ENVISION

WHAT IS THE FUTURE OF OFFICES?

IN A POST-PANDEMIC WORLD

ENVISION - THE FUTURE OF OFFICE SPACE

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

By

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THESIS ABSTRACT

The future of office work is in a rush for a quick yet long lasting solution. Offices need a space that will allow people to access work safely without worrying about the spread of any germs and allowing themselves to be socially distant. The world is looking at its work environment from a different standpoint. A lot of people will be working from a remote standpoint yet office buildings can still have an important role even if it has less users. Technology is going to accelerate in the business world through the fundamental shift of the effects of the COVID pandemic. A near touchless experience will positively impact the experience and health of its users. Consider a bottomup approach of design that incorporates elements friendly to the work environment. The overarching premise of this project emphasizes that architecture can positively impact the physical well-being of people and allow for a cleaner environment for its users. Precedent case studies and combined strategies guide design elements that correlate with the COVID-19 pandemic to be implemented into the built environment of the office building.

Title: ENVISION: What is the Future of Offices? In a Post-Pandemic World.
Typology: Office
Site: 30 S. 3rd St, Minneapolis, MN 55414
Project Size: Approximately 365,000 S.F.

THESIS NARRATIVE

NARRATIVE OF THE THEORETICAL ASPECT OF THE THESIS

The overall design of a business layout is changing in front of our eyes. The effect of the COVID pandemic has changed the way the world looks at working and how companies plan around their working employees. With most of the world working remote during the height of the pandemic it has raised the question; How much work can actually be done remote versus in a office building? How can the world prepare for people to come back into the work place? The business world needs a fresh design that solves the issue of a clean environment that allows individuals to socially distance as well as having maximum air flow and an efficient work environment. The companies that can afford to keep the offices open need a design plan for the future. This topic is a good example of research because this current issue needs a design plan going forward for businesses and office space. It poses the question for all offices around the world. The research is geared towards improving office spaces and quality for the working people. I hope to address the questions that comes up with the future of the workspace and come up with solid solutions that can be used in every office. This question can be applied across the nation and the solutions can be used in office spaces everywhere. A design that will consist of an office building or regional hub. A building that has a near touchless experience and can detect illness as it enters the front doors. This topic is a good example of research because it is contributing to the architectural world by expanding current knowledge of the work environment and how to accommodate for illnesses or future pandemics. This research is geared towards finding viable solutions and design elements to kill viruses throughout the building before they are able to spread. It poses a new question to a problem that faces society in a way that can be applied across the nation rather than within a single office building. We can learn that, perhaps our current design practices are not held to the highest standard and we have the ability to amend them.

PROJECT TYPOLOGY

The building typology would closely correlate with the research undertaken for the future of workspaces and how the pandemic has directly and indirectly influenced the environment. This is important because the research will include the collection of survey data questions related to office spaces and how they can continue to work through the COVID pandemic. Mainly, how they can come out of the pandemic thriving and ready to overcome any other pandemic that may occur. The typology of this building is an office. An office building is an important typology in examining the unifying idea and theoretical premise of this project. The implicit premise of this project is to determine if architecture can influence the spread of viruses. This information is unified by the effect architecture has on the health of individuals in close proximity.

TYPOLOGICAL RESEARCH

ONE22ONE BUILDING

Case Study 01 | Downtown Nashville, Tennessee

FEDERAL CENTER SOUTH

Case Study 02 | Seattle, Washington

BULLITT CENTER

Case Study 03 | Seattle, Washington

CASE STUDY 01
ONE22ONE

Figure 01 | The ONE22ONE Building Render

SUMMARY:

TYPOLOGY: Office
LOCATION: 1221 Broadway, Nashville, Tennessee, 37203
PROJECT SIZE: 24 - Story, 365,000 square-foot project
ARCHITECT: Gresham, Smith and Partners

DISTINGUISHING CHARACTERISTICS

The 365,000 square-foot project has been making headlines for being the first new office building in Nashville to incorporate virus-mitigation features. The building will incoporate a number of health-related elements to ensure protection against viruses and other health concerns. The HVAC system is designed to allow each office floor to operate independently of other floors, eliminating the sharinig of air supply or return air between floors or tenants. This aids in stopping viruses from spreading throughout the building. The office tower offers a near touchless experience, everything from elevator dispatch to hands-free faucets, motion light sensors, a mobile parking app, and more. this means that employees will rarely have to touch anything beyond their own supplies and equipments. The emergency response plan includes thermal scanning in the building lobby to identify any individuals with excessive temperature entering the building, upgraded HVAC filters and enhanced cleaning protocols. Due to sophisticated design and elevated standards of health and wellness, ONE22ONE has potential to pursue a WELL v2 designation, the next version of the pioneering WELL building standard. The building is also pursuing LEED Certification.

Figure 02 | ONE22ONE Marketing

ENVIRONMENTAL/SOCIAL RESPONSE

This particular case study addresses both social and economic issues going on in the world currently. The goal of the ONE22ONE project is to stop the spread of viruses throughout the building while detecting them as they enter the front doors. This building has a special HVAC system that effectively manages the airflow of the building and each level individually. This building offers a near touchless experience that will also help with the COVID pandemic as well as any pandemics that will be in the future. The building offers dispatch elevators, as well as UV lighting and thermal imaging. This will allow more people to work in the office who are at a risk. This will allow its users to be more flexible about working in the office. This project is the future for businesses to flourish during the unusual times of a pandemic.

CASE STUDY 01
ONE22ONE

TYPICAL PARKING GARAGE FLOOR PLATE
2.8/1,000 SF Parking Ratio

KEY FEATURES
This parking garage has ample parking on 12 levels for tenants and guests. Floors 2-10 have above grade parking as well as 3 levels below grade for executive parking. The parking garage can be accessed through an app which is another feature for a near touchless experience. The parking is controlled and monitored by having planned out guest parking seperate from employee parking. The parking garage has more than enough space to allow visitors and guests.

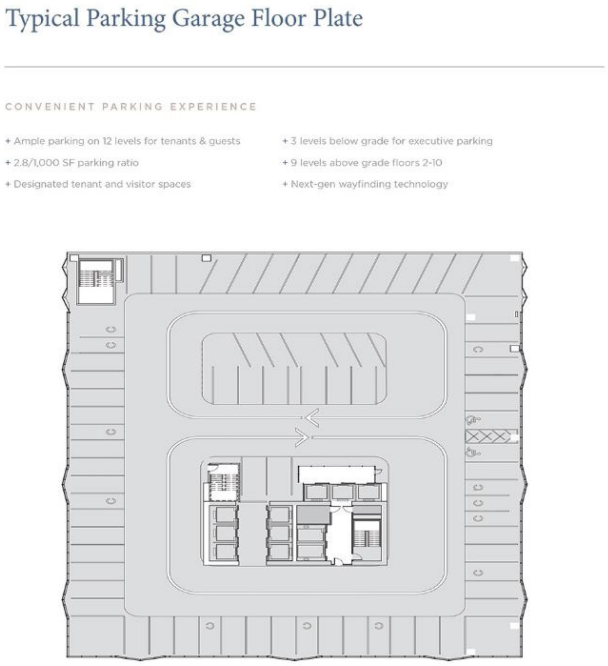


Figure 03 | The ONE22ONE Parking Garage Plan

TYPICAL OFFICE FLOOR PLATE
365,000 SF of Offices
26,000 SF floors plates

KEY FEATURES
The flexible office sace allows movement and collaboration within the work environment. Each level offers 360 degree views of downtown Nashville. There are 24 floors of offices that have floor-to-floor heights of 14' typical; 16' penthouse; and 18' amenity. It is built out of a concrete frame and curtainwall glass with floor to ceiling windows. In the core of the building is a 6 high speed destination dispatch elevators.

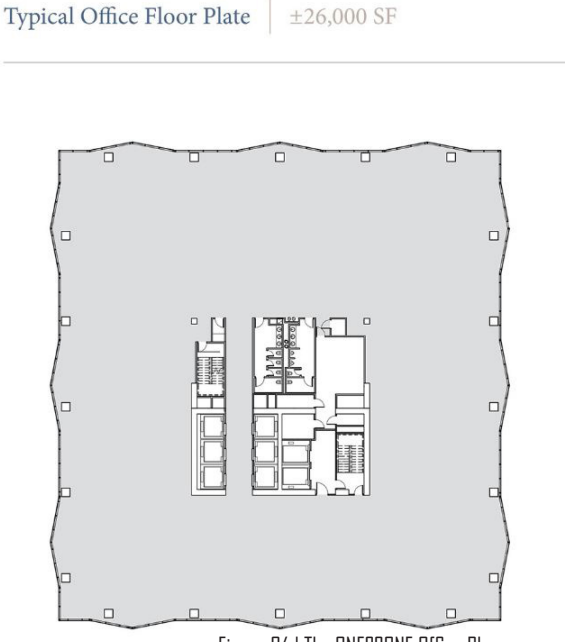


Figure 04 | The ONE22ONE Office Plan

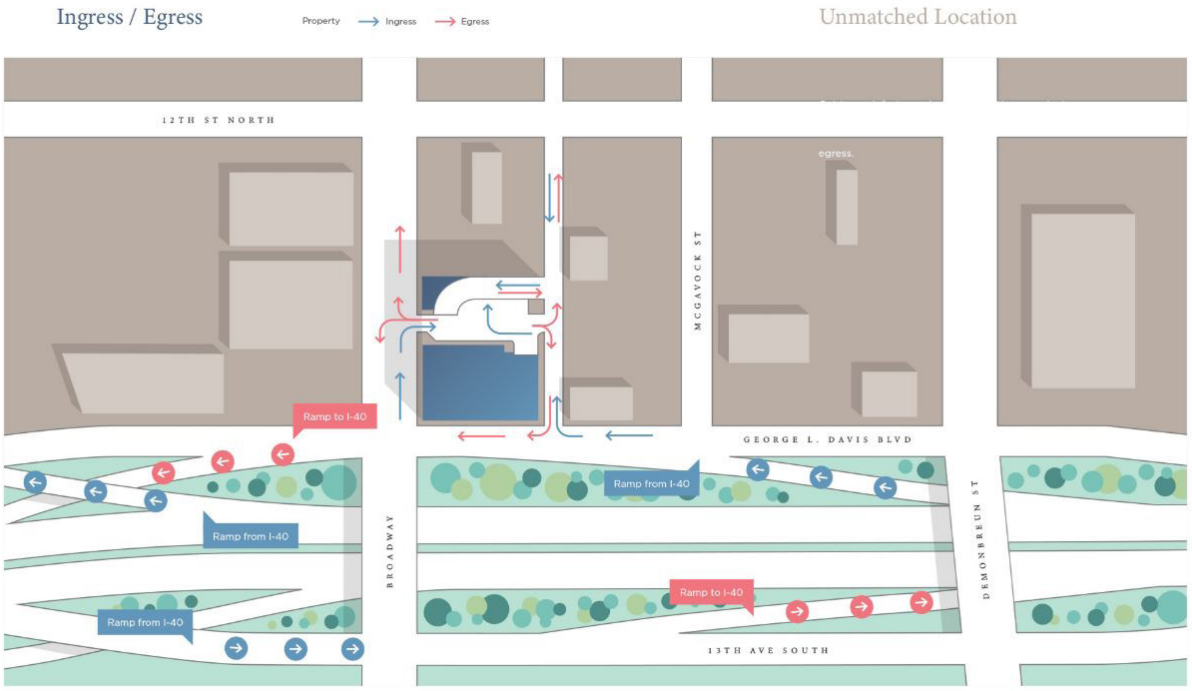


Figure 05 | The ONE22ONE Office Site Plan

PROGRAM ELEMENTS

Offering retail spaces from 1,625 SF to 13,992 SF, incuding second floor and two-story retail space, fine dining, a coffee shop, financial services, and more. The shaded amenity deck faces East towards downtown with high end luxury finishes. It offers an outdoor greenspace for everyday use and events on the open-air terrace. It includes games, a putting green, fire pits, wifi, and a bar area. The amenity deck also has an indoor/outdoor tenant skylounge with seating areas and tables. For health and wellness they added a spa quality fitness center with best-in-class equipment, fitness classes, and locker rooms with showers. ONE22ONE has a conference center that is dedicated shared conference space available for tenant use. All these spaces have panoramic views.

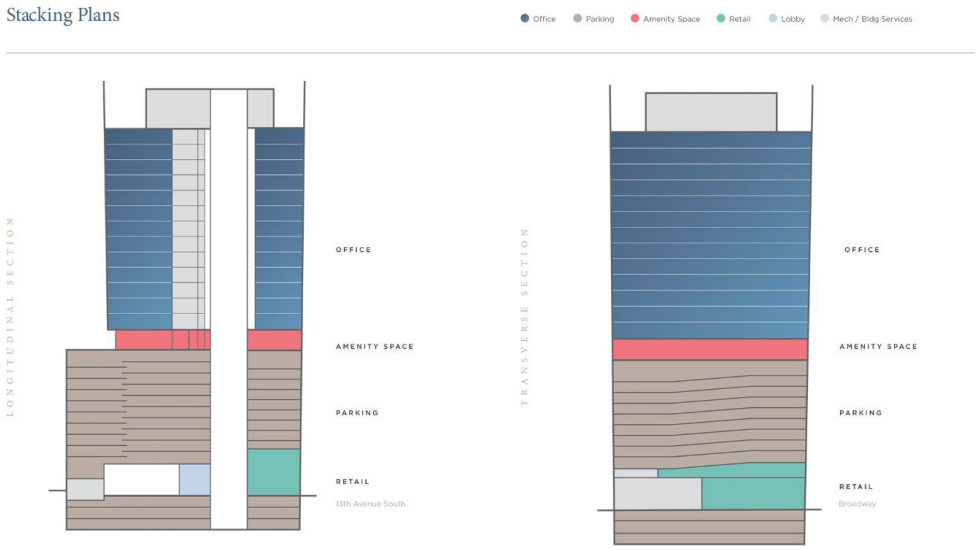


Figure 06 | The ONE22ONE Elevations

CASE STUDY 02
FEDERAL CENTER SOUTH

Figure 07 | The FCS Exterior View

SUMMARY:
TYPOLOGY: Office
LOCATION: Seattle, Washington
PROJECT SIZE: 3-Story, 209,000 square-foot project
ARCHITECT: ZGF Architects

DISTINGUISHING CHARACTERISTICS

The Federal Center South Building 1202 is a renovated warehouse turned into the northwest regional headquarters for the U.S. Corps of Engineers. The collaborative workplace environment is not the only prominent feature of the building which was re-designed with cost-effective and sustainability in mind. The building re-uses timber from the non-historical 1202 warehouse and employs active and passive systems. It is protected from the sun with its horizontal shades, vertical blades, and internal window coverings. Natural ventilation and daylighting are sufficiently suppied to the building's interior, which is also provided with rain water harvesting and a natural drainage system. The building has managed to achieve a Gold LEED certifcate, and it is currently one point below platinum,

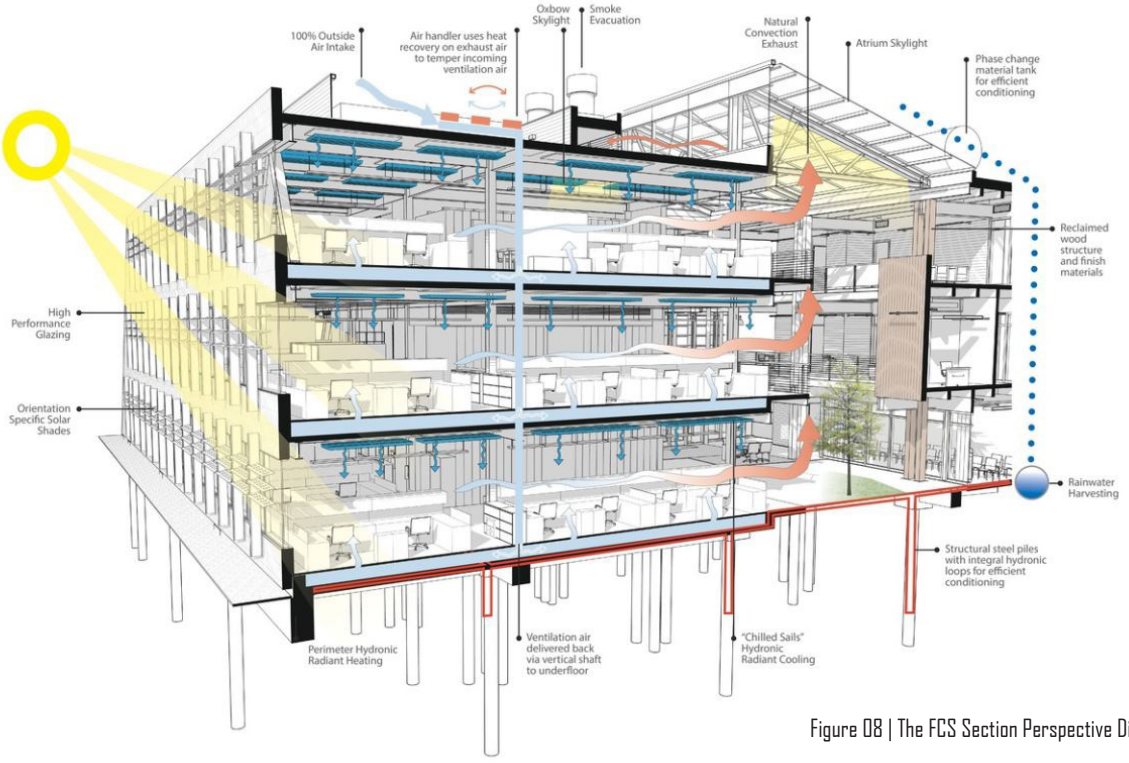


Figure 08 | The FCS Section Perspective Diagram

CASE STUDY 02
FEDERAL CENTER SOUTH

Figure 09 | The FCS Floor Plan

ENHANCING THE INTERIORS OF THE STRUCTURE

The massing of the building is an oxbow-shape plan that allows sunlight to reach the majority on the interior spaces, while limiting the western exposure that would drive up the solar heat gains. The workspaces are open to daylight and views while the landscape connects to the site. The exterior facades of the building with louvered openings allow natural light and ventilation in the corridors. The use of materials like timber, glass, and steel are used for more of a sustainable design. The individual offices and open-plan workspaces line the perimeter of the building, giving everyone plenty of exposure to daylight. To boost light levels, offices and conference rooms are located around a skylight, garden filled atrium. The internal atrium acts as a space of collaboration to the surrounding offices and creates good ambience to encourage working. The overall design has many sustainable features, the natural daylighting being an important one. Every major aspect of the building is designed to create a high-performance interior environment that establishes a new modern and sustainable workplace standard. At the same time, the project regenerates the site, breathing new life into the Federal Center South campus.

Figure 10 | The FCS Site Plan

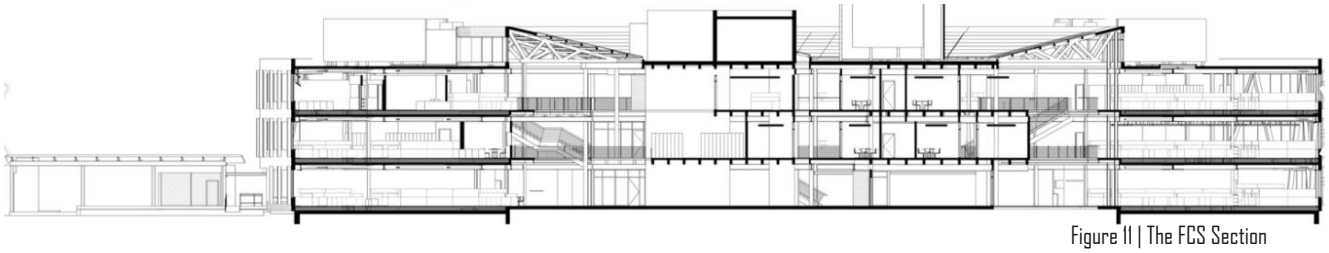


Figure 11 | The FCS Section

CASE STUDY 02
FEDERAL CENTER SOUTH

SUSTAINABLE DESIGN: The building features a complex system for storm water management and water savings. Rainwater collected from the building's rooftop is reused throughout the site. Taking shape around the Commons, a variety of open, closed and hybrid meeting spaces accommodate a wide range of work styles, providing maximum flexibility for different project needs, and appropriately allocate shared programmatic spaces such as conference and meeting areas. Driven by sustainable design and high-performance goals, the design integrates active and passive systems, materials, and strategies in new ways. Its optimized form, systems and building orientation will place Building 1202 within the top one percent of energy-efficient office buildings across the country. The building will earn an ENERGY STAR Score of 100 and comply with 2030 Challenge goals. The building has managed to achieve a Gold LEED certifcate, and it is currently one point below platinum, Every major aspect of the building is designed in direct response to creating a high performance building that establishes a new workplace standard. The project is one of the first in the region to use structural piles for geo-thermal heating and cooling, as well as a phase change thermal storage tank. Two new products, chilled sails and open office lighting, were developed and manufactured specifically for this project to help achieve aggressive energy targets. To optimize the use of the available reclaimed timbers, the team designed, tested, and constructed the first wood composite floor system in the United States.

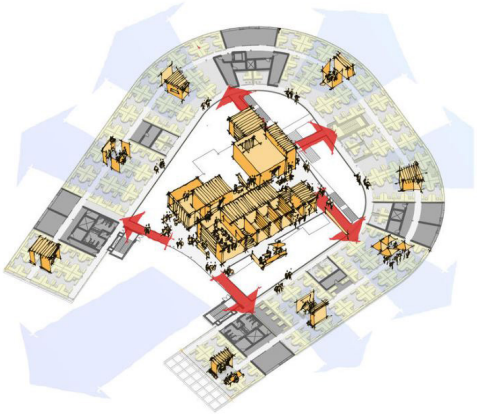


Figure 12 | FCS Views Diagram

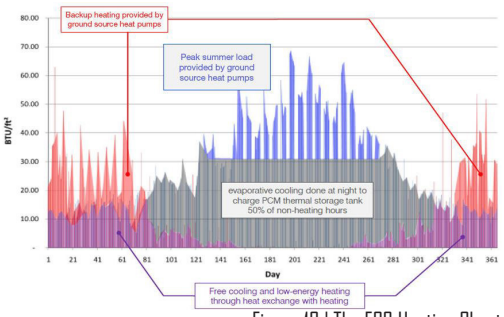


Figure 13 | The FCS Heating Chart

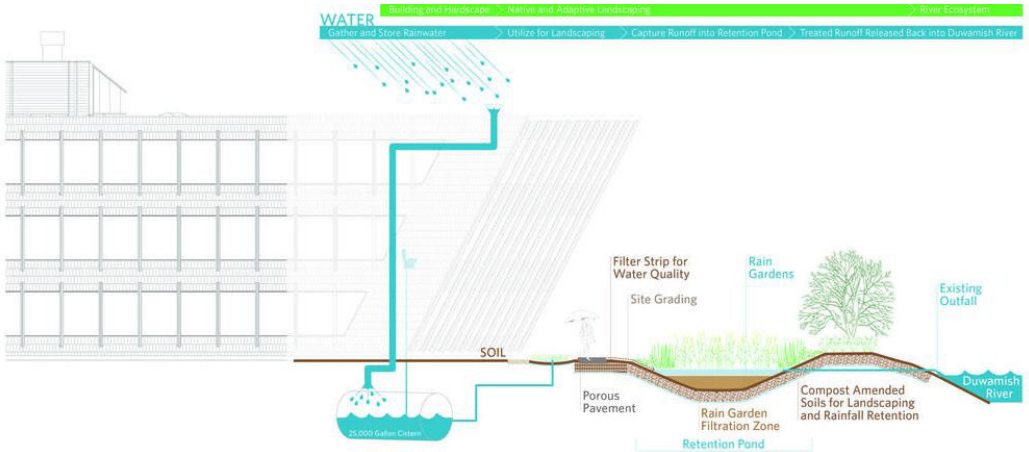


Figure 14 | FCS System for Storm Water Management and Water Savings

Figure 15 | The Bullitt Center Exterior View

CASE STUDY 03
BULLITT CENTER

SUMMARY:

TYPOLOGY: Office
LOCATION: Seattle, Washington
PROJECT SIZE: 6-Story, 50,000 SF Project
ARCHITECT: Miller Hull

DISTINGUISHING CHARACTERISTICS

Located in a dense urban neighborhood near downtown Seattle, the six-story Bullitt Center was the first commercial office building to be fully certified as a Living Building. The design team set out to create a building that would last at least 250 years, A lifespan closer to that of a tree. The trees of the Pacific Northwest served as the building's inspiration and its central metaphor. The building form consists of exposed structural wood beams and ceilings and a "canopy" of solar modules that still allow in plenty of light through the skylights. With health and wellness of occupants at the forefront, the team designed the building to provide all occupants with access to daylight and fresh air. An "irresistible staircase" serves as the main means of moving through the building, connecting tenants with views of the city and each other. As part of the project development, one of the surrounding streets was permanently closed, creating a pedestrian plaza between the building and a neighborhood pocket park called McGlivra Park. By cultivating an ecosystem of integrated indoor and outdoor spaces, the building has brought the block to life. The center is known as a "Living Building," meaning it uses less electricity than it produces. The building converts rainwater into drinkable water and also includes a bicycle garage with a repair and wash station, onsite composting toilets, and 26 geothermal wells that run 400 feet below surface level to help regulate building temperatures between the summer and winter months. From the 575 solar panels along the roof to an elevator that generates electricity by braking between floors, the list of environmentally friendly features is long.

Figure 16 | The Bullitt Center Roof

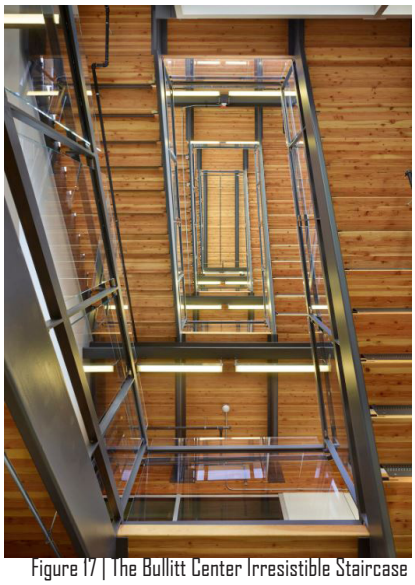


Figure 17 | The Bullitt Center Irresistible Staircase

CASE STUDY 03
BULLITT CENTER

ENVIRONMENTAL FEATURES

Air: The Bullitt Center relies on natural ventilation, with fully operable windows that allow the building to breathe in response to the weather. When the windows are open, breezes circulate through the spaces, connecting the occupants to the sounds and smells of the surrounding urban neighborhood. Serving as a transition space linking inside and outside, the irresistible staircase is not heated. Instead, it is ventilated with fresh air and maintains the same temperature as outside.

Natural Materials: The Bullitt Center is the first timber-framed structure to be permitted in Seattle since the 1920s. The exposed glu-lam structural members and wood ceilings, sourced from regional and FSC-certified forests, connect the occupants of the building to the great conifer forests of the Pacific Northwest, and the natural wood palette brings warmth and texture to this urban environment.

Views and Vistas: The building's long vertical windows create a strong connection to the outdoor environment, from street to sky. Most floors provide distant glimpses of Mount Rainier as well as close views of the nearby McGilvra Park. From within the building, people can enjoy a unique perspective, looking down on the green canopy of the urban forest with the geometry of high-rise buildings in the distance. The irresistible staircase frames views of downtown Seattle, connecting the building to the city and its region and compelling people up the flights to the final landing, where they are rewarded with expansive views framed by the overhanging solar canopy.

LIGHT AND SPACE

Natural Light: In a region prone to overcast winter days and rain, its important to allow as much natural light into the building as possible. On each floor, tall ceilings with large, full-height vertical windows allow light to penetrate deeply into the building, filling the spaces with bright and dynamically changing light. Workstations are open, allowing the light to spread throughout the offices. Natural light also fills the staircase, highlighting the warm wood tones of the stair treads. Throughout the building, the combination of natural light on wood grain connects people with the natural environment.

Spaciousness: Occupants experience spaciousness on different scales, depending on where they are in the building. With its soaring ceiling, the lobby is an airy volume grounded by cement columns. In the office environment, generous floor-to-ceiling heights and open layouts contribute to the feeling of spaciousness. Full-height windows invite light to bounce through the spaces. The staircase, composed of wood, steel, and transparent glass, functions as an outdoor room in an indoor space.

Light and Shadow: When the sun shines, stripes of sun and shadow move across the floor of the Bullitt Center, marking time and season and orienting people to place. When animated with light, the staircase becomes a functional sculpture. The stair treads filter incoming sunlight, casting diagonally patterned shadows on the walls and on the flights and floors below. As clouds gather and disperse, occupants experience the shifts of light and connect with outside conditions. The building's design breaks down the barriers between inside and outside. The walls can open up entirely, creating an open-air pavilion, and the verandas provide shaded spaces for people to gather, protected from sun and wind.

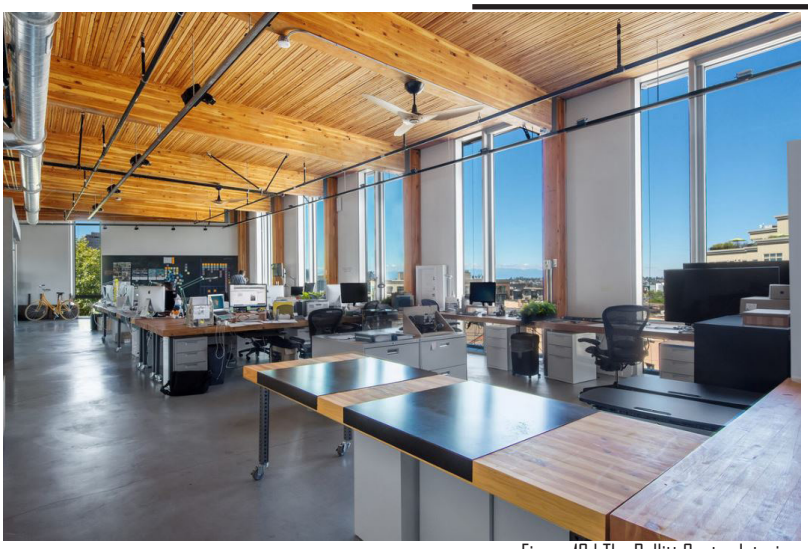


Figure 18 | The Bullitt Center Interior

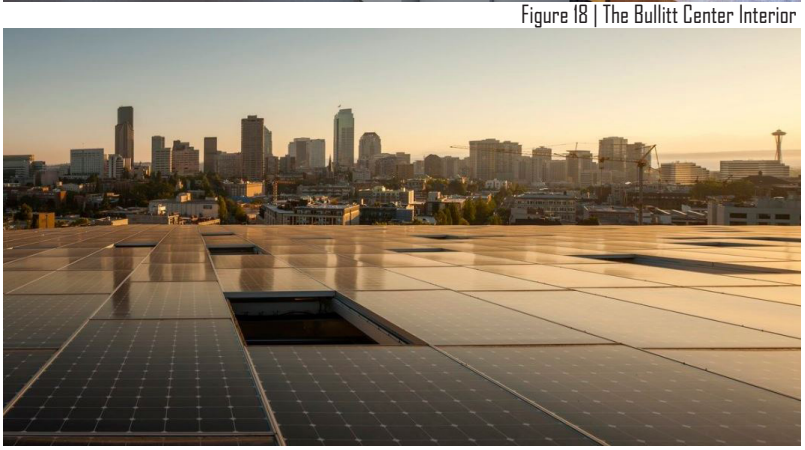


Figure 19 | The Bullitt Center Exterior Solar Roof

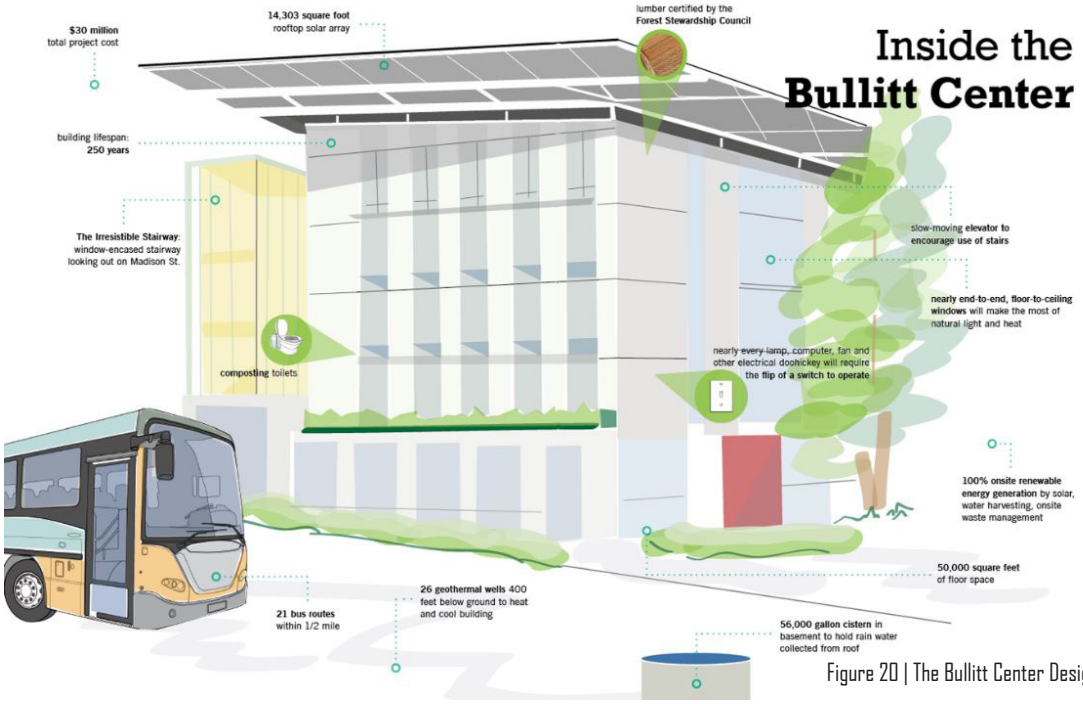


Figure 20 | The Bullitt Center Design Elements

TYPOLOGICAL SUMMARY

The reasoning for the choice of the three previous case studies mentioned, They were described in correspondence to the project's unifying concept. Each case study has elements that will be integrated into the improvement of work environment experience. Each case study has a particular element that can be implemented to contribute to this thesis project's final overall project. The first case study, The ONE220NE, was analyzed due to its typology and qualifications toward the WELL Building Standard. It emphasizes health in an office environment and the different concepts used to enhance the desirability to work and collaborate with others. Also, the buildings virus-mitigation features were analyzed in the work environment to investigate a near touchless experience. The HVAC system allows for each floor to be individually ventilated to improve air quality and slow down the spread of viruses. The second case study, The Federal Center South, was selected primarily because of its Active and Passive Systems. The thesis projet will incorporate sustainable design. This case study demonstrates natural ventilation and sunlight throughout the interior of the building. Every major aspect of the building is designed to create a high-performance interior environment that establishes a new modern and sustainable workplace standard. This case study is Gold LEED certified. The third case study, The Bullitt Center, was chosen within the case study analysis because of the environmental features. The Bullitt Center proved its status as the greenest commercial building in the world by becoming the first office building to earn Living Building certification, the most challenging benchmark of sustainability in the built environment. To earn the certification, the Bullitt Center demonstrated that it produces more electricity from solar panels on its roof than occupants use in a year. In addition, toxic chemicals were screened from all building materials and all wood was Forest Stewardship Council certified. Its occupants' human waste is composted and rainwater is captured for all uses, including drinking. To conclude the typological research to the thesis proposal, each element may be drawn and evaluated and combined to assist with the development of the final project. Each case study relates to the project's theoretical premise, each with its own inherent value of components and principles of design that will be included in the final product.

MAJOR PROJECT ELEMENTS

-Developing a strategy to counteract the statistic that during any given business day, 30 to 40 percent of the physical workspace is vacant due to distributed work practices.

- Flexible office space that allows users to socially distant and well as touchless concepts.

- Collaborative workspaces, private workspaces, outdoor space, restrooms, fitness room, lobby, conference rooms, multi tenant corridors.

-Workflow that is properly distributed throughout the office.

-LEED Certified elements that allow for daylight, clean energy flow, and energy savings.

-Near touchless experience.

- HVAC system that effectively manages the airflow of the building and each level individually.

-Green design throughout the building design.

-Extended Parking for users.

-Outdoor Space, flexible areas, strong integration of natural light.

-Public, private, and gender neutral bathrooms.

- Private, semi-private, and public spaces.

-Spaces for continuoud learning and education.

-Outdoor space for workers to enjoy lunch and breaks.

MAJOR PROJECT ELEMENTS

OFFICE BUILDING WITH A MAIN FOCUS ON HEALTH

-Materials throughout building will withstand more than regular cleaning

-UV light technology that will kill viruses over night

- Gym that allows people to workout during or after work hours

- Smaller collaboration spaces and conference rooms

- technology driven work spaces

- Breakrooms

CLIENT DESCRIPTION

An office typology in a project will require one main building or a layout that has one main office and a regional hub that supports it. The client and user base will be white-collar workers. The goal is to target people who work in larger companies. The design intention is to keep office buildings open and clear of all health risks that can be controlled in the work place.

The office space will be occupied by business professionals working in the built environment. While the design process and programing will dictate the placement of the office environment, it is intended to fit 150-300 users including business owners, associates, secrataries, and employees with the surrounding Minneapolis metropolitan area.

THE SITE

Minneapolis, MN
30 S. 3rd St, Minneapolis, MN 55414

Zoning: B4-1

REGION | MINNEAPOLIS | UNITED STATES OF AMERICA

Minneapolis–Saint Paul is a major metropolitan area built around the Mississippi, Minnesota and St. Croix rivers in east central Minnesota.The area is commonly known as the Twin Cities after its two largest cities, Minneapolis, the most populous city in the state, and its neighbor to the east Saint Paul, the state capital. Minneapolis, the state's most populous city, spreads out on a relatively level plain. Within its limits are 22 lakes and lagoons and around 170 parks. The city's riverfront is part of Mississippi National River and Recreation Area. Lake Minnetonka, 12 miles of irregular shoreline, is in the western suburban area; its outlet, Minnehaha Creek, flows eastward and then drops 53 feet over a bluff at Minnehaha Falls. The climate is cool temperate, with long, cold winters and warm summers. Minneapolis residents over the last 10 years have significantly increased, with 46,804 additional residents, a 12.2 percent increase since 2010. Minneapolis is the most populous city in Minnesota, and is known for high-rise office buildings and a vibrant nightlife.

Figure 21 | The Minneapolis Metropolitan Area

THE SITE

Minneapolis, MN
30 S. 3rd St, Minneapolis, MN 55414

Figure 22 | The 30 S. 3rd Street, Minneapolis Site

CITY | MINNEAPOLIS | CENTRAL BUSINESS DISTRICT

Zooming further into the region of the site, the location is within the Metropolitan area of Minneapolis. Also known as the "Twin Cities," Minneapolis is located just 10 miles from St. Paul, which is approximately a seventeen-minute drive. The economy of Minneapolis, MN employs 244 thousand people. The largest industries in Minneapolis, MN are Health Care & Social Assistance (38,110 people), Professional, Scientific, & Technical Services (29,817 people), and Educational Services (27,614 people), and the highest paying industries are Finance & Insurance ($75,967), Utilities ($73,308), and Professional, Scientific, & Technical Services ($68,430). With hundreds of thousands of people working out of Minneapolis, The need for cleaner, healthier, and safer businesses is a need. An office building people can go to knowing their experience is being taken very seriously as well as knowing the environment around them is doing its job to keep them healthy and driven to stay successful in the business world.

PROJECT EMPHASIS

The project emphasis is to create a safe and healthy work environment for its users. It will incorporate LEED certified building elements. The goal is to accomadate the office space for users who will work remote and in the office to keep businesses flourishing. Two types of offices spaces in the future will accomodate the designs to keep businesses running. They include main office buildings and regional office hubs. The new design of office space is critical in the business world as technology is constantly advancing and there is only so much that can be done at home. Social distancing is very important as well as allowing the spaces to maintain more cleanining than usual. The project will include a near touchless experience and will detect illness as it enters through the front doors. The project will save the use for office buildings during and or after global pandemics and as the world is shifting the need and want to work remote. The project will emphasize the integration of sustainable design.

PROJECT GOALS

The goal of the project is to gain knowledge from findings and case studies to get an understanding on how offices are going to look post pandemic. Most importantly, how they will succeed in staying open and allowing users to stay comfortable and healthy in an office setting.

Theoretical, physical, and social goals of the project

1. Physical: Create a document referencing the amenities, utilities, and elements that succesfully analyzes the design precedents to allow for a healthier, and more clean experience.

2. Theoretical: Answer the question, What is the future of offices? In a post-pandemic world.

3. Social: Establish the proposed office building as a building that can be useful for users even during a pandemic. A building people can use for technology and collaborate with others while still being socially distant if needed. A design that lets collaboration excel through people's work.

4. Social: Educate individuals on the importance of cleanliness in the work place as well as the importance to socially distance. Educate individuals on how to make an office suitable to use during a pandemic.

5. Theoretical: Learn about construction techniques of an office building and what goes into a building to make it a near touchless experience as well as learning design that improves air quality.

PLAN FOR PROCEEDING

Research Direction: The research areas that must be explored prior to solving the question issue proposed.

RESEARCH AREA	RESEARCH CONDUCTED
THE THEORETICAL PREMISE	Defining and understanding key terms related to health, illness, wellness, and the workplace. Collection of qualitative and quantitative data to obtain a basic understanding of the role that offices play in designing a safe and clean workspace that allows users to comfortably work.
PROJECT TYPOLOGY	Conducting case studies to understand how different design elements can enhance the work environment for its users.
SITE ANALYSIS	Physically visiting the site and recording observations through pictures and notes. Conducting GIS software analysis digitally to understand the technical composition of the site.
PROGRAMMIC REQUIREMENTS	Referring back the case study analysis conducted. analyzing the floor plans and section cut layout of the different spaces in relation to one another. Also, referring to the key design elements in each case study to identify successful solutions in the overall design.

PLAN FOR PROCEEDING

DEFINITION OF RESEARCH METHODOLOGY

The process used to arrive at a scientific research conclusion
1. Unifying Idea
2. Topic research leading to discovery of new ideas and tools to help you answer related questions
3. Testing of new ideas and tools
4. Formulation of your own design opinions
5. Formulate those opinions into a proposed intervention

DOCUMENTATION OF THE DESIGN PROCESS

DOCUMENTATION COMPILATION / Documentation creation

Medium for design investigation:	Software for Investigation:	Software for Representation:
Computer representation	Autodesk AutoCAD	Adobe Photoshop
Hand Sketching	Autodesk Revit	Adobe Illustrator
Hand Modeling		Adobe InDesign

Design Preservation Methods:
- Creation/investigation of representation
- Feedback from advisor(s)
- Research Material documented
- Computer files backed up weekly via Google Drive & external hard drive
- Thesis book updated weekly as per schedule
- Drawings/diagrams created upon acquisition in references section

Publication of Material:
Relevant material will be recorded & credited in final thesis book available:
- NDSU Institutional Repository
- Hard cover book format

PLAN FOR PROCEEDING

ENVISION

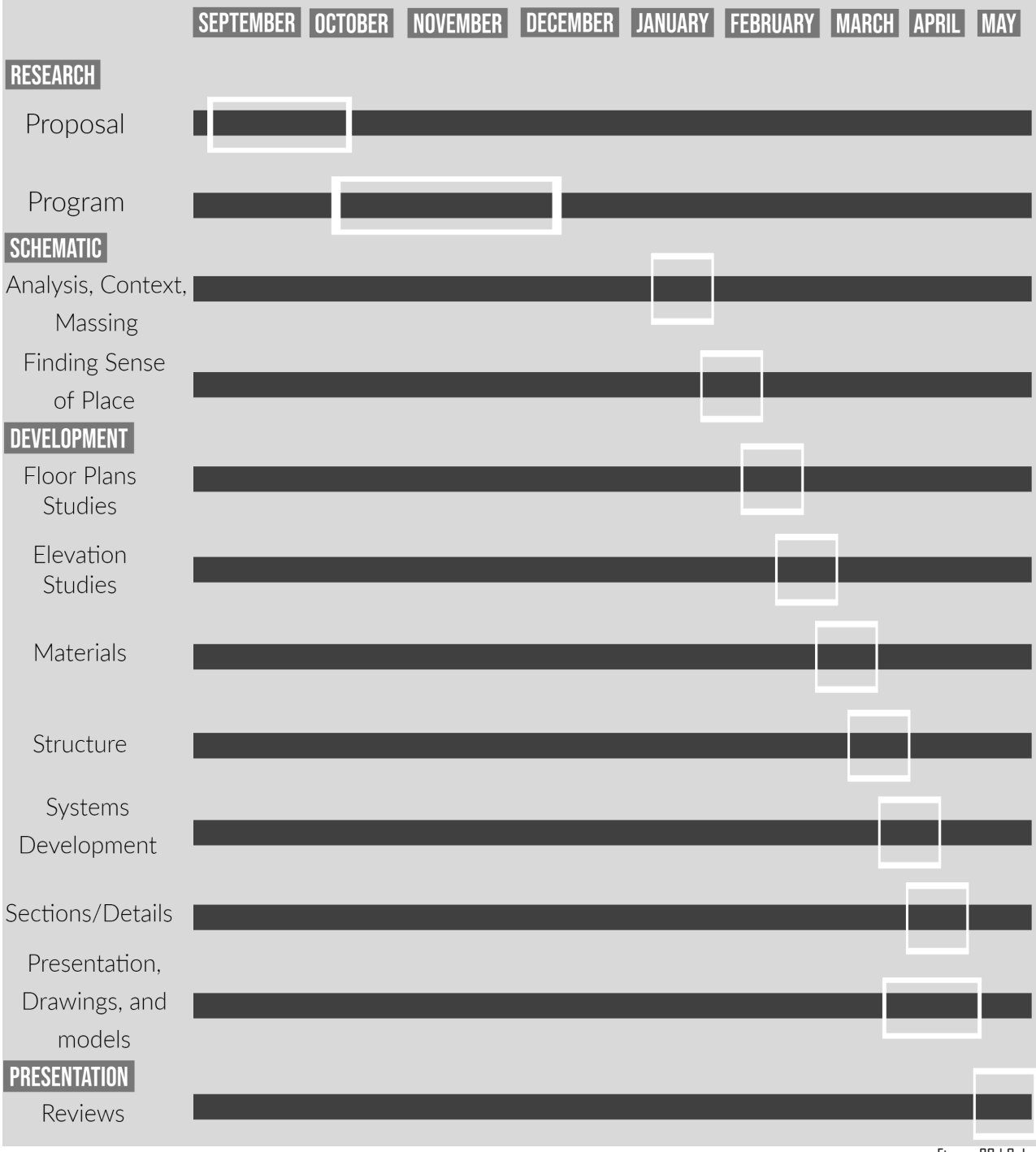


Figure 23 | Schedule

THE PROGRAM

UNIFYING IDEA RESULTS

To better grasp this projects unifying idea, three independent literature reviews were heavily dissected. The first, an article titled 'The Pandemic-Resilient Office Tower' examines architectural design strategies to create a "pandemic-resilient" building. In addition to integrating a range of steps to prevent the spread of disease, its capacity to flex between a normal and health-crisis modes is the design's defining characteristic. Under both situations, the building's operation is programmed and will aim to predict unknown stressors. The second literature is also an article review. The article titled 'Post-Pandemic HVAC System Strategies for High-Rise Office Buildings' goes into detail about how operational improvements in heating, ventilation, and air conditioning (HVAC) have been critical since the beginning of the pandemic to improve well-being and increase occupant comfort. These ASHRAE suggested moves (such as more external air, better filters), along with air cleaning technologies that can be easily applied to current systems such as Ultraviolet Germicidal Irradiation (UVGI) and Bipolar Ionization (BPI). The article poses the question; What if future high-rise buildings were built from the start to better respond to a pandemic? Lastly, is an article written by Peter J. Arsenault. His article titled 'Health-Conscious Construction' emphasizes that current conditions of COVID-19 spark a renewed emphasis on safety and wellness in buildings. He highlights what sustainability is in a post-pandemic world, and introduces contract documents for green design and construction. After reading this article, i now have a starting block of what it takes to have a building be LEED certified and what the world is looking for when it comes to a safer and healthier work environment durind and after a pandemic.

The results of research of my unifying idea has pushed me in the direction of designing spaces that can effectively transition from a normal to health-crisis modes. This will change the overall design of the spaces while maximizing the amount of occupants. The HVAC system design will be started from scratch which will allow me to come up an efficient way to reduce or prevent air mixing between floors and be configured for high-performance buildings. Having floor-by-floor HVAC systems will optimize ventilation effectiveness within the space. I will also provide Intelligent sensors that can provide air quality data, which is useful for both operators and occupants. The data can be collected into concrete metrics and shared with occupants with forward-thinking openness to provide them with insight into building operations and efficiency. I plan on using LEED certification guidelines throughout my design to allow for the most healthy and safe environment for its users.

LITERATURE REVIEW

Authors: Dan Kaplan and Sara Davis

About the Authors

Dan Kaplan, FAIA, LEED AP, is a Senior Partner at FXCollaborative. Kaplan serves in a design and leadership capacity for many of the firm's complex, award-winning projects. Adept at designing large-scale, high-performance buildings and urban designs, each project is approached with the mission of elevating and resonating with greater urban, cultural and climatic totality. The Allianz Tower (Istanbul), 1 Willoughby Square (New York), Fubon Financial Center (Fuzhou, China), and Eleven Times Square are notable projects (New York). Koplan holds a bachelor's or Architecture degree from Cornell University and in various US states he is a licensed architect.

Sara Davis, AIA, LEED GA, is a Senior Associate at FXCollaborative. With more than 15 years of experience with large mixed-use, commercial, and educational projects, Davis 'flexible yet rigorous problem-solving approach facilitates communication to advance a cohesive design program, while considering what the project goals are and how architecture and design can respond to wide-ranging environmental issues. For the 167,000 square-meter 3 Hudson Boulevard office building under construction in Manhattan, she currently serves as a Project Architect. Davis graduated from the Illinois Institute of Technology with a Master of Architecture degree and is a licensed architect in Illinois.

Article Abstract

This paper examines architectural design strategies to create a "Pandemic-Resilient Office Tower." In addition to integrating a range of steps to prevent the spread of disease, its capacity to flex between a normal and health-crisis modes is the design's defining characteristic. Under both situations, the building's operation is programmed and will aim to predict unknown stressors. In Manhattan's Hudson Yards, a proposed Class-A office building that features this approach is analyzed, including qualitative and quantitative considerations. Building entrance sequence, lobby layout vertical circulation, core design, wellness, and productivity aspects are considered, lessons learned and insights for further research are shared, and larger questions relating to a resilient design ethos and lessons for both health and climate crises are explored

Thesis statement

The future of offices is changing in front of our eyes and design that allows office to shift from normal to health-crisis is a must. The shift in design will allow office spaces to be occupied during a pandemic allowing it to be pandemic Resilient. This will allow offices spaces to become more physically and mentally healthier while stopping the spread of illness. We as architects need to think about the future of our workspaces and how they can adapt to be utilized during a health crisis.

LITERATURE REVIEW

Introduction

Our world has entered a new era of pandemic and epidemic risk. Prior to the COVID-19 pandemic, the number of similar outbreaks had been increasing. Now with COVID-19, we are expecting a human, social, and economic toll unprecedented in our lifetimes. In this new period of heightened risk, it is vital to re-examine conventional planning parameters for nearly the entire urban realm, including tall office buildings. Throughout history, high-rise office building design innovation has been driven by a single-minded pursuit of efficiency, which, critically, has generally been made assuming ideal conditions. However, as we are collectively discovering, the result is that our tall buildings are unable to function effectively under more challenging circumstances. Resiliency has gained a new-found urgency. To include pandemic and disease risk, this definition of resilient design urgently needs to be extended. Before the outbreak of COVID-19, the resilient architectural design focused on natural or man-made disaster, severe weather, fire, and adapting for longer term climate change. However, the pandemic has exposed the inadequacy of our built environment to mitigate disruption from extreme public health crises. A poor connection is high-rise office buildings, with their high concentrations of occupants in close quarters accessible by densely packed elevators. This presents a new dimension to the resilient design criteria: internal stressors (physical distancing) must be addressed in addition to anticipating external pressures (heat waves). A healthy re-examination of long-held planning criteria and design techniques is sparked by applying this extended concept of resilience.

Planning Principles for Pandemic-Resilient Design

For the successful performance of buildings, efficiency based on optimistic assumptions can be dangerous; a strategic dose of inefficiency is required. In response to health emergencies, the need to reconsider design standards for versatility and adaptability is evident. Not only is it necessary to implement a range of measures to prevent the spread of disease, but high-rise office buildings should also be able to flex between standard and physical distance modes readily. With this specific lens, we consider the following planning principles:

- Pinch point-free circulation
- Open office layouts for social distancing
- Enhanced vertical transportation
- Wellness and productivity
- Robust ventilation and filtration

Pinch Point-Free Lobbies

The Centers for Disease Control (CDC) has found that "limiting close face-to-face contact with others is the best way to reduce the spread of COVID-19." In addition to wearing masks, the organization suggests keeping the physical distance from individuals at least 6 feet away. Public spaces can tolerate increased physical distance between users during a health crisis, three to four times what is natural, when considering pandemic adaptability. A one-way circulation pattern from the building entrance to the elevator entrance can be produced to facilitate enough occupant spacing and orderly flow, with an adaptable area for health screening prior to entering the elevator lobby. Larger building lobbies facilitate and promote the free movement of pinch

points, avoiding small cross-traffic intersections. Reducing or eliminating touch points throughout public spaces should also be implemented by including touch-free security turnstiles, elevator controls, and automatic doors at building entrances.

Elevator Lobbies

A crucial component of pinch point-free planning is elevator lobbies. Enlarging the elevator lobbies from regular 10 feet to 18 feet, combined with single-loaded elevator banks, allows for one-way, physically distanced circulation during pandemic mode at the entry level. In non-pandemic mode, this configuration results in more gracious entry experience and room for future programming (kiosks, furniture, artwork, etc.). The additional width may initially seem to be inefficient on typical office floors. However, it allows for a broader variety of uses and configurations in what is normally a restricted area of the core. The wider space will handle functions such as reception areas or meeting rooms more appropriately, instead of the awkward and narrow spaces left between the elevators. Restrooms are mostly situated between elevator banks on bypass levels, an the more spacious width provides much greater flexibility in restroom planning.

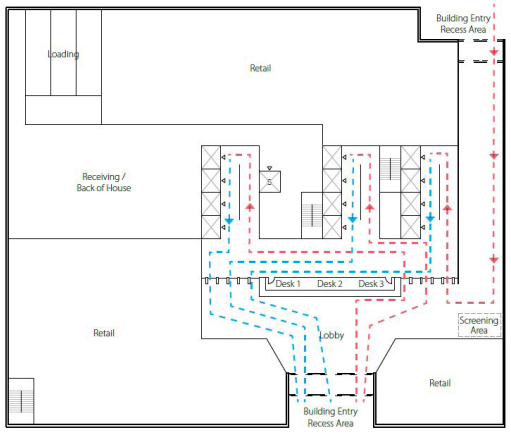


Figure 2. Lobby floor plan from a case study of a Manhattan office building designed for physical distancing, showing one-way circulation systems. © FXCollaborative

Figure 24 | Elevator Lobby Plan

Restroom Planning

Restroom designs should also allow physical distancing, be free of pinch points, and incorporate touchless devices in compliance with the planning principles for public spaces, and configurations should allow one-way or oversized entry. Both, as well as the possibility for single-user individual restrooms, are allowed by the more generous width between elevators. In addition to the appeal of privacy and separation under normal circumstances, in a health crisis, individual restrooms may provide enhanced measures. Full-height partitions between occupants provide the opportunity for individual ventilation and filtration, and the individual cabin also allows for installation of UV lighting for sterilization when occupied. In all cases, touch points throughout restrooms can be reduced or eliminated by using automatic or doorless restroom entries and touch-free plumbing fixtures.

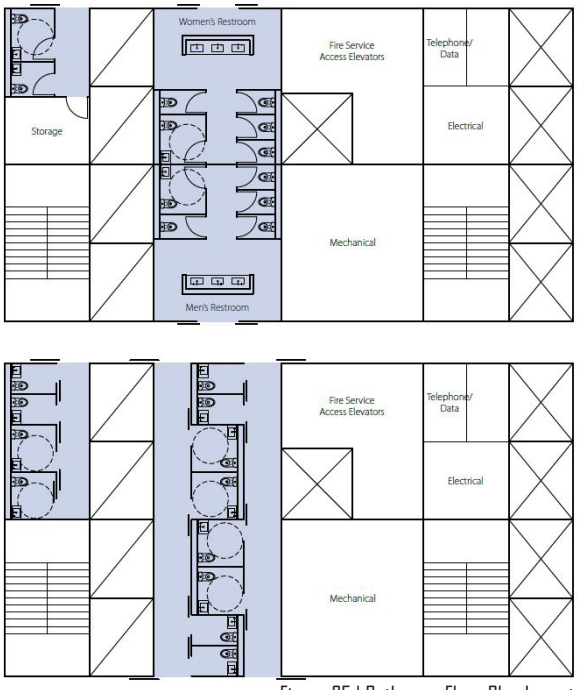


Figure 25 | Bathroom Floor Plan Layouts

LITERATURE REVIEW

Efficiency and Resiliency

Design considerations for pandemic resiliency do not necessarily result in a significant loss of occupancy. The tenant fit out, with properly selected systems furniture, will allow for full, continuous occupancy during a health crisis that demands social distancing. The next challenge is moving occupants vertically to and from each office floor.

Vertical Transportation

The capacity of regular elevator cabs is greatly reduced to comply with pandemic-related physical distance guidelines. Cabs that were designed to accommodate 16 passengers in ideal conditions can now only accommodate 4 occupants. It is only advantageous to achieve resiliency-built office floors with only 14 percent reduction in occupancy if there are also upgrades to the elevator system. Programmable, advanced dispatch control systems are commonly incorporated into current high-rise designs and are a beneficial first step to aid in responsive and effective elevator performance. In addition, oversized elevator cabs (with capacity of 4,000 pounds) allow for additional space between occupants during health crisis periods and support planning principles for pinch point-free design. Advancements in elevator systems design are also evolving and emerging. Thyssenkrupp's twin system allows for two elevators travel independently in the same elevator shafts and with careful study, can increase capacity up to 40 percent. Advances such as this, along with larger cabs, would allow the vertical transportation system to function in pandemic mode with normal wait times in the range of 45 to 50 percent of peak capacity, far greater than the 25 to 30 percent that existing systems can handle. Encouraging the use of egress stairs as communicating stairs is another strategy for resiliency. This helps reduce the occupant load on the elevator system when physical distancing is required, contributes to wellness and productivity of occupants, and reduces energy consumption. To encourage the use of egress stairs, adequate space must be provided for circulation with oversized egress stair width.

Conclusion/Review

When it comes to my design, I will incorporate the planning principles for pandemic resiliency into my design. The pinch point-free lobbies, elevator lobbies, restroom planning, open office layouts for social distancing, efficiency and resiliency, and vertical transportation is a base for starting the design process. It is important to think of all the spaces and how they will be changed because of the way our world is evolving. These topics are crucial when it comes to designing the floor plans of the building. These design solutions will effectively allow my design to adapt from a current office building to a health-crisis mode that allows all its occupants to work through a pandemic. All these topics needs to be considered for my final design.

LITERATURE REVIEW

Post-Pandemic HVAC Systems Strategies for High-Rise Office Buildings

Authors: Mehdi Jalayerian, Tyler Jensen, Kenneth Griffin

About the Authors

Mehdi Jalayerian is Managing Directing at ESD. His expertise spans three decades of work in iconic tall, public assembly and institutional buildings include the world's first positive-energy large-scale building and the world's next tallest building. He is a frequent speaker on integrated building systems design and is a major contributing author to the ASHRAE Design Guide for Tall, Supertall and Megatall Building Systems. He holds a Master's degree in Mechanical Engineering from the University of Kansas and is a licensed professional engineer in 14 states

Tyler Jensen is a Studio Leader is ESD's High Performance Buildings group. He has broad experience across a variety of markets, with a focus on new construction, tall buildings, infrastructure, large commercial interiors, and repositioning projects. He holds a Bachelor of Science and Master of Science Mechanical Engineering degrees from Washington University in St. Louis and is a licensed professional engineer in Illinois.

Kenneth Griffin is an architect and Master of Building Science through his education, with 13 years of professional work experience in building energy performance analysis and building science. He has worked on numerous analytical projects, including envelope optimization, daylighting analysis, parametric analysis, HVAC optimization, thermal comfort analysis, net-zero buildings, existing building retrofits, building integrated renewable technology, climate analysis, code compliance, LEED energy modeling, and urban-scale energy analysis.

Article Abstract

The effect on construction design and strategy of the COVID-19 pandemic would be as groundbreaking as the emergence of the first skyscraper. The design strategy and methods for high-rise office buildings have been changed forever by COVID-19 and possible future pandemics. Operational improvements in heating, ventilation, and air conditioning (HVAC) have been critical since the beginning of the pandemic to improve well-being and increase occupant comfort. These ASHRAE suggested moves (such as more external air, better filters), along with air cleaning technologies that can be easily applied to current systems such as Ultraviolet Germicidal Irradiation (UVGI) and Bipolar Ionization (BPI). But what if future high-rise buildings were built from the start to better respond to a pandemic? Going forward, mechanical systems that reduce or prevent air mixing between floors should be configured for high-performance buildings. They should optimize ventilation effectiveness within the space. Intelligent sensors can provide air quality data, which is useful for both operators and occupants. The data can be collected into concrete metrics and shared with occupants with forward-thinking openness to provide them with insight into building operations and efficiency.

LITERATURE REVIEW

Thesis Statement

As 2020 dawned, it was not on the radar of developers, engineers, architects, or anyone else in the building industry to consider drastically changing the way we currently design HVAC systems. This is subject number one today.

Introduction

Building owners and operators are using the tools available to them to adapt to the current pandemic and are implementing organizational improvements that go together with the requirements of the pandemic. Extending the limits of existing HVAC systems, owners and operators are increasing the use of outside air when conditions allow, running the systems before and after occupancy for longer periods to flush the building, and updating mechanical filters when possible. In the long term, future high rises, system designs, and other practices are poised to change dramatically. While it is too late to alter the HVAC design of an existing building, now is the time to reconsider how new buildings can comply with future pandemics. Right now, is the time to be prepare for the next pandemic.

HVAC Guidelines

Today, primary disease prevention techniques consist of social distancing, wearing masks, keeping sick people out of buildings, cleaning interior spaces, and maintaining good hygiene. Many proactive building owners and operators are looking for ways to further help mitigate the risk of virus spread and are turning to their HVAC systems more and more. This is very important as evidence has proved that airborne transmission of COVID-19 is possible, especially in spaces with poor ventilation and filtration. The American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), the predominant HVAC professional association, has published guidelines for the pandemic. HVAC systems can change operation by diluting the indoor air with more fresh ventilation air and cleaning the indoor air via filtration media. More specifically, ASHRAE guidance for office buildings (ASHRAE 2020) includes advice such as:

- When outdoor temperatures allow, increase the overall ventilation by going to partial air economizer mode to increase outside air delivery and reduce recirculation.
- Disable any demand-control ventilation (DCV) sequences that would otherwise reduce ventilation air for increased energy efficiency.
- Increase hours of operation of systems before and after typical occupancy to flush the space, and to provide additional time for ventilation dilution.
- Upgrade and improve existing filtration media. Minimum Efficiency Reporting Value (MERV) 13 minimum is recommended, and MERV 14 or 15 is even better. High-Efficiency Particulate Air

(HEPA) filtration is not feasible in typical commercial air handling systems and isn't necessary for tall office buildings.

Beyond disease mitigation, many building operators have yet to focus on the challenges of having low occupancy in buildings, especially during the cold winter months, as many office workers continue to work from home.

LITERATURE REVIEW

Retrofit Opportunities

What else can be done in existing tall office buildings, in addition to ASHRAE-recommended improvements, to boost air quality and provide occupants with comfort when they return to the office? Reconfiguration of the wholesale HVAC system is not necessary but upgraded filters and specialized air cleaning systems can be readily retrofitted to existing systems. The effectiveness of air filters is characterized by MERV ratings, with higher-rated filters capable of capturing a larger percentage of particles and capable of smaller particles. Recent ASHRAE test results verified that air filters that have been properly engineered are highly successful in eliminating airborne viruses. Filter MERV 5, usually used for residential applications, captured approximately 30 percent of airborne particles in the test, while MERV 13 filters captured approximately 90 percent of airborne particles. For high performance office space, MERV 13 is the minimum suggested, with the potential for MERV 14 or MERV 15 for even better virus removal. But higher performance comes with an additional pressure drop for the supply fans and higher energy consumption. Depending on the existing system capabilities, supply-fan and motor upgrades may be needed. Further advantages can be provided by advanced air cleaning systems. Ultraviolet Germicidal Irradiation (UGVI) and Bipolar Ionization are two such air-cleaning technologies that can be readily applied to existing systems. These may help minimize airborne exposure and can decrease the transmission of diseases, although neither can be considered 100 percent effective. Both technologies can be reasonably cost effectively retrofitted to existing air handling systems.

Changes ahead for Air-Handling Systems

Typically, a high-rise building requires either a centralized or decentralized arrangement of the air handling systems. A centralized system supplies several floors with ventilation and air conditioning. Dedicated or direct outside air, as well as a relief/exhaust air system, will be used in a decentralized system structure which will restrict the recirculation of air to each floor.

Traditionally, many tall office buildings have utilized central air-handling systems with dedicated mechanical floors incorporating large, built-up systems that serve groups of 20 to 30 floors. This approach reduces the mechanical footprint on tenant floors, centralizes maintenance, and delivers good energy performance with a cost-efficient HVAC system. High performing buildings of the future should be designed to address shifting demands—with the flexibility to efficiently respond to future pandemics, and with HVAC systems that prioritize occupant health and wellness. To achieve these goals, high-performing buildings should be configured with mechanical systems that minimize or eliminate air mixing between floors. They should optimize ventilation effectiveness within the space, maximize fresh air volume and provide economizer/purge capability. They should consider air delivery schemes that reduce local air mixing within the space. Two configurations look to have the best odds of achieving success. The decentralized floor-by-floor AHUs eliminate air recirculation between floors and still enable air economizer/purge capability. They also provide the most rentable square footage compared to other options. Underfloor air distribution increases the number of space air changes per hour (ACH), while enabling air economizer/purge capability during greater number of hours per year; significantly increases space ventilation effectiveness, with a single-pass airflow from floor to ceiling; and minimizes local air mixing compared to the traditional overhead mixing system. Also, with so much uncertainty in the word, versatility is increasingly necessary. Floor-by-floor systems allow single tenants and single floors

the best versatility to independently run their systems. Depending on individual tenant requirements, ventilation, filtration, and advanced air cleaning upgrades may be incorporated flexibly. Floor-by-floor systems will be best positioned to respond and adapt to unknown future requirements.

Conclusion/Review

For all occupants of high-rise office buildings, the COVID-19 pandemic has highlighted the value of HVAC systems and indoor air quality. Because of the pandemic, the way people live, and work will still be modified, and office buildings will need to adapt in order to prioritize tenant's health, safety, and well-being. Intelligent air quality sensors can continuously measure, verify, and provide visibility into a tall building's air quality status. In the increasingly connected world, intelligent sensors can provide air quality data that is useful for both operators and occupants. With forward-thinking transparency, the data can be compiled into meaningful metrics and shared with occupants to give them insight into building operations and performance. By continuously optimizing IAQ and providing full transparency to the occupants, this approach will raise the standard for commercial office buildings and push tall building design to a higher level that can meet and exceed the demands of a post-pandemic workforce. When it comes to designing my building the HVAC system is a key component of the building I need to focus on. This article highlighted the importance of a floor-to-floor ventilation system. The HVAC system will start from new construction which will allow me to have a fresh new design rather than trying to retrofit. Full transparency is a must for users as I will incorporate that into my building to allow for more comfort and physical well-being.

LITERATURE REVIEW

Health-Conscious Construction

Author: Peter J. Arsenault, FAIA, NCARB, LEED AP

'Current conditions spark a renewed emphasis on safety and wellness in buildings'

Sustainability in a Post-Pandemic World

Green and sustainable design has always been interconnected in such a way that it reflects on what is beneficial for both the world and the people who work there. The pandemic of COVID-19 has brought a renewed attention on activities that keep people safe and encourage well-being. At the top of this argument, the U.S. The Green Building Council (USGBC) has taken an initiative focused on the idea that the best way to rebuild a sustainable economy is to have healthy individuals in healthy areas.

Economic Recovery

The Leadership in Energy and Environmental Design (LEED) program of the USGBC is the most commonly used green building ranking system in the world and facilitates the use of strategies that reduce the impact on the environment, improve human health and foster economic growth. USGBC President and CEO Mahesh Ramanujam recently commented, "USGBC and its thousands of member organizations are focused on getting the economy back on track and demonstrating that we can provide a foundation that supports individuals, companies and communities." Several concrete strategies have therefore been introduced by USGBC. The first is to introduce new public health-support LEED pilot credits. In order to advise and help USGBC's CEO on how the organisation, its services, and the building and construction industries should prioritize sustainability in a post-pandemic environment, USGBC will create regional CEO Advisory Councils. In order to help solve social, health and economic disparity within populations, the organization is also speeding up the introduction of its USGBC Equity program. There are also other measures, including a call for proposals, an adapted LEED certification review process and the release of education reports on best practice to help people re-enter their spaces.

LEED for Buildings

USGBC has released four new Safety-First Pilot Credits that align with public health and industry guidelines. These credits are available to all LEED 2009, LEED v4 and LEED v4.1 project as follows:

- The Safety First: Cleaning and Disinfecting Your Space credit requires facilities to create a policy and implement procedures that follow green cleaning best practices to support a healthy indoor environment and worker safety. Procedures and training for cleaning personnel, occupant education and other services are also required.
- The Safety First: Reenter Your Workspace credit is a tool to assess and plan for reentry, as well as measure progress once a space is occupied. It aligns with the American Institute of Architects (AIA) Re-occupancy Assessment Tool and requires transparent reporting and evaluation of decisions to **encourage continuous** improvement.

• The Safety First: Building Water System Recommissioning credit helps building teams reduce the risk that occupants are exposed to degraded water quality. The credit integrates recommendations from industry organizations and experts, including the U.S. Environmental Protection Agency and Centers for Disease Control and Prevention.
• The Safety First: Managing Indoor Air Quality During COVID-19 credit builds upon existing indoor air quality requirements and credits within LEED. Building teams should ensure indoor air quality systems are operating as designed and determine temporary adjustments to ventilation that may minimize the spread of COVID-19 through the air.

Contract Documents for Green Design & Construction

By using construction contracts that detail the procedures required to implement a sustainable project, design and development can be standardized. Sustainable Projects contract documents are offered for this reason by the American Institute of Architects (AIA). These exhibits and operation scopes are attached to prime contracts and guarantees for many methods of project delivery. Regardless of the delivery method used, these documents guide the parties to the sustainable project through a meeting, which should take place as early as possible during the design process, during which project participants discuss the project's sustainable design features. The architect or consultant creates a sustainability plan for the approval of the owner after the workshop that outlines the sustainable steps that are required to achieve the sustainable target. The sustainability plan assigns responsibility to a project participant for each sustainable measure, such as a particular design or building feature, or a post-occupancy usage, service, maintenance or monitoring requirement. In addition, the sustainability plan outlines the sustainability documentation responsibilities required for the project, implementation plans to achieve the sustainable target, and design reviews, tests or metrics to validate the achievement of each sustainable measure.

Conclusion/Review

This article emphasizes that current conditions of COVID-19 spark a renewed emphasis on safety and wellness in buildings. It goes on to highlight what sustainability is in a post-pandemic world, and introduces contract documents for green design and construction. After reading this article, i now have a starting block of what it takes to have a building be LEED certified and what the world is looking for when it comes to a safer and healthier work environment durind and after a pandemic. When it comes to the spaces in my building, i believe listening to the CDC guidelines and personal guidelines will aid me in coming up with a standardized design and development of each space.

PROJECT JUSTIFICATION

OVERVIEW

This project is justified as a valid thesis topic because it provides a new outlook to a healthier and safer workspace for the near future. The future of office work is in a hurry for a solution that is fast, efficient, and long lasting. Offices need spaces that allows individuals to comfortably access work without thinking about the spread of any germ and allowing themselves to be socially distant. The world is looking at its work environment from a different standpoint. Technology is going to accelerate in the business world through the fundamental shifts of the effects of the COVID pandemic. A near touchless experience that can detect illness as it enters the front doors will positively impact the experience and health of its users. With most of the world working remote during the height of the pandemic it has raised the questions; How much work can be done remote versus in an office building? How can the world prepare for people to come back into the workplace? Crafting a basis of a new design solutions for offices and its users has the potential to create better office space environments for all its users to thrive and better their everyday wellness.

PERSONAL JUSTIFICATION

This project topic is defined as important to me personally because both physical and mental wellness, as well as work have been the center of my focus for years now. For a person to succeed in everyday life, all aspects of health are critical, and personal experiences have contributed to the awareness that a healthy mind allows for a healthy body and spirit. Specifically, my thesis focuses on improving workspaces to improve wellbeing and avoid the spread of viruses/illness. The primary reason for selecting this subject is because I have personal experience coping with the consequences of COVID and changes in the work setting. Both positive and negative. It is important to express this project at this stage of academic growth because it allows for comprehensive research and design to identify and highlight the last five years in completion of a master's degree. This project illustrates the level of skill and implementation of what has been previously studied, and how personal analysis and design can take shape as architecture-related new knowledge is learned. In addition, it illustrates the expertise behind various architectural principles, material usage, writing skills and the ability to nurture the process of research and design from beginning to end.

A comprehensive project involves extensive research on a variety of data concerning a specific topic. This research extends my awareness of the value of codes, office standards, physical health, and current and emerging initiatives to stop the spread of viruses/illness in office buildings. With that the knowledge base behind concepts that I have not thoroughly learned or read about in the past is expanding. Through the continuous development of skills in computer programs such as Revit, the Adobe Creative Suite, and rendering platforms, this project can lead to a variety of skills in many ways. It also adds collaboration, studio, work efficiency, and time management to physical skills. This project would also build consistency and an adequate work ethic to succeed as a better student and potential employee overall.

PROJECT JUSTIFICATION

ECONOMIC JUSTIFICATION

Offices are strength in good and bad times. A significant market share of the overall employment pool is held by office-sector jobs, which contributes to the influence of buildings. As this is changing because of COVID, there is still a need for office space and can be more technology driven. According to an independent study coordinated by BOMA, annual expenditure is a feature of the inventory of office space, which continues to develop in competitive markets in response to the change of the economy from good-producing jobs to services-producing jobs, as well as the general expansion of the economy. Spending associated with office construction operations is not as unpredictably responsive as other categories, such as manufacturing, construction, and retail trade, even in a declining economy or during recessions. As these expenditures cycle through the local, state and national economies, they generate additional economic activity, promote substantial direct and indirect job growth and generate new personal earnings that provide additional stimulus. Commercial real contributes greatly to the local, state, and U.S. economies Our industry has a history of weathering downturns from the Great Depression to the Great Recession. The materials and skills needed to develop a technology-driven building through research and a near-touchless experience that can detect illness when it approaches the front doors would require a much greater amount of money. These elements include buildings with more air flow control, windows/glazing, and individual levels that can control air flow. Note, however that this is a theoretical project that focuses on discovering the most efficient architecture for people in the workplace to create the best experience, and cost should outweigh the wellbeing of its users. We're going to continue being the place where America goes to work.

FUTURE JUSTIFICATION

The future of the office design will consist of a LEED certified building that is driven by technology that helps its users stay safe and out of harm's way. This is important with business going forward with the effects of COVID being the leading example of what can happen to buildings that aren't prepared to withstand the spread of illness. This project can be used in any location in the world. The special aspect of the future of this project is that it will constantly being added to and evolve as technology and needs of its users are always evolving. The design of the world's workspace is changing, and it is changing for the better. The world needs to find a sustainable and efficient solution so that we can flourish through the difficult times. With the building being environmentally friendly it will be another example of how the future of our workspaces should be transforming. I believe this project is both imperative and an option as working remote is becoming more commonly known.

PERFORMANCE CRITERIA

ACCESSIBLE DURING A PANDEMIC

The programmic elements will showcase a pandemic proof building that will offer a near touchless experience while stopping the spread of illness in all of the spaces throughout the building. Certain criteria in spacial layout must be met to provide user comfort for all of the buildings users. For instance, during a pandemic the building will be shifted into social distance mode and the building will be an invironment that not everyone is familiar with or people may not feel as safe from illness. An experience that allows users to be fully transparent with the building and its HVAC system will allow a certain feeling of comfort that is needed. Offices, private space, public space, and flexible learning areas will be strategically placed to allow for social distancing when needed.

Greenspace has been dispersed throughout the project. This allows for greenspaces to have different uses throughout the building in both public and private spaces. This provides comfort for the buildings users, and easily-accessible green areas for the community as well.

The diagram below shows the circulatory relationships between each project element. The solid line shows the immediate connection between spaces and the dashed line shows the adjacent connection between each space. These spaces will be used together to create a healthy office environment for all of it users while fulfilling all of the buildings need to be a successful office building.

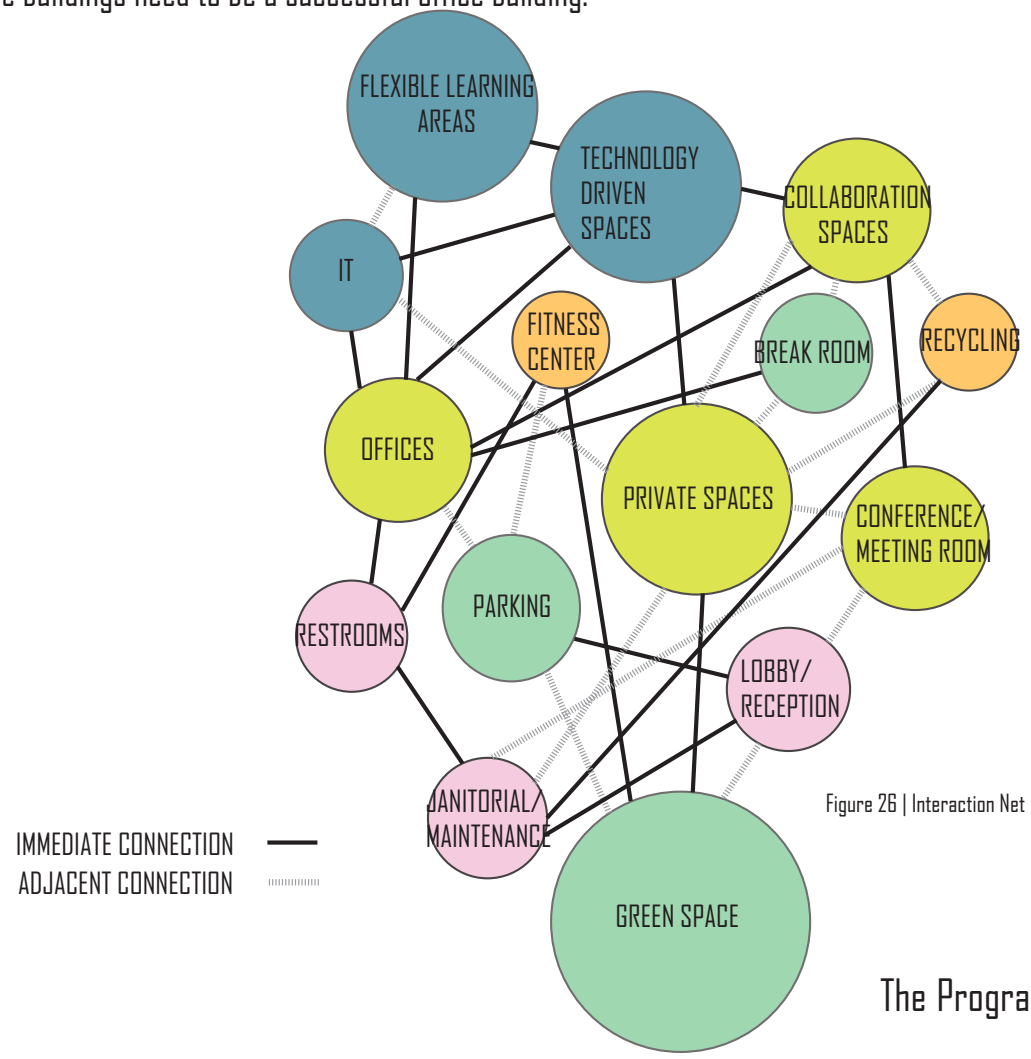


Figure 26 | Interaction Net

PERFORMANCE CRITERIA

INTERACTION MATRIX

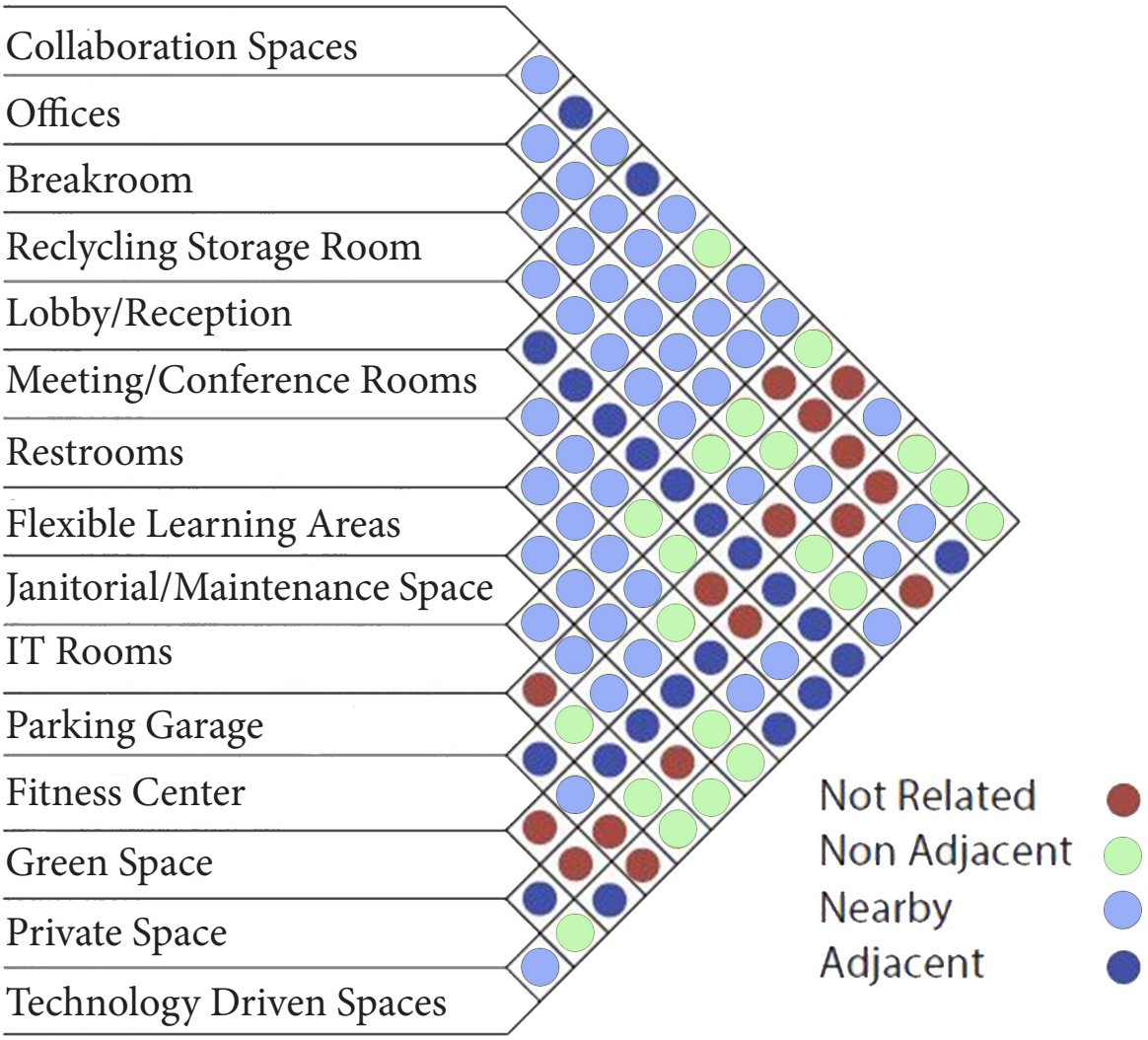


Figure 27 | Space Matrix

SPACE TYPE	SIZE	PERCENTAGE
COLLABORATION SPACES	90 SF Per Space	2.5%
OFFICES	**450,000 SF**	30%
BREAKROOM	80 SF Per Room	2.5%
RECYCLING STORAGE ROOM	100 SF Per Room	2.5%
LOBBY/RECEPTION	2500 SF	2.5%
MEETING/CONFERENCE ROOMS	150 SF Per Room	2.5%
RESTROOMS	100 SF Per Room	5%
FLEXIBLE LEARNING AREAS	150 SF Per Area	5%
JANITORIAL/MAINTENANCE	50 SF Per Area	2.5%
IT	2500 SF	2.5%
PARKING GARAGE	80,000 SF	15%
FITNESS CENTER	40,000 SF	2.5%
GREEN SPACE	140,000 SF	20%
PRIVATE SPACE	120 SF Per Space	2.5%
TECHNOLOGY DRIVEN SPACES	150 SF Per Room	2.5%
TOTAL	**SF**	**100%**

Figure 28 | Space Allocation

SPACE ALLOCATION | SPACIAL PERCENTAGES

The chosen site in Minneapolis allows for no maximum building height. Green space will take up a lot of the building as it can be divided to provide specific areas with greenery. For example, rooftops. the site, and internal spaces. While these numbers are a rough estimate and may fluctuate eventually, providing general numbers for each is helpful to providing a base for the schematic design. The building will consist of mainly office space with spaces supporting them. When the number of stories is determined i will come up with sizes of each floor plate. This will give me the square footages of each floor and the total building.

The spaces considered will support the office space for an effective work environment. This is valuable information when it comes to understanding the spaces needed for the overall design of the building. As i said before, these spaces will fluctuate eventually and different spaces may be added. This is a solid base to start at when figuring out the total amount of space that will be built on.

PERFORMANCE CRITERIA

PROJECT IMPACT

ENVIRONMENTAL PERFORMANCE AND IMPACT

This project highlights the well-being of inhabitants along with the green deign. To minimize the amount of embodied energy required for the project, it is to use materials from the local area, passive systems for lighting by natural light, and solar systems for the lighting needed at night will also be used. It would also be important to experiment with passive heating and cooling to lower the number of active systems required. The HVAC system will be redesigned to offer floor-by-floor ventilation to stop the spread of illness and allow for more ventilation.

PSYCHOLOGICAL IMPACT

The whole basis of this project is to allow places to be adopted to social distancing and health crisis-mode. Interaction between spaces and building occupants should be proactive and allow the spread of illness to be minimized with an increased positive mental impact. Within this project, spaces created will allow a salutogenic design; a design for human health. Increased natural light and ventilation, the flow of spaces, types of spaces, and green elements within the building will allow its users to have a positive experience.

CODE COMPLIANCE

- CDC Guidelines to be treated as code
- International Building Code must be met (IBC)
- International Energy Conservation Code (IECC)
- Minnesota Building Code
- Up to date ADA Design Standards

HISTORICAL CONTEXT

PANDEMICS IN RECENT HISTORY

Throughout history, intermittent outbreaks of infectious diseases have had profound and lasting impacts on communities. The economic, political, and social facets of human civilization have been powerfully influenced by these events, with their repercussions frequently lasting centuries. Some of the fundamental elements of modern medicine have been established by infectious outbreaks, forcing the scientific community to establish epidemiology, prevention, immunization, and antimicrobial treatment guidelines. The most recent pandemics consist of The H1N1 virus, H2N2, flu pandemic, and COVID-19.

The H1N1 occured between 1918 and 1920 when a disturbingly deadly outbreak of influenza tore across the globe, infecting over a third of the world's population and ending the lives of 20 – 50 million people. Of the 500 million people infected in the 1918 pandemic, the mortality rate was estimated at 10% to 20%, with up to 25 million deaths in the first 25 weeks alone. What separated the 1918 flu pandemic from other influenza outbreaks was the victims; where influenza had always previously only killed juveniles and the elderly or already weakened patients, it had begun striking down hardy and completely healthy young adults, while leaving children and those with weaker immune systems still alive.

Another pandemic in recent history was an illness known as the Asian Flu. The Asian Flu was a pandemic outbreak of Influenza A of the H2N2 subtype, that originated in China in 1956 and lasted until 1958. In its two-year spree, Asian Flu traveled from the Chinese province of Guizhou to Singapore, Hong Kong, and the United States. Estimates for the death toll of the Asian Flu vary depending on the source, but the World Health Organization places the final tally at approximately 2 million deaths, 69,800 of those in the US alone.

A category 2 Flu pandemic sometimes referred to as "the Hong Kong Flu," the 1968 flu pandemic was caused by the H3N2 strain of the Influenza A virus, a genetic offshoot of the H2N2 subtype. From the first reported case on July 13, 1968 in Hong Kong, it took only 17 days before outbreaks of the virus were reported in Singapore and Vietnam, and within three months had spread to The Philippines, India, Australia, Europe, and the United States. While the 1968 pandemic had a comparatively low mortality rate (.5%) it still resulted in the deaths of more than a million people, including 500,000 residents of Hong Kong, approximately 15% of its population at the time.

Beginning in December 2019, in the region of Wuhan, China, a new coronavirus began appearing in human beings. It has been named Covid-19, a shortened form of "coronavirus disease of 2019." This new virus spreads incredibly quickly between people, due to its newness – no one on earth has an immunity to Covid-19, because no one had Covid-19 until 2019. While it was initially seen to be an epidemic in China, the virus spread worldwide within months. The WHO (World Health Organization) declared Covid-19 a pandemic in March, and by the end of that month, the world saw more than a half-million people infected and nearly 30,000 deaths. The infection rate in the US and other nations was still spiking. With the coronavirus pandemic, people all over the world have become more aware of the best practices during a pandemic, from careful hand-washing to social distancing.

HISTORICAL CONTEXT

Countries across the world declared mandatory staty-at-home measures, closing schools, businesses, and public places. Dozens of companies and many more independent researchers began working on tests, treatments, and vaccines. The push for the human race to survive the pandemic became the primary concern in the world. The outcome of the Covid-19 pandemic is impossible to predict, but we can learn from pandemics in history to determine our best courses. These are our teachers.

SITE HISTORY

Fort Snelling was established 1819, at the convergence of the Mississippi and Minnesota rivers. Soldiers began using the falls for water control. Two cities on each side of the falls were established when land became available for settlement: Saint Anthony, on the east side, and Minneapolis, on the west side. In 1872, the two towns later merged into one city known as Minneapolis. Early production concentrated on sawmills, but the main industry gradually became flour mills. The construction of railroads and banks, as well as the establishment of the Minneapolis Grain Exchange, accelerated this industrial development. Minneapolis became the world-leading centre of flour production through advances in milling techniques, gaining the name 'Mill City'. Through its churches, art organizations, the University of Minnesota, and a popular park system designed by Horace Cleveland and Theodore Wirth, the community evolved as the city grew. Although the sawmills and flour mills have long ago vanished, Minneapolis remains a regional banking and manufacturing hub. In the Twin Cities area, the two largest milling firms, General Mills and the Pillsbury Company, now consolidated under the name of General Mills, continue to be prominent. The riverfront, which now hosts parklands, the Mill City Museum and the Guthrie Theater, has been rediscovered by the city.

Today, Minneapolis is the largest and most-populous city in Minnesota. As of 2019, Minneapolis has an estimated population of 426,606 people. It is the 46th-largest city in the United States, and the second most densely populated city in the region behind Chicago. Minneapolis and its neighbor Saint Paul make up the Twin Cities.

Figure 29 | Pillsbury Company

Figure 30 | Saint Anthony

SOCIAL CONTEXT

COVID-19 IN THE SOCIO-ECONOMIC CONTEXT

Minnesota, in response to COVID-19, introduced stay-at-home measures in March 2020. Residents of Minnesota were urged to stay home, and there were restricted gatherings for public-facing businesses, such as bars and restaurants, hair salons, gyms, and entertainment facilities. As nearly 70 percent of the economy is powered by consumer spending, sudden shifts in consumer habits obviously have economic repercussions for the state.

Hundreds of thousands of Minnesotans have filed initial unemployment claims within a couple of weeks. Unemployment filing helped with individual household finances for employees of companies mandated to close. However, some of these workers are returning to work as sanctions gradually lift and companies reopen. Unemployment data should provide a better image of the long-term economic impacts of COVID-19 when this happens.

Across Minnesota and the nation, companies that can are telling number of employees to work from home for the foreseeable future. But not all work can be done from a worker's dining room with a laptop and internet connection and some industries are too vital to slow down. Designing buildings that can stay open during future pandemics and allow social distancing will greatly impact the economy and future unemployment. The companies that are thriving are the ones that are able to stay open through the health crisis.

CULTURAL CONTEXT

WORKPLACE CULTURE

The concept of workplace culture will expand beyond the physical workspace after COVID-19. Company culture must become more human-centric in response to pandemics. The role of culture and focusing on the human portion of culture is going to become a lot more important to the business enterprise as our future workplace is embracing the mix of remote and on-site work. Offices will have to adapt to that scenario. This means that companies must actively create and maintain a constructive culture. When it comes to collaboration, it will look different. Technology has shown we can work virtually and collaborate virtually. Investing in technology that effectively helps users in the office to operate as a team when in a hybrid model. This will allow people to operate as a team rather than a constellation of individuals. The internal spaces of an office building will change as meeting rooms may become smaller, cubicles will be farther apart, and the overall premise of how we communicate will shift. This all changes the culture of the workplace after the COVID-19 pandemic. Although there is a cultural shift, it will push office buildings to become a cleaner and healthier environment that leans on technology and new practices, as well as pushing the workforce to establish and maintain a new and modern corporate culture.

SITE ANALYSIS

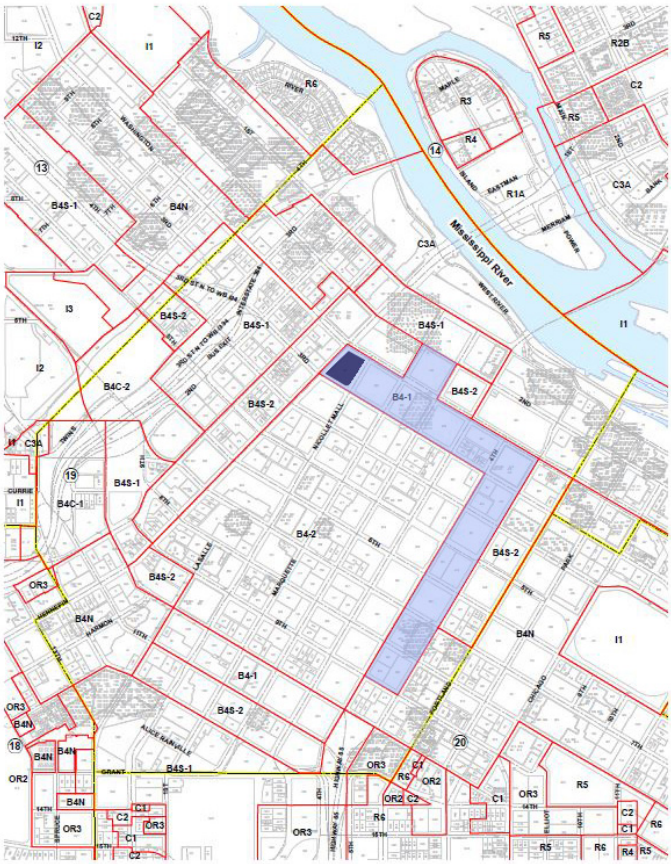


Figure 31 | Minneapolis B4-1 District

B4-1 DISTRICT | MINNEAPOLIS | MINNESOTA

The converging corridors of Hennepin, Washington and Nicollet Avenues formed the basis for the first business centre in the later half of the 19th century. Almost a century and a half later, the central Business District of Minneapolis continues to prosper as the city's financial, cultural, and retail center. The Business District buzzes with activity everyday of the week, a city where work meets play. Throughout the day, huge crowds of professionals walk through the winding 11-mile skyway system of the city, while more casual travelers meandor along Nicollet Mall to the area's favorite shops ands cafes. As the sun goes down, Hennepin Avenue's bright lights attract an entirely new audience to its collection of trendy bars and restuarants, independent music clubs and world-renowned theaters. The Business District is constantly evolving and adapting, much like the busy lives of its residents. The area has undergone massive waves of urban renewal and renovation for decades. With many more renovation plans currently under way. For many years to come, the area is set for solid growth and economic vitality.

This site in Minneapolis has great views of the downtown and easy access to public transportation, public parks, and part of the growing city. Amenities close by include the Guthrie Theater, The US Bank Stadium, Target Field, Target Center and the 11-mile skyway system. The image above shows the site location in the Business District of Minneapolis.

Figure 32 | Minneapolis Skyway System

SKYWAY SYSTEM — TUNNEL — SITE

Figure 33 | Minneapolis Major Roads

PRIMARY ROADWAYS — SECONDARY ROADWAYS — SITE

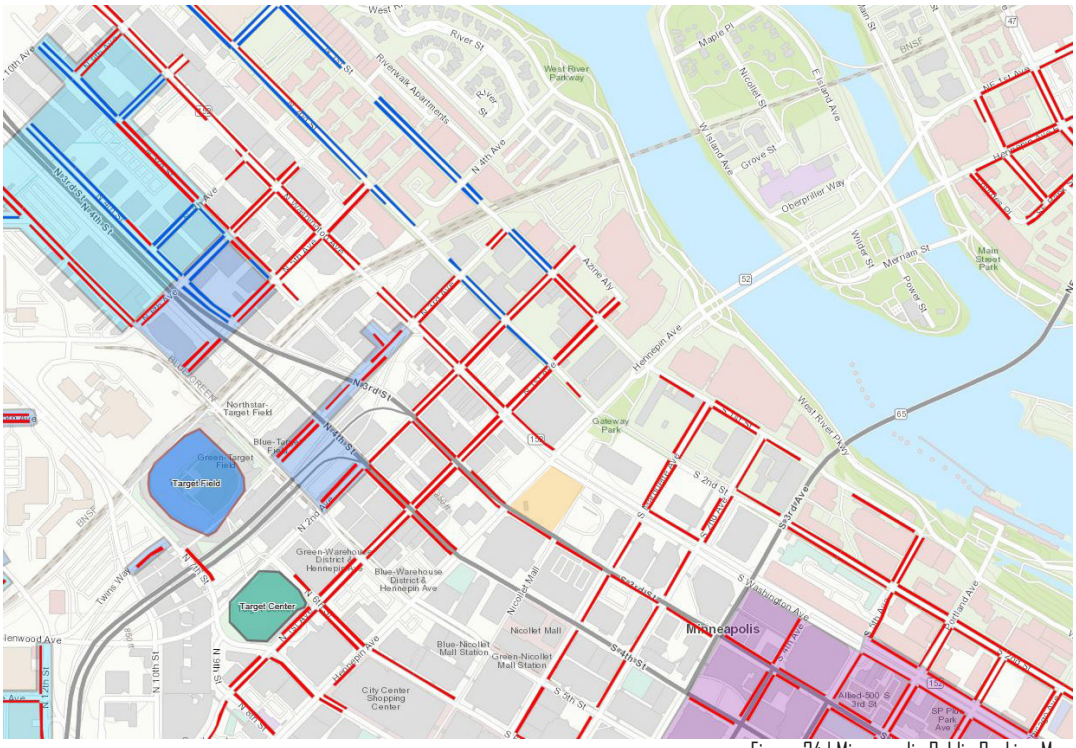


Figure 34 | Minneapolis Public Parking Map

PARKING METER MAP — ENFORCED DAILY / ENFORCED MON-FRI — MAJOR VENUES — EVENT PARKING

SITE

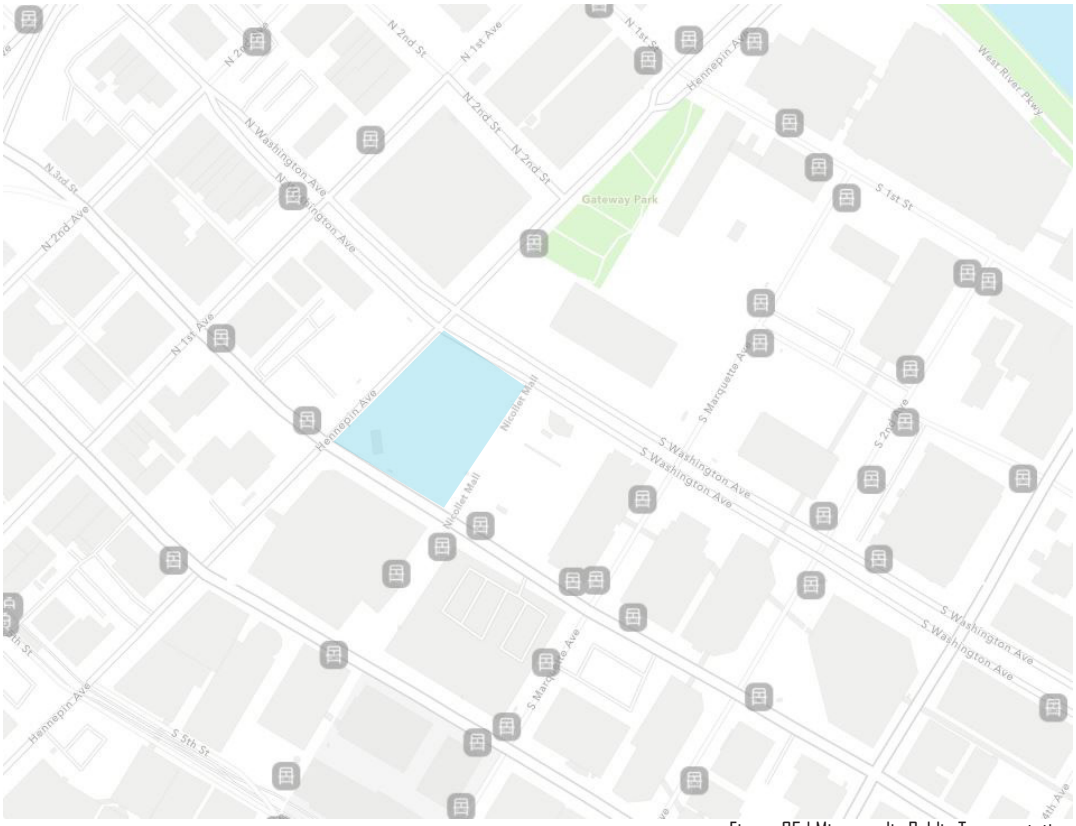


Figure 35 | Minneapolis Public Transportation

PUBLIC TRANSPORTATION STOPS & STATIONS

AERIAL SITE MAP

Figure 36 | Minneapolis Site Map 01

Figure 37 | Minneapolis Site Map 02

Figure 38 | Aerial View of Minneapolis

SITE ANALYSIS

SURROUNDING VIEWS

MINNEAPOLIS | SITE | AERIAL VIEWS

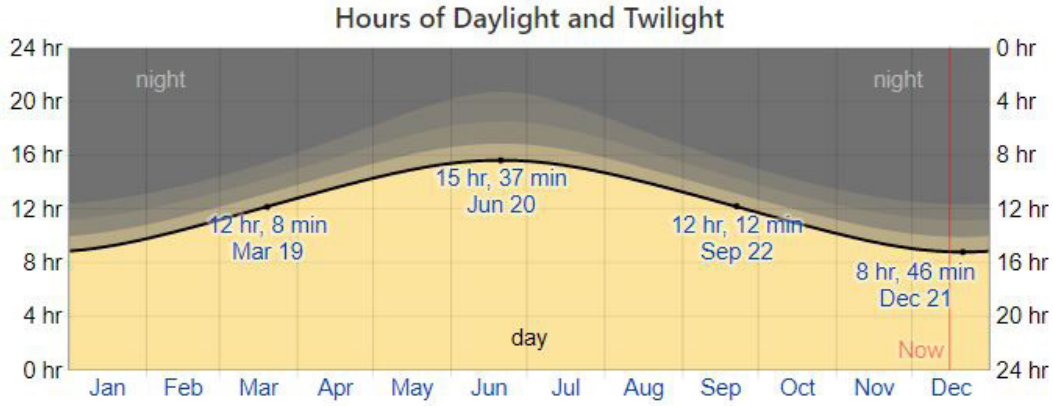
ADDRESS: 30 S. 3rd St, Minneapolis, MN 55414
LOT SIZE: 69,583 Square Feet
ZONING: B4-1
CURRENT LOT USE: Mixed-use building currently being built

The current site offers views towards the Downtown Minneapolis skyline, Nicollet Island, Target Center, and Target Field. This site was chosen because of the views, location, public transportation system, and it is near the 11-mile skyway system that is integrated into Minneapolis and its buildings. Minneapolis has a climate that creates a challenge when it comes to green space and how to effectively implement it. There are many opportunities to promote sustainability into Downtown Minneapolis with a site like this.

Figure 39 | Minneapolis Site Map 03

SITE ANALYSIS

SOLAR PATTERNS



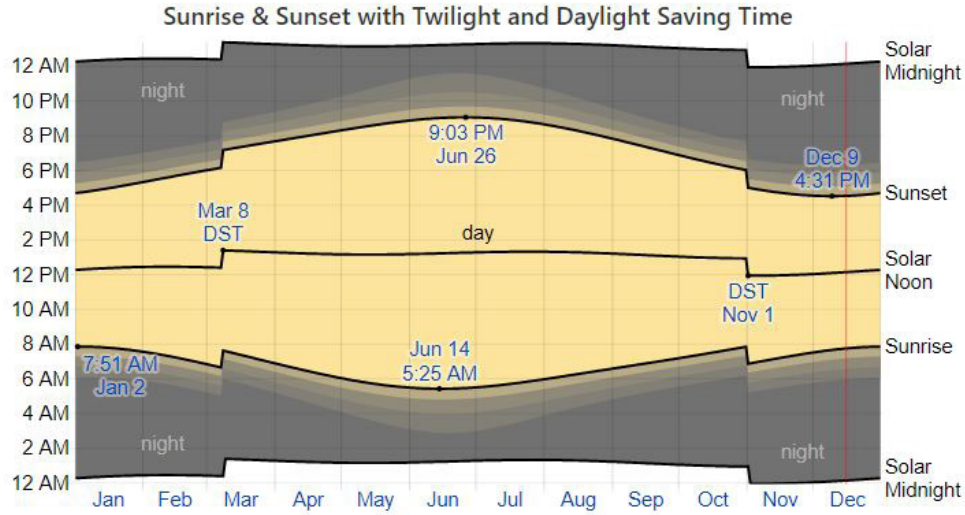
The number of hours during which the Sun is visible (black line). From bottom (most yellow) to top (most gray), the color bands indicate: full daylight, twilight (civil, nautical, and astronomical), and full night.

Figure 40 | Minneapolis Hours of Daylight Data

The length of the day in Minneapolis varies significantly over the course of the year. In 2020, the shortest day is December 21, with 8 hours, 46 minutes of daylight; the longest day is June 20, with 15 hours, 37 minutes of daylight.

The earliest sunrise is at 5:25 AM on June 14, and the latest sunrise is 2 hours, 26 minutes later at 7:51 AM on January 2. The earliest sunset is at 4:31 PM on December 9, and the latest sunset is 4 hours, 32 minutes later at 9:03 PM on June 26.

Daylight saving time (DST) is observed in Minneapolis during 2020, starting in the spring on March 8, lasting 7.8 months, and ending in the fall on November 1.

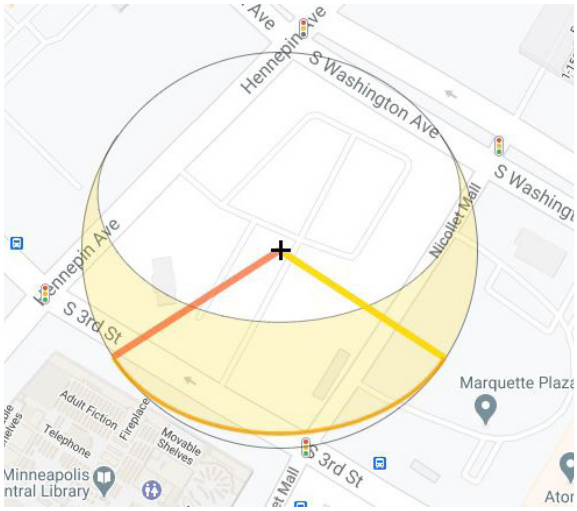


The solar day over the course of the year 2020. From bottom to top, the black lines are the previous solar midnight, sunrise, solar noon, sunset, and the next solar midnight. The day, twilights (civil, nautical, and astronomical), and night are indicated by the color bands from yellow to gray. The transitions to and from daylight saving time are indicated by the 'DST' labels.

Figure 41 | Minneapolis Sunrise & Sunset Data

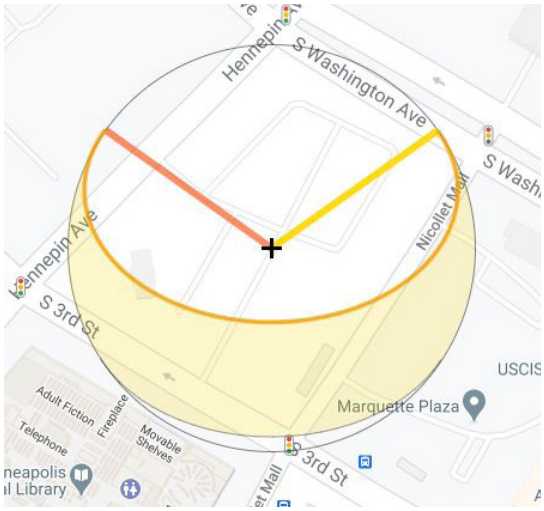
SITE ANALYSIS

SOLAR PATTERNS



Summer Solstice

Figure 42 | Site Solar Patterns 01



Winter Solstice

Figure 43 | Site Solar Patterns 02

CLIMATE TYPE

Minneapolis, which shares geographic and climatic characteristics with Saint Paul, is situated at the point where the Minnesota River joins the Mississippi River on flat or gently rolling terrain. Sixteen lakes are located within the city limits. Most of the lakes are small and shallow, covered by ice in the winter. The city's climate is continental, with large seasonal temperature variations and a favorable growing season of 166 days. Severe weather conditions, such as blizzards, freezing rain, tornadoes, and wind and hail storms are fairly common; winter recreational weather is excellent, however, because of the dry snow, which reaches average depths of 6 to 10 inches.

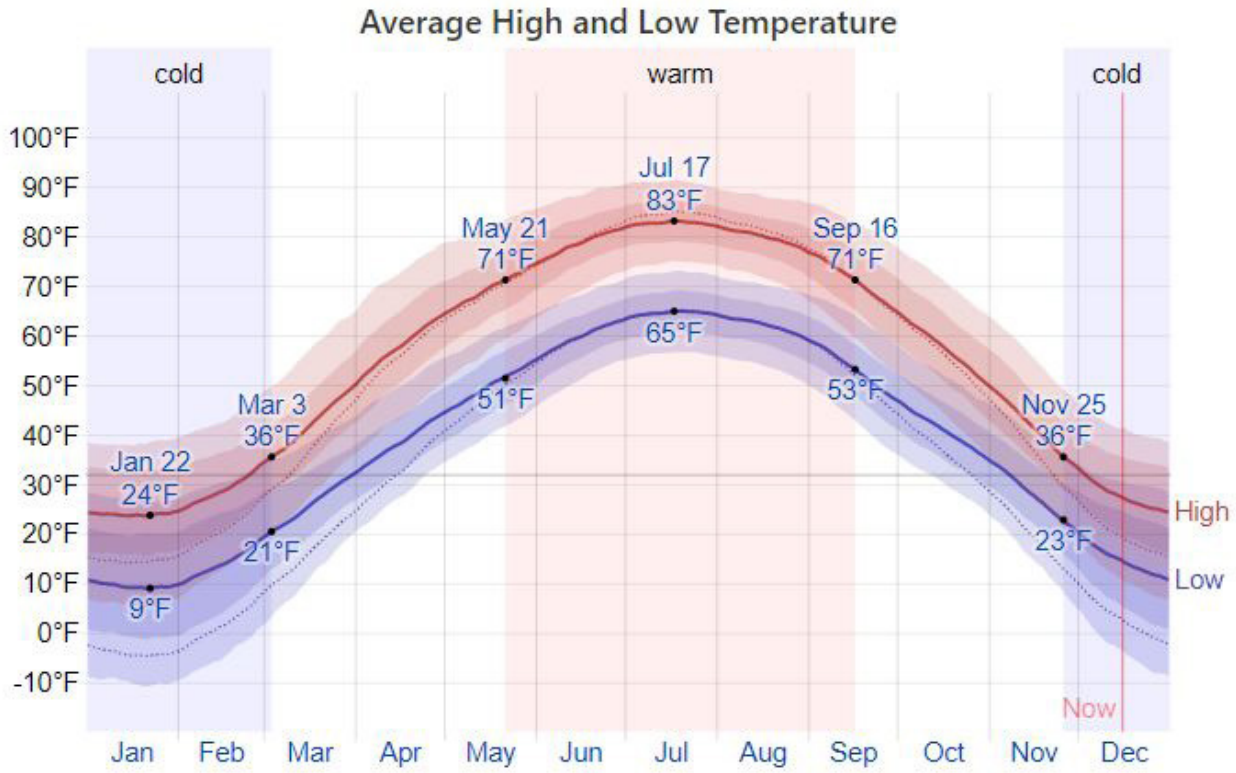
Area: 54.9 square miles (1999)
Elevation: Ranges from 687 feet to 1,060 feet above sea level
Average Temperatures: January, 11.2° F; August, 70.6° F; annual average, 44.7° F
Average Annual Precipitation: 26.36 inches

CLIMATIC DESIGN PRIORITIES

- Keep the heat in and the cold temperatures out during the winter
- Let the winter sun in

CLIMATE DATA

CLIMATIC PATTERNS



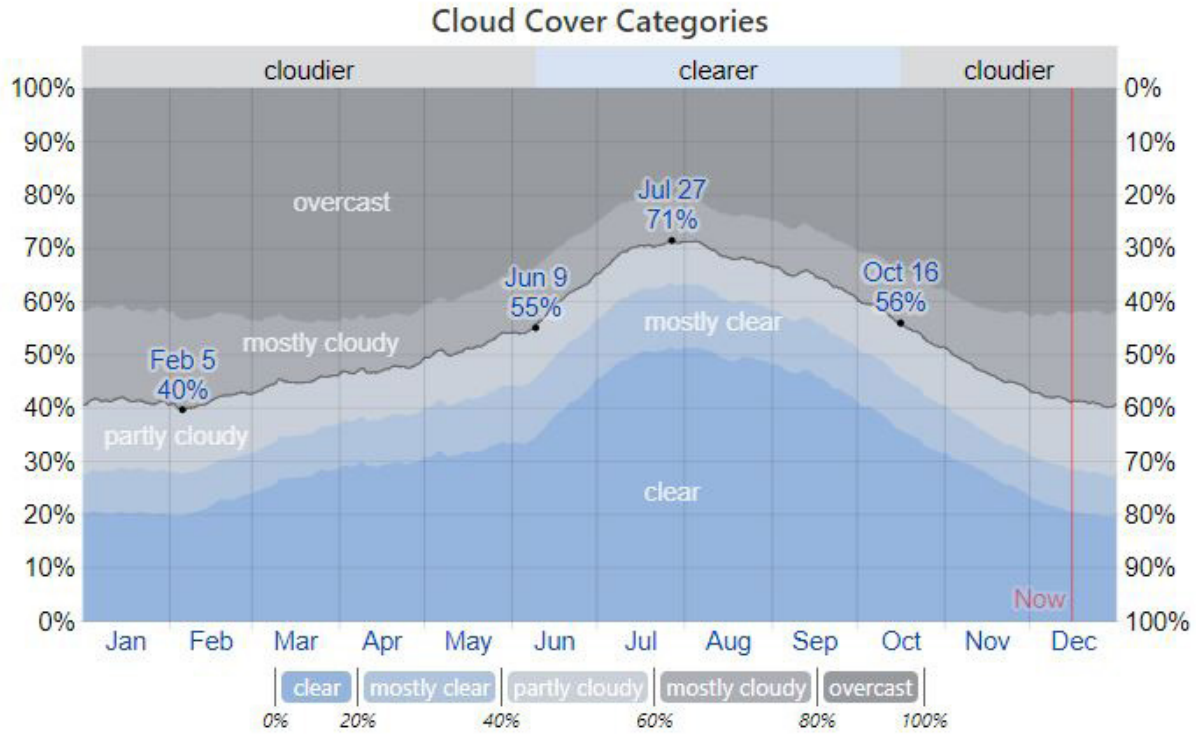
The daily average high (red line) and low (blue line) temperature, with 25th to 75th and 10th to 90th percentile bands. The thin dotted lines are the corresponding average perceived temperatures.

Figure 44 | Minneapolis Temperature Data

The warm season lasts for 3.9 months, from May 21 to September 16, with an average daily high temperature above 71°F. The hottest day of the year is July 17, with an average high of 83°F and low of 65°F.

The cold season lasts for 3.3 months, from November 25 to March 3, with an average daily high temperature below 36°F. The coldest day of the year is January 22, with an average low of 9°F and high of 24°F.

CLIMATE DATA



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

Figure 45 | Minneapolis Cloud Coverage Data

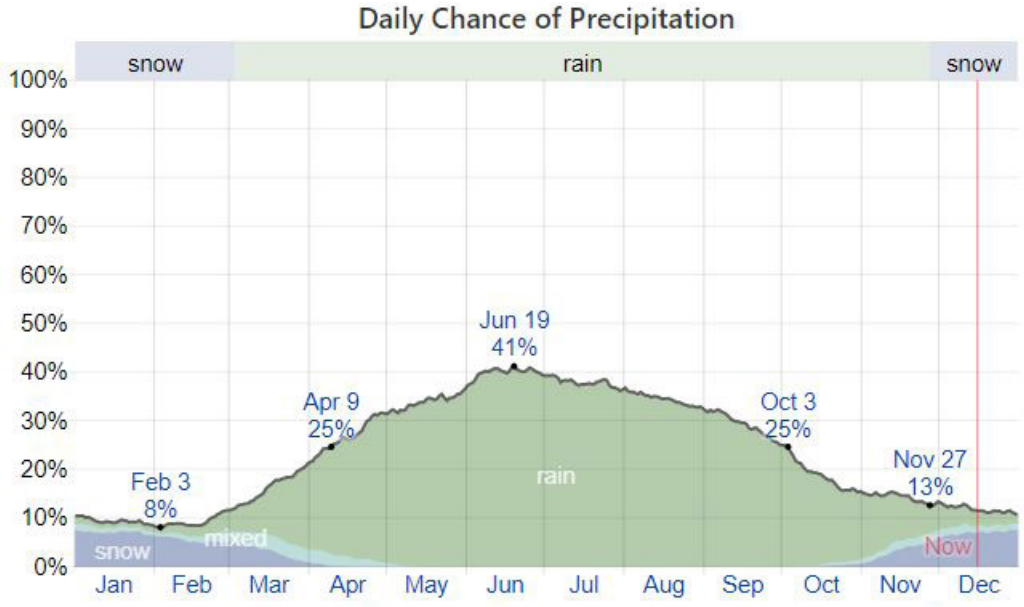
In Minneapolis, the average percentage of the sky covered by clouds experiences significant seasonal variation over the course of the year.

The clearer part of the year in Minneapolis begins around June 9 and lasts for 4.2 months, ending around October 16. On July 27, the clearest day of the year, the sky is clear, mostly clear, or partly cloudy 71% of the time, and overcast or mostly cloudy 28% of the time.

The cloudier part of the year begins around October 16 and lasts for 7.8 months, ending around June 9. On February 5, the cloudiest day of the year, the sky is overcast or mostly cloudy 60% of the time, and clear, mostly clear, or partly cloudy 40% of the time.

CLIMATE DATA

CLIMATIC PATTERNS



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 46 | Minneapolis Precipitation Data

A wet day is one with at least 0.04 inches of liquid or liquid-equivalent precipitation. The chance of wet days in Minneapolis varies significantly throughout the year.

The wetter season lasts 5.8 months, from April 9 to October 3, with a greater than 25% chance of a given day being a wet day. The chance of a wet day peaks at 41% on June 19.

The drier season lasts 6.2 months, from October 3 to April 9. The smallest chance of a wet day is 8% on February 3.

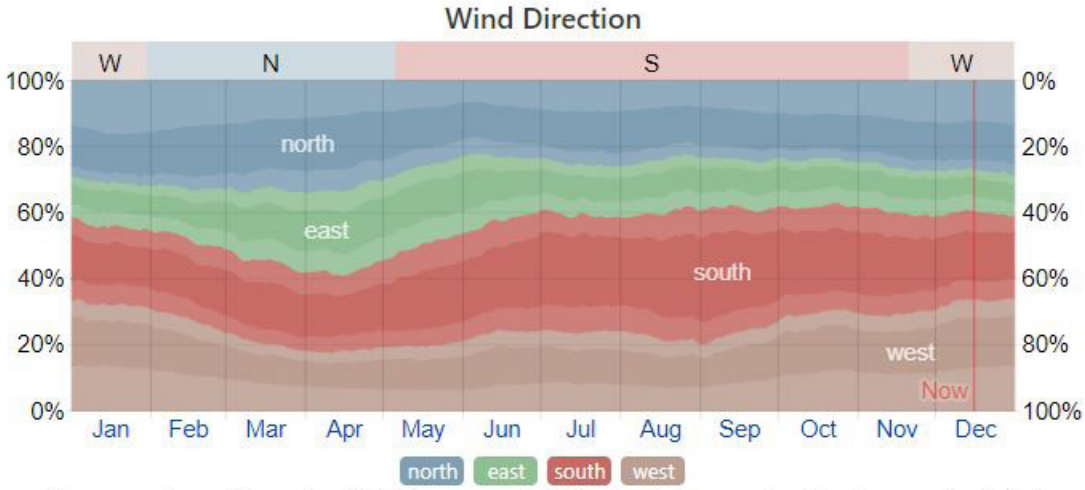
Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. Based on this categorization, the most common form of precipitation in Minneapolis changes throughout the year.

Rain alone is the most common for 8.8 months, from March 3 to November 27. The highest chance of a day with rain alone is 41% on June 19.

Snow alone is the most common for 3.2 months, from November 27 to March 3. The highest chance of a day with snow alone is 8% on December 28.

CLIMATE DATA

WIND PATTERNS



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).

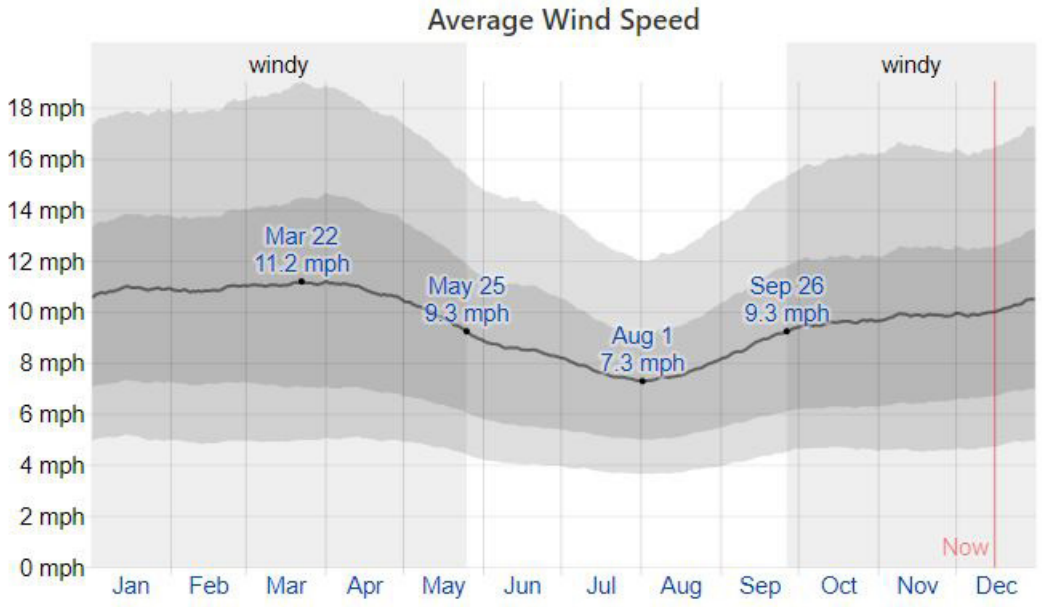
Figure 47 | Minneapolis Wind Direction Data

The predominant average hourly wind direction in Minneapolis varies throughout the year.

The wind is most often from the north for 3.2 months, from January 30 to May 5, with a peak percentage of 34% on April 1. The wind is most often from the south for 6.5 months, from May 5 to November 20, with a peak percentage of 41% on September 3. The wind is most often from the west for 2.3 months, from November 20 to January 30, with a peak percentage of 34% on January 1.

CLIMATE DATA

WIND PATTERNS



The average of mean hourly wind speeds (dark gray line), with 25th to 75th and 10th to 90th percentile bands.

Figure 48 | Minneapolis Wind Patterns

This section discusses the wide-area hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages.

The average hourly wind speed in Minneapolis experiences significant seasonal variation over the course of the year.

The windier part of the year lasts for 8.0 months, from September 26 to May 25, with average wind speeds of more than 9.3 miles per hour. The windiest day of the year is March 22, with an average hourly wind speed of 11.2 miles per hour.

The calmer time of year lasts for 4.0 months, from May 25 to September 26. The calmest day of the year is August 1, with an average hourly wind speed of 7.3 miles per hour.

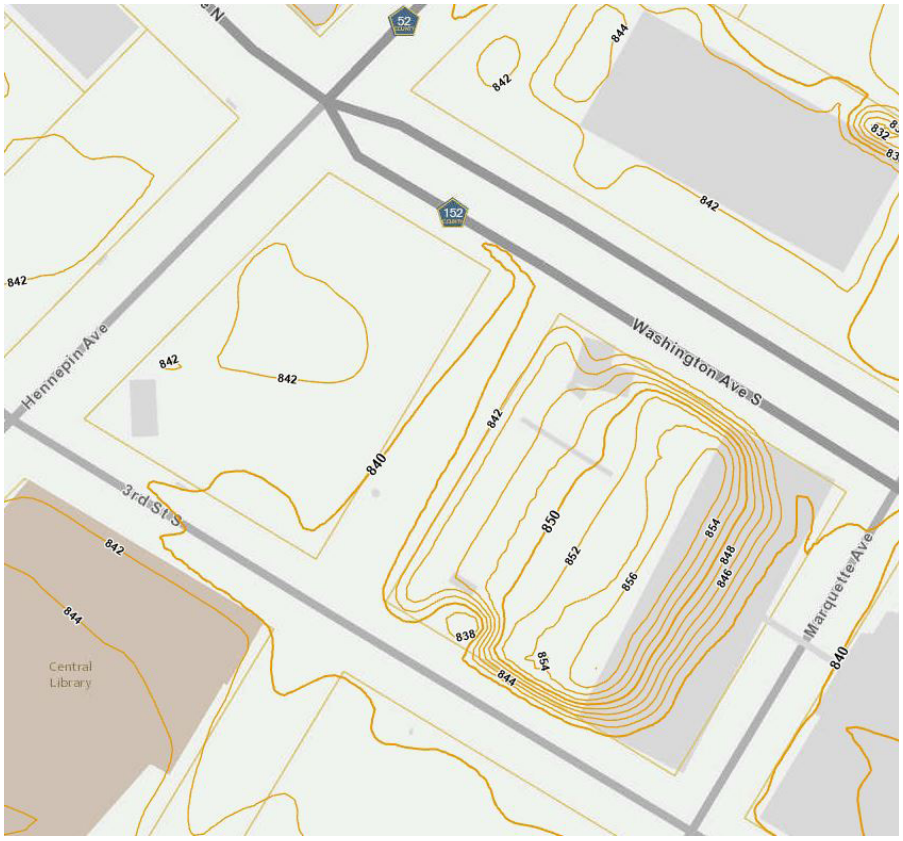


Figure 49 | Topographic Contours

U4A—Urban land-Udipsamments (cut and fill land) complex, 0 to 2 percent slopes
Component Description

Urban land

Extent: 65 to 85 percent of the unit
Geomorphic setting: Outwash plains and stream terraces
Slope range: 0 to 2 percent
Flooding: None
Ponding: None
General description: Urban land consists mainly of industrial parks, office buildings, warehouses, and railroad yards and is covered by impervious surfaces. Most areas were originally wet, mineral or organic soils in depressions. Because of the variability of this component, interpretations for specific uses are not available. Onsite investigation is needed.

DESIGN SOLUTION

ENVISION

Figure 50 | Aerial Perspective

NARRATIVE

- No one place or location can meet the needs of today's work. The Covid-19 lockdowns of 2020 not only proved that it is possible to work from home but also made us realize it is perhaps even preferable for many workers to do their jobs from anywhere. This poses the question; How can the world prepare for people to come back into the workplace? What is the future of our workspace? How do we adapt to socially distance as well as having maximum air flow and an efficient work environment.

- As employees return to the office, organizations can create thriving environments that allow everyone to flourish. This project offers a range of work points and settings to meet an individual's needs, a home office, a coworking space and a combination. Although remote work is here to stay, for all the advantages distributed work creates the freedom to live anywhere and the flexibility for better work/life balance, it also brings new challenges and opportunities for employers and employees.

DESIGN SOLUTION

DESIGN SOLUTION

- Embrace a workplace strategy that supports people's ability to work from anywhere
- Leverage unassigned and shared spaces to maximize space efficiency and support long-term flexibility
- Utilize Coworking and satellite offices as a supplement and not a replacement for a headquarters experience
- Offer a wide range of settings and styles to provide workers a variety of choices
- Maximize air flow throughout the building to slow the spread of germs and generate spaces that can endure more cleaning throughout the year

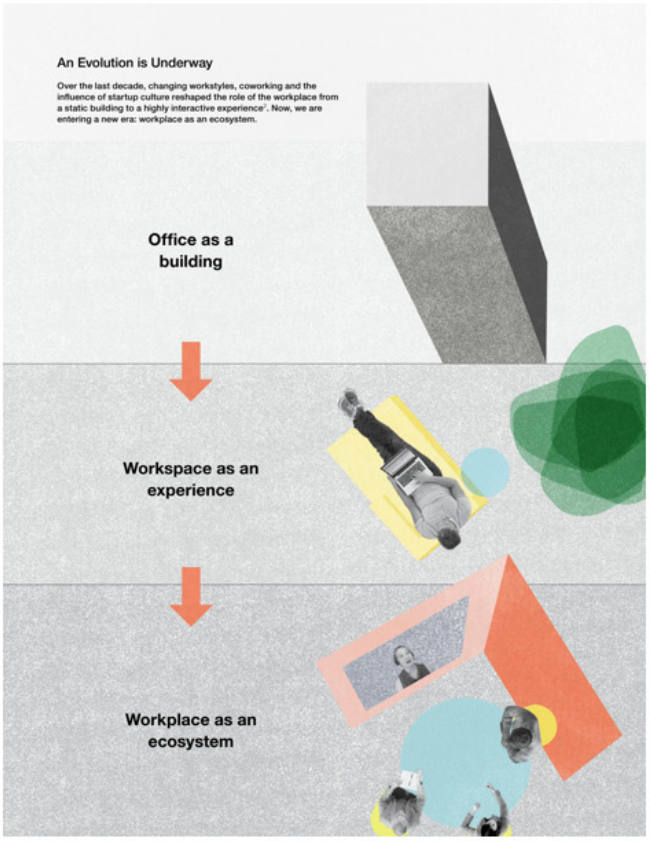


Figure 51 | Design Solution

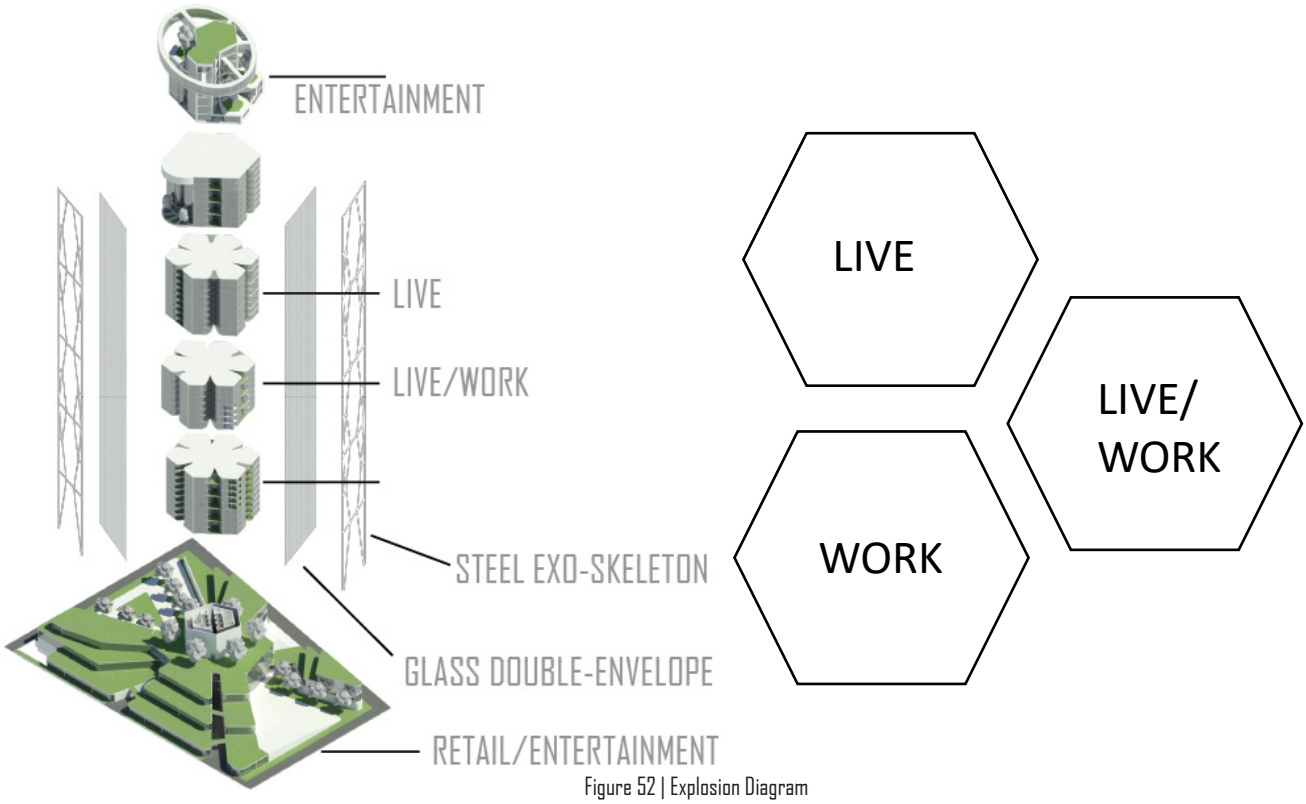


Figure 52 | Explosion Diagram

DESIGN SOLUTION

OVERALL SITE CONTEXT/ SITE PLAN

- HIGH RISE TOWER
- RETAIL
- EVENT SPACE
- VENDOR SPACE
- RESTAURANTS
- OFFICE SPACE
- OUTDOOR GREEN SPACE
- APARTMENTS

Nearby: Marquette Plaza to the Southeast/ MPLS Central Library to the South/Easy Access to MPLS Skyway System

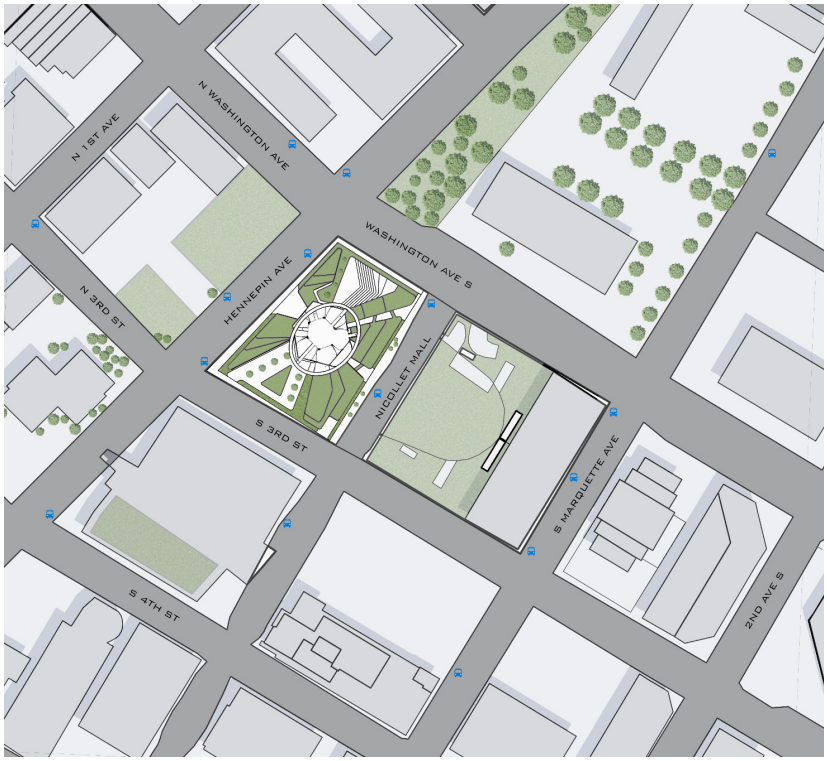


Figure 53 | Site Plan

BUILDING PROGRAM

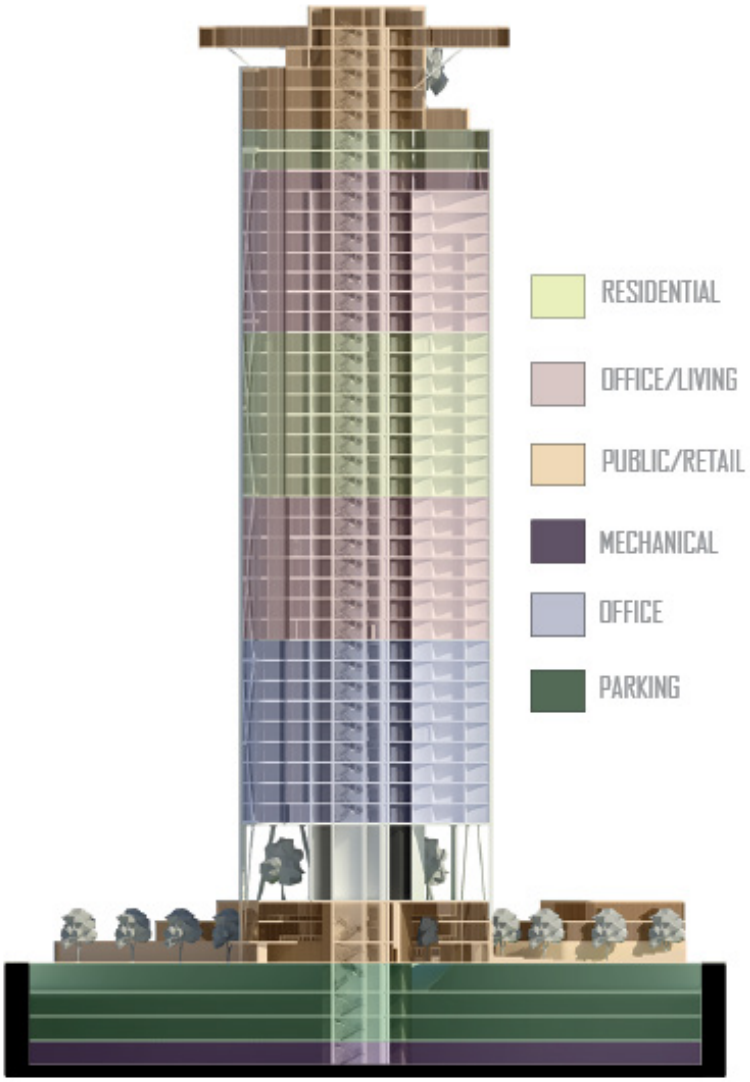
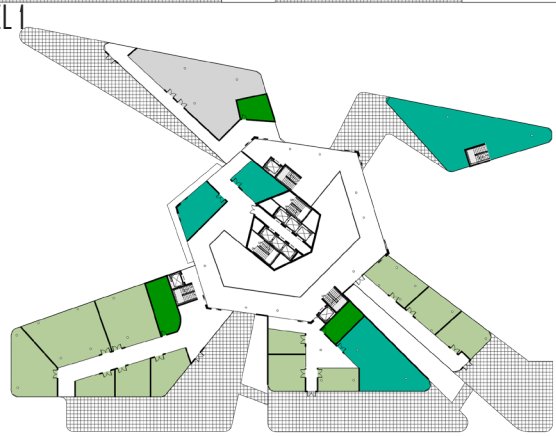


Figure 54 | Section

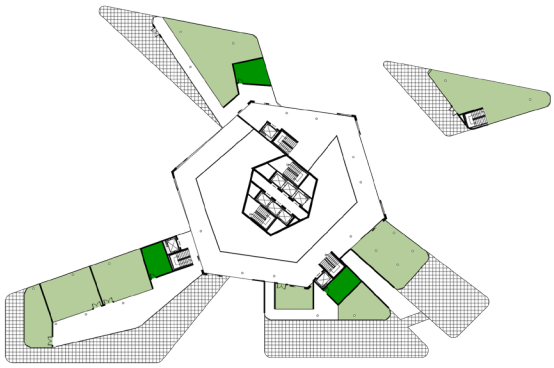
-47 Stories
-Mechanical Space
-Outdoor Space on Each Level
-Greenhouse in Units
-3 Levels of Parking
-Private and Public Parking
-9 Stories of Retail/Public Space
-9 Stories of Offices (Work)
-9 Stories of Apartments (Live)
-15 Stories of Office Living (Live/Work)

BASE FLOOR PLANS

LEVEL 1



LEVEL 2



LEVEL 3

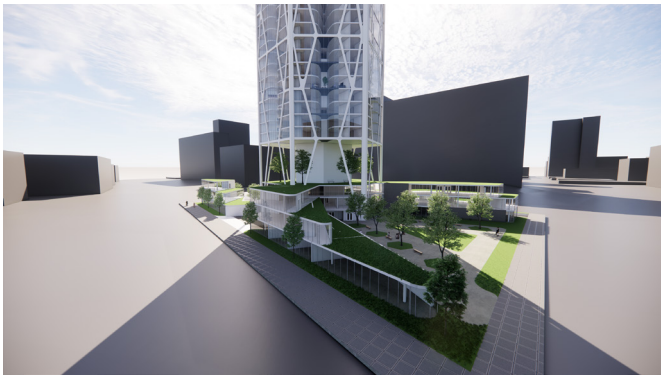
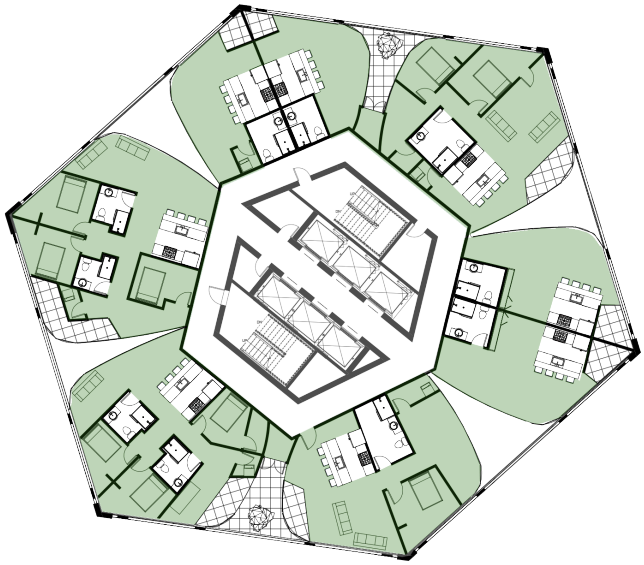


Figure 55 | Base Floor Plans

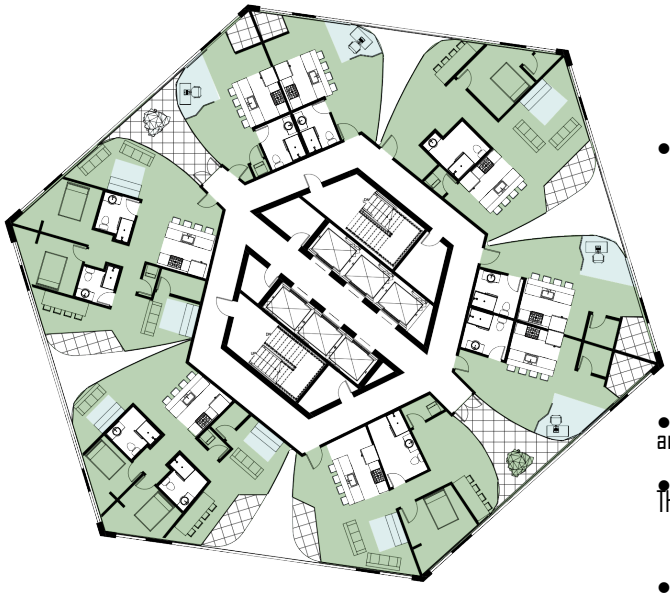
PUBLIC SPACE LEGEND

- PUBLIC ENTRANCE
- RETAIL
- BATHROOM
- RESTAURANT
- FITNESS
- TOWER LOBBY

TOWER FLOOR PLANS



TYPICAL 'LIVE' FLOOR PLAN



TYPICAL 'LIVE/WORK' FLOOR PLAN

UNIT LEGEND

LIVE

SERVICE

PUBLIC SPACE

WORK

- A typical floor plan consists of
  - 2 - Studios
  - 2 – One Bedrooms
  - 2- Two Bedrooms
  - Central Core
  - Outdoor Space

- Live/Work units will be equipped with office spaces as well as living amenities.
- This layout gives occupants a feeling of community and belongingness. This allows you to connect both in-person and virtually.

- This office space allows movement and collaboration within the work environment. Each level offers 360-degree views of downtown Minneapolis.

Figure 56 | Tower Floor Plans

- It is built out of a concrete frame and curtainwall glass with floor to ceiling windows. In the core of the building is 5 high speed destination dispatch elevators.

- A one-way circulation pattern that reduces or eliminates touch points throughout public spaces
- single-loaded elevator banks, allows for one-way, physically distanced circulation
- Each Live/Work Unit will consist of a 'Pocket Office"

ORI POCKET OFFICE

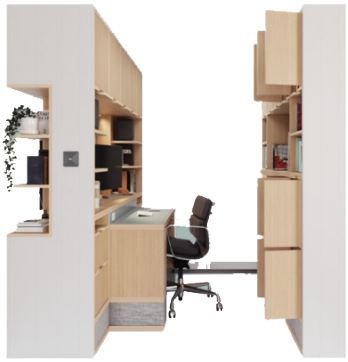
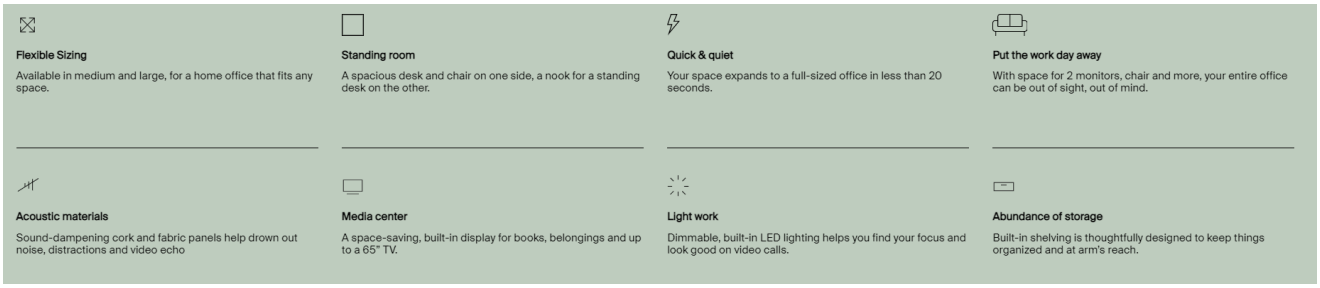


Figure 57 | ORI Pocket Office

Ori Pocket Office

- A flexible home office setup that appears when it's needed and makes room for living space when it's not.
    - This piece of furniture allows you to enjoy working in the comfort of your own home.
    - Each Live/Work unit will be equipped with a pocket office to increase efficiency in your workplace.



TOWER FLOOR PLANS

Figure 58 | Tower Floor Plans Cont.

- Rather than a single large, dense, open floor plate, Envision supports scalable planning – a range of settings that can be sized up or down to support the users' need and support of a variety of interactions and activities throughout the workplace
- Each office floor plan consists of dynamic neighborhoods and zones.
  - Co-Creation Workroom
  - Visitor/Group Get-together
  - Sidewalk Café
  - Project Studio
  - Resident Retreat
  - Central Agora
  - These neighborhoods and zones can shift depending on phase of the project or working needs
- Office Floor plans can be adapting to a companies needs
  - The left floor plan is a prototype of a company taking an entire floor as an office
  - The right floor plan is a prototype of two companies occupying one floor for office space
  - This floor plan is very adaptable as the corridor walls can be taken down or kept in place to allow for multiple occupants
  - Each office space has operable windows with fresh air coming from all three sides. This allows for more ventilation throughout the space and the core
  - Each level has multiple green spaces and access to fresh air

VENTILATION & COOLING

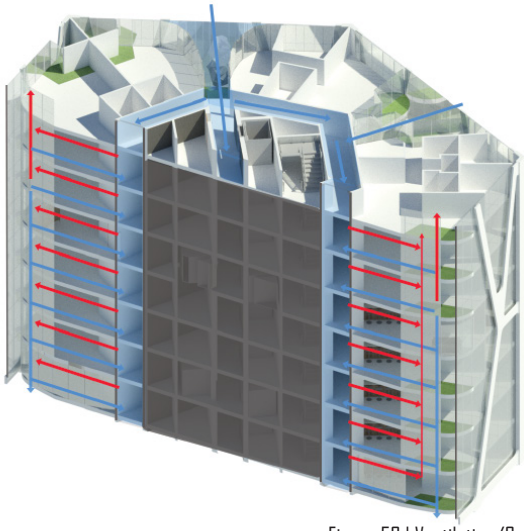


Figure 59 | Ventilation/Cooling Section

COLD AIR

HOT AIR

- Twin Façade
  - Offers strategies for use and control of solar heat gain, increased daylight and moderation of temperature differences.
- The HVAC system is designed to allow each office floor to operate independently of other floors, eliminating the sharing of air supply or return air between floors or tenants. This aids in stopping viruses from spreading throughout the building.
- The floor plate shape allows for each level have natural ventilation through operable windows.
- This helps stop the spread of illness and germs

VENTILATION & COOLING

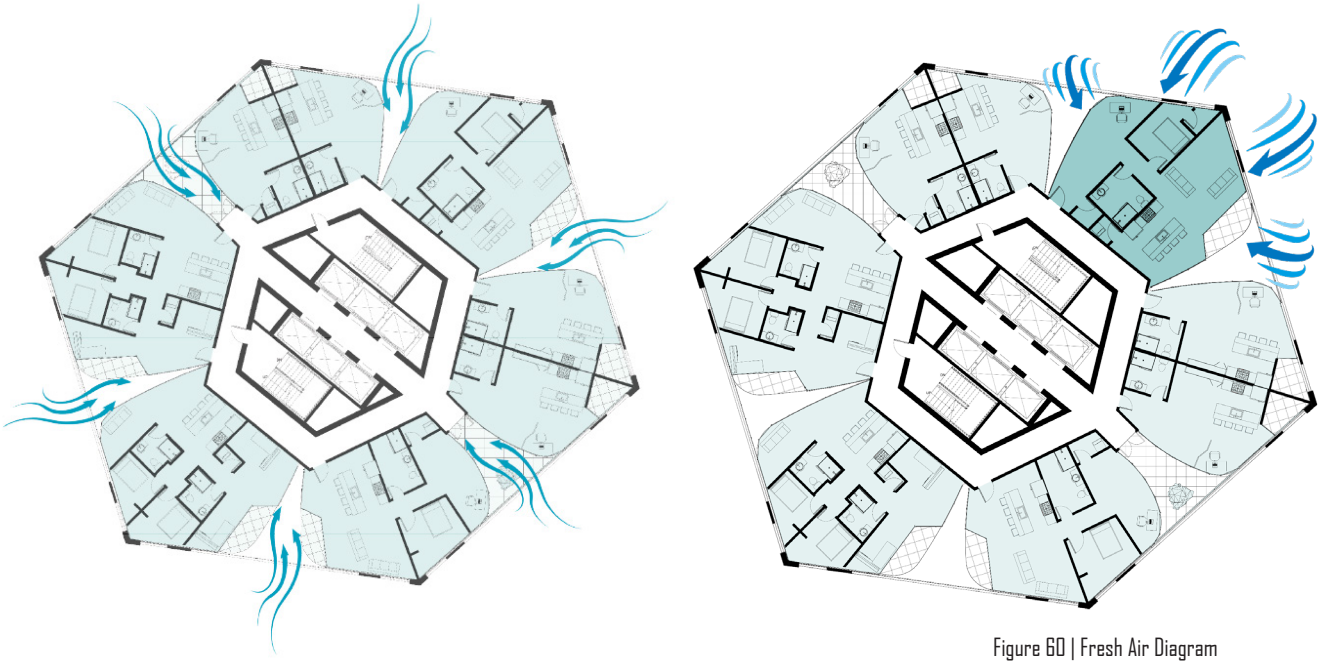


Figure 60 | Fresh Air Diagram

- The Pedal shape of the floor plan allows fresh air supply directly to the core.
- Fresh air is important to reach the core as this is where most of the foot traffic will occur as well as the spread of germs and illness.
- The living units will have the option to choose how much fresh air supply is needed for personal comfort
- The unique feature of the pedal shape is that the user has the option of choosing fresh air on almost all sides instead of typically one direction
- The pedal shape creates efficiency in the workplace as the user can completely customize the air flow in each unit maximizing comfort which leads to employees carrying out tasks more efficiently.

Daylighting

- Good lighting of the workplace is one of the main factors of indoor comfort that can positively influence health and productivity of office personnel. Natural light, its variations and its spectral composition are of great importance for well-being and mental health.
- Daylighting is important in two ways; first it reduces the amount of electrical lighting required and second is that the quality of light from daylight is superior to electrical lighting. The double skin façade with its increased glazing coverage improves the access to daylighting in the space. Also important to daylight penetration is floor to ceiling height and floor plan depth.

ELEVATIONS

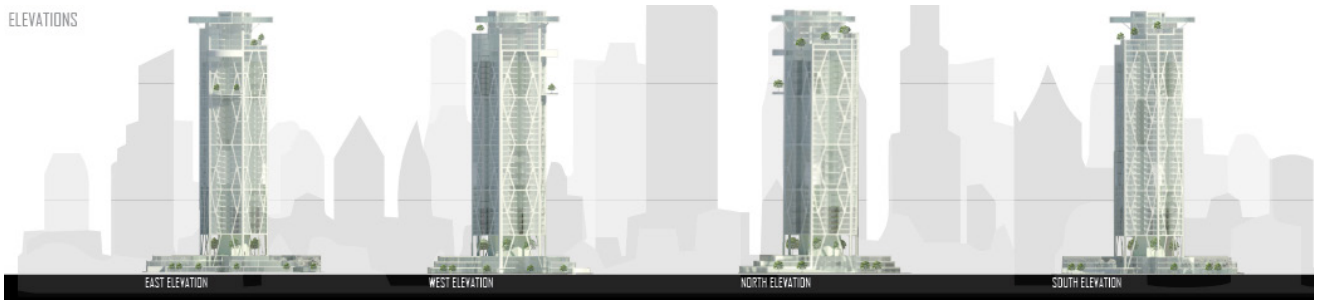


Figure 61 | Elevations

RENDERS

Figure 62 | Aerial Perspective

RENDERS

Figure 63 | Aerial Perspective

RENDERS

Figure 64 | North Entrance

Figure 65 | South Entrance

RENDERS

Figure 66 | Aerial Perspective

RENDERS

Figure 67 | Aerial Perspective

RENDERS

Figure 68 | View of Retail

Figure 69 | View of Living Unit

VIDEO

Figure 70 | Video QR Code

https://www.youtube.com/watch?v=nvLcwxXKG64

THE APPENDIX

PREVIOUS STUDIO EXPERIENCE

Darryl Booker - 2nd Year: Fall 2017

-Teahouse
-Boathouse

Charlotte Greub- 2nd Year: Spring 2018

-Small Dwelling | Birdhouse
-Mixed-Use Apartments

Paul Gleye- 3rd Year: Fall 2018

-Fargo Visitor Center
-Fargo Mixed-Use Developent

Ronald Ramsay- 3rd Year: Spring 2019

-Hotel
-Native American Museum

Cindy Urness- 4th Year: Fall 2019

-High Rise

Mark Barnhouse- 4th Year: Spring 2019

-Water Treatment Plant

Ronald Ramsay- 5th Year: Fall 2020

-Agincourt, Iowa Addition | Restaurant & Brewery

Bakr Aly Ahmed- 5th Year: Spring 2021

-Envision - The Future of Office Space

Figure 50 | Previous Studio Experience

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