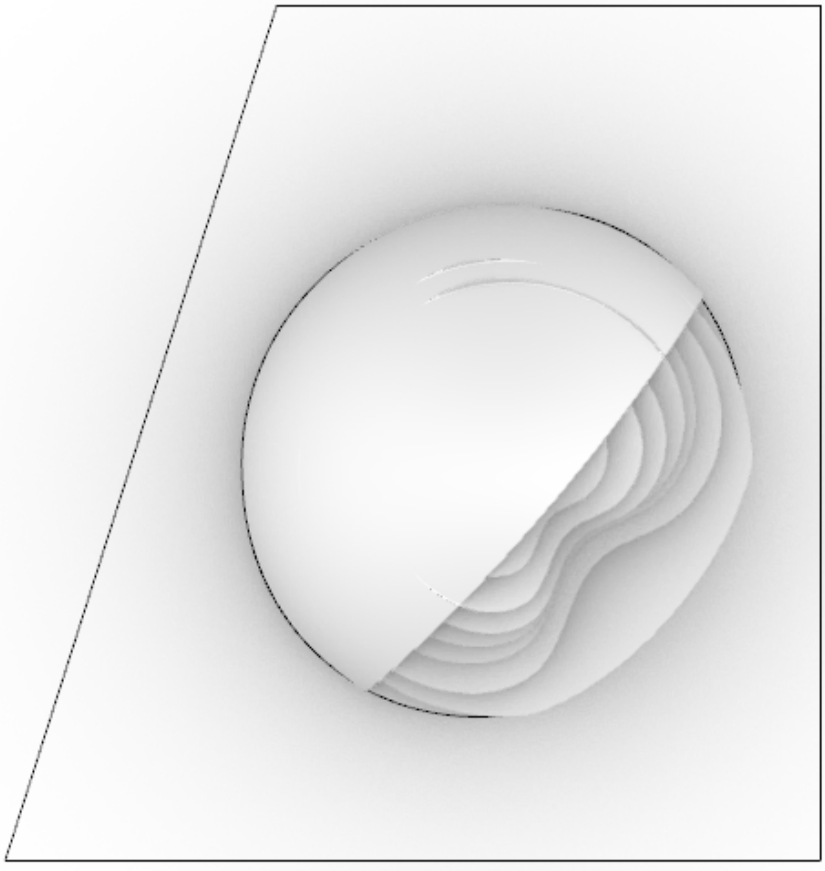


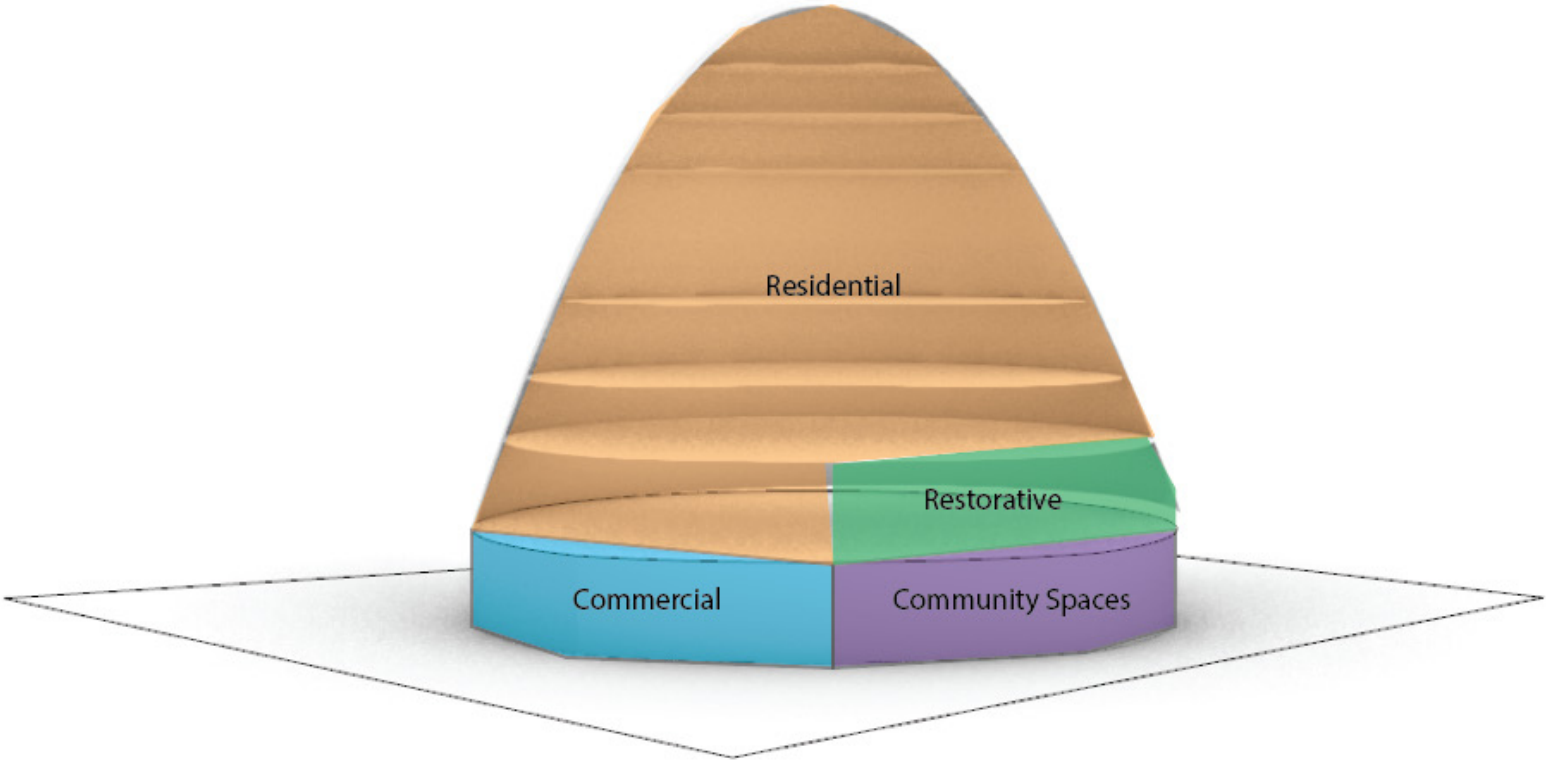
At the beginning stages of the design process, our Studio section began first with a comparison of “extreme schemes”.

For the first of these design schemes I began with a very geometric approach, separating uses into their separate “blocks” of the building. On the lower levels of the building, I allocated a parking garage, a few floors of commercial uses, a few floors of community uses, & an atrium that would be relagated to green spaces; the majority of the large tower would be reserved residential uses.

Many of these ideas would permeate the following designs as well, such as the idea of the green atrium & the residential tower.

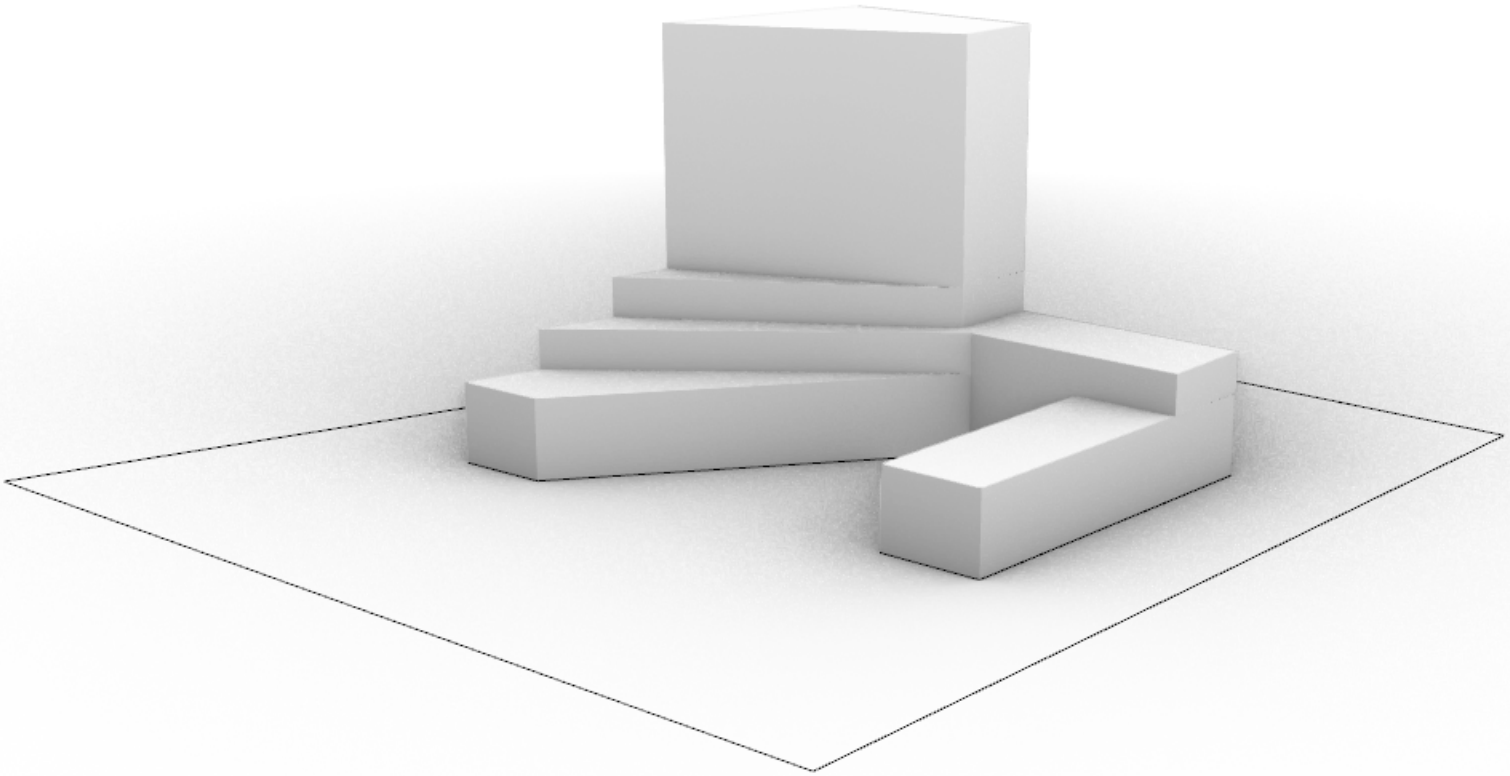


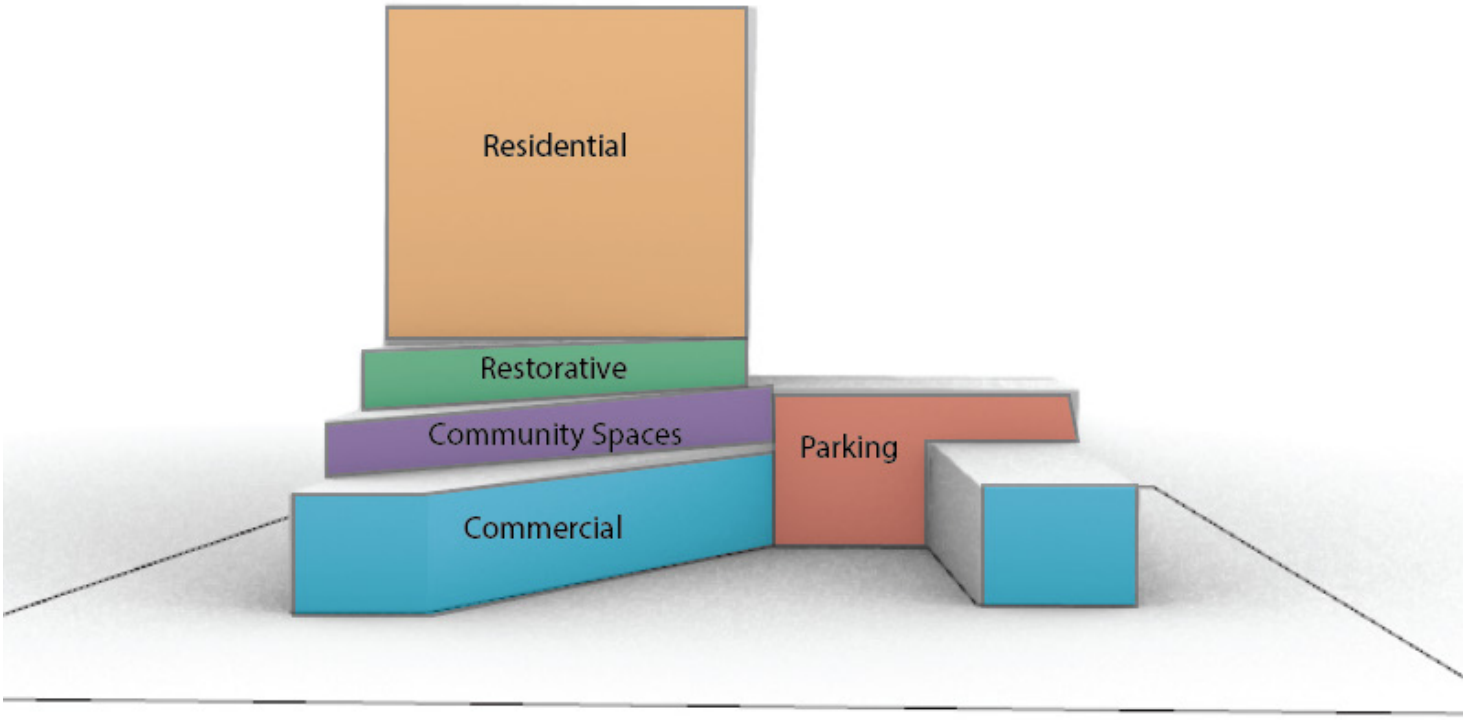




For the second of these "extreme" design schemes, I took a very organic approach to sculpting the building & irregular, sloping facades. For this scheme, the allocation of floor uses was much less clear which would ultimately lead to a departure, largely, from this form. Here, the commercial & community spaces share the first few floors, restorative green spaces would come next with residential uses coming soon after, dominating the vast majority of the parabaloid. This overall shape was conceived with the aim of maximizing natural sunlight from the south.

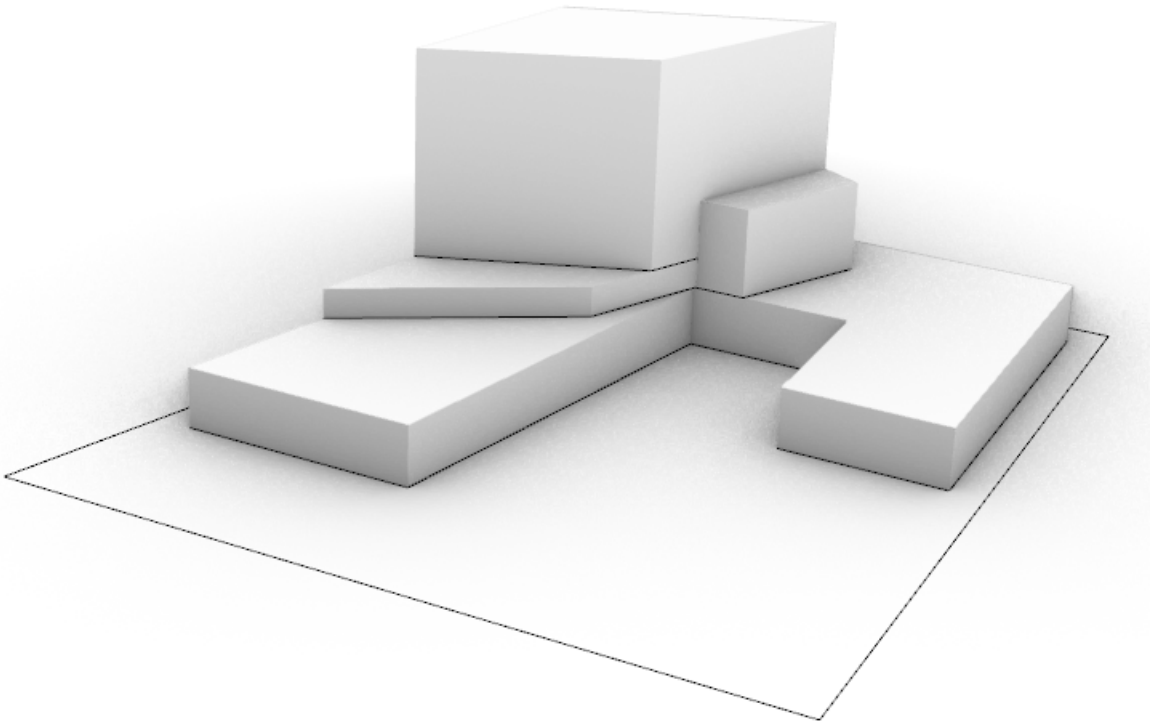
The ideas that persisted past this stage of design would help to shape the organic form that would come later on.

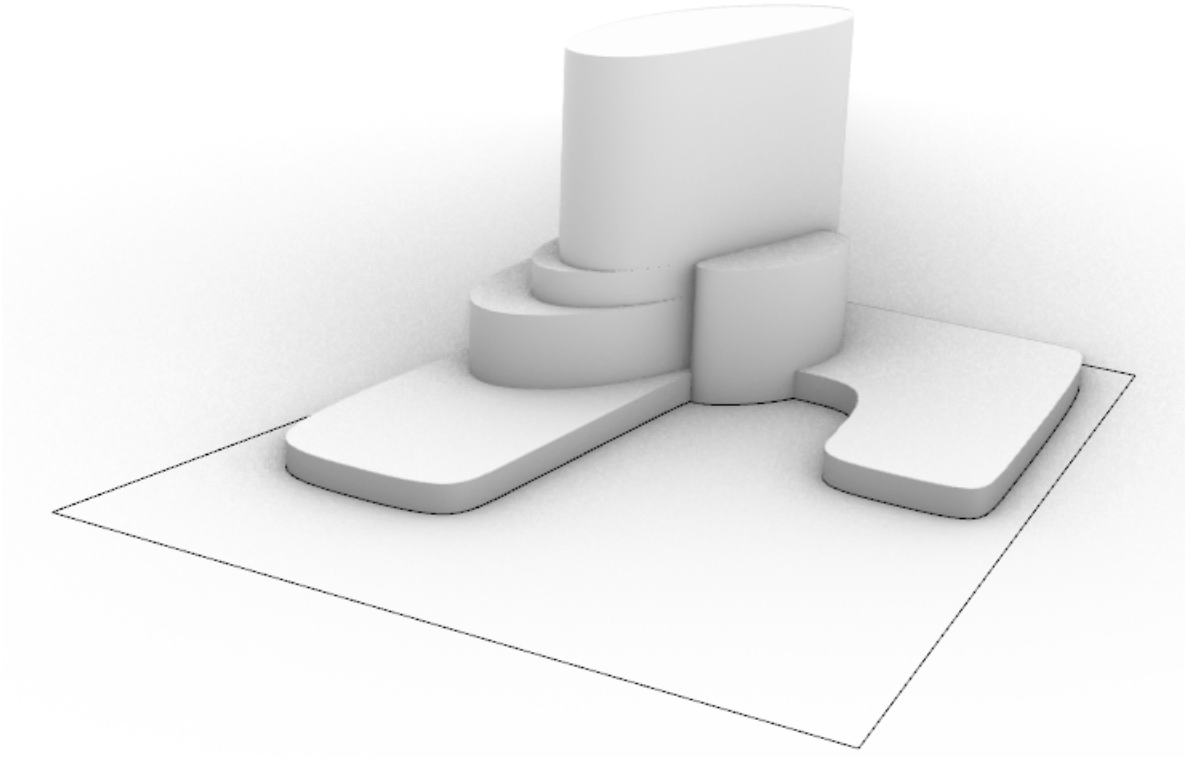


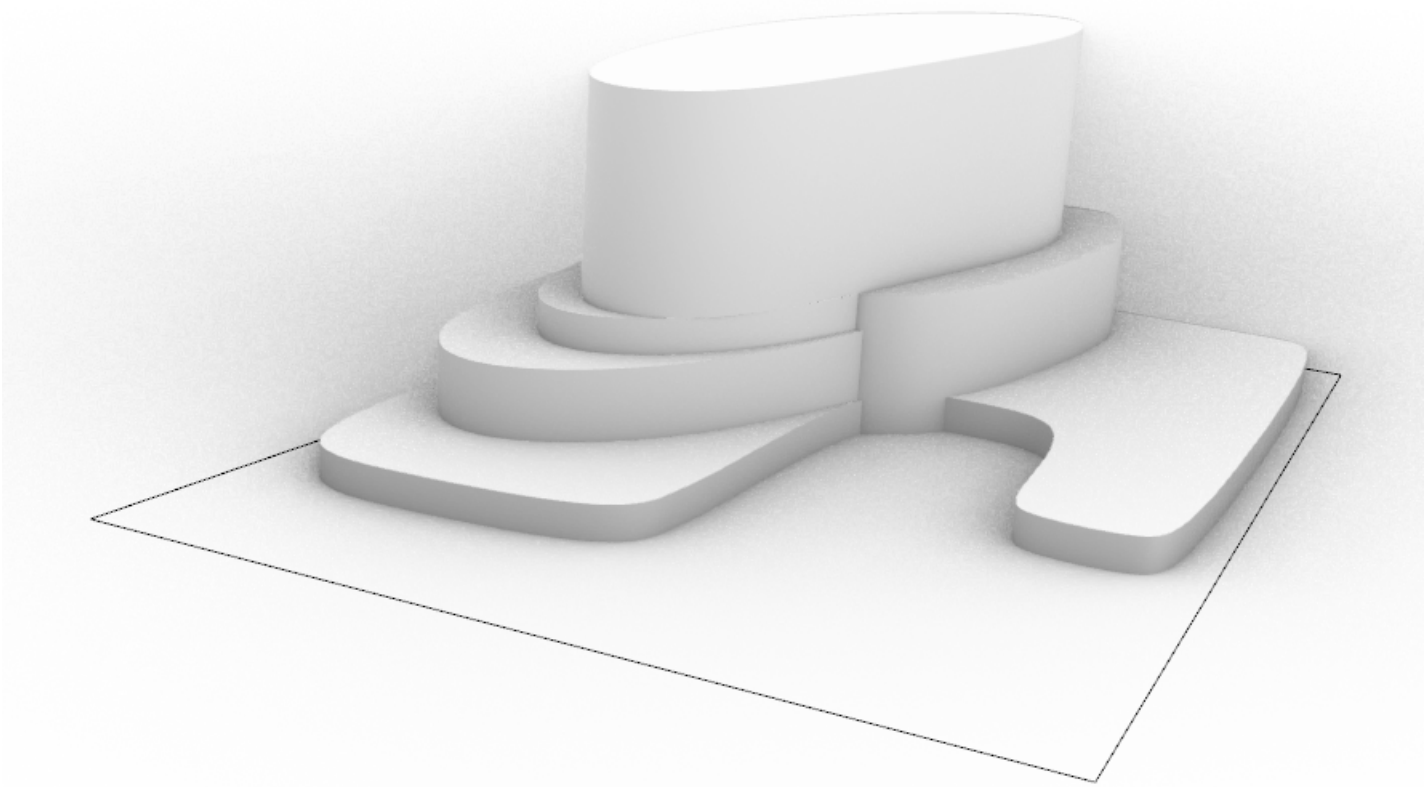


For the third & final of my "extreme" design schemes, I decided to go with a "stepped" form, pushing & pulling on the layers of the building & attributing uses to each resulting layer. Here, I relagate a block of my building to the parking garage while also splitting the commercial uses into two opposing sections of the building; on the upper levels of the building I would come to stack the community spaces, restorative green spaces, & residential tower on top of one another. This form also creates an opportunity for an outer courtyard space.

Of the ideas explored in this scheme, the one that would persist would be the idea of "stepping back" the form the create a more inviting effect. This layering effect & the courtyard space would be present in later iterations of the final design.

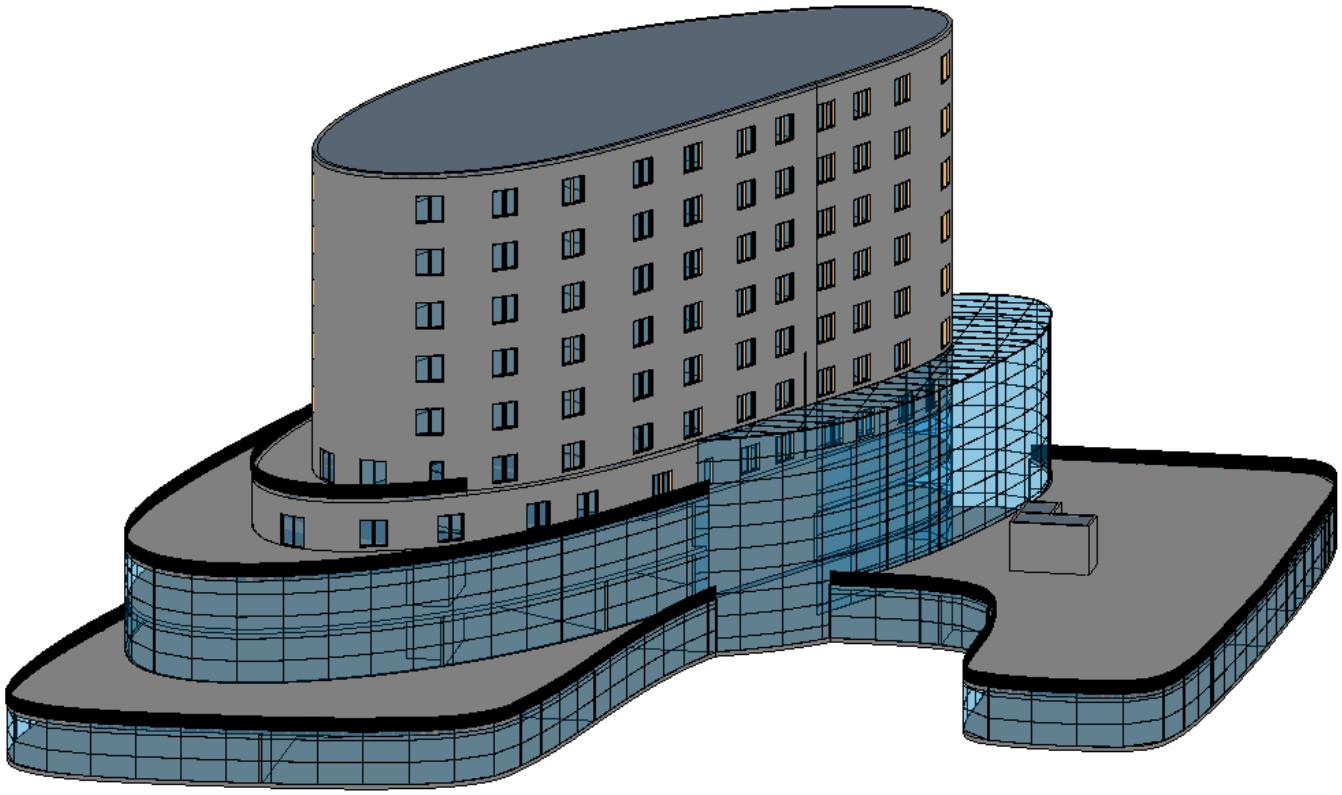


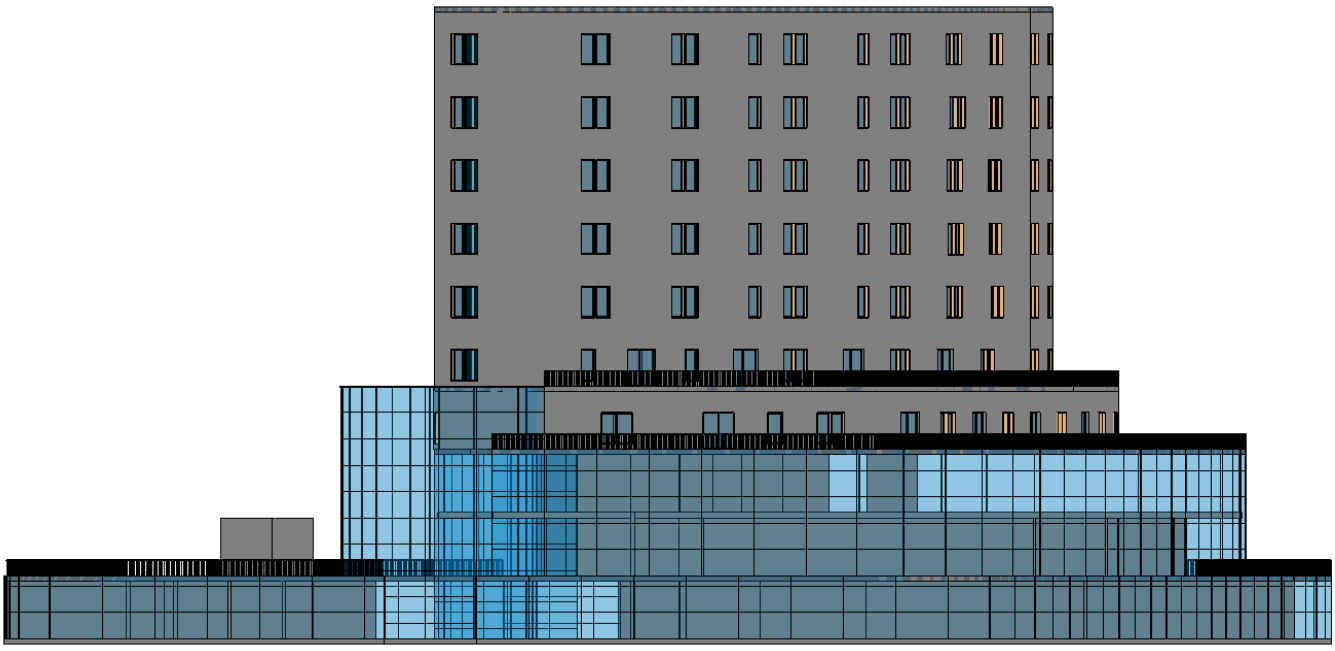


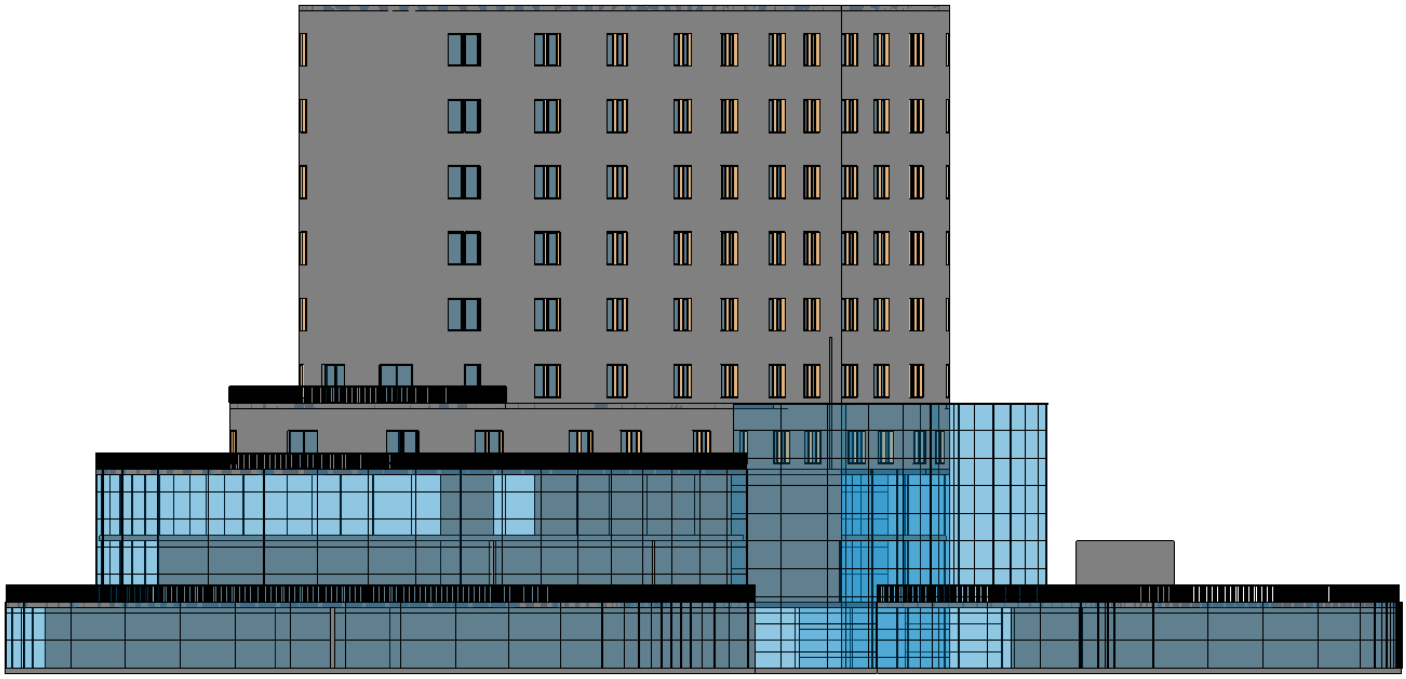


Following the creation & comparison of the three “extreme” schemes, the next step would be to merge together major elements of these schemes in meaningful ways, resulting in some of the schemes you see here.

Largely, I stuck to an organic theme with a stepped form, large residential tower, a green atrium that spans multiple floors, & an outer courtyard space. I would also allocate the first few floors to a combination of community & commercial spaces while electing to keep parking underground.



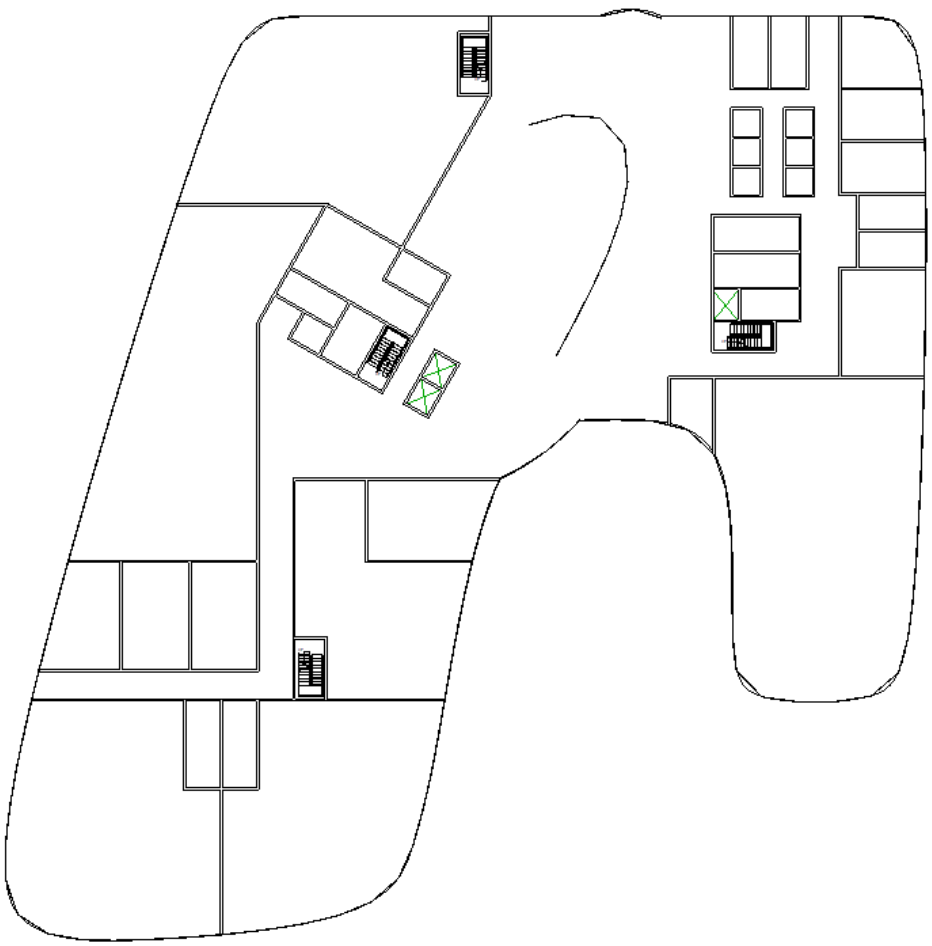


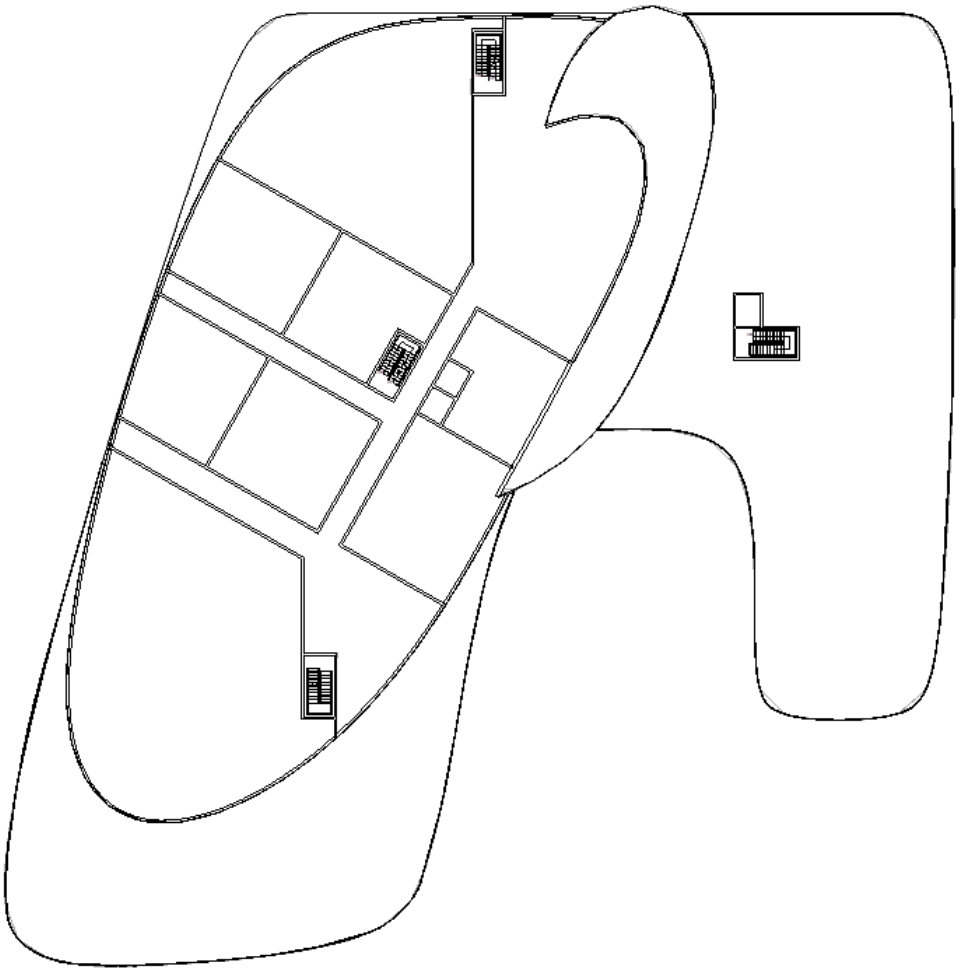


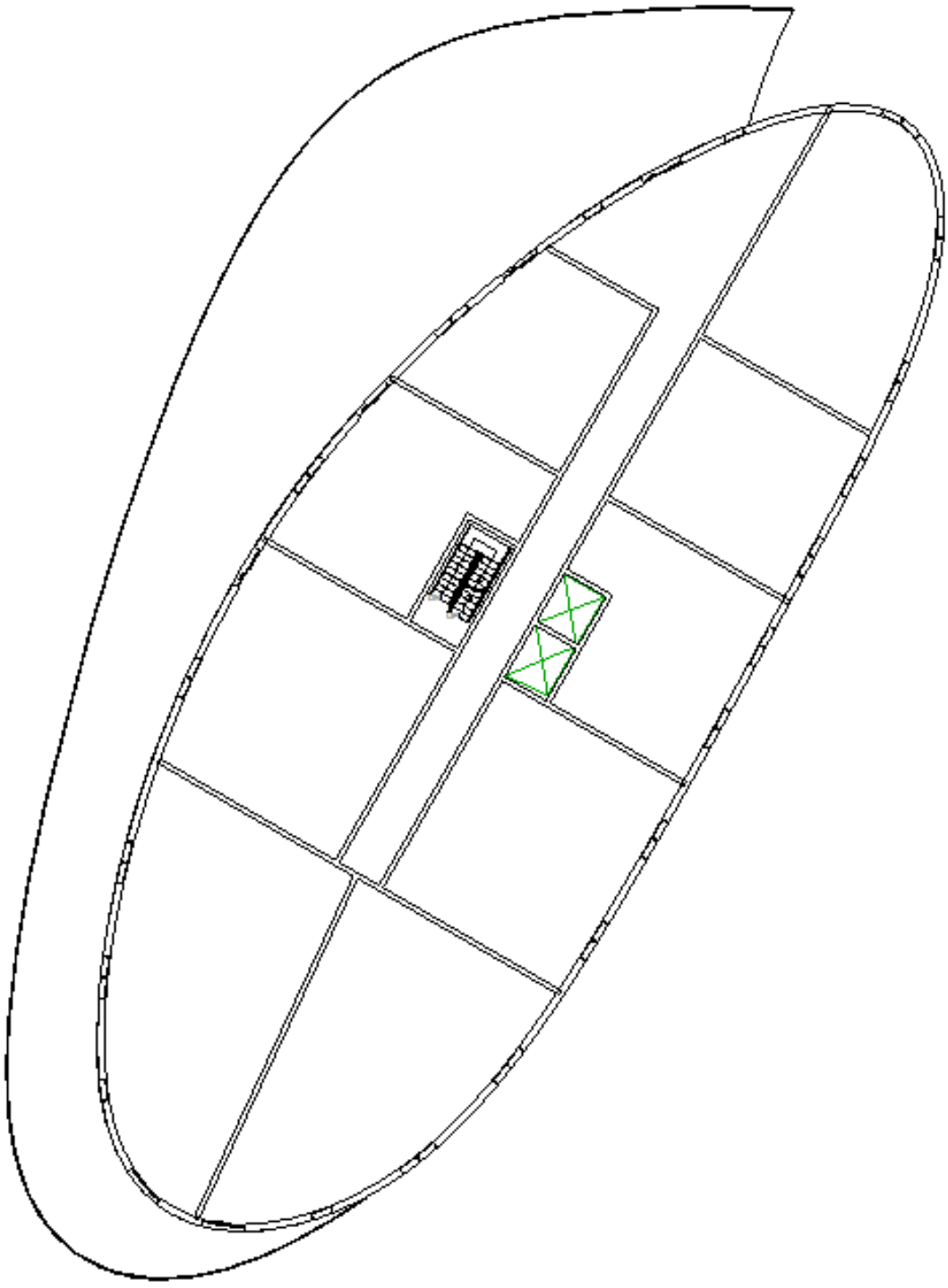
The following images were used as a part of the midterm critiques: the perspective, elevations, & floor plans.

Some of the elements that would later change as a result of both critque & instruction would include the creation of a indoor/ outdoor lounge space for the second story green roof, altering of the atrium shape, further development (& furnishing) of floor plans, as well as (the greatest change overall) the alteration of the residential tower.

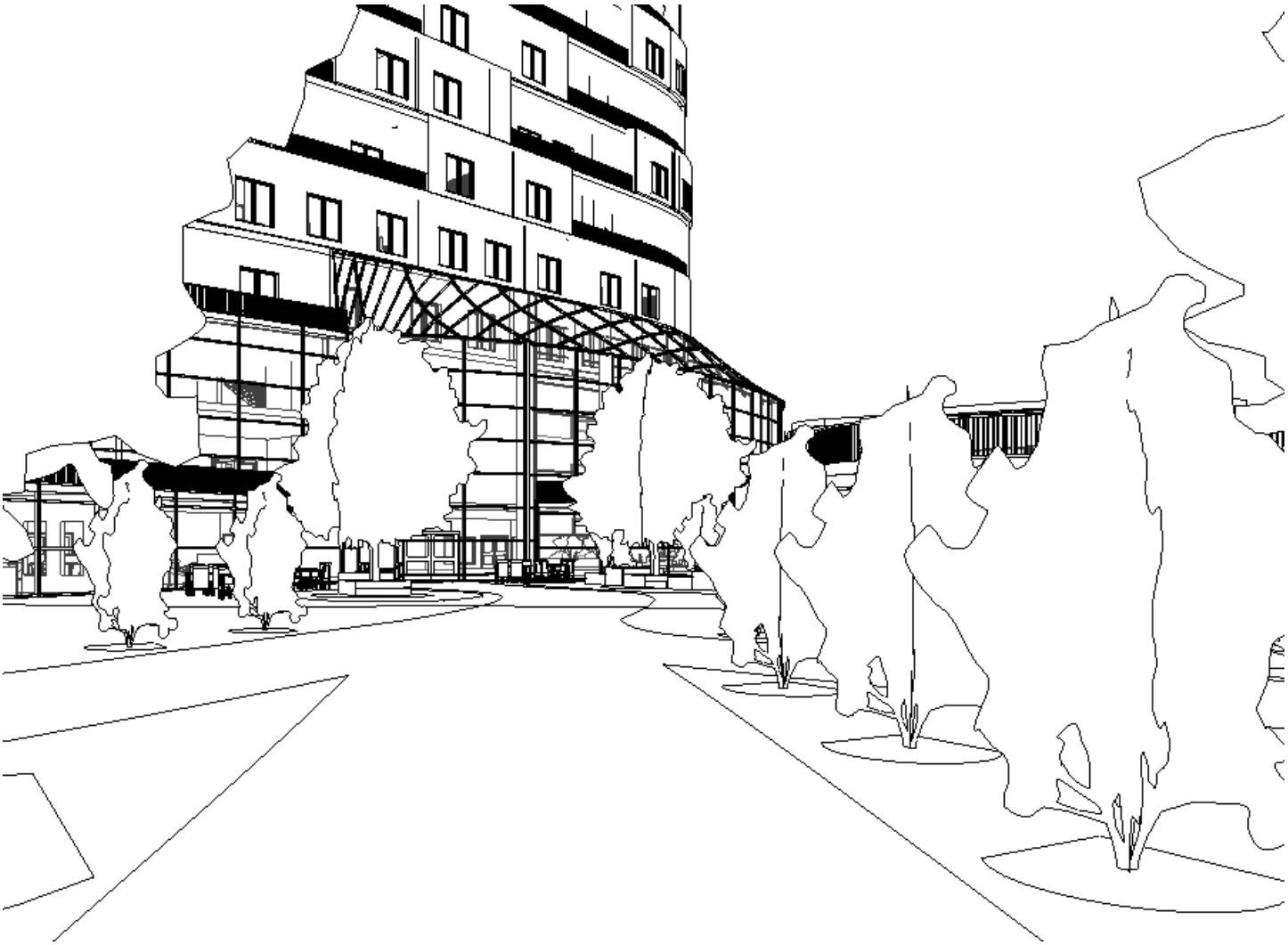
These changes are realized in the Project Solution.



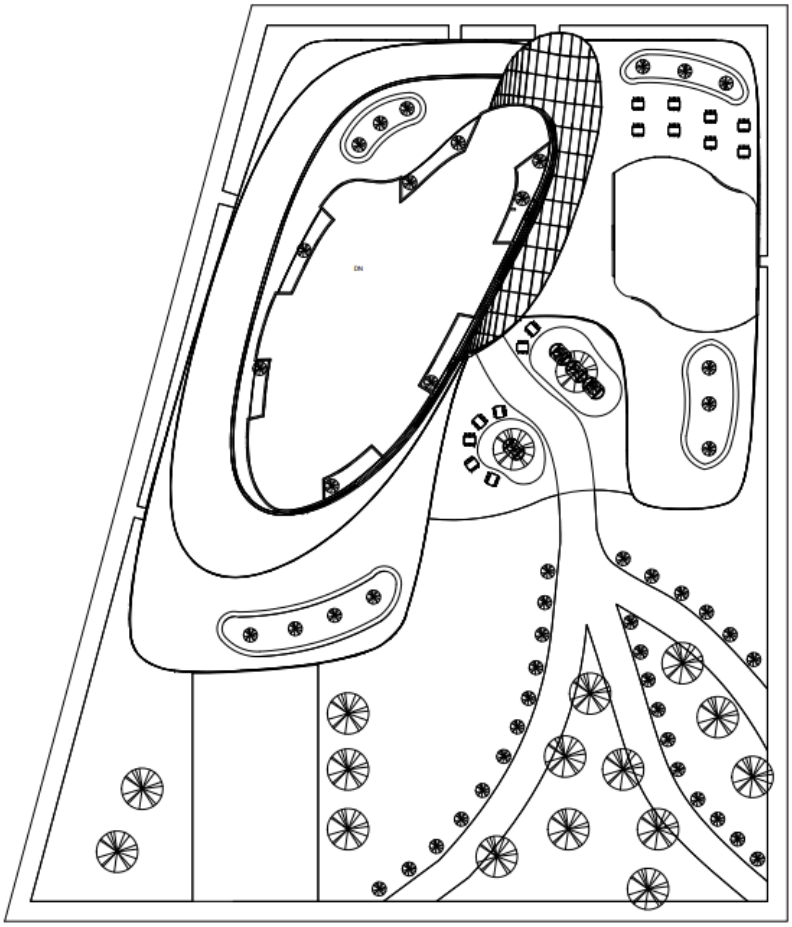




Project



Solution



Site Plan

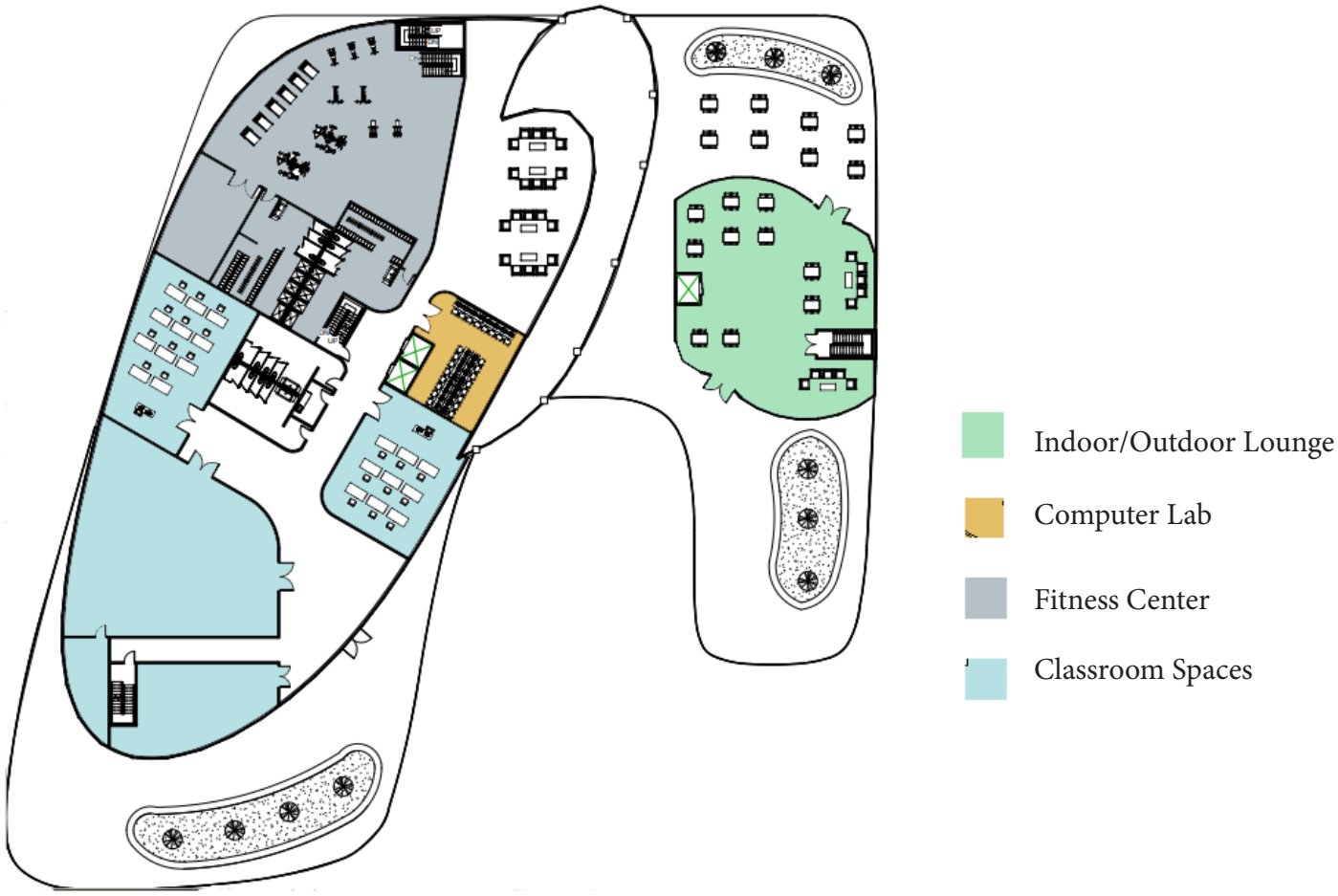
Workspace/Offices

Fitness Center

Restaurant/Cafe

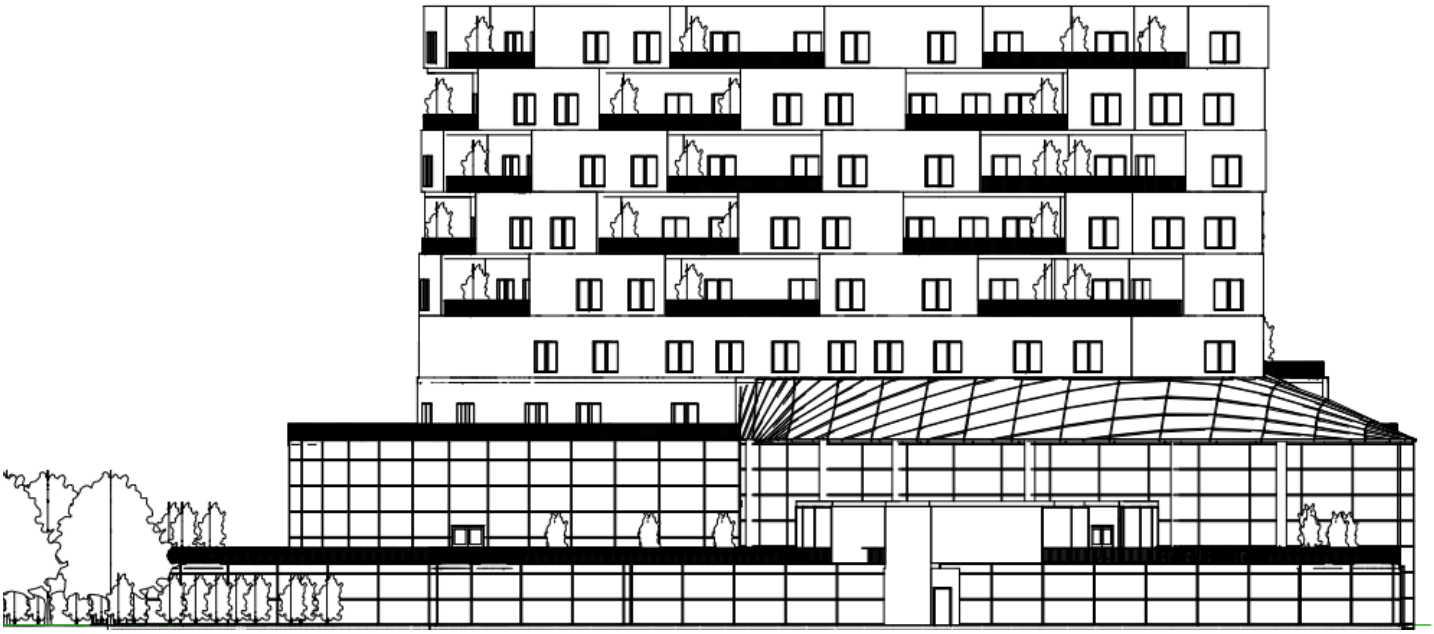
Community Recreation Spaces

First Floor Plan

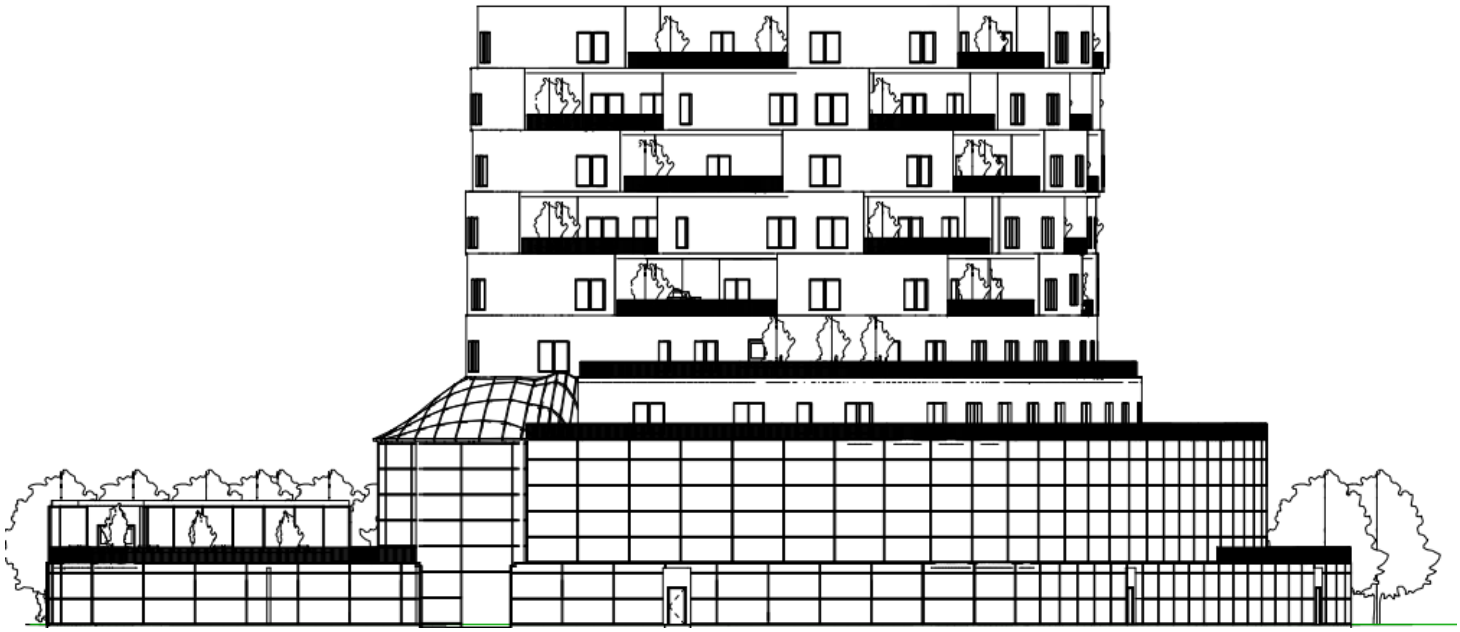


Second Floor Plan

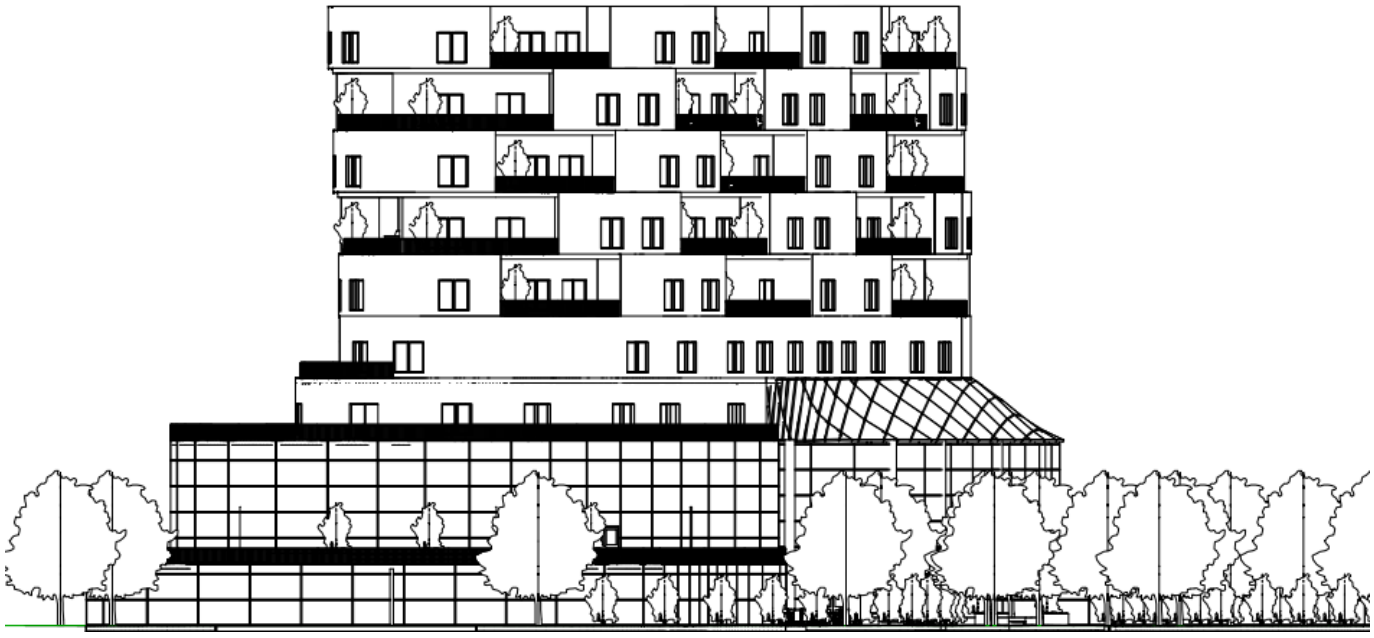
Sixth & Seventh Floor Plans



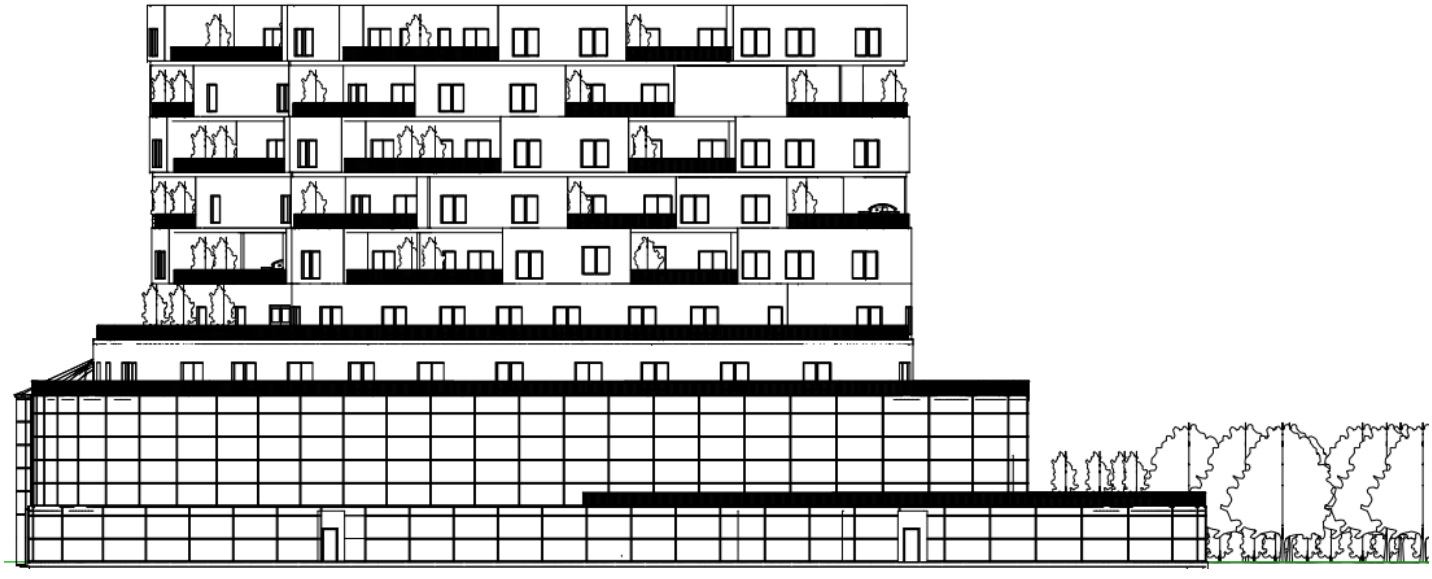
East Elevation



North Elevation

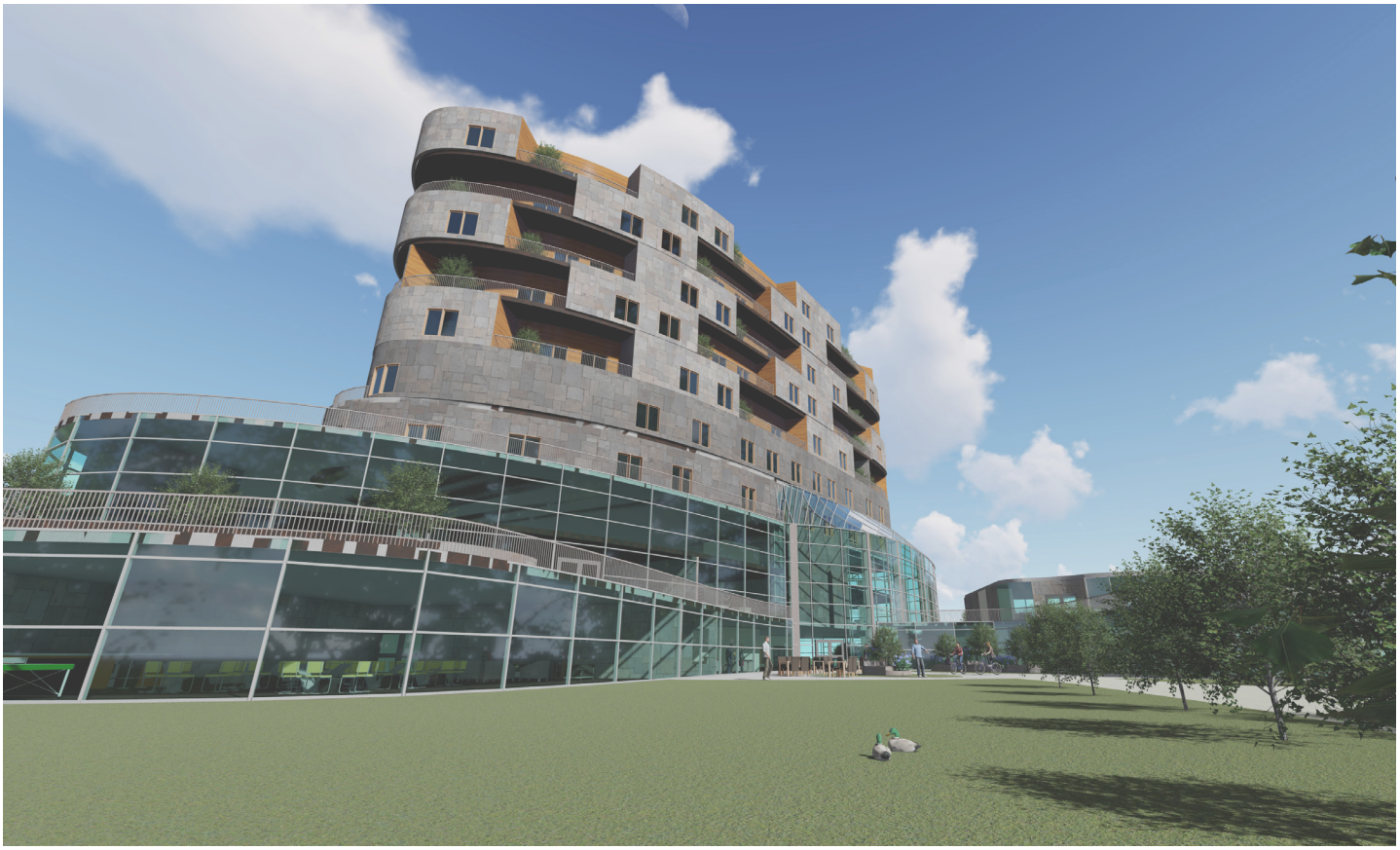


South Elevation

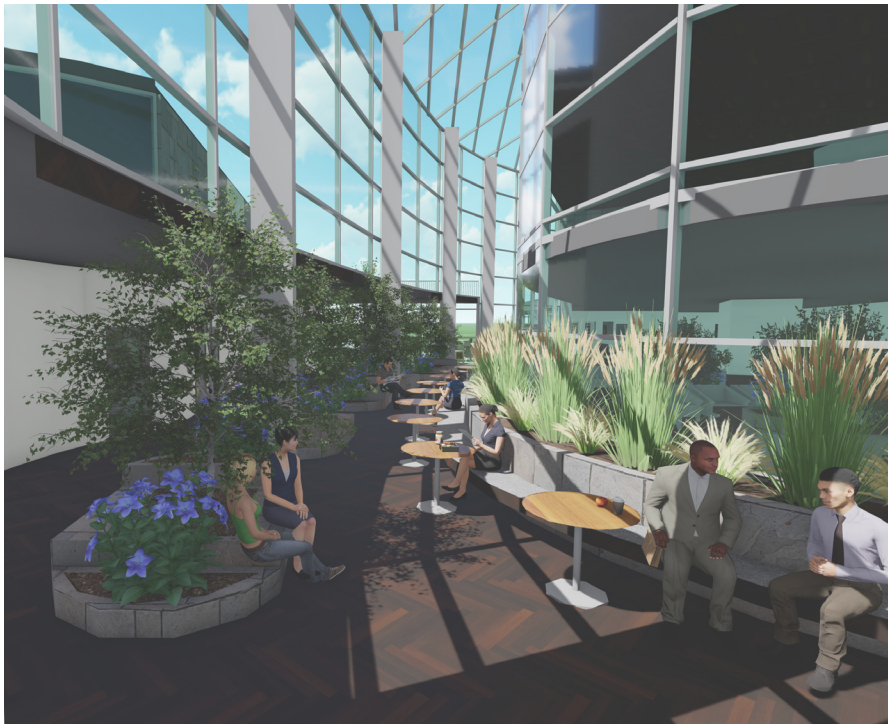


West Elevation

Exterior Perspective, Second Floor Green Roof



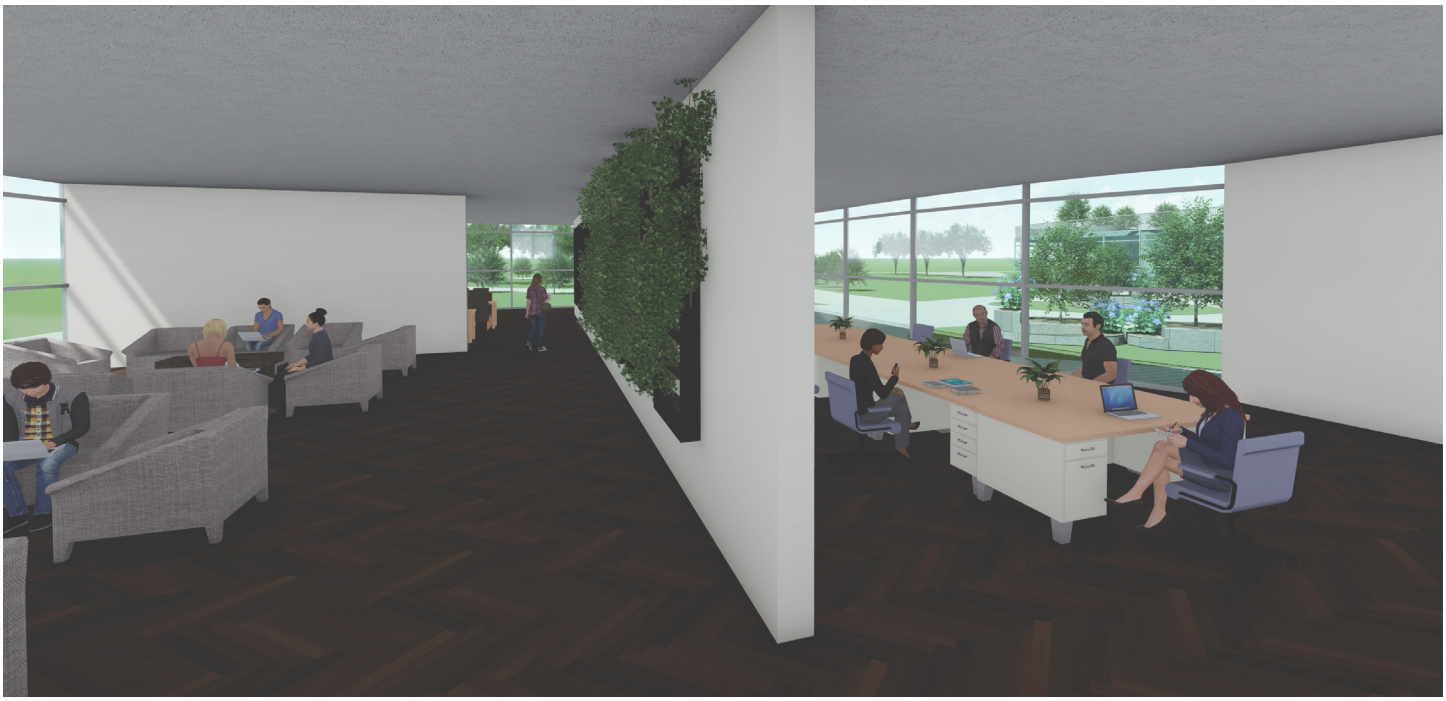
Exterior Perspective



Interior Perspective, Interior Garden

Exterior Perspective, Outer Courtyard

Interior Perspective, Community Recreation Space



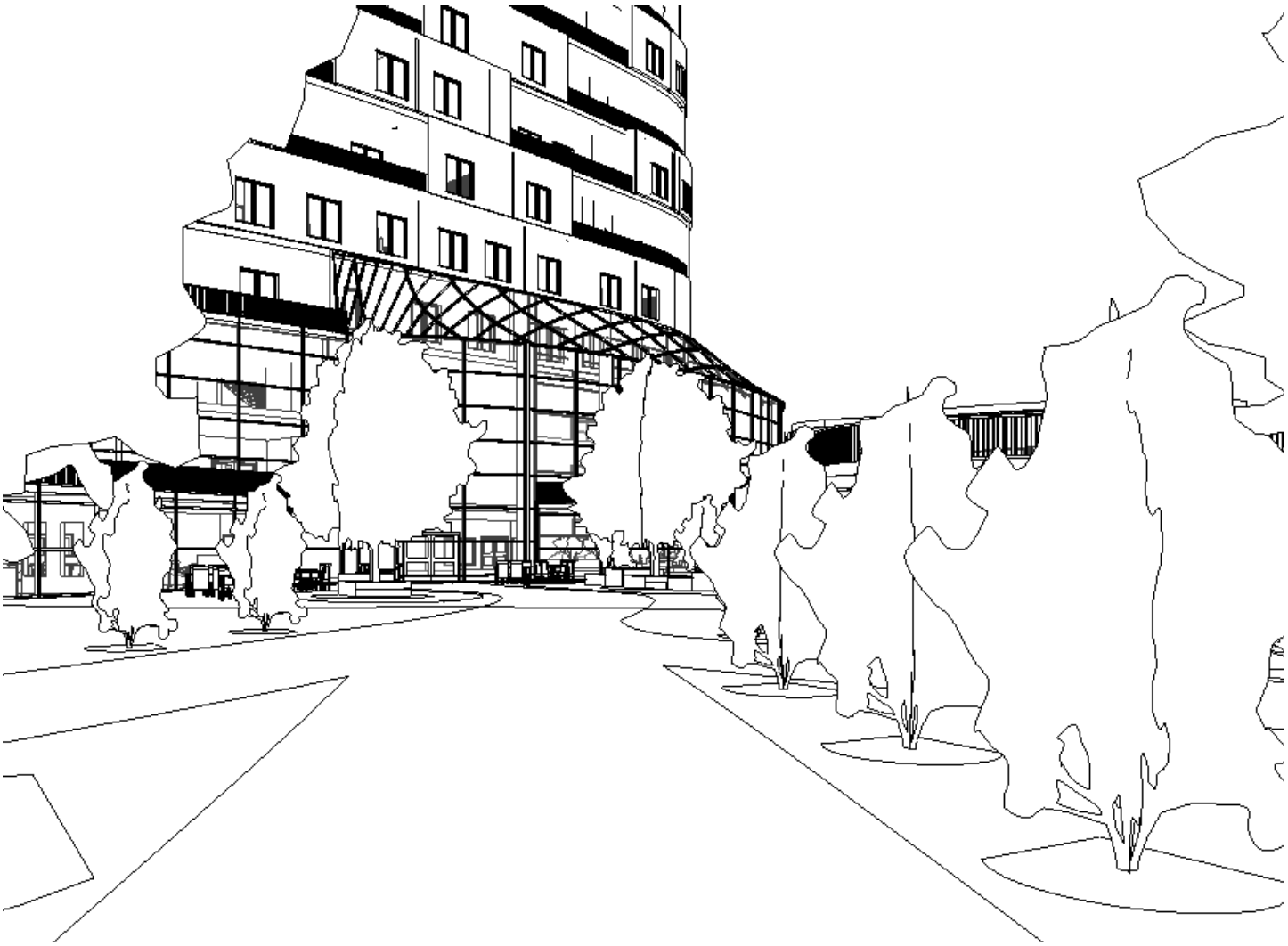
Interior Perspective, Studio Workspace

Interior Perspective, Fitness Center

Interior Perspective, Sixth Floor Residential Unit

Exterior Perspective, Fifth Floor Rooftop Area

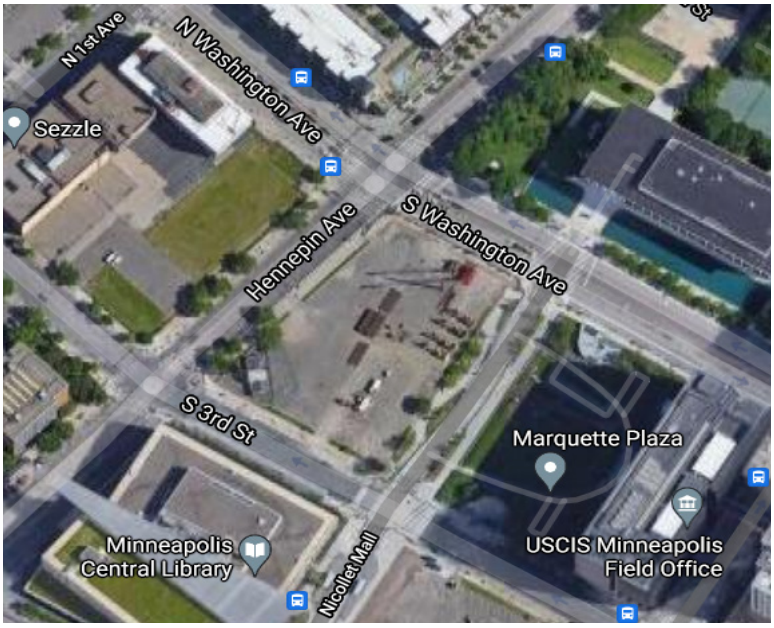
Performance

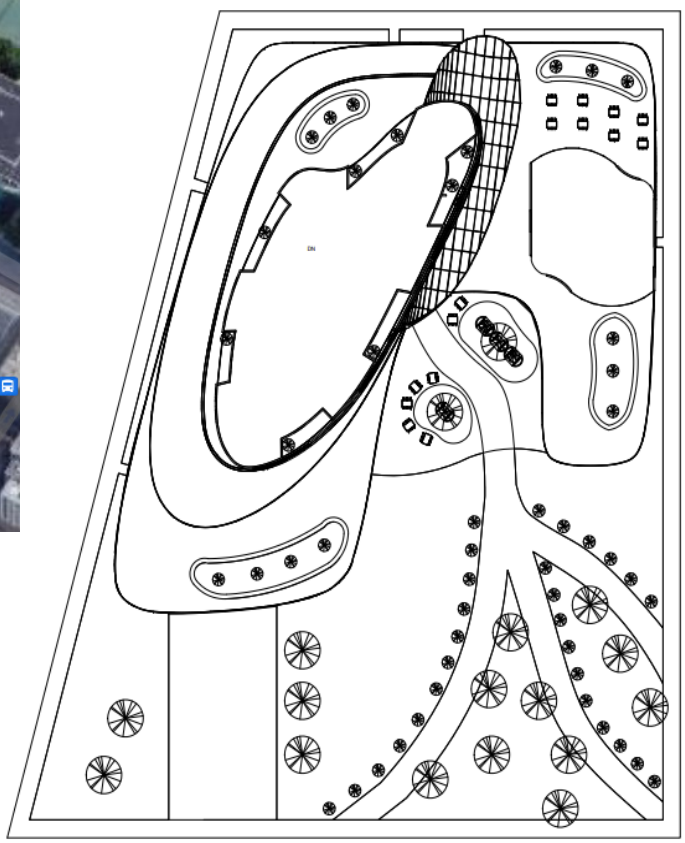


Analysis

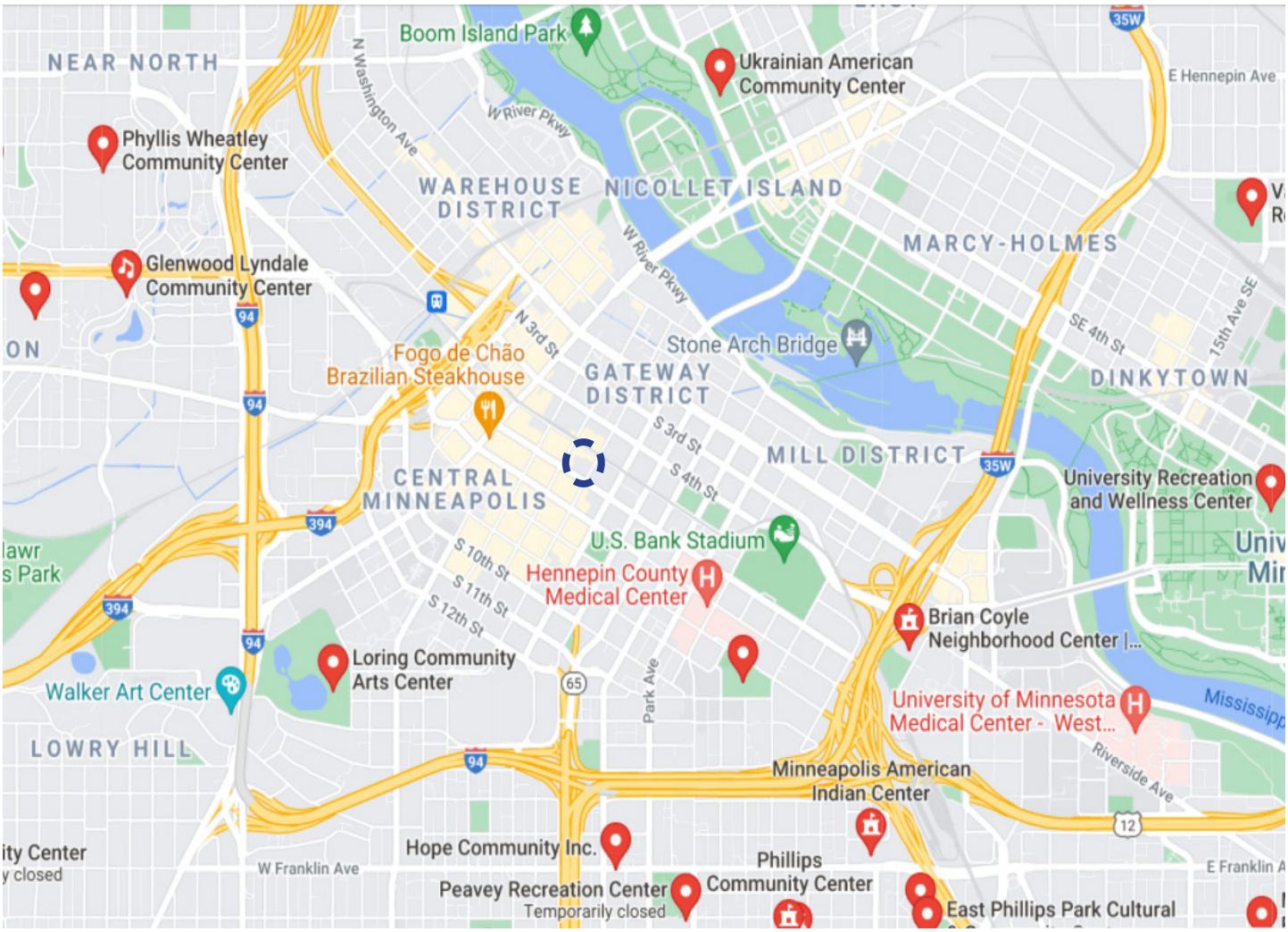
Response to Site/Context

One major response to site & context was the inclusion of underground parking, as the site pre-project was dominated by a dilapidated & under-utilized parking lot. The underground parking is also sufficient as the area is also dotted with nodes of public transit. Additionally, in response to the surrounding sites' greenery, I wanted to include green spaces in order to both blend in with the surrounding context but to also stand out with the inclusion of the interior garden area.





One of the major responses to the site & context was the choice to make the building a mix of a community center mixed with residential use. This is due to the sheer lack of community centers in the immediate area (indicated below with red markers), to include a community hub in an area that is otherwise dominated by business. With this in mind, another response to the context was the decision to include workspaces for those working in the area that may be without office space or reliable internet.



Response to Precedent Research

The majority of my precedent research was based around examining the approaches to mixed use residential projects. The first of these case studies offered insight into how to marry a marketplace with a residential scheme in a new exciting way.

The second of my case studies showed me one of the ways in which a designer could create a major hub for human activity, creating a micro-city if you will.

Thirdly, my case studies lead me to a project whose draw was not that of a mixed use building but a building that had taken an interesting approach to integrating greenery in a multitude of ways.

Of my miniture case studies, each was either residential or mixed-use residential. For the first of my mini case studies, I was shown a building form that was designed to allow for greater daylighting opportunities.

Secondly, I was exposed to a unique building form wherein the push & pull of the balconies would create an interesting texture to the facade of the building.

Third & finally, my perusal of case studies brought me to a project that transformed an old warehouse into a mixed-use residential building, the likes of which emphasized the importance of sustainability, greenery, & creating opportunity for community.

Response to Goals

Greater Understanding

My project provides several opportunities for both self-reflection--through the inclusion of lounging/seating areas, interior garden, green roofs--& meaningful human interactions--through the inclusion of the community & commercial spaces.

Stress Reduction

My project reduces stress through several different avenues: through the inclusion of different community- & commercial-based spaces in order to provide a wide range of stress reductive activities; this was also effective in alleviating feelings of isolation. Additionally, I provided spacious, quality housing in order to reduce the feeling of overcrowding while also alleviating stress. The inclusion of plentiful green spaces also works towards my goal of reducing stress.

Sense of Community

With the wide range of activities hosted in the building, through community & commercial spaces, this project fosters positive social connections amongst a wide range of users.

Natural Intervention

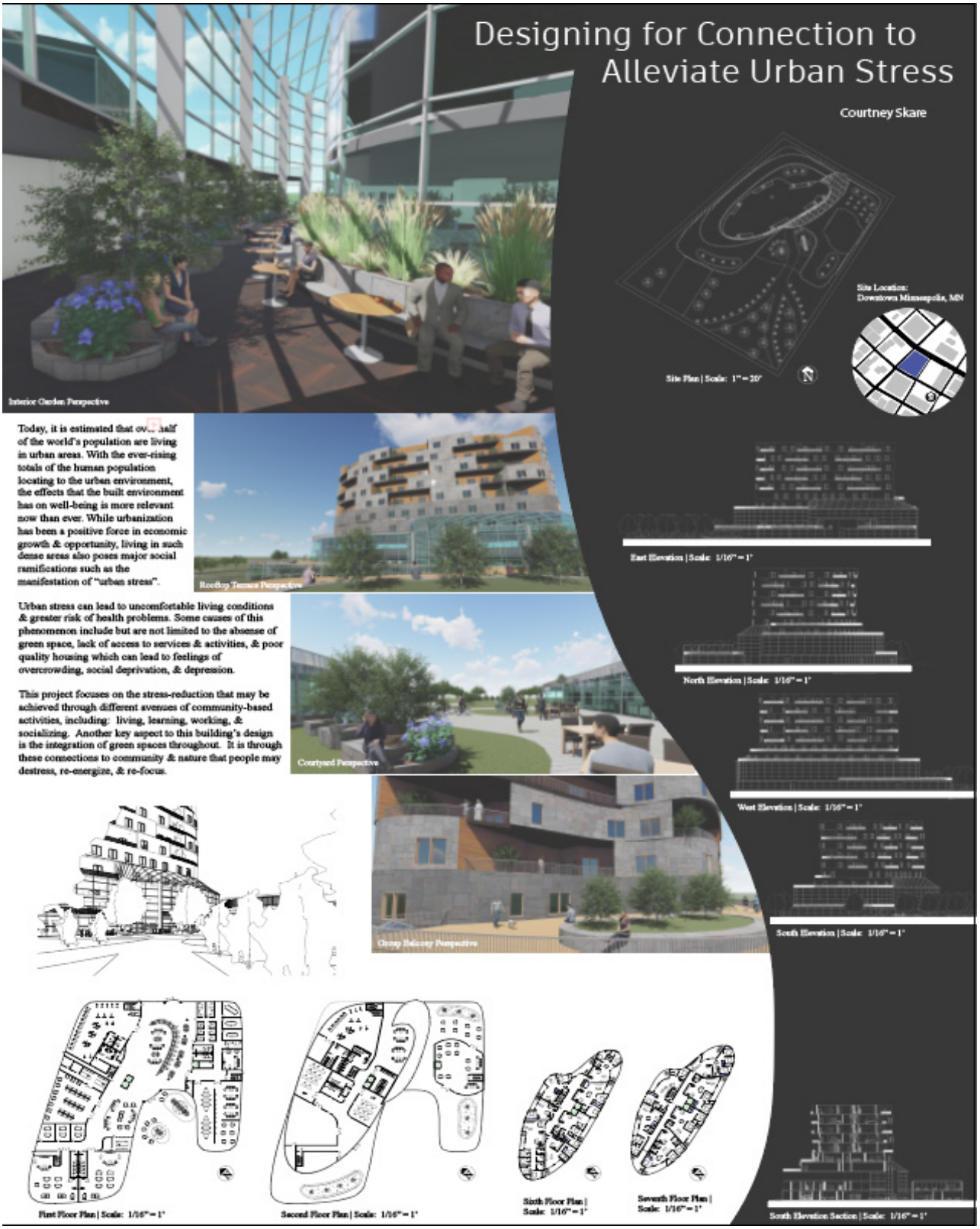
The project introducing nature into the building scheme through the use of daylighting strategies & the implementation of the interior garden & green roofs.

Critique of Research Methods

Rotterdam Markhal View of Market

Largely, my research is comprised of case studies (typically of residential or mixed-use residential buildings) & of qualitative research, primarily in the form of literature reviews. These methods both helped me to explore creative solutions while also creating a strong basis for my research on urban stress & designing for the human condition. I found that this combination of methods, in my case, was sufficient in further developing my thesis project.

Boards Design



Thesis Appendix

Reference List

5 Things You Should Know About Stress. (n.d.). Retrieved October 11, 2020, from https://www.nimh.nih.gov/health/publications/stress/index.shtml

Adli, M. (2011). Urban stress and mental health. LSE Cities.

Aguilar, C. (2014, October 08). Markthal Rotterdam / MVRDV. Retrieved October 13, 2020, from https://www.archdaily.com/553933/markthal-rotterdam-mvrdv
Burton, I. (1990). Factors in urban stress. J. Soc. & Soc. Welfare, 17, 79.

Evans, G. W., & McCoy, J. M. (1998). When buildings don't work: The role of architecture in human health. Journal of Environmental psychology, 18(1), 85-94.

Luco, A. (2020, July 13). MicroCity Het Platform / VenhoevenCS. Retrieved October 13, 2020, from https://www.archdaily.com/942753/microcity-het-platform-venhoevencs?ad_source=-search

Sanchez, D. (2015, January 26). SK Yee Healthy Life Centre / Ronald Lu & Partners. Retrieved October 13, 2020, from https://www.archdaily.com/590542/sk-yee-healthy-life-centre-ronald-lu-and-partners

Urbanization: An Environmental Force to Be Reckoned With. (2020, June 17). Retrieved October 11, 2020, from https://www.prb.org/urbanization-an-environmental-force-to-be-reckoned-with/

U.S. Census Bureau QuickFacts: Minnesota. (n.d.). Retrieved October 11, 2020, from https://www.census.gov/quickfacts/MN