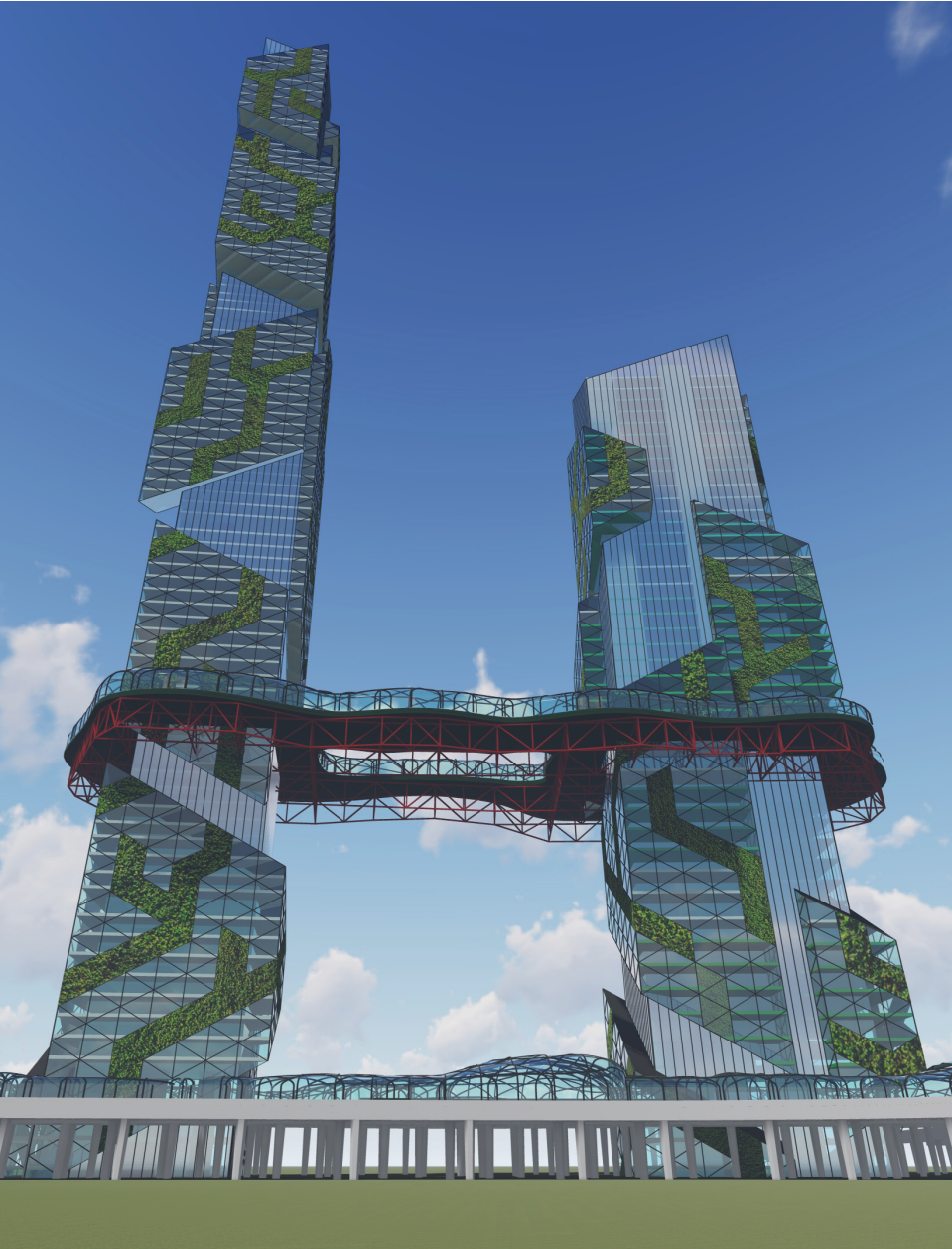


# HEDERA HOMESTEAD

GROWING A STRONGER  
AND HEALTHIER COMMUNITY

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Building Model by Student

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Course // Vertical Urban Utopias  
Academic Year // Spring 2020  
Project Titile // Hedera Homestead



The driving factor of this thesis project is a desire to strengthen the community and improve public health by encouraging a healthy lifestyle and promoting the practice of sustainable living through community-based urban farming and public placemaking. In addition to providing programs which improve health, such as fitness centers and educational spaces, and supplying fresh food for the local community, the building would also promote the idea of sustainability through visually green spaces using biophilic design practices. The project would promote health on all levels, from physical and mental, to environmental to social. Because personal health is very closely connected to nature, green spaces are very important to the project. It has been proven that being in nature, or even viewing scenes of nature, reduces anger, fear, and stress and increases pleasant feelings. Exposure to nature not only makes you feel better emotionally, it contributes to your physical wellbeing, reducing blood pressure, heart rate, muscle tension, and the production of stress hormones. The concept of living a healthy, sustainable lifestyle within the building would ideally extend to the surrounding neighborhoods and the city as a whole through vibrant social spaces and a thriving community marketplace.

Concept Statement by Christina

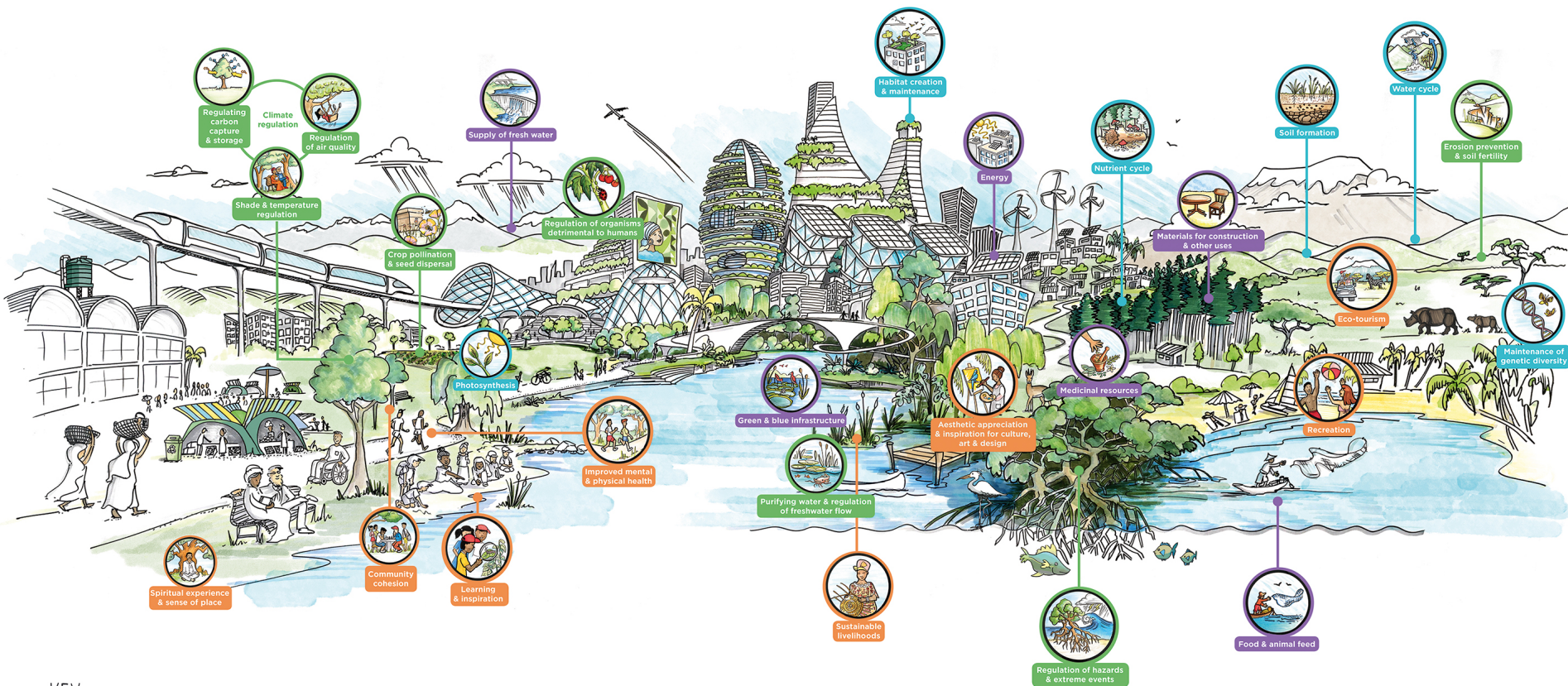
New York City is being weighed down by urban overcrowding, congestion, noise pollution and traffic. To relieve this pressure, the Hedera Homestead intends to raise the city out of this fog of congestion by creating a new layer for the city. This new layer is made up of a system of green bridges that will create new pedestrian walkways that connect select high rises of the city through nature. Currently the most expensive apartments in the city overlook Central Park giving the richest of the rich the monopoly of the green spaces of New York. The bridge system makes nature accessible to everyone no matter their financial standing. Green Spaces are essential for communities, whether as meeting spaces, or recreational spaces for children to play and for adults to jog, decompression spaces for getting away from the noise and the everyday life of the city. The greenery of the bridges promote physical activity and better mental health, reduce noise pollution, and help clean the air. The intention of the new layer is to alleviate the tension in the city through convenience and accessibility. The use of multiple bridges allow for a new city to grow over and work with the city below. The Hedera Homestead is inspired by the Highline which was built on an abandoned train track that runs along the west side of Manhattan and will be built around the above ground subway tracks of Queens Borough Plaza.

Concept Statement by Fiona

The word homestead describes a place that is not only a home, but a property which is able to support its residents through the production of food and other substances needed for survival. Hedera Homestead's intention is to **create a stronger and healthier community** that is supported by its own resources, and **promotes a sustainable lifestyle**. The Homestead will gather the surrounding community together with thriving green space and strengthen community bonds through **recreational parks and collective farming**. Located in the Dutch Kills area of Queens, Hedera Homestead brings the history of it's site back to life as it recalls the family-owned farms which produced food for Manhattan in the 1800's. The Homestead **reimagines the concept of community farming for a modern urban environment** through a vertical farm and residential tower connected by skybridges. The construction of the triborough bridge, Queens borough plaza, and the sunnyside rail yard, have transformed Dutch Kills Green from it's roots as a farmscape into a modern transportation hub. This remodel of the Dutch Kills area has unfortunately turned it into a space which is passed through rather than a space to congregate and share experiences. **The goal of the Homestead is to embrace the history of the site and create inviting and exciting green space which cultivates connections between people and reunites the built environment with natural landscape.**

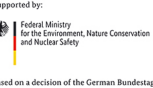
# THE VALUE OF NATURE IN URBAN LIFE

Nature provides diverse life-supporting and life-enhancing contributions to people in cities and towns. These gifts from nature make human life both possible and worth living. All cities critically depend on healthy interconnected ecosystems within and around them, so it is essential that nature is fully integrated into urban planning and development. There is a growing urgency for collective and large-scale action to protect the biodiversity in and around cities to prevent irreversible loss and damage to the natural systems we depend on.

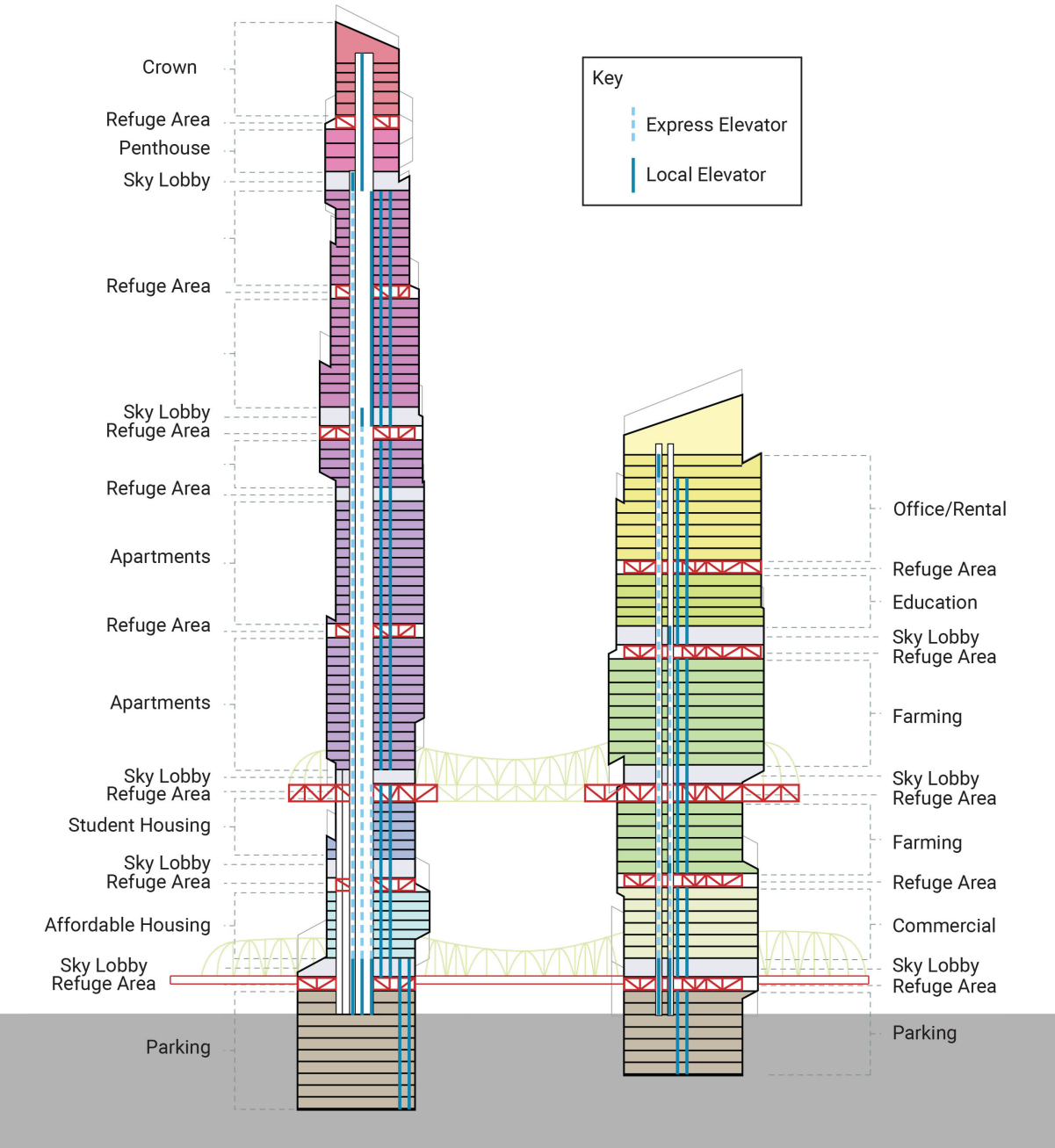


KEY:

- TANGIBLE THINGS FROM NATURE THAT MEET HUMAN NEEDS
- BENEFITS OBTAINED FROM THE PROCESSES THAT REGULATE THE NATURAL ENVIRONMENT
- NATURE'S GIFTS THAT ENRICH OUR LIVES
- SUPPORTING THE LONG-TERM HEALTH OF THE PLANET

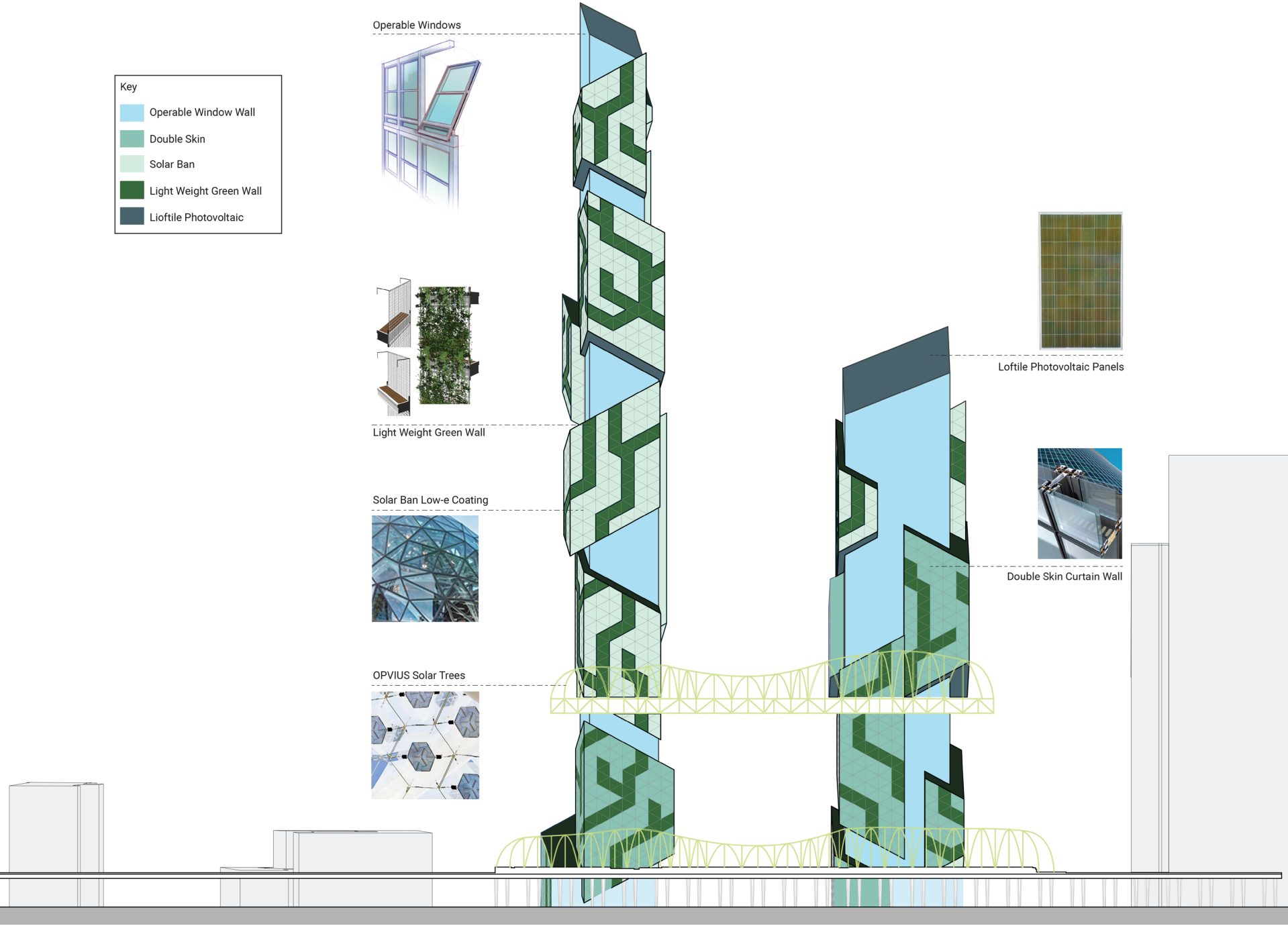






The vertical farming system provides fresh produce to the surrounding neighborhood, while lowering the carbon footprint that comes from non-locally sourced food. The bridge-parks give the community much needed **space for performances, recreation, community events and relaxation**, providing a new home for the green that has been lost to modern construction. The greenery of the parksapes is drawn into the towers, throughout the interior with green walls weaving through spaces, as well as double height greenhouse lounges. The farm is not only an efficient production system, with modules that produce the most possible for the area, but an **effective education center**. The public is welcomed to explore and learn the importance and benefits of locally grown vegetables, in addition to the **positive impact of foliage** on their own mental health and physical well being. Plants promote better mental health through the reduction of noise, sound, and light pollution that has a negative reaction on the mind when it never receives a reprieve. A marketplace is provided for produce to be sold, along with a space for local businesses and jobs for those who live in the community. **Hedera Homestead is not only a place to live or work but a place to grow, and relearn skills that city life has disconnected its residents from; reacquainting humanity to the value of nature.**

The Hedera Homestead is located in the Dutch Kills area of Queens, just northwest of the sunnyside rail yards. This location was chosen for its uninterrupted sun that coats the site from the southeast. This access to the sun is key for the two skyparks, the vertical farming facility, and the **vertical green walls that weave throughout** the residential building. The skyparks are encased in a triangulated space frame that shields from wind and makes the park usable for the entirety of the year no matter the weather. The roofing system that is wrapped over the space frame is a mix of OPVIUS solar trees and PALRAM polycarbonate DYNAGLAS, that collect solar power and prevent wind. The **name Hedera comes from the English Ivy** that is the most predominantly used for shading and cleaning the air within the two towers. The towers are designed to imitate a growing plant, with angular sections wrapping around a main vertical element, **similar to the way a vine might climb the trunk of a tree**. The triangulated system used for the space frame is reflected in a triangulated grid on the facade of the wrapping sections. The grid on the facade is broken up by portions of light weight green wall, which provide shade to the buliding's interior. Each tower is crowned by an **angled roof that continues the motion of the wrapping** sections. The angles that shape the sections allow for the creation of double and triple height greenhouse lounges on the interior of the building. While the bridge-park provides recreational green space and the indoor greenhouses provide visual green elements, the vertical farm focuses on productive planting. The farming floor levels are designed with efficiency in mind, with the planting modules organized in neat rows and positioned according to ideal sunlight conditions for the various plants which are grown in them.

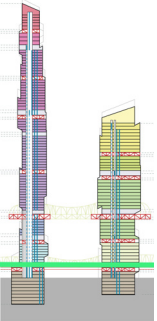


Facade Diagram by Student



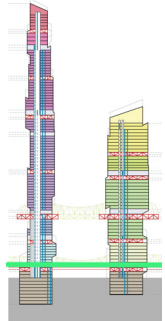
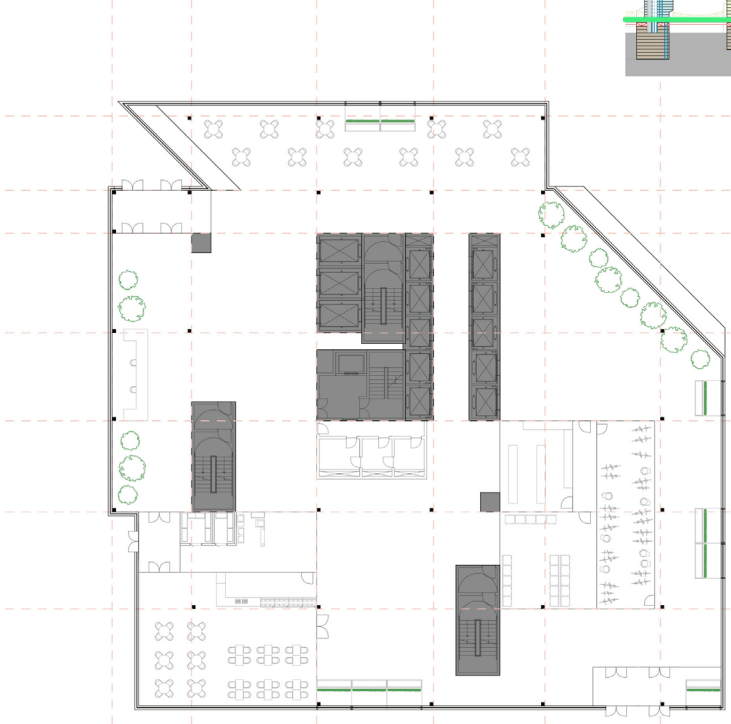
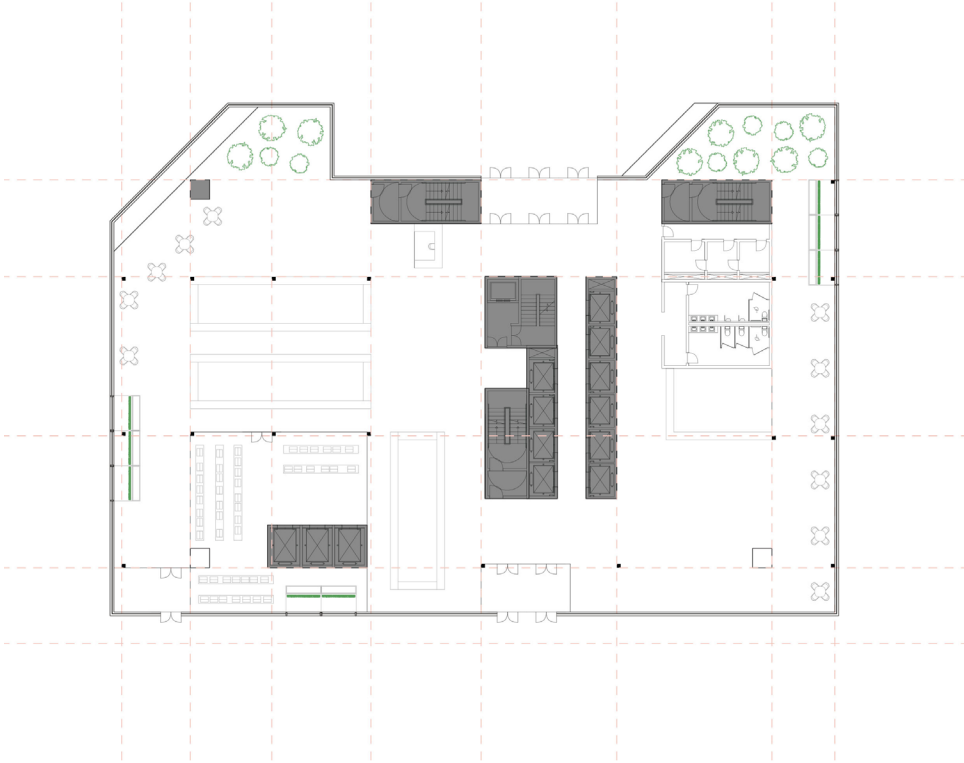
Bridge Plan

Drawing by Student



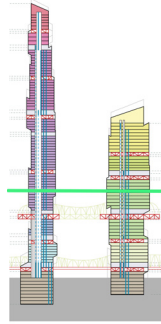
Lobby Plans

Drawings by Student



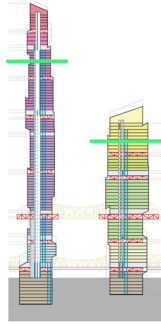
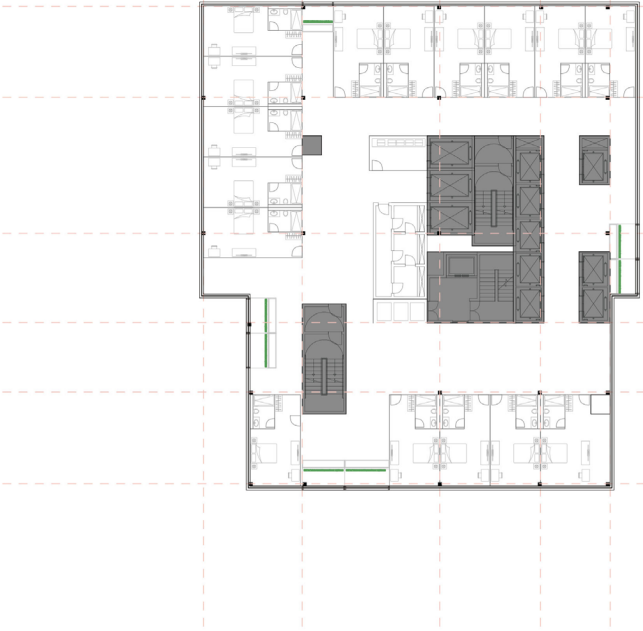
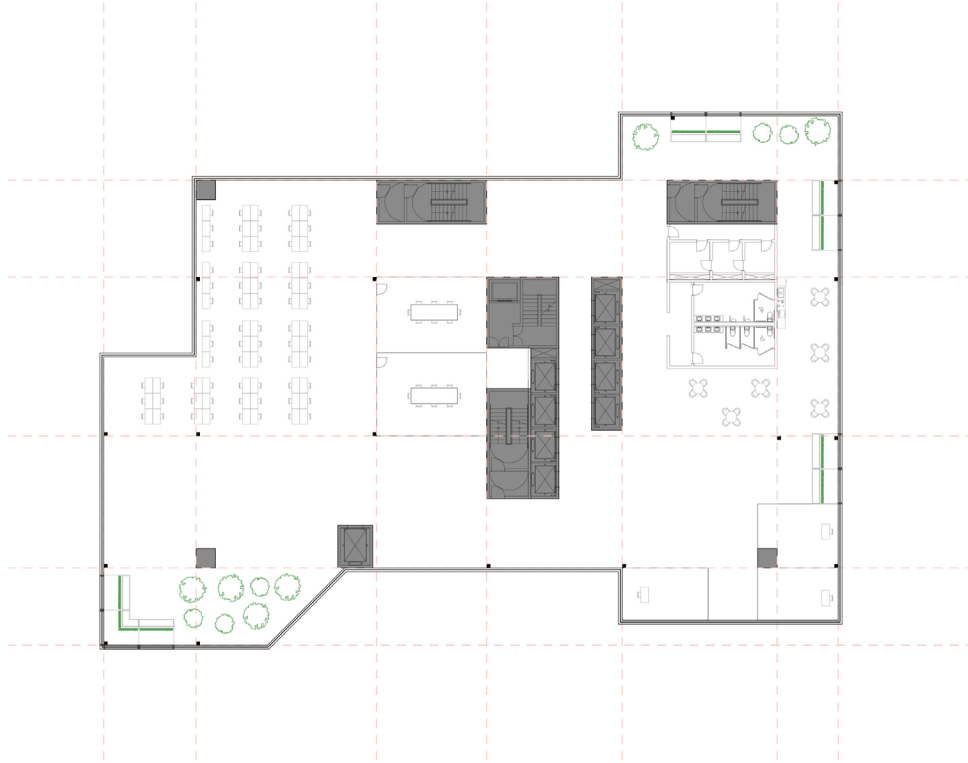


  
Farming Plan/Apartment Plan

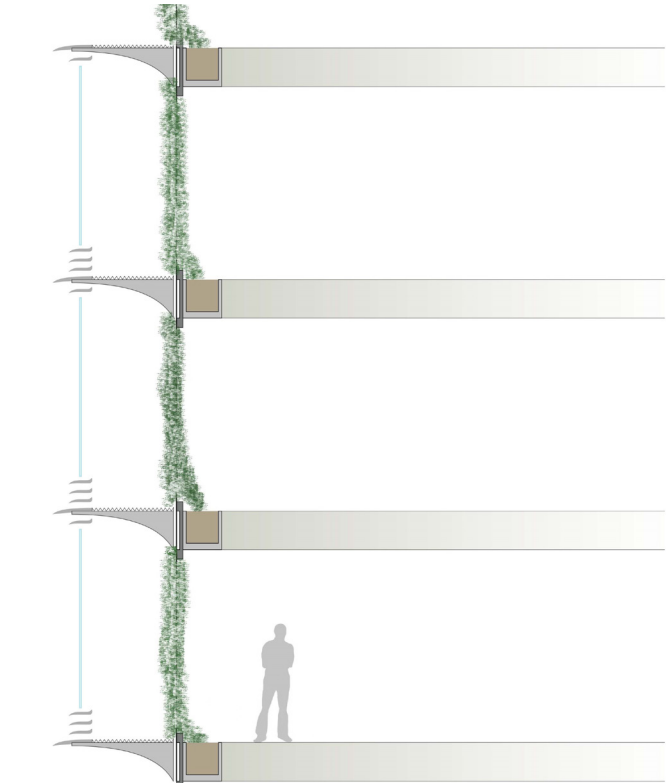


Drawing by Student

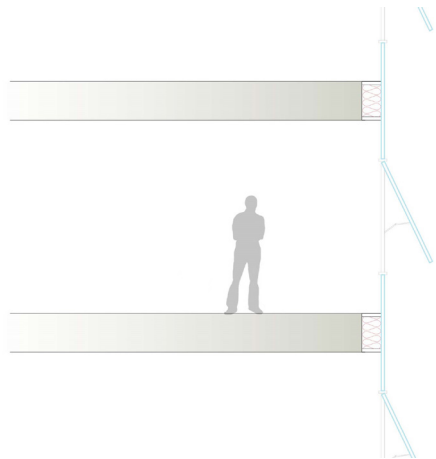
  
Office Plan/HotelPlan



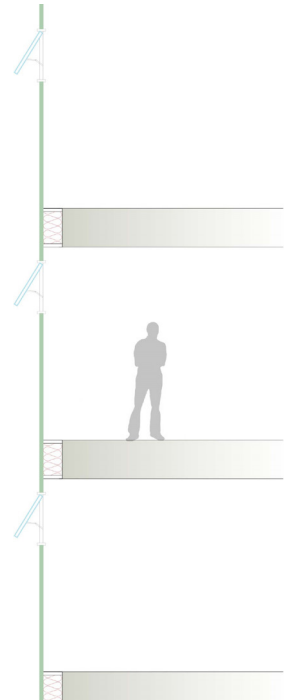
Drawings by Student



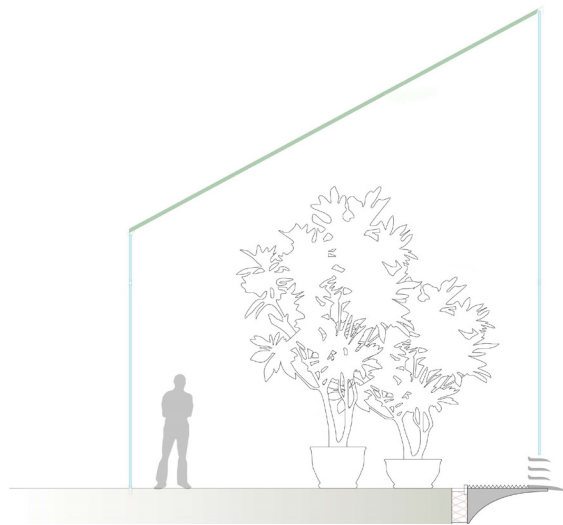
Double Skin Ivy Wall



Operable Windows

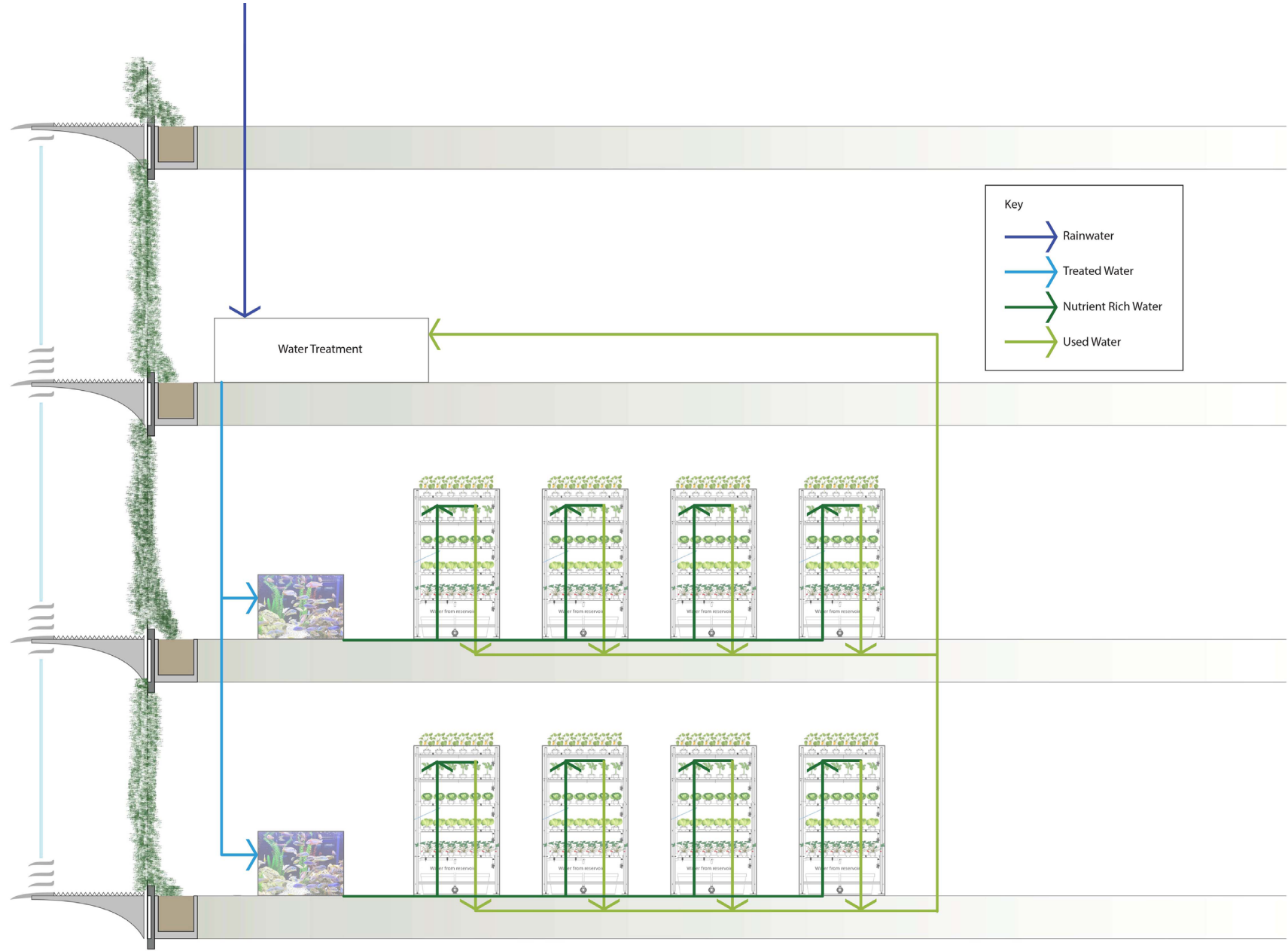


Loftile Color Photovoltaic Panels



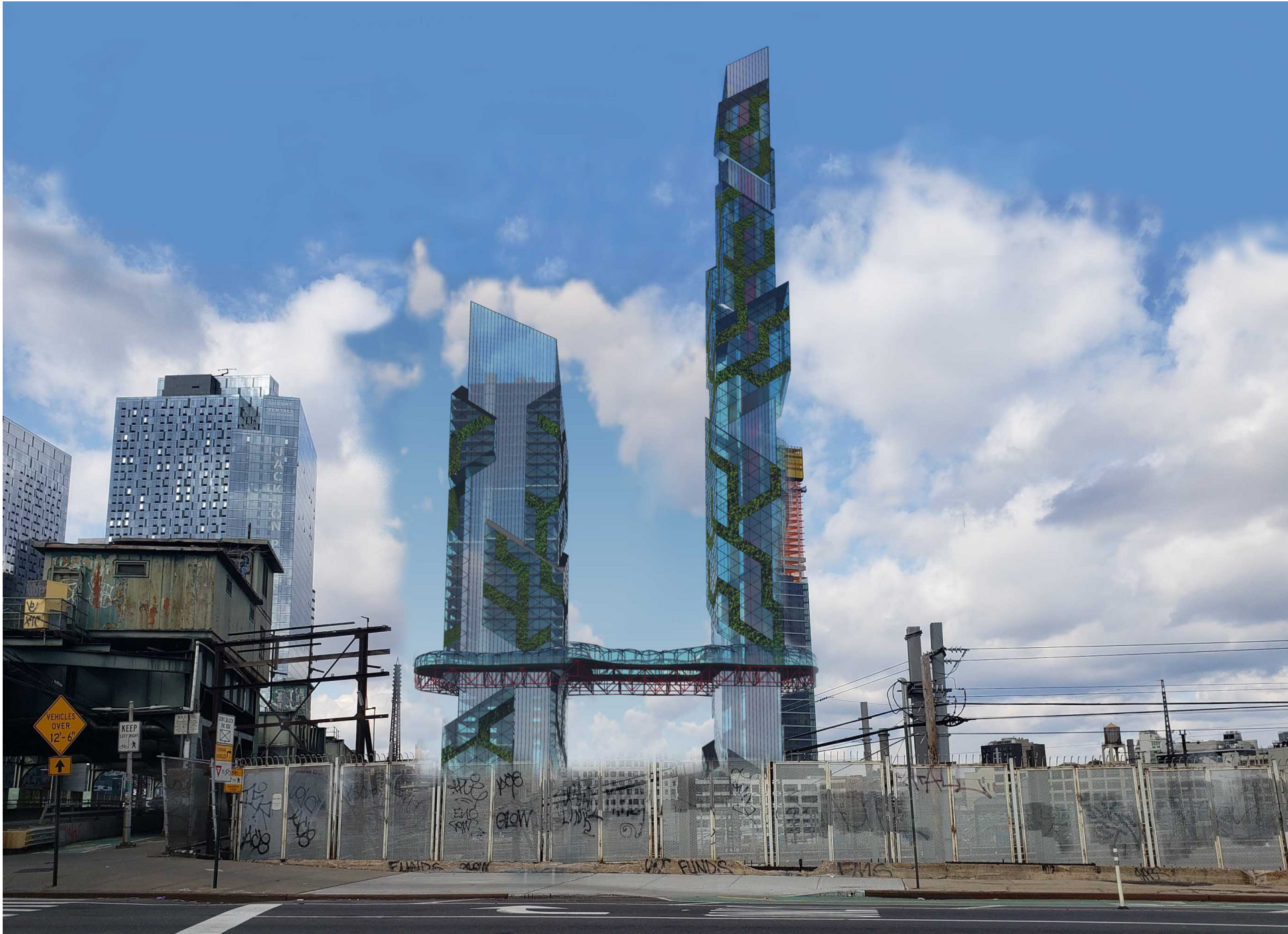
Double Height "Greenhouse"

Drawings by Student

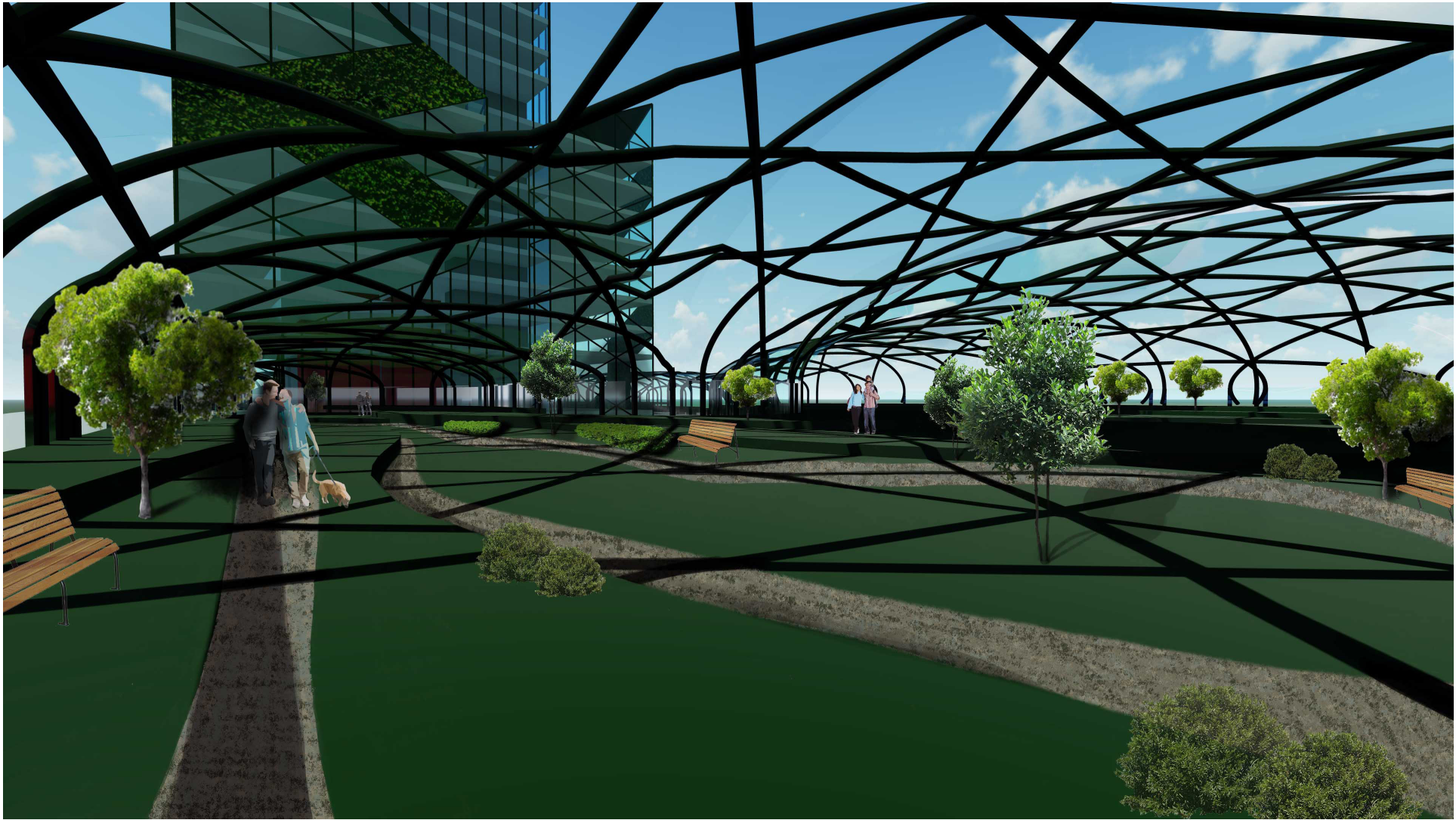


Water Reuse Diagram by Student





Street View Render by Student

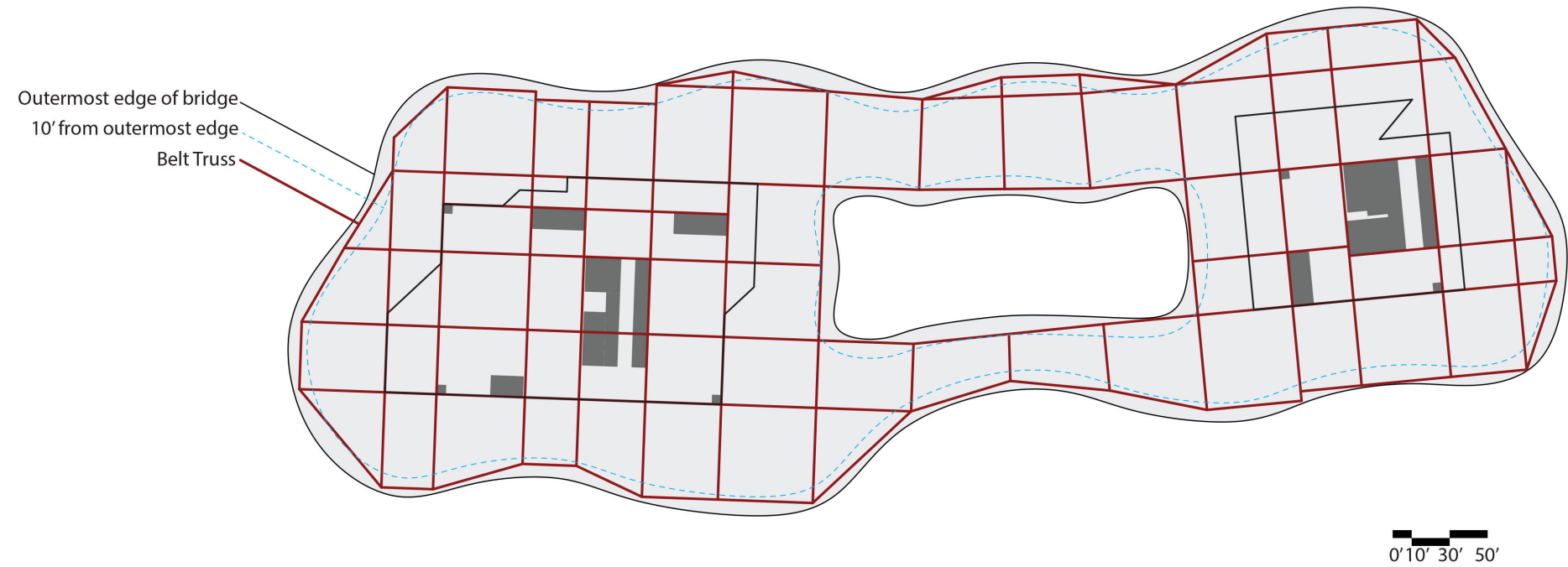


Bridge Park Render by Student

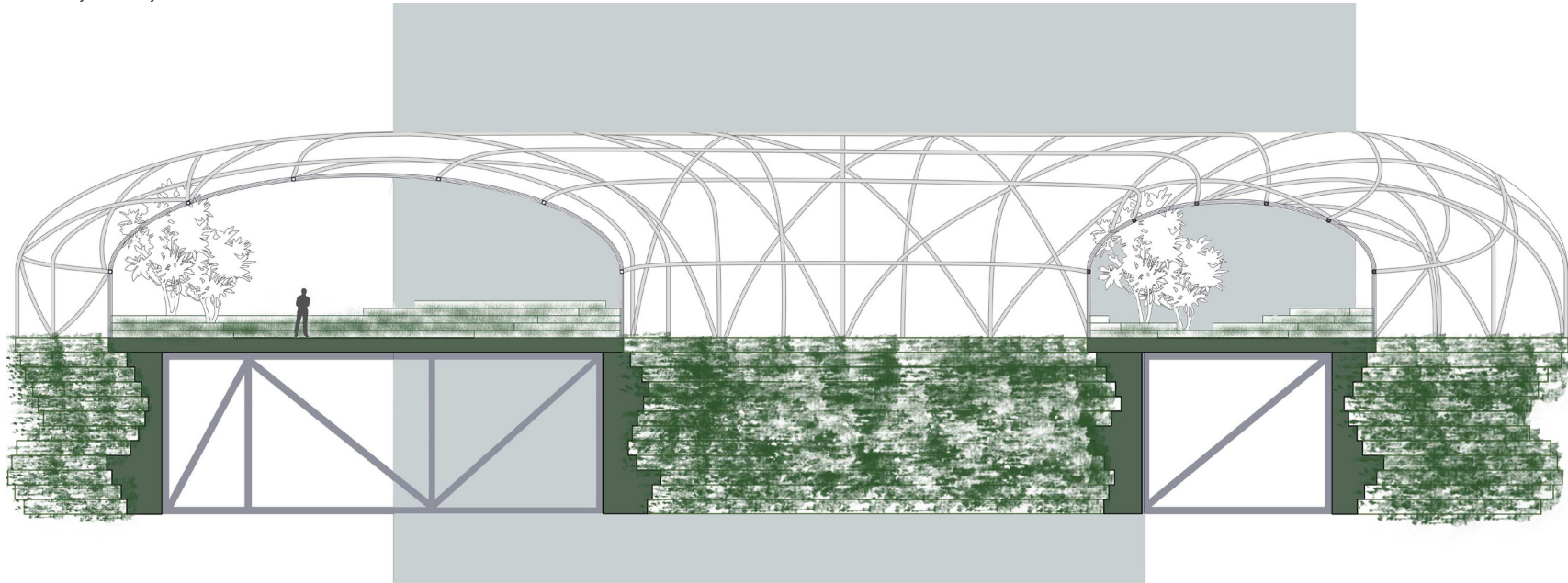




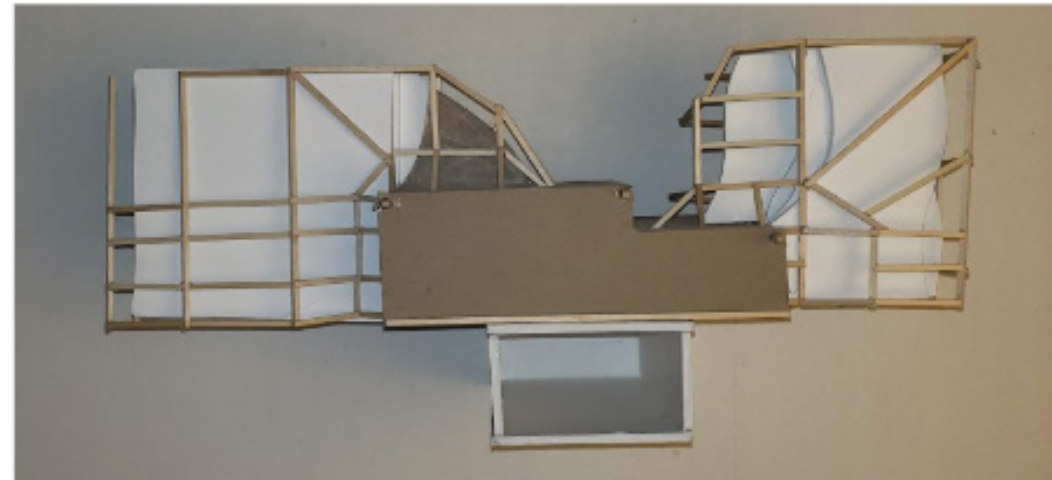
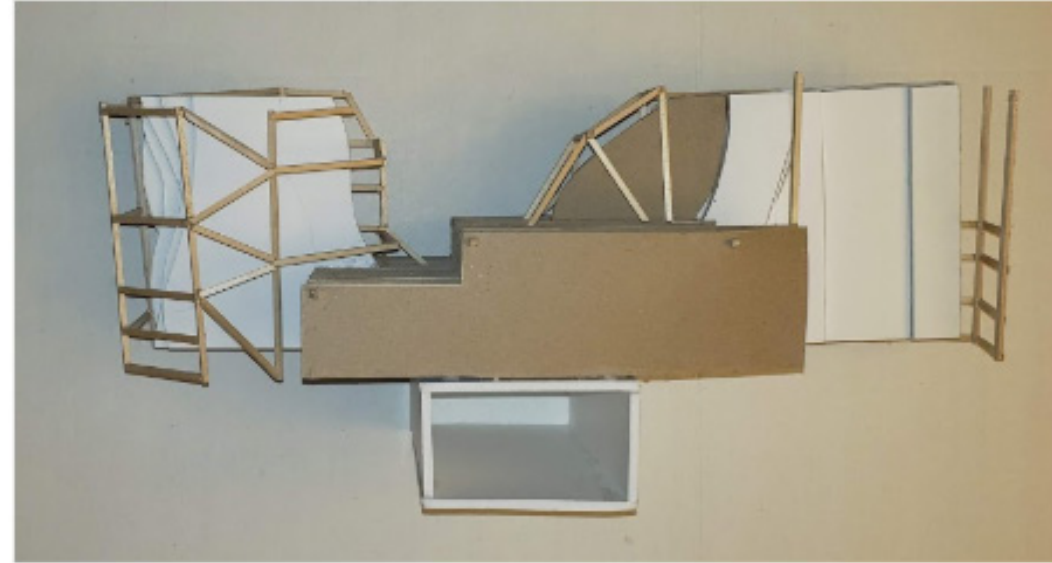




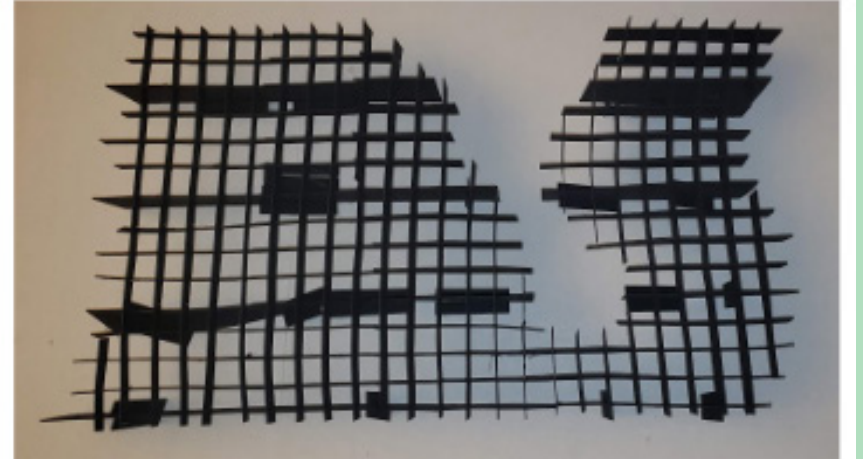
Bridge Truss Layout by Student



Bridge Section by Student



Bridge Models by Student





What makes a healthy community? Health is about more than just access to medical care, it is a complex and elaborate concept that involves all aspects of a person's well-being. The physical and emotional health of community members is necessary in order to cultivate strong social and environmental health. Vibrant public spaces are an essential ingredient in thriving communities. Social areas where people come together to learn, play, exercise, relax, and interact with one another are vital to a strong community. Historically, low-income neighborhoods have often been neglected when it comes to the development of public space. Coincidentally, these neighborhoods also often report high rates of nutrition-related health issues, such as diabetes and obesity, usually because fresh healthy food is not available at an affordable price. The health of impoverished neighborhoods can be improved with a steady supply of affordable healthy food options and the encouragement of a healthy lifestyle. Community-based farming is an activity that promotes physical, social, and environmental health simultaneously. While it strengthens the community health within the neighborhood, it also promotes the idea of sustainability and healthy lifestyle to the larger community of the city.

For most of our history, humans lived a nomadic hunter-gatherer lifestyle, migrating with the seasons to follow their main sources of food. With the invention of farming some 10,000 years ago, the structure of human communities changed drastically, as our nomadic ancestors began to create settlements based around the practice of agriculture. The social structure of communities organized around shared farming ground can be seen well into the 17th century, when the farming arrangements of the feudal system in England included common land where people could graze animals or grow crops. People who lived off the common land were known as commoners, and because it was their main source of food, their daily lives revolved around farming and agriculture. This began to change when the practice of enclosure, or privatizing common land, became popular. The Enclosure Movement and an increase of factory jobs in large cities, due to the industrial revolution, resulted in large numbers of people moving from rural to urban areas. Agriculture was now controlled by people who could afford land, and began to transform into the industry that nearly every person in the world today relies on. As the world began to transition from a feudal system to a capitalist system, farming became less about providing for the community, and more about making money.

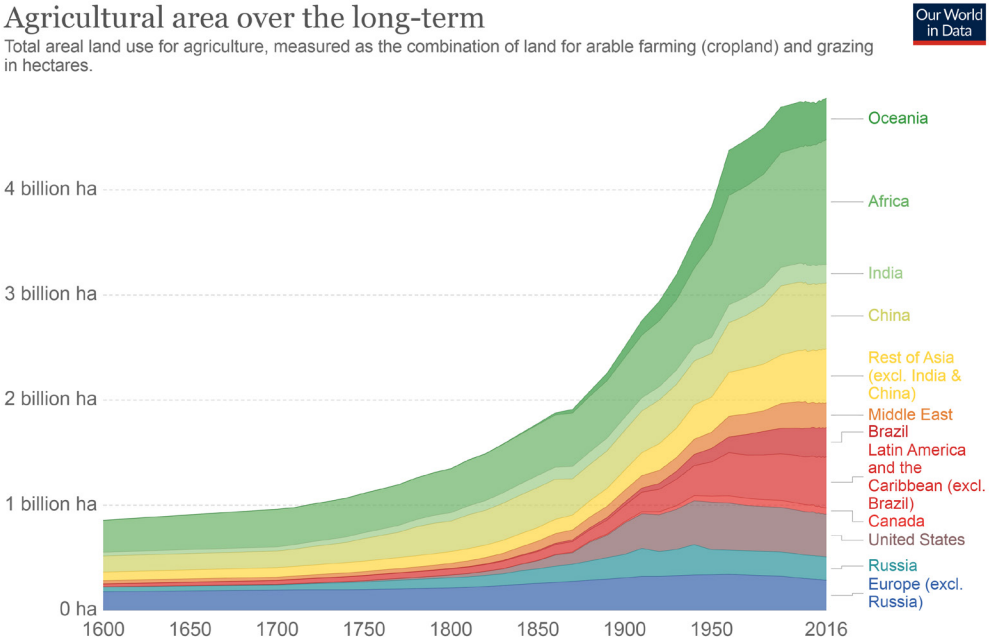


Building Healthy Communities - [buildhealthyplaces.org](http://buildhealthyplaces.org)



Native Americans farming in Tennessee - Painting by Carlyle Urello





Agricultural area in Hectares - History Database of the Global Environment

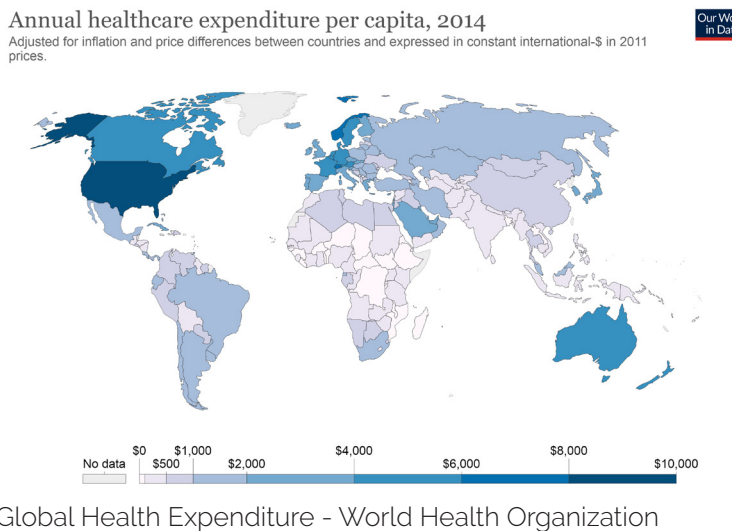
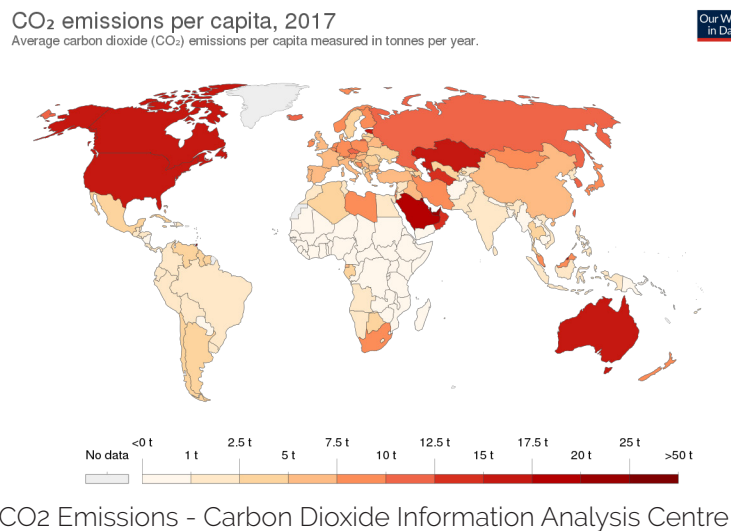


Deforestation due to Agriculture in the Amazon - National Geographic

There have been three main revolutions in farming technology which significantly changed the way we practice agriculture in the United States. The first was the mechanical revolution, which took place in the early 1900s and saw the invention of new tools like the tractor, which reduced the need for labor. From 1910 to 1950, the number of farm workers decreased by 26.8%, while the amount of farmland increased by 31.8%, as rising population levels created a larger demand for food and other raw materials produced on farms. In the chemical revolution during the second half of the 20th century, scientific advancements in chemical war technology paved the way for the perfection of pesticides and fertilizers. Pesticides reduced the amount of crops lost to bugs and disease while fertilizers helped plants grow stronger, both of which increased crop yield. The third revolution can be called the "biotechnology revolution," which began in the late 20th century and is still ongoing today. Modern science has given us control over the modification and hybridization of crops, and plants can now be genetically modified to grow larger and faster. Each of these revolutions improved the efficiency of the contemporary agricultural industry, which the constantly growing world population relies on as our main source of food.

Unfortunately, modern agricultural practices contribute significantly to global climate change, accounting for about 20% of the world's total greenhouse gas (GHG) emissions. In the agricultural industry, the main source of greenhouse gas is methane (CH<sub>4</sub>) from livestock and rice production, but emissions also come in the form of carbon dioxide (CO<sub>2</sub>) due to deforestation and nitrous oxide (N<sub>2</sub>O) from fertilizing or burning crops. In addition to the GHG emissions from deforestation and agricultural management, the share of emissions from transportation, packaging, and waste of food account for another 10% of global GHG emissions. This means that the global food trade system as a whole is responsible for nearly one third of the world's total greenhouse gas emissions. Ironically, as agriculture contributes to rising global temperatures, it is also detrimentally affected by climate change. Erosion and land degradation from extensive agriculture have cost the world about 30% of its arable land in the past 40 years. Additionally, extreme climate events caused by global warming such as heat waves, droughts, and floods can seriously harm crop yields. There is an endless cycle between the modern agricultural industry and global climate change, as each one continuously affects the other. We need to come up with more sustainable agricultural practices which are healthy for both our societies and our planet as a whole.

The United States is one of the world's leading agricultural producers, and also one of the most unhealthy countries in the world. The unhealthy diet of average Americans is closely related to some of the leading causes of death in the United States. A typical American diet is high in sodium, calories, saturated fat, and added sugars, and does not contain enough fresh fruits and vegetables, calcium, or whole grains. A poor diet increases the risk of numerous diseases, such as diabetes, heart disease, high blood pressure, obesity, and even some types of cancer. The U.S. is also one of the worlds biggest spenders on healthcare, having spent \$3.5 trillion, or \$10,739 per person, in 2017. That number is astronomically high, as other developed countries spend almost half as much per capita on healthcare. The National Association for Sport and Physical Education estimates that by 2018, obesity alone will account for 21 percent of total healthcare costs in America. In the United States, capitalism is king, and money is the driving factor for essentially everything, including the health industry. There is a staggering difference in the promotion of healthy foods by the government vs the promotion of unhealthy foods by private companies. The Division of Nutrition and Physical Activity at The Center for Disease Control spent roughly \$47 million on the promotion of healthy lifestyles while the Hershey Company spends roughly \$562 million on advertising and promotion of their candy. The amount of fast food restaurants far outnu mbers the amount of health food stores, particularly in low income areas. Part of the reason that Americans eat so unhealthily is the fact that fresh foods tend to be more expensive than sodium-filled fast food and other pre-prepared meals.



The terrible irony is that poor health actually costs more in the long run. According to the Center for Disease Control, reducing the sodium Americans eat by 1,200mg per day on could save up to \$20 billion a year in medical costs. Even if people save money by eating cheaper, healthier food, they can end up having to pay high medical bills as a result of health issues. For people of low socioeconomic status, having to pay expensive medical bills pushes them closer to the poverty line, and so they continue to eat the cheapest food available. The endless cycle of eating cheap food and paying expensive medical bills is one of the reasons that low income neighborhoods often have poor health ratings. People in these neighborhoods have diet related health problems because they either don't understand the consequences of unhealthy food, or it is simply the only thing available to them. More than 23 million Americans, including 6.5 million children, live in food deserts, areas that are more than a mile away from a supermarket. Oftentimes if healthy food is available, it is the more expensive option. In order to improve the physical and economic health of low income neighborhoods, we need to provide them affordable, healthy food.

Creating new methods of farming which are based around community can improve many aspects of public health in impoverished neighborhoods. Farming as a collective activity encourages cooperation and interaction, improving social health. A supply of affordable healthy food options could, in the long run, help community members move towards a more stable economic health. Educational programs which teach the public about nutrition and promote the idea of a sustainable lifestyle would improve intellectual health. Locally produced food would reduce the need for transportation of food products, reducing carbon emissions and improving the environmental health of the city.

What is public architecture? According to Charles Jencks, it is made of three parts: artistic vision, what society needs and what the client wants. What does society need? (Jencks, Iconography) An ecological and health revolution through the vision of architects. Our environment is falling apart and there is a decline in the physical and mental health of society. The architecture of this 'revolution' must re-establish a dialogue between humans and nature that is continuous and evolving. (Yeang, Eco-skyscrapers) This dialogue begins with the use of green systems, such as green walls, and community gardens, spaces that can not only reconnect people with each other. How can the advantages of vertical structures be used to make up for their drawbacks, while compensating for their predecessors' negative effects on the environment and society?

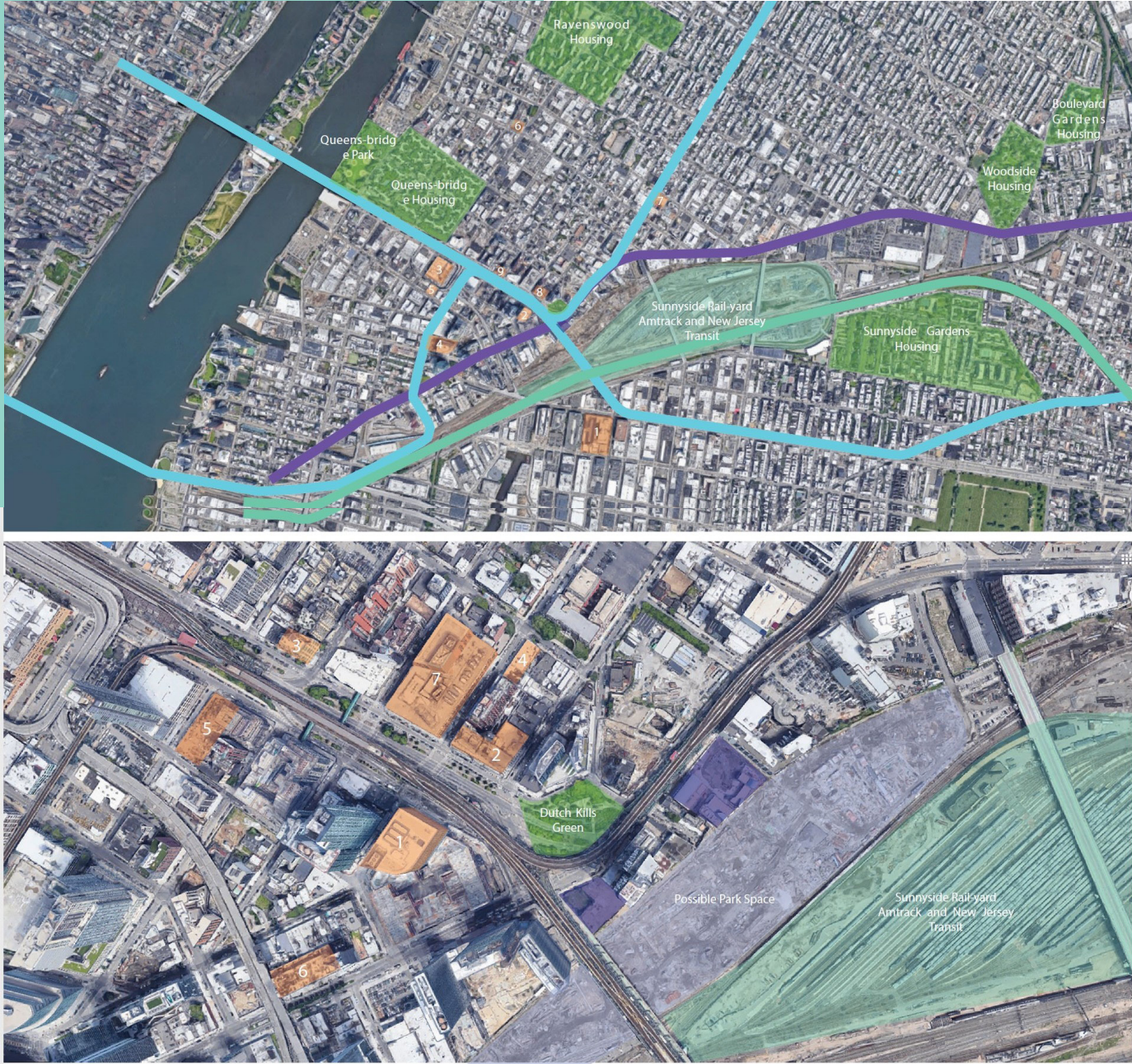
Skyscrapers and vertical megastructures are not ecologically friendly. To build and operate these vertical structures, one third more material and energy is necessary, and they are also more difficult and costly to demolish, which makes the impact of these structures extremely negative for the planet. As Ken Yeang has argued, vertical structures need to adapt and become more like natural ecosystems, for in ecosystems everything is recycled and nothing is wasted. This can begin with recycled material for construction. The built environment has increased the amount of inorganic material in the world, and this has caused a mass removal of organic material to create space for the urban landscape. At the same time, however, vertical mega structures have a unique characteristic that can be utilized for reconstruction of the organic landscape. Even Frank Lloyd Wright, who opposed what he called "The Tyranny of the Skyscraper," acknowledged that high-rise buildings can sell and populate their footprint some fifty times over, (Wright, pg. #168) if this factor is considered in designing then the biomass of the footprint could not only be replaced but multiplied, which could make up for the footprints of surrounding buildings. Nature being brought back into the city is often seen as a need to reconstruct what was, to recreate a former reality. Nature was the past of the city and is the only hope for the future of the city and humanity. The use of artificial forms allows for programmed nature to be brought into the city rather than recreating the nature that was before,(Gessen, Architecture Reconstruction) nature that can be used to create spaces that are private or communal and be used as a way to eliminate sound pollution.

The environment in which we live in directly affects who we are, our mental, physical health and what our society is as a whole. Today most modern cities are made up of vertical structures that stand disconnected from one another. This disconnected architecture is reflected in New Yorkers disconnection from one another. Social isolation, combined with high population density and constant stress from noise pollution and traffic has a degrading effect on our minds. The mental health of city residents is lower with a higher risk of various mental illnesses living in a city nearly doubles your risk of developing schizophrenia. Those who live in rural areas have a lower risk of mental illness due to the lower population and green spaces. Social interaction and community development plays a major role in our mental health. The ability to develop as well as have consistent relationships and a sense of community is a key factor in promoting healthy lifestyle changes. If, as Frank Lloyd Wright argued, "Architecture is to be in the service of man" (Wright, pg. 170), then the architecture of the urban ecology 'revolution' must provide spaces of connection to allow for community development, spaces of privacy to help escape the overpopulation of the city while using those same systems to help eliminate the noise pollution and create a visual separation from the traffic and stress triggers that come from living in New York City. The separation and variation of spaces will draw from the different green spaces that are used, plants such as English ivy, which is a climbing vine that not only filters the air but creates shaded privacy spaces. City life provides access to healthcare, food, and diverse cultural experiences, which are much more difficult to access in rural areas this accessibility is due to the various types of public transportation. However, what is readily accessible in rural areas is green space, which promotes physical activity such as walking and maintaining a front yard as well as gardening, encouraging the growth of one's own fruits and vegetables. Green spaces are important for oxygen production and air filtration as well as helping to moderate temperatures, and in addition, natural environments can be a form of therapy to help remedy depression and reduce stress triggers. The main stress triggers that are a large part of city life are noise, light and air pollution, in rural areas these types of pollution are kept at bay by various plant species, ivies, fern and even plants used for cooking just as basil are adept at cleaning the air, while plants like evergreens with thick branches create a barrier as well as breaking up sound.

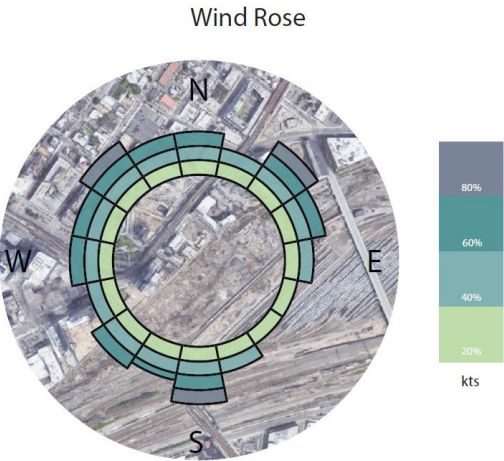


Another benefit of living in a suburban area is that residences may each have their own plot of land, with the valuable privacy that it affords. These plots of land blend into the front and backyards of surrounding homes, this creates spaces of connection and activity. Places for children to be able to play games and develop important social skills, children's access to green spaces for playing is an important part of early development. Higher interaction with green spaces promote social behavior as well as provide children with a lowered overall chance of mental disorders. Green spaces are so deeply rooted in childhood development that green spaces carry the same amount of weight as family history, parent's age, the only thing stronger than these three elements is socioeconomics. The spaces also are utilized by adults to host block parties and develop friendships that are needed when raising children and dealing with the everyday aspect of adulthood. Community spaces such as these rarely find a home in the skyscraper culture that is taking over New York City as well as many other cities of the world. Bringing green spaces into the city allows for the benefits of suburban living to be blended with the benefits of urban lifestyle. Spaces such as community gardens bring tenants together as well as teach children about plants and encourage a healthier diet. Public architecture should not only be a space viewed and inhabited by the public but also an architecture that promotes ecologically sustainable growth. An environmental and health-conscious design that revives the lost dialogue between nature and humanity, though the strength and flexibility of a vertical structure. Our world needs to address the environmental and mental health degradation that our society is facing, and green systems and variation of spaces can be the tools to enhance the benefits of urban lifestyle while addressing the stress and global warming stimulants.





- Subway Lines
  - Highway
  - LIRR Lines
  - Railyard
  - Housing with Garden Spaces
  - Site
  - Purposed Park Space
1. La Guardia College Performing Arts
  2. New York City Department of Health and Mental Hygiene
  3. Silver Cup Studios
  4. CUNY School of Law
  5. United States Citizenship and Immigration
  6. Queens Library at Long Island City
  7. Social Security Office
  8. New York City Department of Education
  9. Consulate of Ecuador in Queens



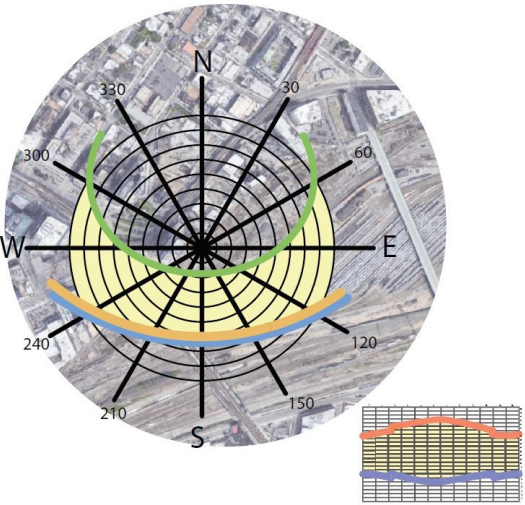
1. New York City Department of Health and
2. New York City Department of Education
3. Consulate of Ecuador in Queens
4. Academy of American Studies
5. Apex Technical School
6. Queens Adult Learning Center
7. JetBlue Airways Corporation

Site Maps by Student

Dutch Kills was founded in 1642, originally a swampy area, it became **known for its farms and Mill**. In the 1800's the farms supplied the produce for New York City's markets, the mill ground the City's grain. Dutch kills began its history as a **transportation hub** due to its production of goods for the city. In 1901 the construction of the Queens Borough Bridge, followed by the construction of the Sunnyside Railyards. In order to construct this new infrastructure, the longstanding **mill and farms were torn down**. Currently Dutch Kills has become home to multiple Skyscrapers, with more coming, as well as **two above ground subway tracks and a below ground station**.

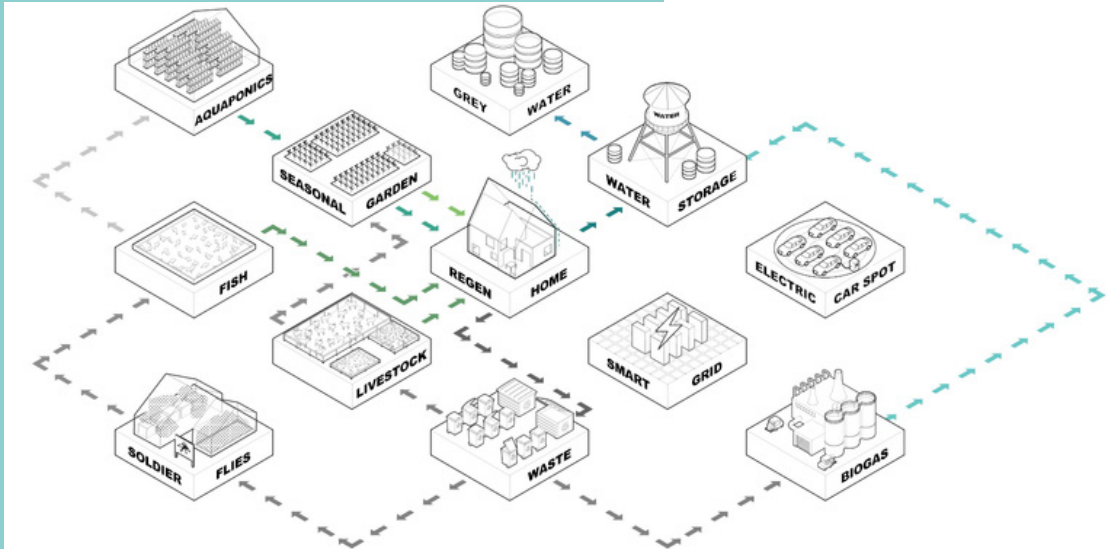


1. New York City Department of Health and Mental Hygiene
2. New York City Department of Education
3. Susten Energy





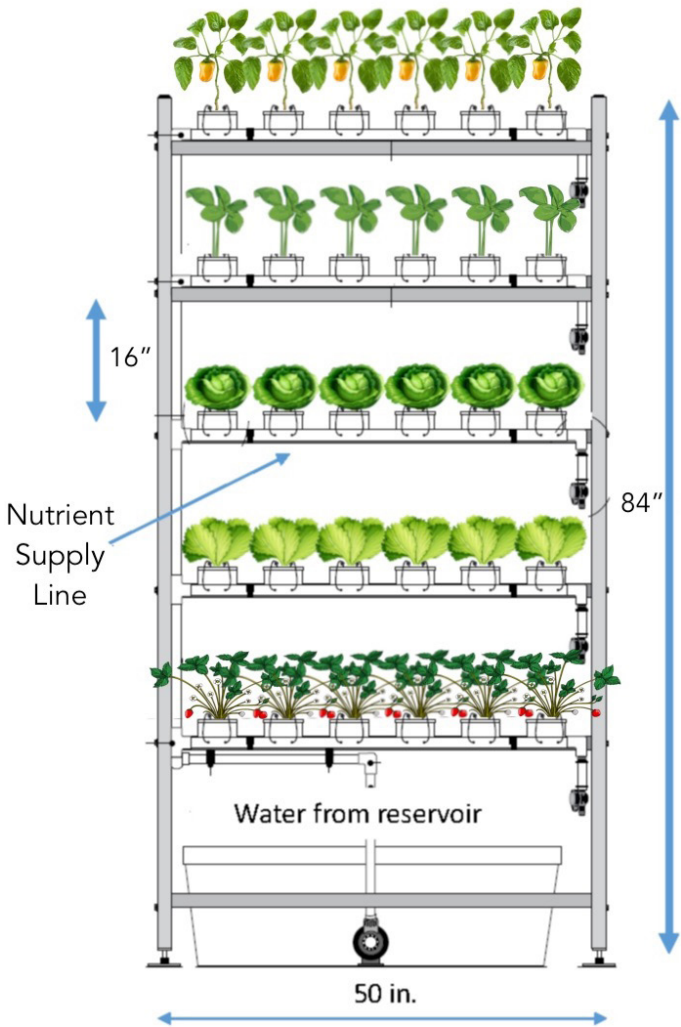
The Hedera Homestead begins with a train station parkscape, that acts as the main entry level, with a marketplace and community area. The North tower is the home part of the homestead providing living space for low-income families, college students, as well as apartments, condos, and a hotel, all crowned by a viewing deck, restaurant and bar. Throughout the North tower green **walls weave from floor to floor**, paired with the double height greenhouse lounges the skypark experience twists its way around and within. Hedera Homestead gets its name from the english ivy that is grown throughout the towers due to its ability to **clean air and filter light**. The South tower is a **vertical farming facility** as well as an education center, market place, crowned by office space. The **produce grown in the South tower will supply the restaurants and cafes in the North tower**, as well as be available for sale to the local community. The North and South towers are connected by a sky park in addition to the train station parkscape, connecting a sky lobby of the North tower to the public farming floor in the South. This public farming floor allows for people to learn about vertical farming as well as the value of locally sourced food.



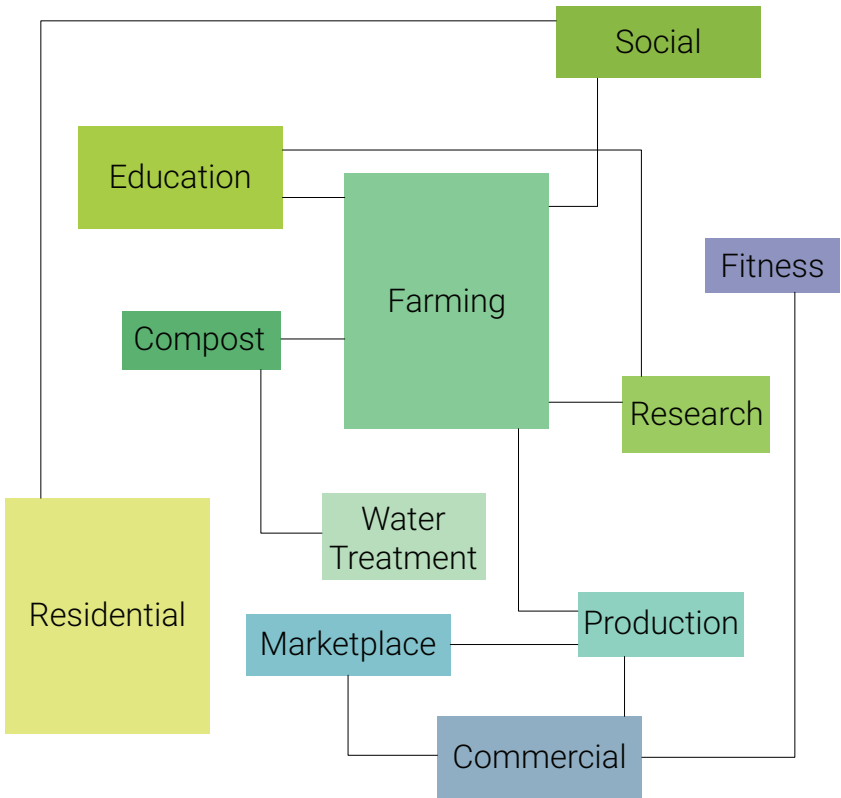
ReGen Villages - Almere, Netherlands



ReGen Villages - Almere, Netherlands



Hydroponic Farming System - Cityfarmer.info



Program Diagram by Student







Japanese Holly



Alpine Carpet Juniper



Arborvitae



Leyland Cypress

Plants for Noise Reduction - nmlawn.com



English Ivy



Basil



Boston Fern



Snake Plant

Plants that clean Air Pollution - hdtv.com



Valerian



Lavender



Chrysanthemum

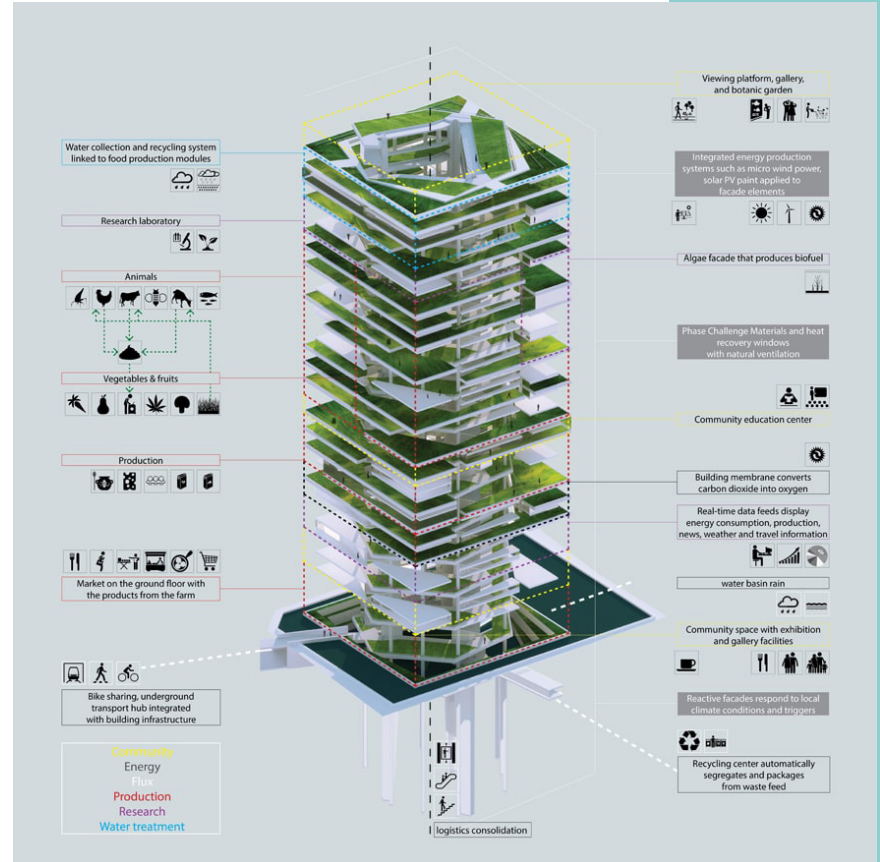


Peace Lily

Plants that help Insomnia - tuck.com



Locavore Fantasia - WORKac



Vertical Farm Seoul - Zoubeir Azouz Architecture

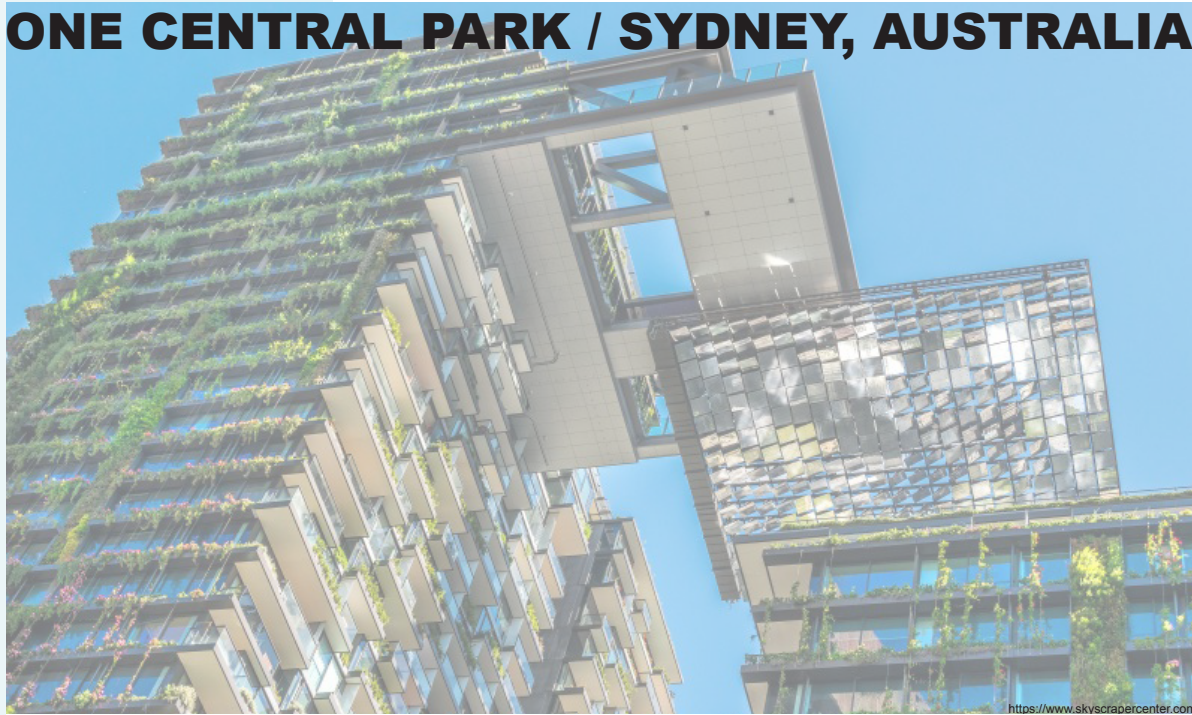


- "3D Data & Maps." Boston Planning & Development Agency. Accessed December 13, 2019. <http://www.bostonplans.org/3d-data-maps/3d-smart-model/citywide-3d-model>.
- "Adult Obesity Causes & Consequences." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, November 6, 2019. <https://www.cdc.gov/obesity/adult/causes.html>.
- "Agricultural Pesticides and Human Health." Case Studies, November 14, 2016. [https://serc.carleton.edu/NAGTWorkshops/health/case\\_studies/pesticides.html](https://serc.carleton.edu/NAGTWorkshops/health/case_studies/pesticides.html).
- "Agriculture and Climate Change." European Environment Agency, December 10, 2019. <https://www.eea.europa.eu/signals/signals-2015/articles/agriculture-and-climate-change>.
- Beatley, Timothy. "Understanding the Nature of Biophilic Cities." Handbook of Biophilic City Planning and Design, 2016, 13–32. [https://doi.org/10.5822/978-1-61091-621-9\\_2](https://doi.org/10.5822/978-1-61091-621-9_2).
- "Boston Common." Boston Common. Accessed December 13, 2019. <https://www.digitalcommonwealth.org/search/commonwealth:c821gs31f>.
- "Climate Ready South Boston." Boston.gov, September 15, 2017. <https://www.boston.gov/departments/environment/climate-ready-south-boston>.
- D'Anna, Christina. "Learn the Basics of Hydroponics: the Most Efficient Gardening Method." The Spruce. The Spruce, December 1, 2019. <https://www.thespruce.com/beginners-guide-to-hydroponics-1939215>.
- Davis, Frederick Rowe. Banned: a History of Pesticides and the Science of Toxicology. New Haven: Yale University Press, 2015.
- Edwards, Arthur C. Sustainable Agricultural Systems. Delray Beach, FL: St. Lucie Press, 1990.
- "Excess Body Weight: A Major Health Issue in America." American Cancer Society. Accessed December 13, 2019. <https://www.cancer.org/cancer/cancer-causes/diet-physical-activity/body-weight-and-cancer-risk/health-issues.html>.
- "Food: Transforming the American Table ." National Museum of American History, September 30, 2019. <https://americanhistory.si.edu/food>.
- Giordano, Zach. "Pull up a Chair: The Power of Food in Building Community." Boston.com. The Boston Globe, April 30, 2017. - <https://sponsored.boston.com/the-pinehills/the-power-of-food-in-building-community>.
- Harvey, Dana. "How a Healthy Food System Can Transform Your Community." RWJF, May 23, 2018. <https://www.rwjf.org/en/blog/2016/11/role-food-systems-community.html>.
- "History of Agriculture." EnvironmentalScience.org. Accessed December 13, 2019. <https://www.environmentalscience.org/history-agriculture>.
- "How Does Agriculture Change Our Climate?" Environment Reports. Accessed December 13, 2019. <http://www.environmentreports.com/how-does-agriculture-change/>.

- "ICLEI Cities Biodiversity Center." ICLEI. Accessed December 13, 2019. <https://cbc.iclei.org/>.
- James, Clive. 2011. Global Status of Commercialized Biotech/GM Crops: 2011. ISAAA Brief No. 43. ISAAA: Ithaca, NY.
- Lyson, Thomas A. Civic Agriculture Reconnecting Farm, Food, and Community. Medford, MA: Tufts University Press, 2004.
- Mcwilliams, Carey. "Farms into Factories: Our Agricultural Revolution." The Antioch Review 1, no. 4 (1941): 406. <https://doi.org/10.2307/4608849>.
- Muhlke, Christine. "Growing Together." The New York Times. The New York Times, October 8, 2010. <https://www.nytimes.com/2010/10/10/magazine/10FOB-WWLN-t.html>.
- National Association for Sport and Physical Education & American Heart Association. (2010). 2010 Shape of the nation report: Status of physical education in the USA. Reston, VA: National Association for Sportand Physical Education
- Nunez, Christina. "Deforestation and Its Effect on the Planet." Deforestation facts and information, February 25, 2019. <https://www.nationalgeographic.com/environment/global-warming/deforestation/#/10-global-warming-gallery.jpg>.
- Plessis, S. J. Du. "The Role of Agriculture in the Process of Community Development." Agrekon 7, no. 4 (1968): 5–13. <https://doi.org/10.1080/03031853.1968.9524383>.
- Rasmussen, Wayne D., and Paul Steven Stone. "Toward a Third Agricultural Revolution." Proceedings of the Academy of Political Science 34, no. 3 (1982): 174. <https://doi.org/10.2307/1173738>.
- Sawyer, Bradley, and Cynthia Cox KFF. "How Does Health Spending in the U.S. Compare to Other Countries?" Peterson-Kaiser
- Health System Tracker. Accessed December 13, 2019. <https://www.healthsystemtracker.org/chart-collection/health-spending-u-s-compare-countries/#item-average-wealthy-countries-spend-half-much-per-person-health-u-s-spends>.
- "Sources of Greenhouse Gas Emissions." EPA. Environmental Protection Agency, September 13, 2019. <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.
- "South Boston." Boston.gov, July 11, 2016. <https://www.boston.gov/neighborhood/south-boston>.
- Stanley, Stephen. "Seven Projects Honored with Inaugural Active Design Award." ArchDaily. ArchDaily, May 3, 2014. <https://www.archdaily.com/500525/seven-projects-honored-with-inaugural-active-design-award>.
- "Unsustainable Agriculture: Community Environmental Legal Defense Fund." CELDF, August 4, 2015. <https://celdf.org/advancing-community-rights/issues/unsustainable-agriculture/>.
- Yin, Jie, and John D. Spengler. "Going Biophilic." Urban Health, 2019, 369–74. <https://doi.org/10.1093/oso/9780190915858.003.0040>.
- "Zoning Viewer: BPDA." Zoning Viewer | BPDA. Accessed December 13, 2019. <http://maps.bostonredevelopmentauthority.org/zoningviewer/>.



# ONE CENTRAL PARK / SYDNEY, AUSTRALIA



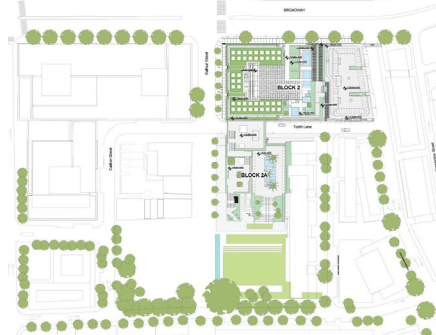
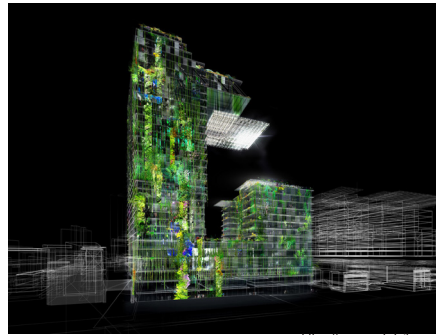
### CONCEPT:

- Name: One Central Park
- Location: Sydney, Australia
- Architects: Foster + Partners, Ateliers Jean Nouvel, PTW Architects
- Date: 2008-2014
- Height: 384 ft
- Located on the site of an old brewery near Central Station in Chippendale, Sydney.
- The vision for Central Park Sydney was to encircle the site with buildings and create a public garden within a dense urban fabric. The masterplan was designed by Foster + Partners.
- One Central Park was the first completed project in the proposal, designed by Ateliers Jean Nouvel and PTW Architects.
- Green facade composed of 250 species of Australian flowers and plants, which are "constantly changing" in appearance, and providing connection to nature.

https://www.centralparksydney.com  
https://www.architecturalrecord.com  
https://www.archdaily.com



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### PROGRAM:

- The West Tower has 18 floors and the East Tower has 34.
- The first 5 levels are composed of over 16,000 square meters of retail and commercial space, while the upper 29 floors house 5 different types of apartments.
- There are 240 apartments in the West Tower, and 383 in the East Tower, including 38 luxury apartments on the top three floors.
- The topmost level of the central podium which the towers share includes community spaces such as a pool, gymnasium, and garden terrace.

https://www.architecturalrecord.com  
https://www.ptw.com.au

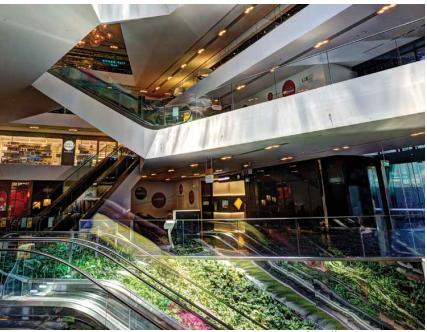
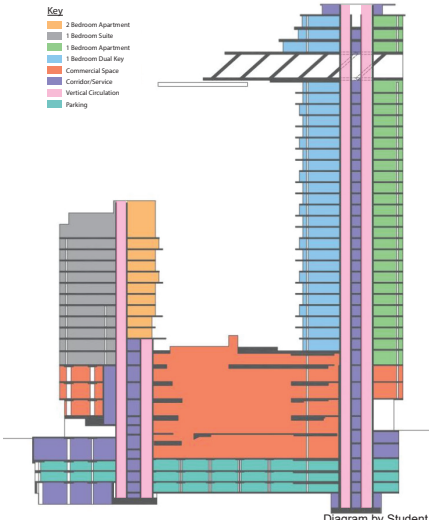


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### PROGRAM:



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CIRCULATION:

- Both towers have a vertical circulation core in center of the building which lead to central corridors.
- West Tower contains four elevators and two sets of egress stairs. East Tower contains five elevators and two sets of egress stairs.
- The multi-level retail podium uses network of escalators as main means of circulation.

https://www.ptw.com.au



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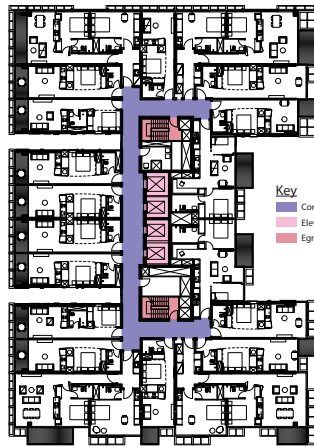
ENVIRONMENTAL SYSTEMS:

- In order to remediate overshadowing of the park, the volume is broken up into a lower and a taller tower.
- The lower tower contains 42 heliostats which redirect sunlight up to 320 reflectors on a cantilever off the taller tower, which then beam the light down into areas that would otherwise be in permanent shade.
- The system adapts hourly and seasonally to the need for brightness and warmth.
- At night, the heliostat can be lit with LED lights that merge into a giant screen and "simulate reflections of glittering harbour waters."
- This heliostat feature is the first of its kind used in a residential setting in Australia and the largest of its type in the world used in an urban context.

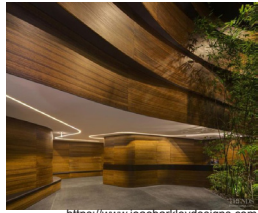
https://www.domusweb.it  
https://www.greenroofs.com



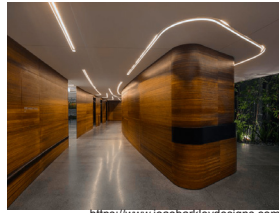
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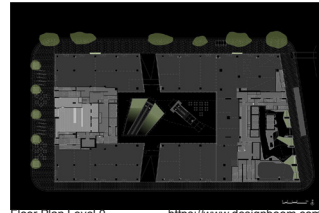
Key  
Corridor  
Elevators  
Egress Stairs



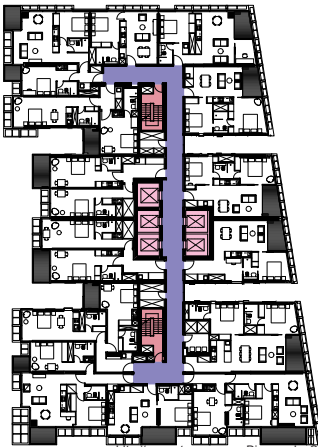
https://www.joaobarkleydesigns.com



https://www.joaobarkleydesigns.com



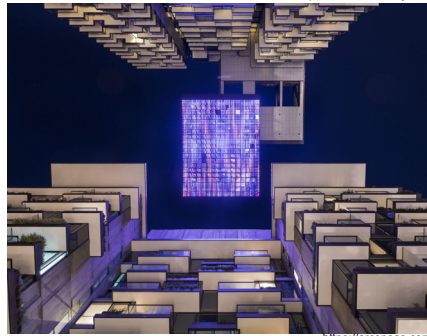
Floor Plan Level 0  
https://www.designboom.com



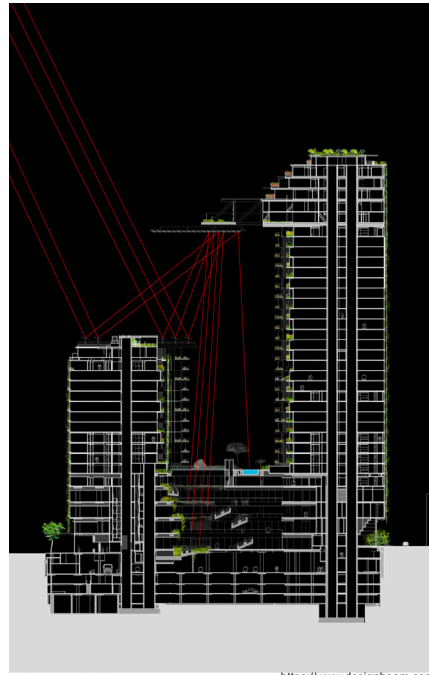
http://www.ptw.com.au  
Diagram by Student



https://www.archdaily.com



https://arcspace.com



https://www.designboom.com

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ENVELOPE:

- All four sides of One Central Park contain some form of greenery. The North and East facades incorporate a strong drapery of vines and vertical green walls, while the South and West facades contain horizontally planters and balconies.
- The plants not only deliver a message of sustainability, but they also reduce energy consumption by providing shade and reducing heat gain by up to 30%.
- The building has a 25% lower energy consumption rate than the average high rise in the area.
- Each horizontal and vertical planter is supported by its own irrigation system which is supplied by the on-site recycled water treatment plant. This system also monitors the environmental conditions.

https://www.domusweb.it  
https://watersensitivecities.org.au

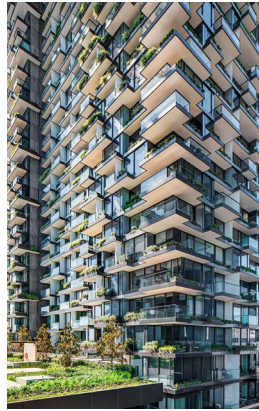


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STRUCTURE:

- Primary structural elements are the concrete cores at the center of each building and the shear walls connected to the cores.
- Secondary concrete columns are placed around the core to create support for the floor slabs.
- System of trusses tied to the buildings central structure hold the cantilever which contains the heliostat.

http://www.robertbird.com



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ps://www.archdaily.com

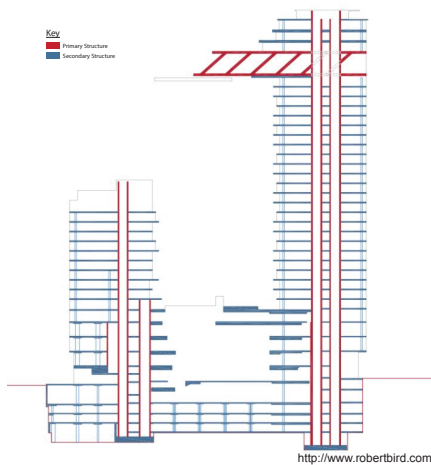


http://www.ptw.com.au

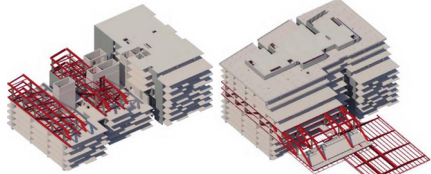


https://www.greenroofs.com

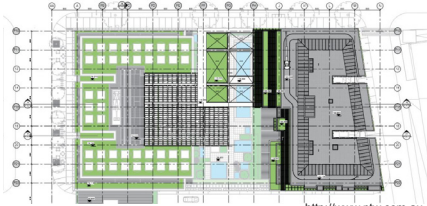
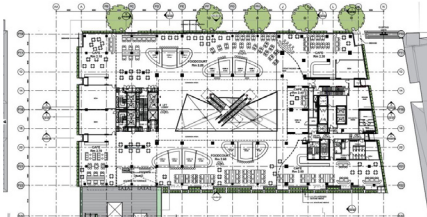
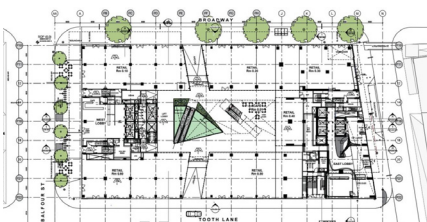
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http://www.robertbird.com



http://www.robertbird.com



http://www.ptw.com.au

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BIBLIOGRAPHY:

Cilento, K. (2010, August 5). One Central Park / Jean Nouvel. Retrieved from [https://www.archdaily.com/71946/one-central-park-jean-nouvel?ad\\_medium=gallery](https://www.archdaily.com/71946/one-central-park-jean-nouvel?ad_medium=gallery)  
cpsydney. (2011, March 9). One Central Park construction animation, by Watpac. Retrieved from <https://www.youtube.com/watch?v=crfWA60EMs>  
cpsydney. (2013, August 28). Central Park 360 degree masterplan animation. Retrieved from <https://www.youtube.com/watch?v=Si6WxNgTjRY>  
Dwyer, G. (n.d.). Retrieved from <https://www.propertyobserver.com.au/forward-planning/adding-value/renovation-and-improvement/20726-yc-frasers-central-park-one-in-sydney-gets-roof-top-heliostat.html>  
Farrelly, E. (2019, May 20). One Central Park. Retrieved from <https://www.architecturalrecord.com/articles/7705-one-central-park>  
Fullen, J. B. (n.d.). One Central Park. Retrieved from [https://issuu.com/johnbrianfullen/docs/one\\_central\\_park](https://issuu.com/johnbrianfullen/docs/one_central_park)  
Interiors on One Central Park East & West Towers. (2017, October 7). Retrieved from <https://www.joabarkleydesigns.com/interiors-one-central-park-east-west-towers/>  
Jean Nouvel and the One Central Park green homes in Sydney: Floormature. (n.d.). Retrieved from <https://www.floormature.com/jean-nouvel-and-the-one-central-park-green-homes-in-sydney-11253/>  
One Central Park. (n.d.). Retrieved from <http://www.jeannouvel.com/en/projects/one-central-park/>  
One Central Park. (n.d.). Retrieved from <https://urbannext.net/one-central-park/>  
One Central Park. (n.d.). Retrieved from [https://www.ptw.com.au/ptw\\_project/one-central-park/](https://www.ptw.com.au/ptw_project/one-central-park/)  
One Central Park. (n.d.). Retrieved from <https://arcspace.com/feature/one-central-park/>  
One Central Park. (n.d.). Retrieved from <https://www.greenroofs.com/projects/one-central-park/>  
One Central Park. (n.d.). Retrieved from <http://www.skyscrapercenter.com/building/one-central-park/10710>  
One Central Park. (n.d.). Retrieved from <https://www.architectmagazine.com/project-gallery/one-central-park-5683>  
One Central Park. (n.d.). Retrieved from <https://good-design.org/projects/one-central-park-2/>  
One Central Park by Jean Nouvel Features Lush Vertical Gardens. (2015, January 19). Retrieved from <https://www.designboom.com/architecture/jean-nouvel-one-central-park-sydney-10-08-2014/>  
Robert Bird Group One Central Park. (2019, August 6). One Central Park Sydney. Retrieved from <http://www.robertbird.com/rbg-projects/one-central-park-sydney/>  
Saieh, N. (2014, September 25). One Central Park / Ateliers Jean Nouvel. Retrieved from [https://www.archdaily.com/551329/one-central-park-jean-nouvel-patrick-blanc?ad\\_medium=gallery](https://www.archdaily.com/551329/one-central-park-jean-nouvel-patrick-blanc?ad_medium=gallery)  
Sydney's Central Park. (n.d.). Retrieved from <https://sustainableurbanplaces.weebly.com/sydneys-central-park.html>  
Sydney's new downtown. (n.d.). Retrieved from <https://www.centralparksydney.com/>

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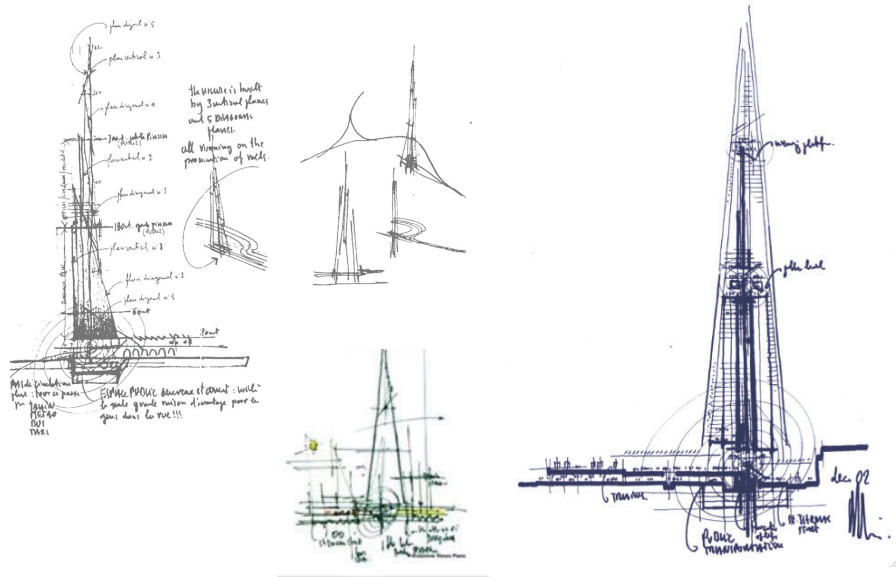
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# The London Shard



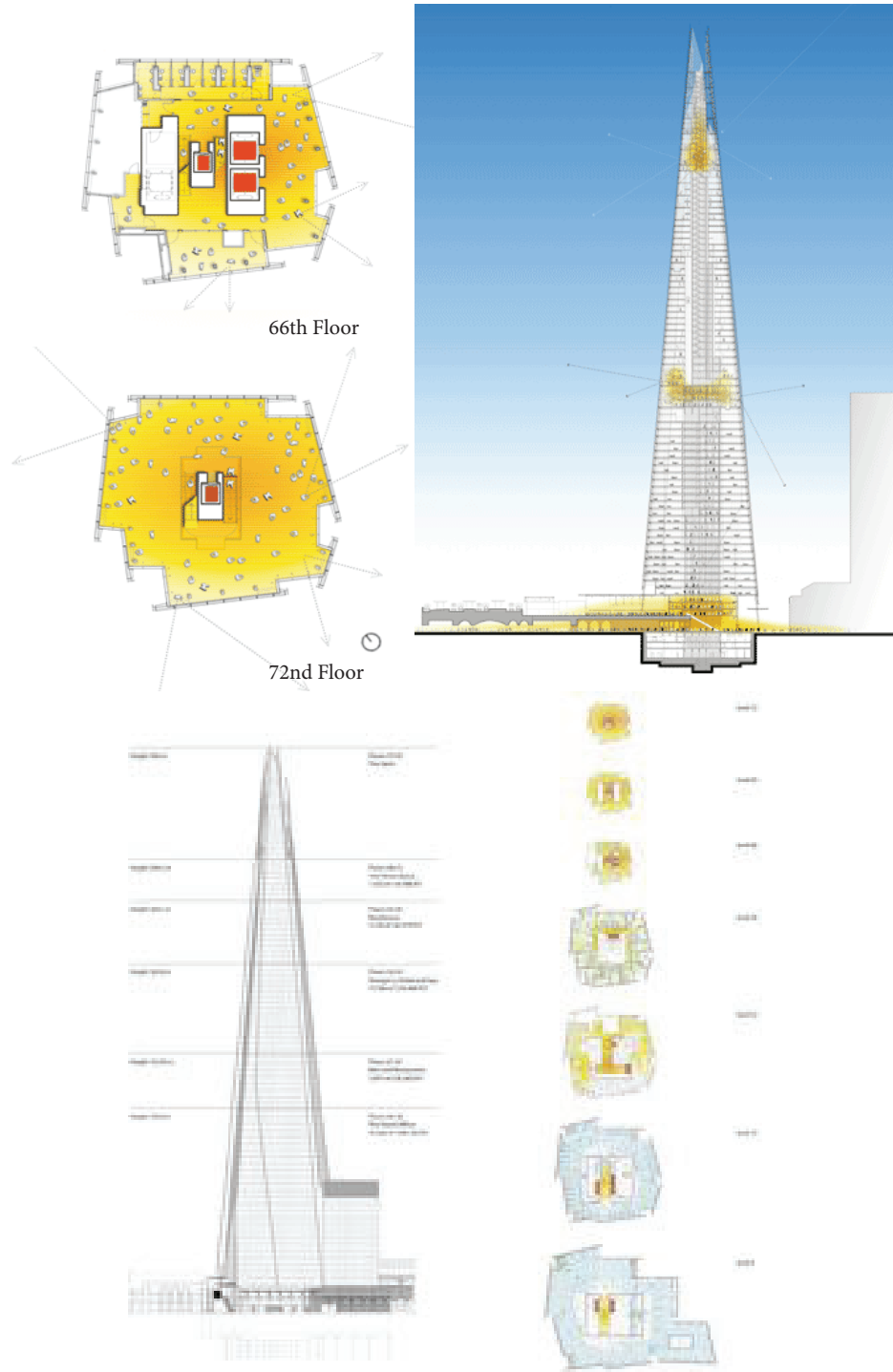
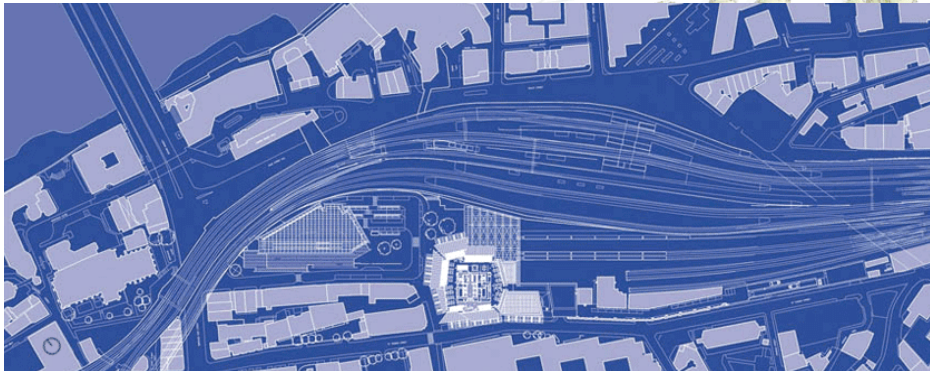
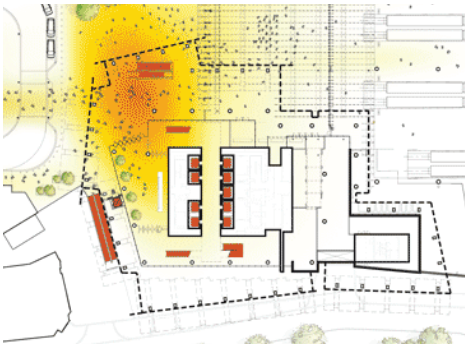
Generative Ideas:  
Inspired by the Spires of London churches, and the masts of ships. Renzon Piano stated that he hated tall building but the railway lines and the beauty of the Thames appealed to him. So on the back of a menu he drew what the Shard of today would look like.





Programmatic System:  
95 stories, floors 4 through 28 are offices, there are 3 floors of restaurants and bars, a hotel and apartments above it. The last floors are for the public, which includes a 360 viewing gallery.  
The shard is made of 8 glass 'shards' which create 8 asymmetric sides that do not touch, built around a concrete and metal central block which not only houses the lifts but provides the main structure.

[www.theplan.it/eng/webzine/international-architecture/the-shard](http://www.theplan.it/eng/webzine/international-architecture/the-shard)



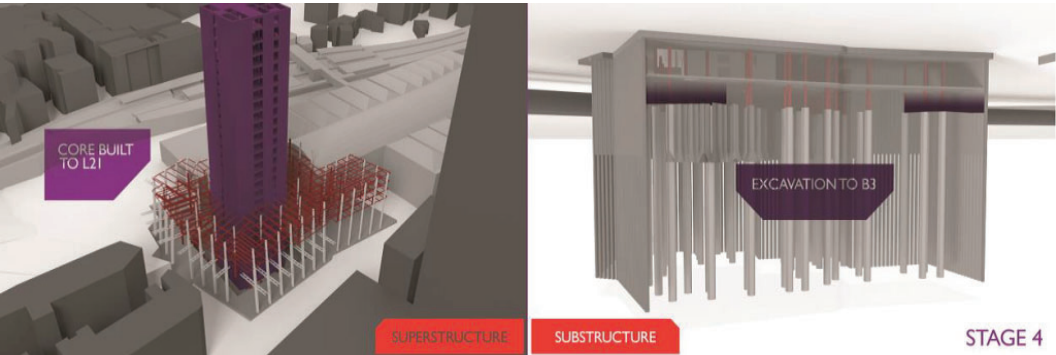
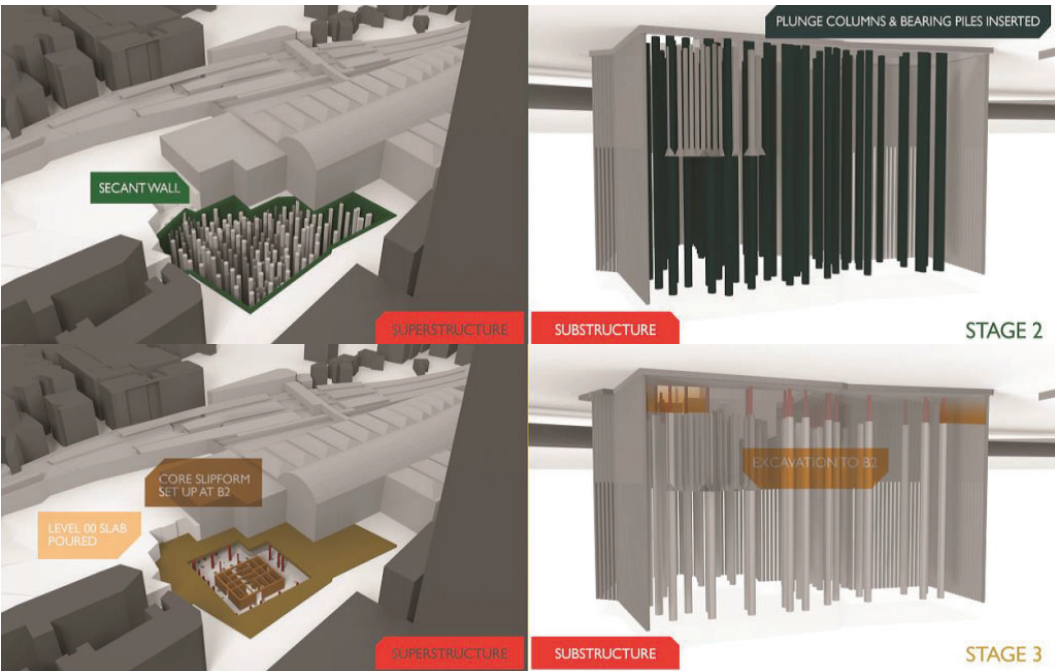
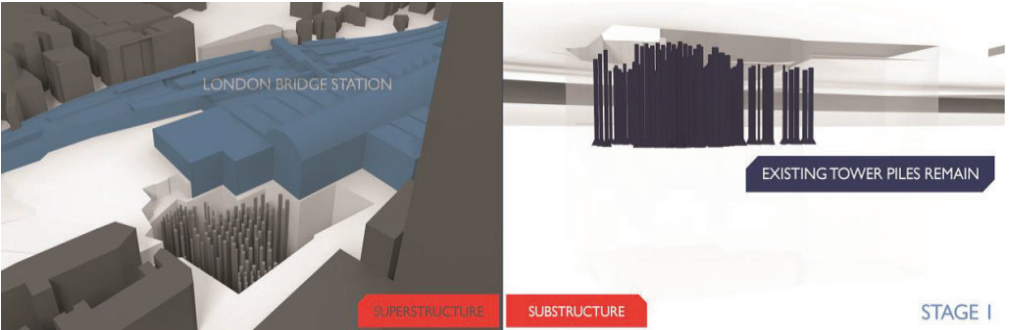
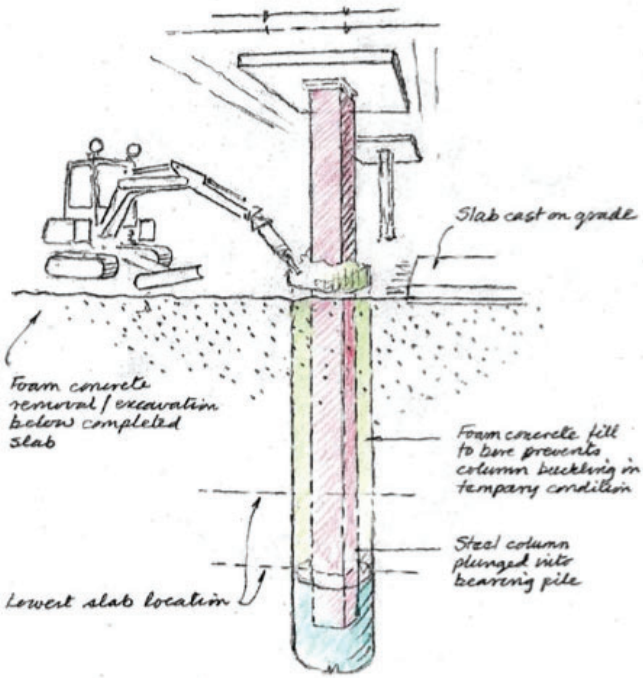
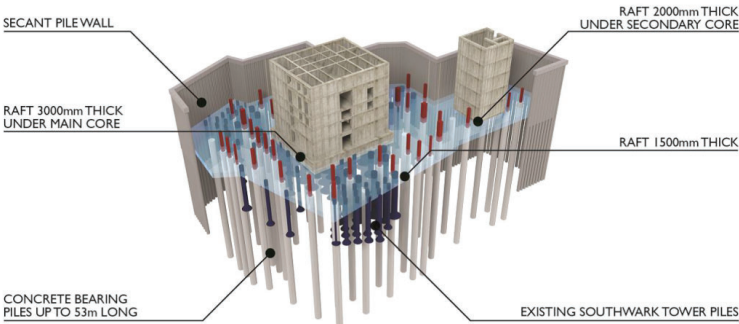


Structural Systems:

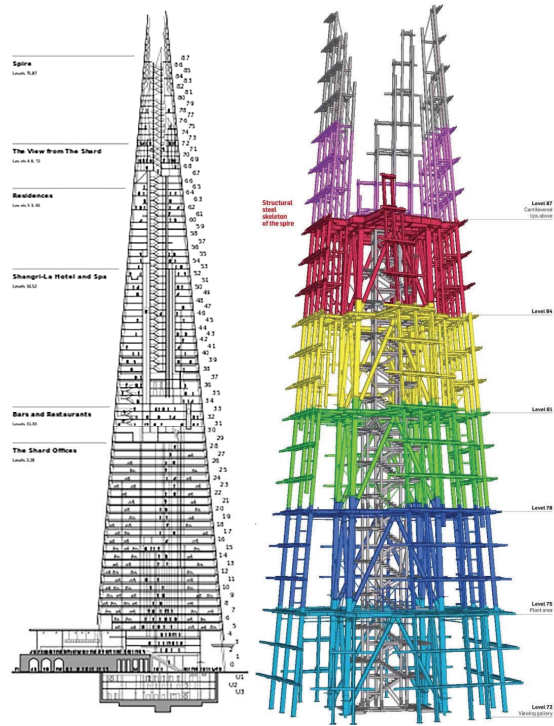
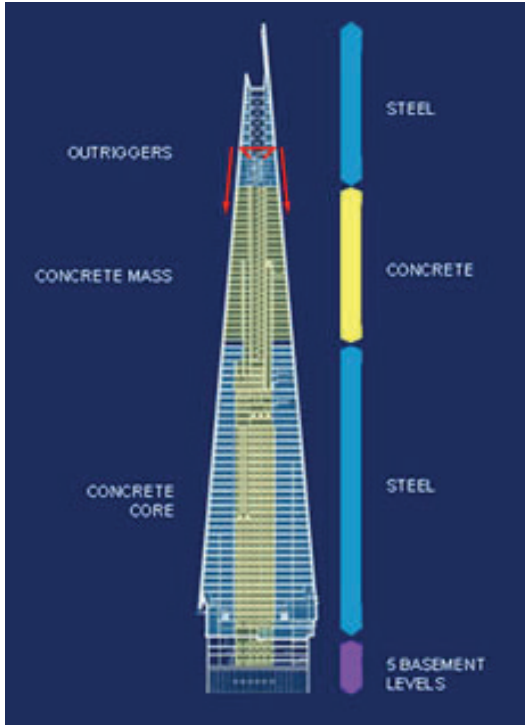
Top down construction, was used to allow for faster construction, upper floors could be completed before the basement was excavated. The process employs steel plunge columns embedded in wet concrete which are used as temporary support for the core and floor slabs. This beings with bearing piles are bored from ground level and steel plunge columns installed. The ground slab is cast on a slip membrane, 2 layers of the basement were then excavated and a slipform is set up. Then a slab for basement level 2 is poured, excavation lower can then begin. The roof slab was installed in a single 32 hour pour. All loads of construction were carried by secant walls and piles containing plunge columns.

After core walls were completed plunge columns became redundant, but not removed.

[www.engineersjournal.ie/2016/01/26/engineering-the-shard/](http://www.engineersjournal.ie/2016/01/26/engineering-the-shard/)



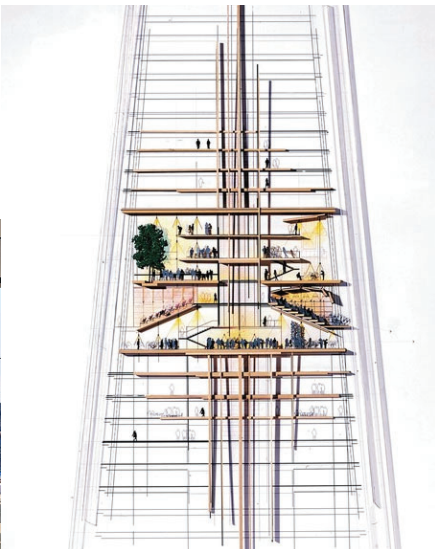
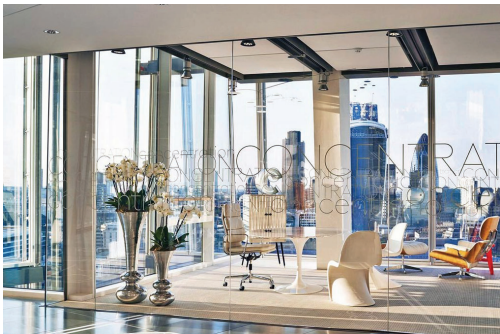




#### Enviromental Aspects and Envelope

The London Shard utilizes a double skin facade that reduces heat gain. The naturally ventilated Winter gardens allow occupants to interact with the outdoors. The Shard achieved the BREEAM Excellance rating.

[www.adamson-associates.com/project/shard-london-bridge](http://www.adamson-associates.com/project/shard-london-bridge)



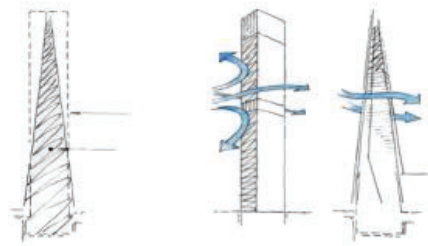
#### Environmental Aspects and Envelope

The Shard's envelope is made up of 11200 curtain wall panels. Each floor has 400 panels, each panel is 1.5 m wide and 3m high. the triple layering of the glass creates a .12 g value reducing the buildings need for air conditioning to cool it, the external panels do not meet allowing for a constant air flow that regulates the internal temperature. 95% of construction materials were recycled.

A seriea of pumps and pump rooms on the 21st, 51st and 68th floors allowing water pressure to be rest without the risk of high pressure water damaging the pipework.

[www.aluminiumtradesupply.co.uk](http://www.aluminiumtradesupply.co.uk)

[www.business2community.com/ travel-leisure/8-things-you-didnt-know-about-the-shard](http://www.business2community.com/travel-leisure/8-things-you-didnt-know-about-the-shard)



#### BIBLIOGRAPHY

[www.the-shard.com](http://www.the-shard.com)

[www.engineersjournal.ie/2016/01/26/engineering-the-shard](http://www.engineersjournal.ie/2016/01/26/engineering-the-shard)

[www.theplan.it/eng/wbzine/international-architecture/the-shard](http://www.theplan.it/eng/wbzine/international-architecture/the-shard)

[www.wsp.com/en-gl/projects/the-shard](http://www.wsp.com/en-gl/projects/the-shard)

[www.businesss2community.com/travel-leisure/8things-you-didnt-know-about](http://www.businesss2community.com/travel-leisure/8things-you-didnt-know-about)

[www.adamson-associates.com/project/shard-london-bridge](http://www.adamson-associates.com/project/shard-london-bridge)

[www.aluminiumtradesupply.co.uk](http://www.aluminiumtradesupply.co.uk)

LAYOUT	CAPACITY (SQFT)	OCCUPANCY	GRID			CORRIDOR		EGRESS		BATHROOM			VERTICAL CIRC.	SERVICE	MEP	FIRE LIFT	TRAVEL DISTANCE	DAYLIGHT PER METER	DAYLIGHT PERCENTAGE (%)
			All grids are to be 5000 sqft servicing one (1) occupant per 100 sqft.			No dead end corridors		44" minimum egress provided at end of every corridor; maximum 150' apart		Based on business occupancy B, table 403.1			1 elevator per 50 occupants	1 unit per 150 occupants	1 per 50 occupants	1 per 200 occupants			
A1	5,000	50	1	0	0	950sf	450sf	1	1	1	0	0	1	0	1	1	136'	256'	96.5
A2	5,000	50	1	0	0	1050sf	700sf	0	2	1	0	0	1	0	1	1	135'	262'	98
A3	5,000	50	0	1	0	870sf	700sf	0	2	1	0	0	1	0	1	1	103'	252'	89.5
B1	10,000	100	1	1	0	1650sf	250sf	0	3	0	1	0	1	0	1	1	96'	412'	81.5
B2	9,900	990	1	0	1	1900sf	550sf	0	3	0	1	0	1	0	1	1	138'	391'	89
B3	10,000	100	2	0	0	1550sf	250sf	0	3	0	1	0	1	0	1	1	128'	455'	91.3
C1	15,000	150	3	0	0	2500sf	300sf	0	4	0	1	0	0	1	1	1	138'	606'	87.3
C2	14,900	149	1	1	1	2470sf	400sf	0	4	0	1	0	0	1	1	2	138'	544'	88.2
C3	14,900	149	0	2	1	2500sf	50sf	0	3	0	1	0	0	1	1	2	114'	407'	76.3
D1	20,000	200	4	0	0	3800sf	550sf	0	5	2	0	0	2	0	2	1	144'	795'	90
D2	19,800	198	0	2	2	3050sf	100sf	1	3	0	0	1	2	0	1	1	139'	660'	85.3
E1	30,000	300	3	3	0	4740sf	2100sf	0	5	1	1	0	0	2	2	2	192'	1359'	92.8
E2	29,800	298	0	4	2	5520sf	200sf	2	4	1	1	0	0	2	2	2	175'	891'	75.8
F1	40,000	400	4	4	0	6020sf	260sf	0	7	2	1	0	1	2	3	3	168'	1725'	90.1

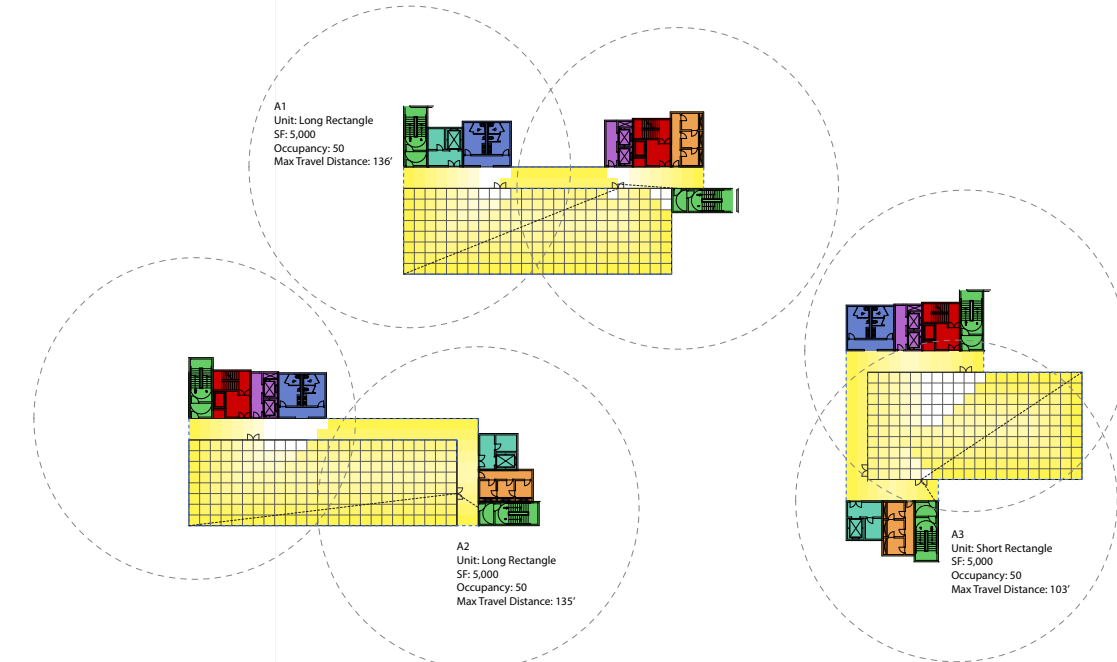
Key

- Solid Wall
- Fire Rated Glazing
- Longest Travel Distance
- 75' from Egress
- Solar Exposure

50				200			
TOTAL FLOOR OCCUPANTS	WATER CLOSETS & URINALS	LAV	DRINKING FOUNTAIN	TOTAL FLOOR OCCUPANTS	WATER CLOSETS & URINALS	LAV	DRINKING FOUNTAIN
5000 SF	NO. PERSONS EA. SEX: 16-55 NO ADDITIONAL	3 0	NO. PERSONS: 46-60 0	1 PER 100	1 100	1 100	1 100
	REQUIRED FIXTURES: 3 PROVIDED FIXTURES: 4	TOTAL: 3 TOTAL: 4	TOTAL: 100 TOTAL: -				
10000 SF	5000 SF	NO. PERSONS EA. SEX: 81-100 NO ADDITIONAL	NO. PERSONS: 91-125 0	1 PER 100	1 100	1 100	1 100
	REQUIRED FIXTURES: 5 PROVIDED FIXTURES: 6	TOTAL: 5 TOTAL: 6	TOTAL: 100 TOTAL: -				
15000 SF	10000 SF	NO. PERSONS EA. SEX: 111-150 NO ADDITIONAL	NO. PERSONS: 111-150 0	1 PER 100	1 100	1 100	1 100
	REQUIRED FIXTURES: 6 PROVIDED FIXTURES: 6	TOTAL: 6 TOTAL: 6	TOTAL: 100 TOTAL: -				

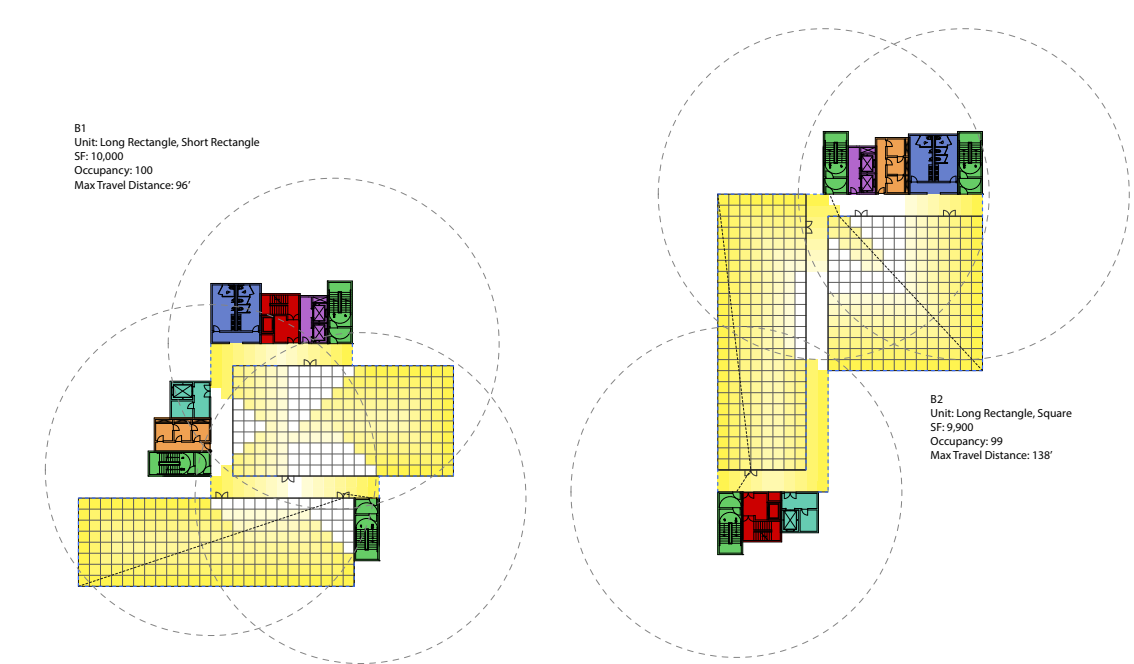
CORE STUDY  
Christina Grimes

PART A - EVALUATION TABLES  
Fall 2019



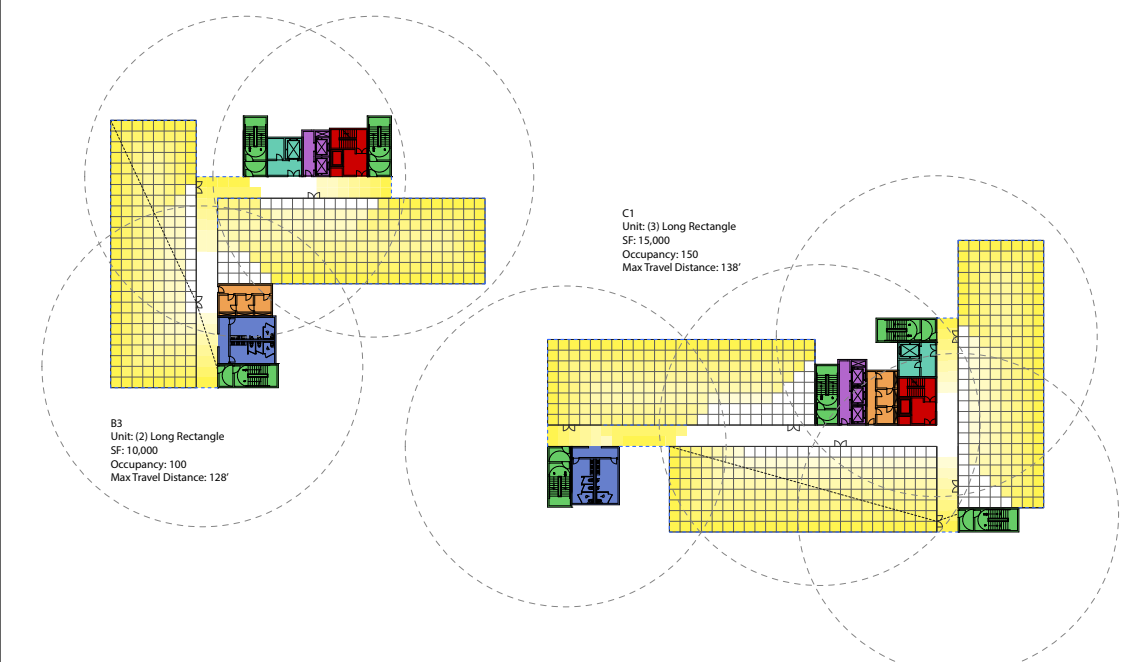
CORE STUDY  
Christina Grimes

PART B - PLANS  
Fall 2019



CORE STUDY  
Christina Grimes

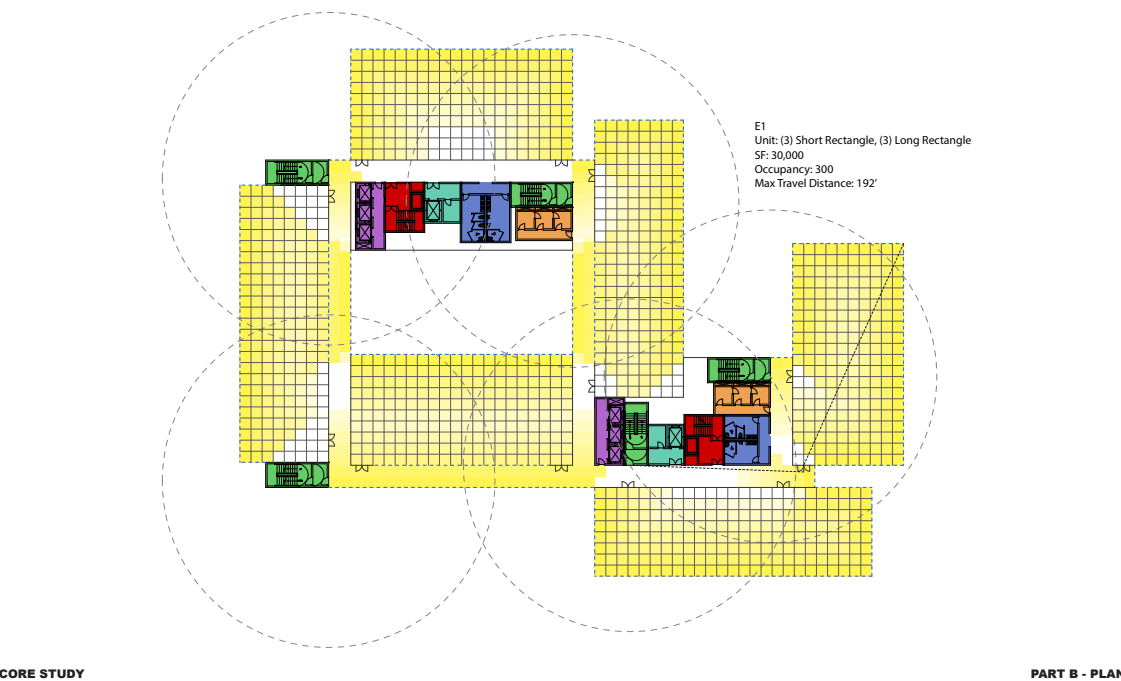
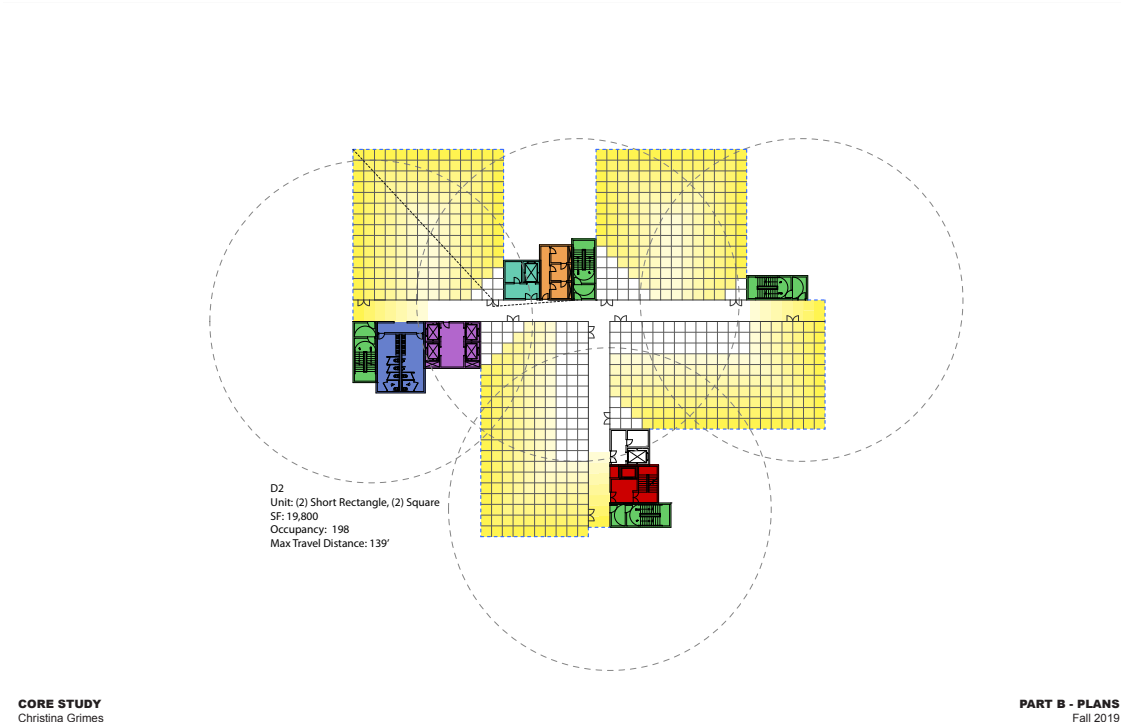
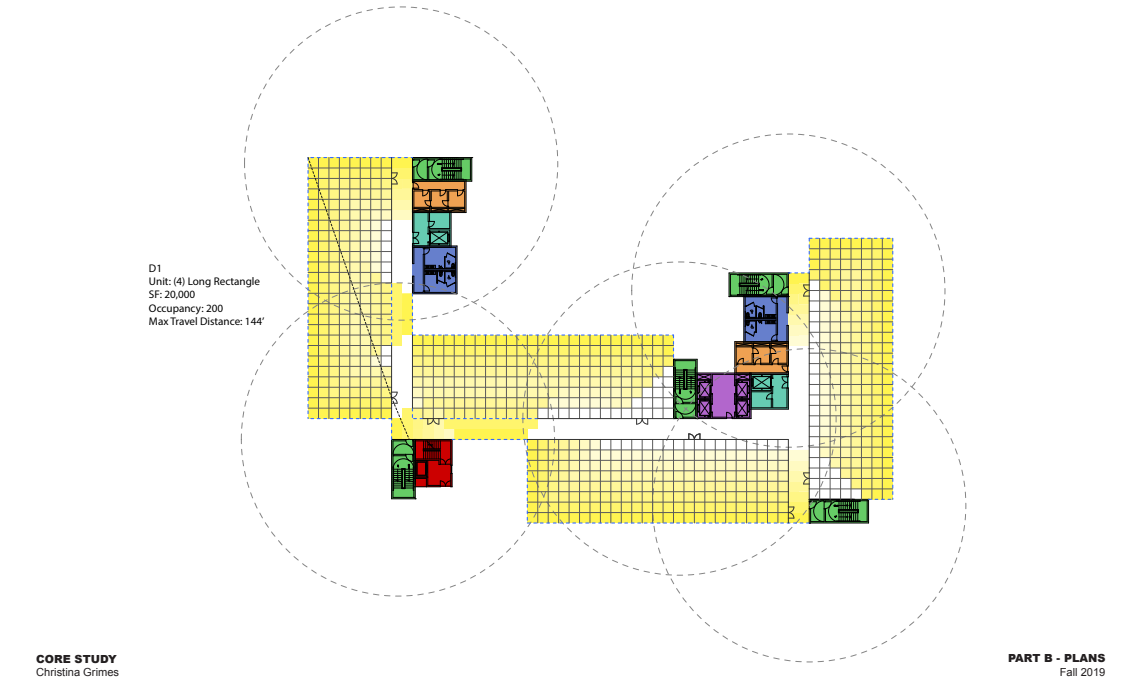
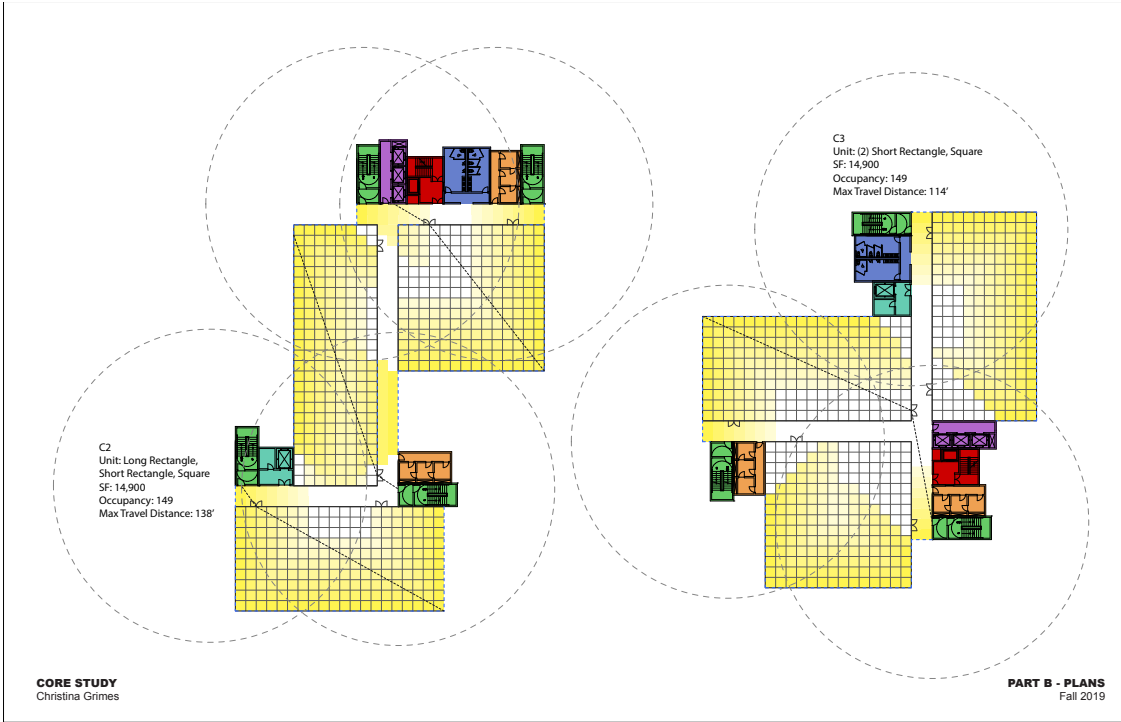
PART B - PLANS  
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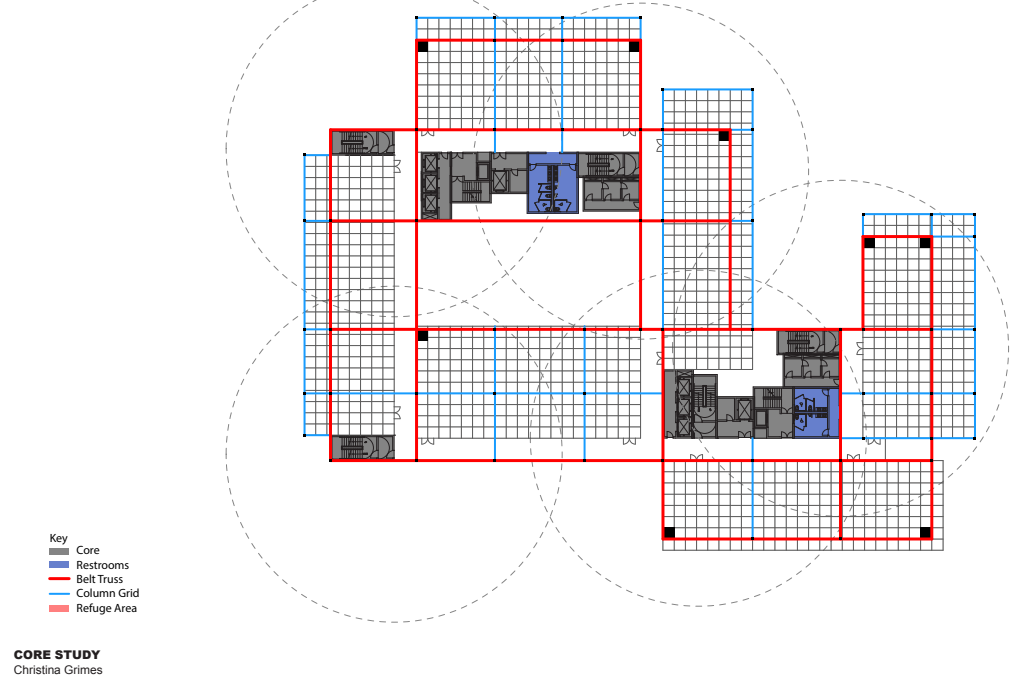
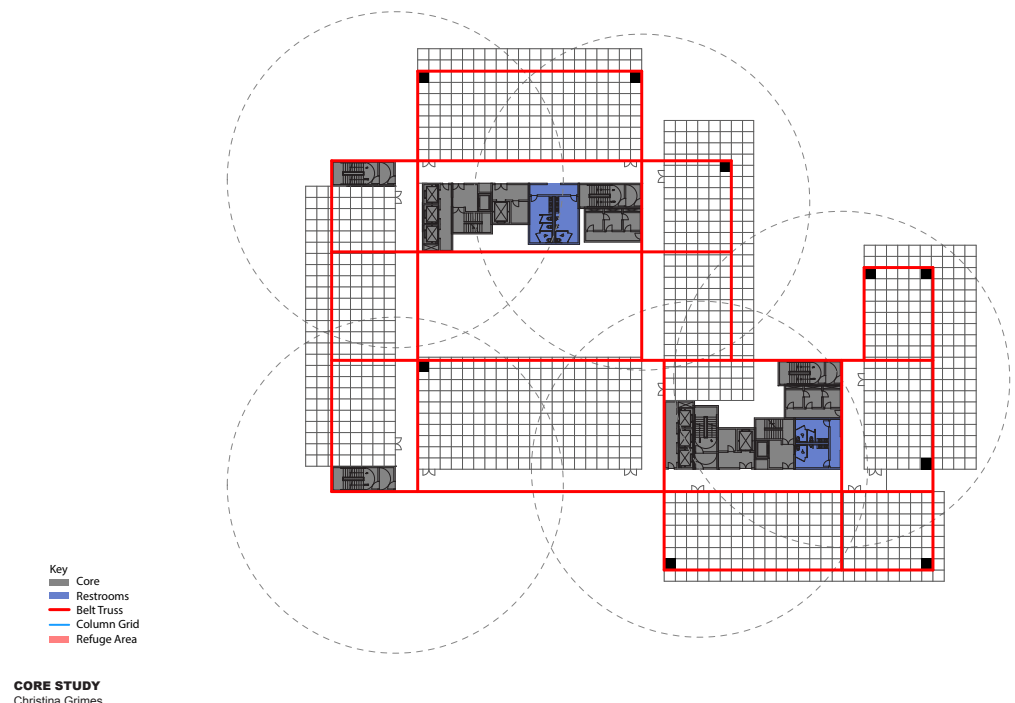
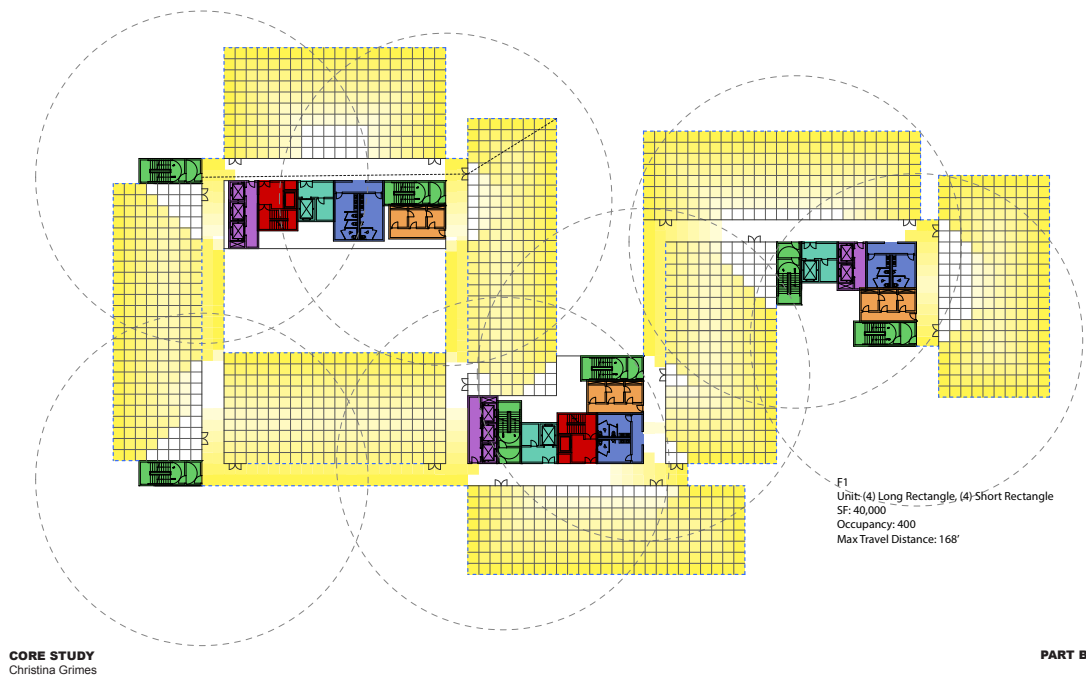
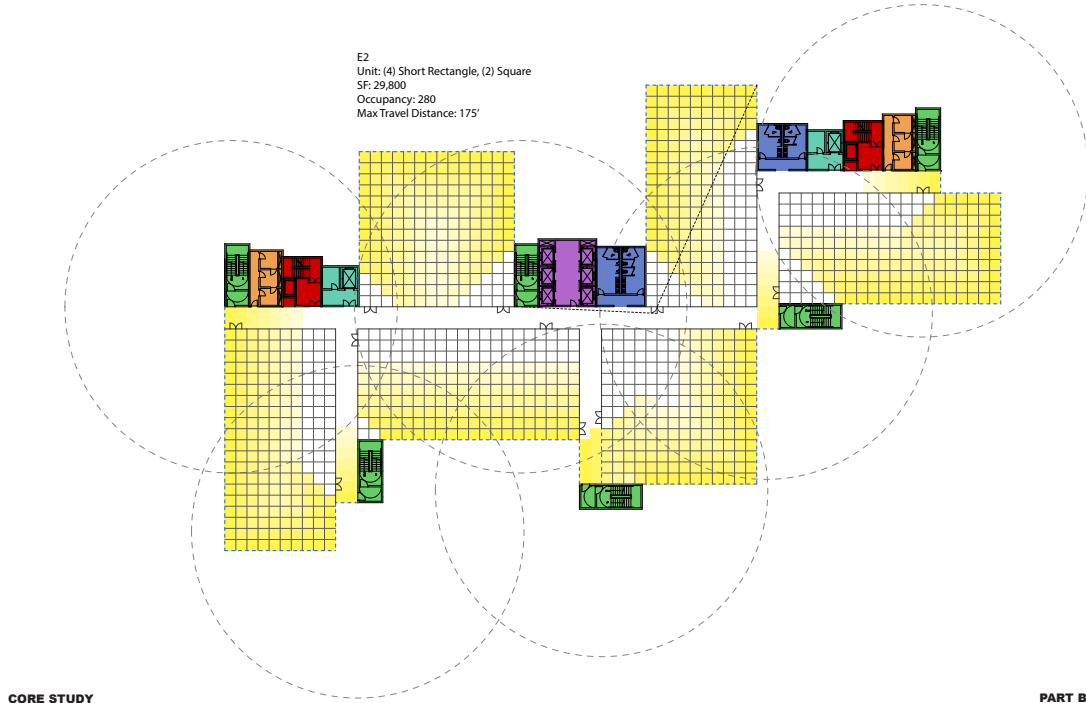
CORE STUDY  
Christina Grimes

PART B - PLANS  
Fall 2019

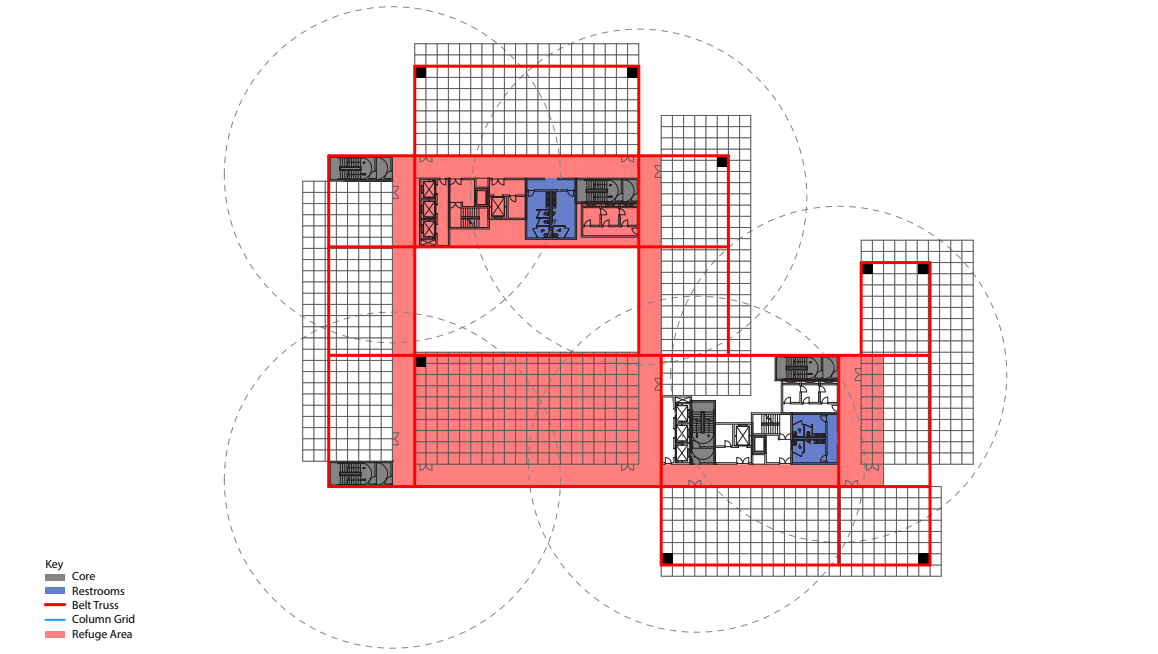






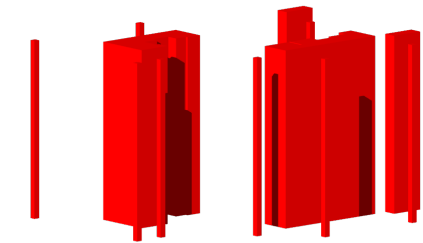




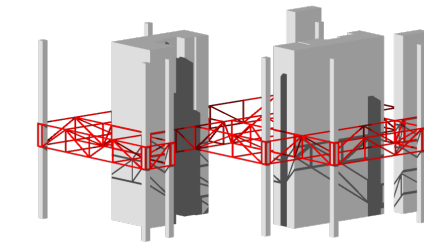


**CORE STUDY**  
Christina Grimes

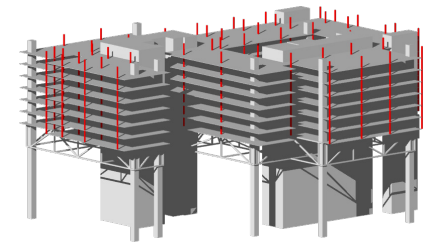
**PART C - STRUCTURE**  
Fall 2019



Shear Walls and Mega Columns

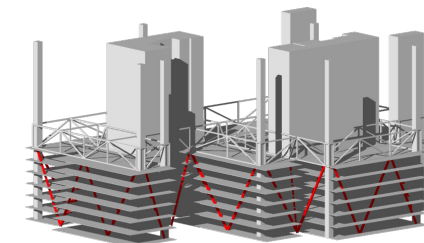


Belt Truss



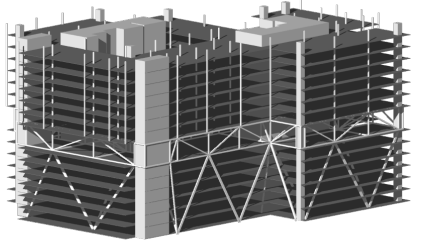
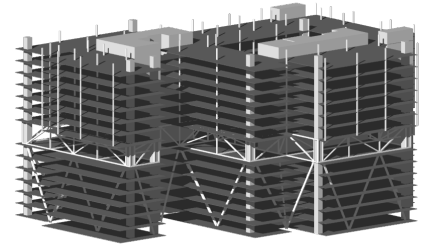
Compression Floors

**CORE STUDY**  
Christina Grimes

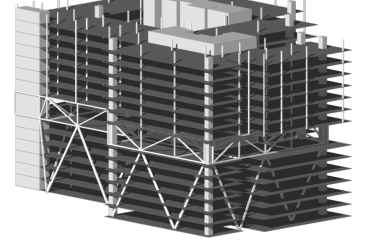
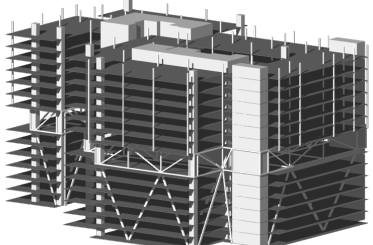


Tension Floors

**PART D - STRUCTURE PACKAGE MODEL**  
Fall 2019

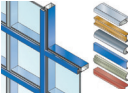
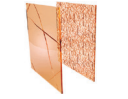






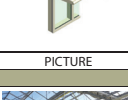



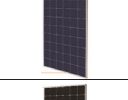

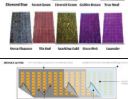

**CORE STUDY**  
Christina Grimes



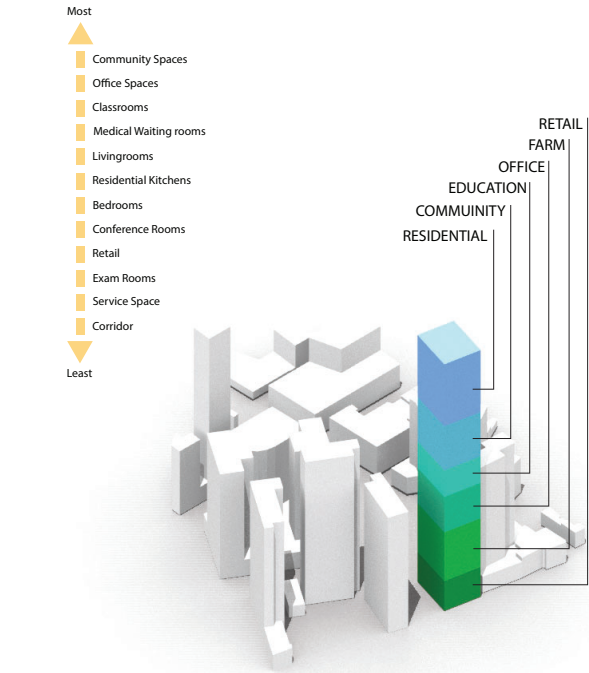
**PART D - STRUCTURE PACKAGE MODEL**  
Fall 2019



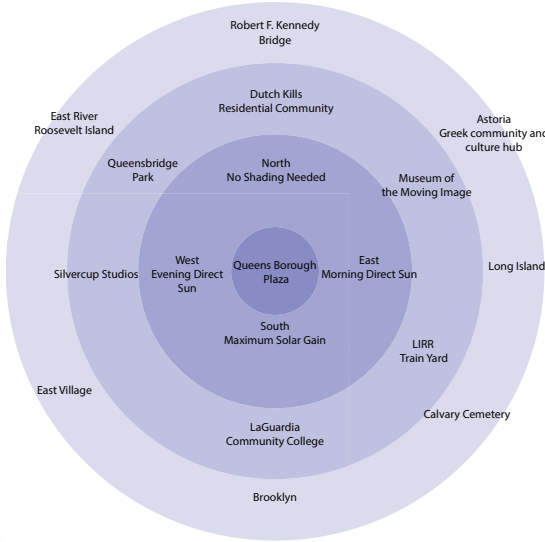
TYPES	PICTURE	MANUFACTURER	DESCRIPTION	SPECIFICATION	PROGRAM USE
CURTAIN WALL SYSTEMS					
1. YHC 300 SSG - Impact Resistant and Blast Mitigating Structural Silicone Glazed Curtain Wall System  https://www.ykkap.com/commercial/product/curtain-walls/yhc-300-ssg/#more		YKK AP	high performance curtain wall system designed and tested to meet the most demanding conditions. With varied infill and components, YHC 300 SSG can meet the requirements for Impact Resistance, Blast Mitigation or both.	Sightline: 3" Mullion Depth: 7-1/16" (Monolithic Glass Infill) 7-3/4" (Insulating Glass Infill) Framing Installation Method: Shear Block Glazing Installation: Outside / Structural Glass Type: Monolithic / Insulating	
2. YUW 750 XT - Unitized Wall System with Superior Thermal Performance  https://www.ykkap.com/commercial/product/curtain-walls/yuw-750-xt/		YKK AP	Unique and versatile unitized wall system designed to curb a building's energy appetite and protect against interior moisture. The system is designed to be assembled and glazed in a climate controlled environment for increased quality assurance of critical seals	Sightline: 2-1/2" Mullion Depth: 6", 7-1/2" Framing Installation Method: Screw Spine / Unitized Glazing Installation: Inside / Structural Glass Type: Monolithic / Insulating Thermal Break: Polyamide Thermal Barrier	
3. Stackwall®  https://obe.com/products/stackwall/		Oldcastle	exclusive structural wall system comprised of facade glass panels joined to vertical glass mullions with metal patch or "spider" fittings. Vertical glass mullions are designed to resist site specific design loads.	For heights up to 50'. Structural fastening surfaces are required at the perimeter	Malls, Museums, Hotels, and Airports
4. Series 4500 Window Wall  https://efccorp.com/products/detail/4/13/1180		EFCO	single infill plane for both vision and spandrel areas of a building. The integral slab bypass is designed to provide maximum design flexibility to accommodate a range of infill and insulation thicknesses at the face of the slab.	Multiple system depths provide the flexibility. 90° inside and outside corners. Accommodate insulated or monolithic glass, brake metal, or insulated panels. Horizontally stacked units, narrow 3" sightlines	Used primarily for low to mid rise multi-family and mixed use buildings.
5. System 5600 Impact Curtain Wall System  https://efccorp.com/products/detail/4/1/91		EFCO	This 2 1/4" X 6" Impact Curtain Wall System is approved for use in High Velocity Hurricane Zone (HVHZ). Acoustic Curtain Wall improves sound reduction - STC rating of 30 or greater Thermal Isolator used between exterior and interior extrusions	Various mullion depths and widths available Wide variety of snap-on face covers Allows 90° and 135° inside and outside corners Shear block construction Compatible with all 1 3/4" EFCO doors	Offices, Schools, and Hotels
5. Sculpted™ 3D*  https://metalwerksusa.com/product/sculpted-3d/		Metalwerks	Rainscreen system featuring three interchangeable wall panel design schemes. may be installed over continuous masonry, concrete, or as the outer cladding in a wall assembly that incorporates continuous insulation and a suitable air and water barrier.	Variable reveals: Horizontal 0.5" - 2" (12.7mm - 50.8mm); Vertical 0.25" - 6" (6.35mm - 152.4mm) Integrated LEDs Integrated planters and irrigation	Exterior/Interior facades for large public spaces such as stadiums, hotels, convention centers, airports/transit centers
TYPES	PICTURE	MANUFACTURER	DESCRIPTION	SPECIFICATION	PROGRAM USE
GLASS TYPES					
1. Oversized Skylights, Sloarium  www.fenex.com/oversized-and-walkable-skylights-an		Fenex	Walkable, and impact rated with custom sizing.	Max Width 12' 2D and 3D shapes available - Pyramid, Dome, Curve. 120 psf, structurally glazed and framed for a walkable roof.	
2. Fire proof and Ballistic Windows  https://www.fenex.com/specialty-windows		Fenex	Any shape Can last 60 minutes at 1800°	Level bullet proof	
3. Sound Control  https://obe.com/products/sound-control/		Oldcastle	Shields building environment from increasing noise levels, especially near airports and busy highways. Laminated glass is a proven, effective solution for acoustical protection.		
4. BuildingEnvelope® fully tempered glass  https://obe.com/products/fully-tempered/		Oldcastle	Four times stronger than annealed glass of the same thickness and configuration. When it is broken, tempered glass fractures into small fragments that reduce the probability of serious injury as compared to annealed glass.		
5. BuildingEnvelope® Hurricane Resistant StormGlass™  https://obe.com/products/hurricane-resistant-stormglass/		Oldcastle	Resists the effects of windborne debris as well as sustained turbulent winds lasting several hours. Can withstand pressures in excess of 100 psf.	Tested in sizes up to 50 square feet. Can be used in four-sided structurally glazed applications.	

TYPES	PICTURE	MANUFACTURER	DESCRIPTION	SPECIFICATION	PROGRAM USE
SHADING DEVICES					
1. Polycarbonate Solar shading SolarSmart  www.palram.com/us/solution/polycarbonate-glazing/		Palram	For facade, roofs, conservatory. More versatile color and solar transmission per project.	Solar smart sheets and panels are designed to reflect out infrared radiation that creates heat while letting in natural light.	
2. Wooden Solar shading De Groot  www.hess-timber.com/en/references/detail/lenco-slats		HESS	For facades Used on Town Hall Grave, Netherlands	Constructed with slats that have an elliptical cross-section Western Red Cedar.	
3. Glass Solar Shading, with motorized rotation  www.stg-beikirch.de/referenzen-detail-seite-en/items/9		STG BEKIRCH	For facades Glass, vertical motorized rotating panels.	Facade opens and closes automatically based on weather conditions. Has the heat accumulation of concrete, and the climate buffer effect of an atrium.	
4. Metal Solar Shading  www.kingspan.com/us/en-us/product-groups/metal-roof-wall-systems/roof-systems/exposed-fasteners		Morin	For facades Horizontal application, perforated metal.	Used for noise reduction, wind diffusion. Multiple patterns and perforation sizes available. As well as logos and graphics.	
5. E-Shade™  https://efccorp.com/products/detail/4/11/50		EFCO	Sunshade designed to provide an economical solution for reducing solar heat gain and glare while allowing natural daylight into the building.	Shade is available in 5 standard lengths and is designed to integrate with EFCO Curtain Wall Systems.	
TYPES	PICTURE	MANUFACTURER	DESCRIPTION	SPECIFICATION	PROGRAM USE
GREEN WALLS					
1. Vertical Barrel  https://www.aponix.eu/		Aponix	Intended to help eliminate traveling for food and food waste by allowing a variety of food readily available.	Edible plant production in 3D, this differs from its conventional partners that are usually single layered fixed immobile rack like structures.	
2. SemperGreenwall Outdoor  https://www.sempergreen.com/en/solutions/living-wall/products/sempergreenwall-outdoor		SemperGreen	Green living wall system suitable for greening all possible exterior facades, remains beautifully green throughout the year. Fully automatic irrigation system	constructed from modular Flexipanel and is finished with a gutter and a frame.	
3. Panel Trellis System  https://greenscreen.com/products/elements/#		Greenscreen	three dimensional, welded wire trellising system. The panel's depth creates a "captive growing space" for supporting plants.	2" or 3" thick, 4' wide, and 6', 8', 10', 12' or 14' tall.	
TYPES	PICTURE	MANUFACTURER	DESCRIPTION	SPECIFICATION	PROGRAM USE
PHOTOVOLTAIC					
1. 305W MWT Module Poly 60 Cells  www.sunportpower.com		Sunport	No bus-bar 3% less shadow, effectively avoid microcrack caused by pressure between cell edge and ribbon. compatible with other cell types including PERC, HIT, Black Silicon, etc.	18.7% higher efficiency, 98% 1st year	
2. 320W MWT Module Mono 60 Cells  www.sunportpower.com		Sunport	No bus-bar 3% less shadow, effectively avoid microcrack caused by pressure between cell edge and ribbon. compatible with other cell types including PERC, HIT, Black Silicon, etc.		
3. LofTile "Colors"  www.lofsolar.com		LofSolar	Anti-reflective coating Fire reaction class Max snow load 5400 Pa		
4. Flextron Peel and Stick Photovoltaic Panels  https://www.bipvco.com/products/		Flextron	Peel ad stick, flexible photovoltaic panels		

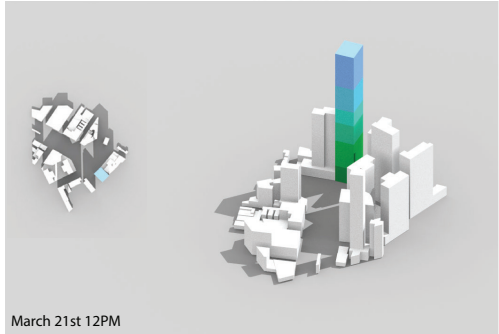




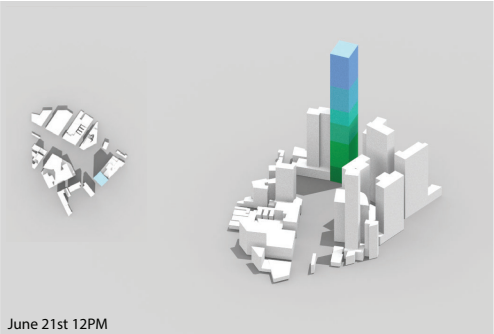
**CURTAIN WALL STUDY**  
Christina Grimes & Fiona Mihalatos



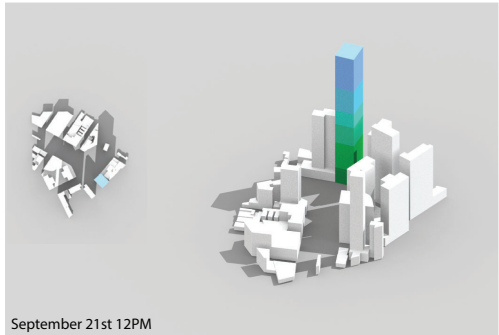
**SITE INFO**  
Fall 2019



March 21st 12PM

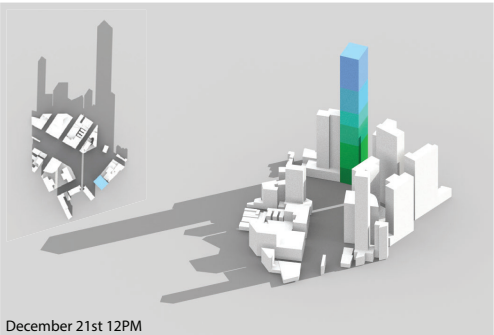


June 21st 12PM



September 21st 12PM

**CURTAIN WALL STUDY**  
Christina Grimes & Fiona Mihalatos



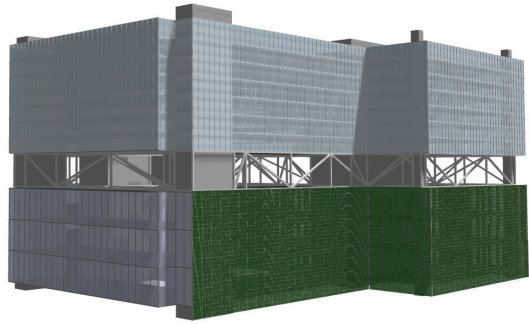
December 21st 12PM

**SUN STUDY**  
Fall 2019

**CONDITIONS:**

EXPOSURE: NORTH WEST FACADE  
ELEVATION: +750 ft  
PROGRAM: RESIDENTIAL  
CURTAIN WALL: OPERABLE WINDOW  
SHADING: INTERIOR BLINDS

ELEVATION: +570 ft  
PROGRAM: COMMUNITY CENTER  
CURTAIN WALL: SINGLE PANE CURTAIN WALL  
SHADING: N/A



**CONDITIONS:**

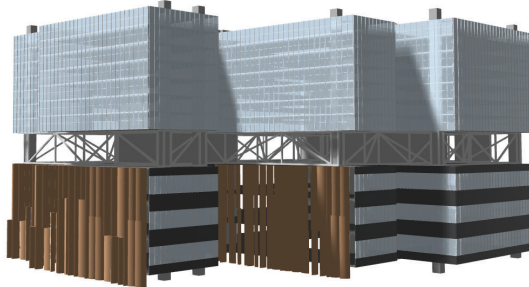
EXPOSURE: SOUTH WEST FACADE  
ELEVATION: +750 ft  
PROGRAM: RESIDENTIAL  
CURTAIN WALL: OPERABLE WINDOW  
SHADING: INTERIOR BLINDS

ELEVATION: +570 ft  
PROGRAM: COMMUNITY CENTER  
CURTAIN WALL: GREEN WALL  
SHADING: N/A

**CONDITIONS:**

EXPOSURE: SOUTH EAST FACADE  
ELEVATION: +750 ft  
PROGRAM: RESIDENTIAL  
CURTAIN WALL: OPERABLE WINDOW  
SHADING: INTERIOR BLINDS

ELEVATION: +570 ft  
PROGRAM: COMMUNITY CENTER  
CURTAIN WALL: OPERABLE WINDOW  
SHADING: WOODEN SHADING



**CONDITIONS:**

EXPOSURE: NORTH EAST FACADE  
ELEVATION: +750 ft  
PROGRAM: RESIDENTIAL  
CURTAIN WALL: OPERABLE WINDOW  
SHADING: INTERIOR BLINDS

ELEVATION: +570 ft  
PROGRAM: COMMUNITY CENTER  
CURTAIN WALL: OPERABLE WINDOW  
SHADING: SOLAR PANELS

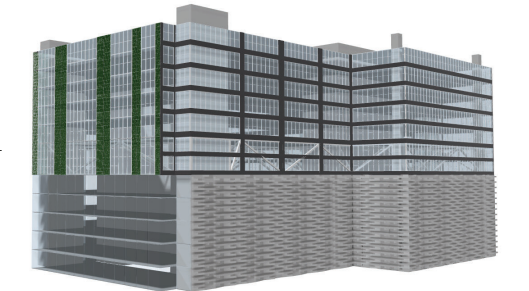
**CURTAIN WALL STUDY**  
Christina Grimes & Fiona Mihalatos

**BUILDING PACKAGE 1**  
Fall 2019

**CONDITIONS:**

EXPOSURE: NORTH WEST FACADE  
ELEVATION: +460 ft  
PROGRAM: EDUCATION  
CURTAIN WALL: OPERABLE WINDOWS AND  
SHADING: DOUBLE GLAZE CURTAIN WALL  
GREEN WALL

ELEVATION: +320 ft  
PROGRAM: OFFICE  
CURTAIN WALL: GLASS SOLAR SHADE  
SHADING: N/A



**CONDITIONS:**

EXPOSURE: SOUTH WEST FACADE

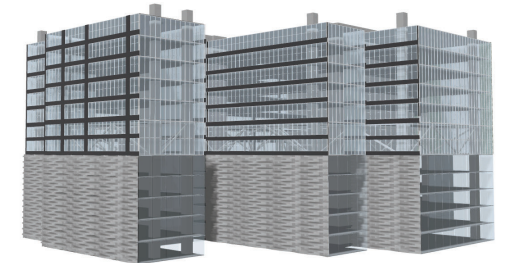
ELEVATION: +460 ft  
PROGRAM: EDUCATION  
CURTAIN WALL: OPERABLE WINDOW  
SHADING: SOLAR PANELS

ELEVATION: +320 ft  
PROGRAM: OFFICE  
CURTAIN WALL: RAIN SCREEN  
SHADING: N/A

**CONDITIONS:**

EXPOSURE: SOUTH EAST FACADE  
ELEVATION: +460 ft  
PROGRAM: EDUCATION  
CURTAIN WALL: OPERABLE WINDOW  
SHADING: SOLAR PANELS

ELEVATION: +320 ft  
PROGRAM: OFFICES  
CURTAIN WALL: RAIN SCREEN  
SHADING: N/A



**CONDITIONS:**

EXPOSURE: NORTH EAST FACADE

ELEVATION: +460 ft  
PROGRAM: EDUCATION  
CURTAIN WALL: DOUBLE GLAZED CURTAIN WALL  
SHADING: INTERIOR BLINDS

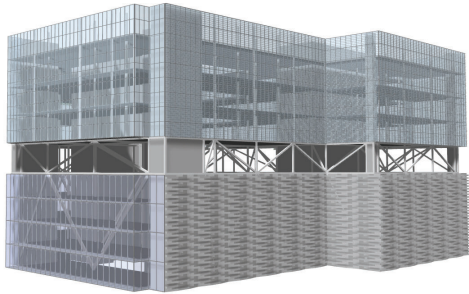
ELEVATION: +320 ft  
PROGRAM: OFFICES  
CURTAIN WALL: GLASS SOLAR SHADE  
SHADING: N/A

**CURTAIN WALL STUDY**  
Christina Grimes & Fiona Mihalatos

**BUILDING PACKAGE 2**  
Fall 2019

CONDITIONS:

EXPOSURE: NORTH WEST FACADE  
ELEVATION: +120 ft  
PROGRAM: FARMING  
CURTAIN WALL: DOUBLE GLAZED CURTAIN WALL  
SHADING: GREEN WALL  
  
ELEVATION: +0 ft  
PROGRAM: RETAIL  
CURTAIN WALL: STRUCTURAL GLASS  
SHADING: GLASS SOLAR SHADE

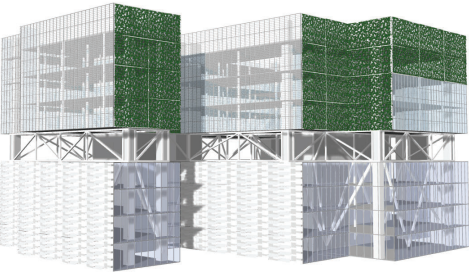


CONDITIONS:

EXPOSURE: SOUTH WEST FACADE  
ELEVATION: +120 ft  
PROGRAM: FARM  
CURTAIN WALL: SINGLE PANE CURTAIN WALL  
SHADING: HORIZONTAL SUNSHADES  
  
ELEVATION: +0 ft  
PROGRAM: RETAIL  
CURTAIN WALL: RAIN SCREEN  
SHADING: N/A

CONDITIONS:

EXPOSURE: SOUTH EAST FACADE  
ELEVATION: +120 ft  
PROGRAM: FARM  
CURTAIN WALL: SINGLE PANE CURTAIN WALL  
SHADING: N/A  
  
ELEVATION: +0 ft  
PROGRAM: RETAIL  
CURTAIN WALL: RAIN SCREEN  
SHADING: N/A

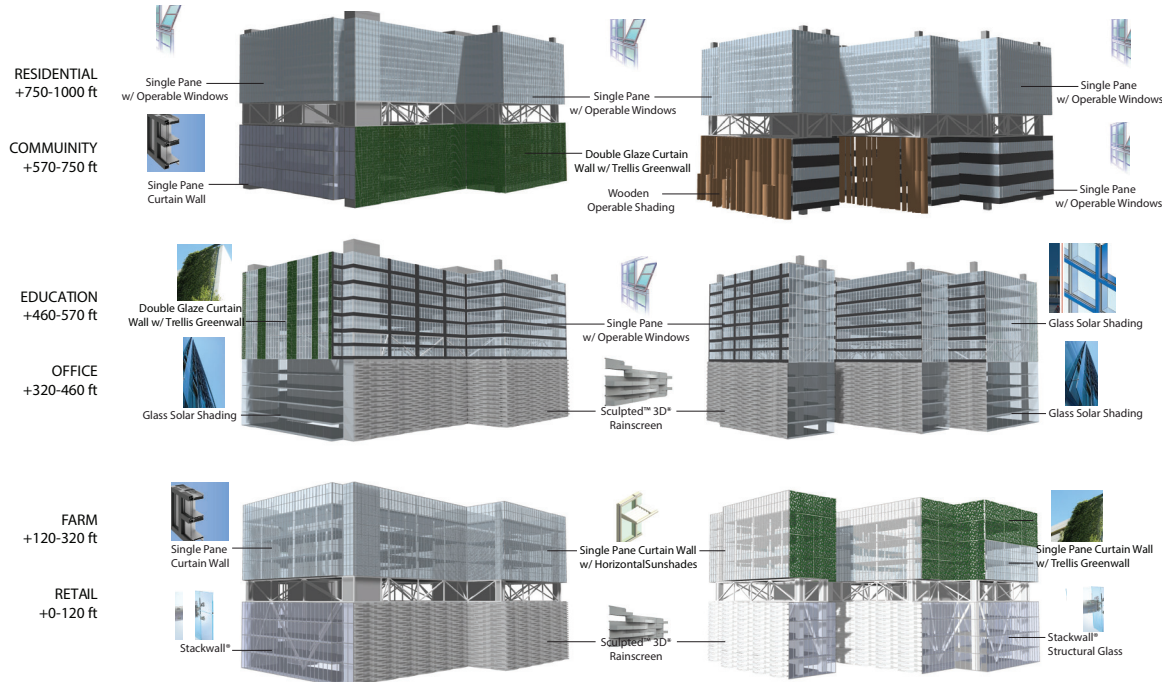


CONDITIONS:

EXPOSURE: NORTH EAST FACADE  
ELEVATION: +120 ft  
PROGRAM: FARM  
CURTAIN WALL: DOUBLE GLAZED CURTAIN WALL  
SHADING: TRELLIS GREEN WALL  
  
ELEVATION: +0 ft  
PROGRAM: RETAIL  
CURTAIN WALL: STRUCTURAL GLASS  
SHADING: N/A

CURTAIN WALL STUDY

Christina Grimes & Fiona Mihalatos



CURTAIN WALL STUDY

Christina Grimes & Fiona Mihalatos

BUILDING PACKAGE 3

Fall 2019

FULL BUILDING

Fall 2019



CHRISTINA GRIMES & FIONA MIHALATOS  
DEGREE PROJECT  
2020