SUSTAINABLE URBANISM STUDIO

UNIVERSITY OF NEBRASKA LINCOLN
SRPING 2016 - TIANJIN, CHINA

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PRESERVATION

Ever since planners began the process of embracing the goals and strategies of modernism, cities have been on a collision course with the environment. The ills of the Industrial Revolution, which both sparked the high carbon development patterns of modernism and began the degradation of the environment, have resulted in an unsustainable relationship between human settlement and the natural environment. To find a healthy balance with the planet, and foster a community that can sustain this balance, requires the reorientation of planning and design trajectories to be concerned with performance in the areas of survival, purpose, ecology and heritage. Survival to reconnect settlement to water, food and shelter as the foundations of settlement, purpose to connect human industry and innovation to the needs of settlement while being mindful of their impacts, ecology to integrate urbanism within the environment and heritage to critically consider the role the past has in defining the present and the future definition of place.

The Sustainable Urbanism studio focuses of exploring strategies that seek to evolve the nature of the city from its unsustainable present towards a sustainable future. The rapid urbanization of the planet has made this a pressing reality for the professions concerned with human settlement and the environment. The studio pursues this goal through grounded speculation in the present, seeking balanced, inclusive solutions as opposed to singular, biased polemics. Density is embraced but not at the expense of privacy. Survival is understood as something that must be addressed within development not somewhere else. Growth is a reality pursued strategically where integration and diversity are important as opposed to segregation and singularity. Purpose, as manifest in economics, improvement and occupation, provides the means for civilization and the environment to adapt to the dynamic conditions of our world. Sustainability is not just green. It comes in all colors, requiring a holistic approach where ecological balance is valued over human arrogance. The breadth of sustainability is not its weakness. It is its strength. Humanity's weakness is its failure to embrace this reality. The Sustainable Urbanism Studio embraces the challenge of pursuing balance over polemics, inclusion over exclusion, integration over segregation and the fact that human settlement is a part of the environment not apart from the environment.

Spring 2016 Ecology of Innovation

Tianjin, China: Tianjin University (Re)development

Sustainability and Innovation

Within the broad definition of 'sustainability', purpose is the trajectory that propels civilization toward the future. Humanity's ability to learn from and improve the conditions of existence gives meaning to life's pursuit. Cities are the environments where civilization has made its biggest leaps forward. The collection of human and financial capital that exists in cities make them a natural habitat for ideas to come to life and reach their potential. Throughout history, these incubators of innovation have changed, creating the appropriate environment to facilitate and leverage the emerging forces of the time. In the age of globalization, emerging economies, and rapidly expanding digital frameworks, the nature of the next evolution of the city is an open question. Add to this the challenges of climate change and the carbon footprints of cities and there is a need to rethink the nature of cities.

Context

The industrial age fueled by improvements in transportation and power technology caused a significant disruption to the process of manufacturing and management. In the digital age, the world wide web, new making technologies and lean management strategies are once again transforming our world. This dynamic environment is empowering a new generation of entrepreneurs with the ability to alter our human condition. Where the Industrial Revolution brought mass production and a segregated management labor relationships housed in factories and office buildings, the digital age has elevated the start-up incubator environments, on-demand manufacturing and makers spaces. What impact this will have on the city is the subject of this studio.

Design Research

The changing landscape of manufacturing in a Post-Fordian environment, communication in the age of the world wide web and information management in the time of 'big data', presents interesting challenges and opportunities for the city. As China looks to shift from a government driven Keynesian, demand side, economic structure to a more privately driven supply side economy, the facilitation of innovation will become an important challenge for urban designers. This investigation explores the 'ecology' of innovation through the design of a new innovation center. Students were to consider the development of new ventures from start-up to established companies, connections to the adjacent university, housing of transient expertise, marketing and selling of new produc and employee amenities among other things. All pursued within a framework that used less energy and pursued other sustainable performance objectives.

02 RESEARCH

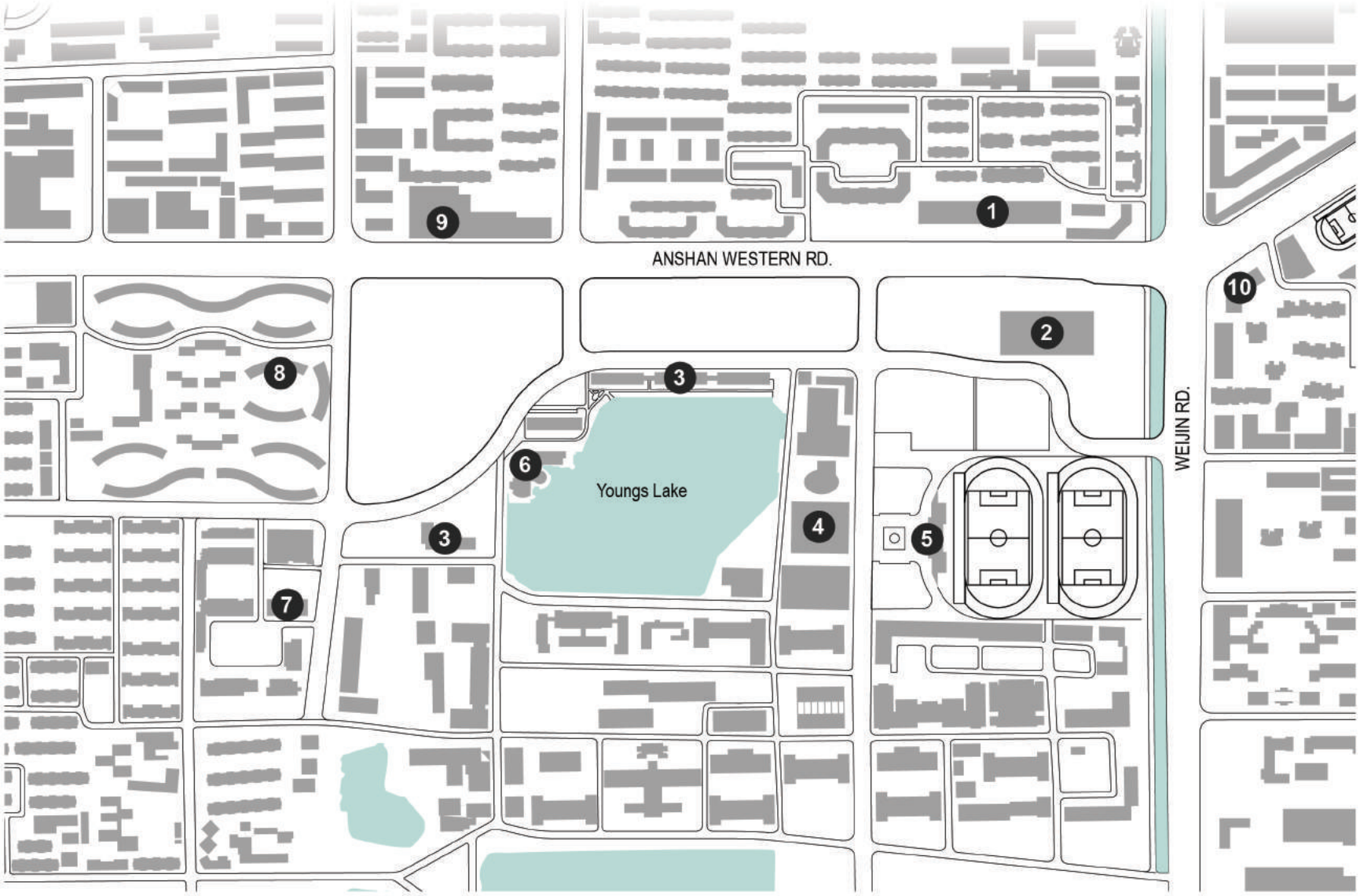
LOCATION - TIANJIN, CHINA

Tianjin is a metropolis in northern coastal Mainland China, administered by the People's Republic of China and one of the five national central cities of China, with a total municipal population of 15,469,500. It is the largest coastal city in northern China.

LOCATION - TIANJIN UNIVERSITY CAMPUS

Tianjin University is the first modern higher education institution in China, and one of the largest multidisciplinary engineering universities in China. In order to carry out the "21st Century Education Revitalizing Action Plan", in late 2000 the Ministry of Education and Tianjin Municipality signed an agreement which aims to build Tianjin University into a 1st-class university in the world in the 21st Century.

SURROUNDING CONTEXT



SCALE: 1:3000

The site is an eleven hectare area along the northern edge of the Tianjin University Campus. The site is divided into four areas as defined by proposed circulation corridors. These circulation corridors can be crossed above ground level. Previously the area was home to student housing, which will no longer be needed after the relocation of the main University campus to a new site. Some existing historic dormitories and the associated student union facility located along a lake, outside the site, are to be renovated and continue to serve the same purpose. A new perimeter road will be cut through the area to provide improved access and definition to the new Innovation Campus.

1. 1895 Hall

2. Gym Facility

3. Dormitary

4. Fengjicai Art Center

5. Sport Area

6. Student Activity Center

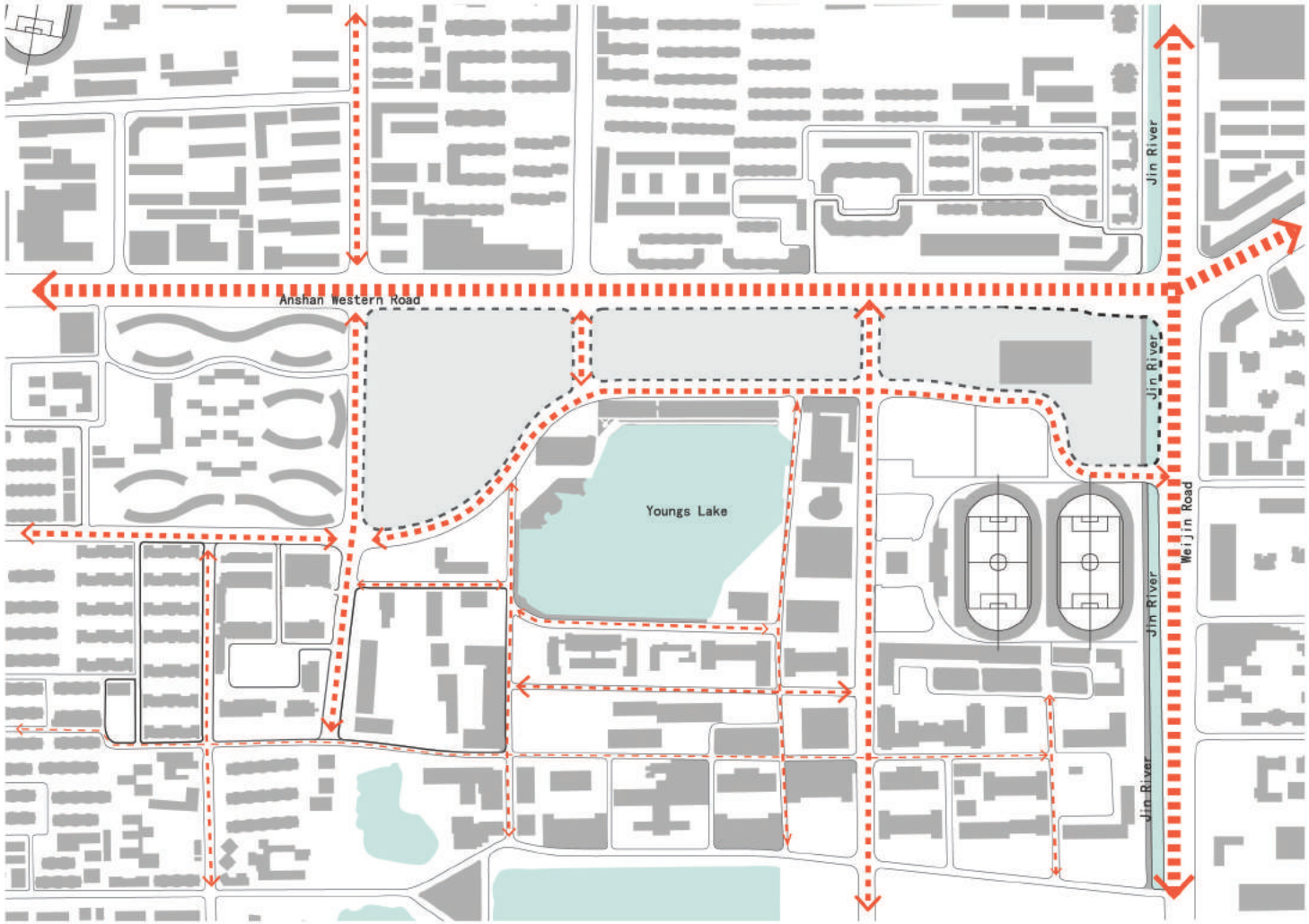
7. Student Apartment

8. Apartments

9. Qiyuan Hotel

10. Jinbin Hotel

VEHICULAR CIRCULATION



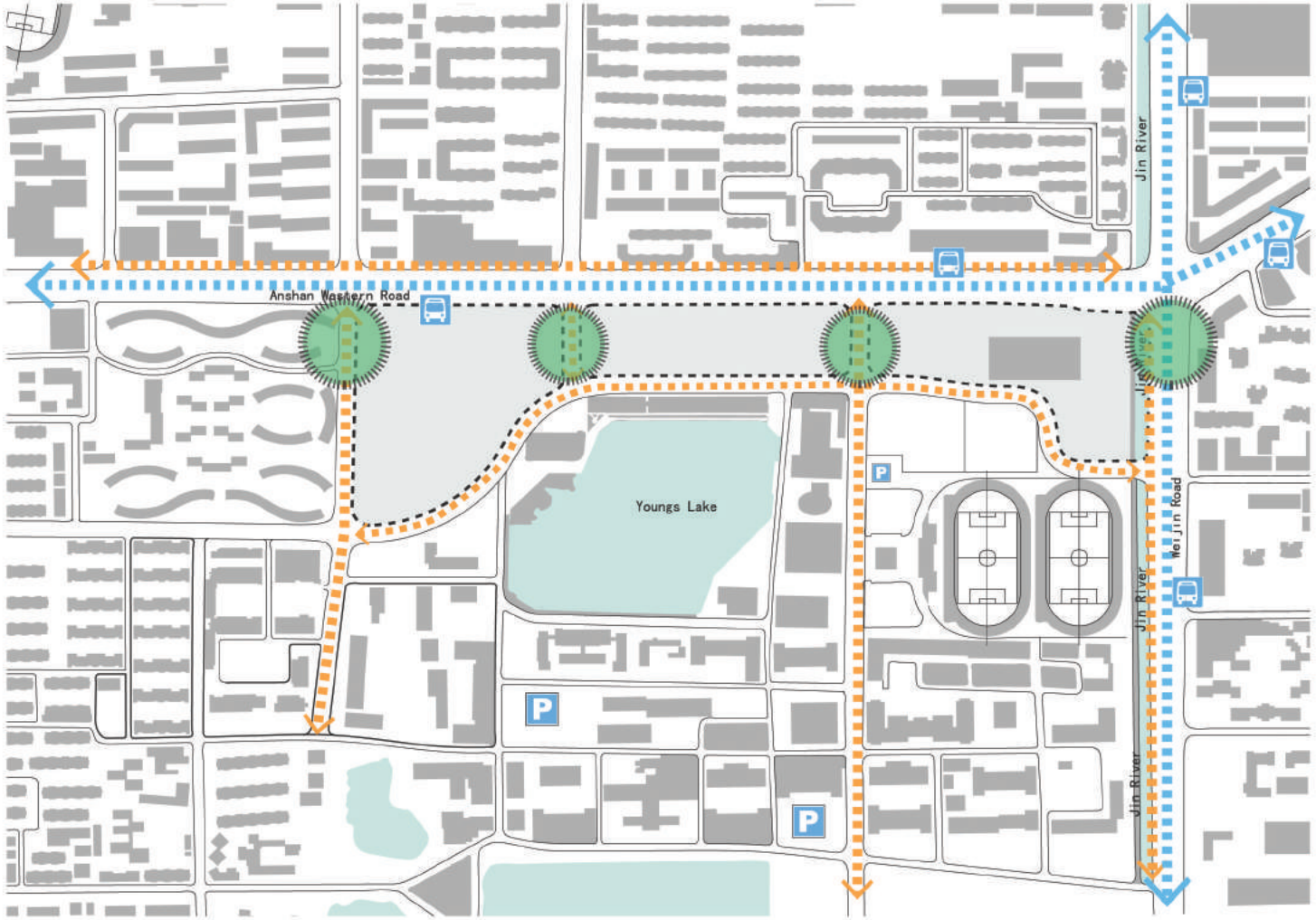
Primary

Secondary

Tertiary

SCALE: 1:3000

PUBLIC & PEDESTRIAN CIRCULATION

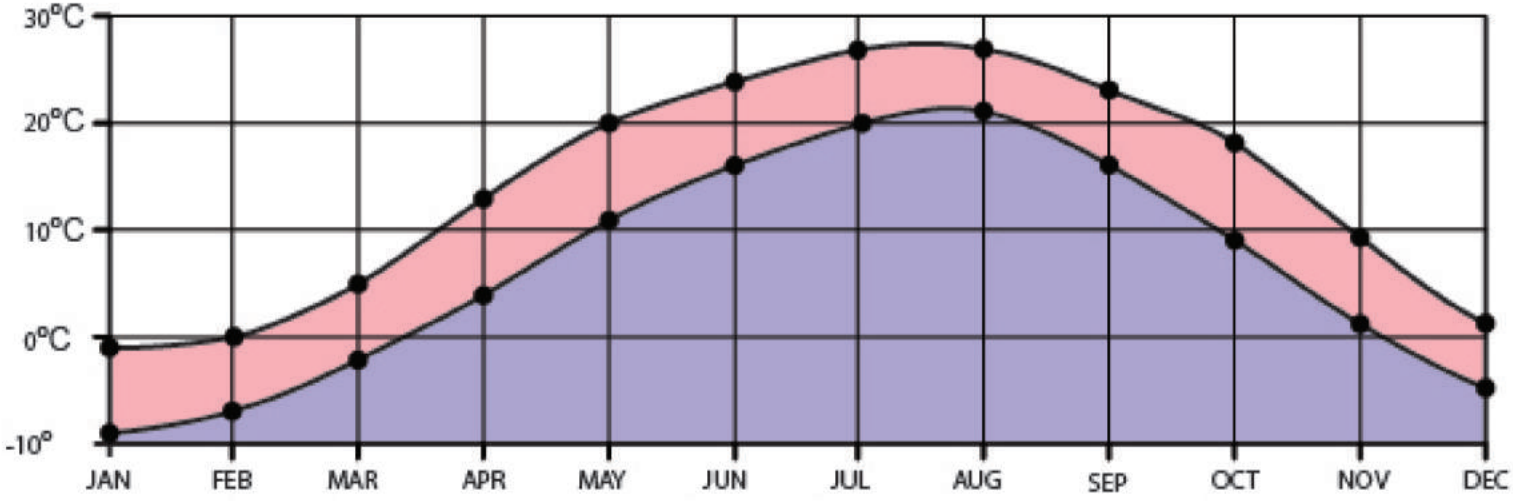


Major Circulation Public Transportation Main Pedestrian Bus Stop

SCALE: 1:3000

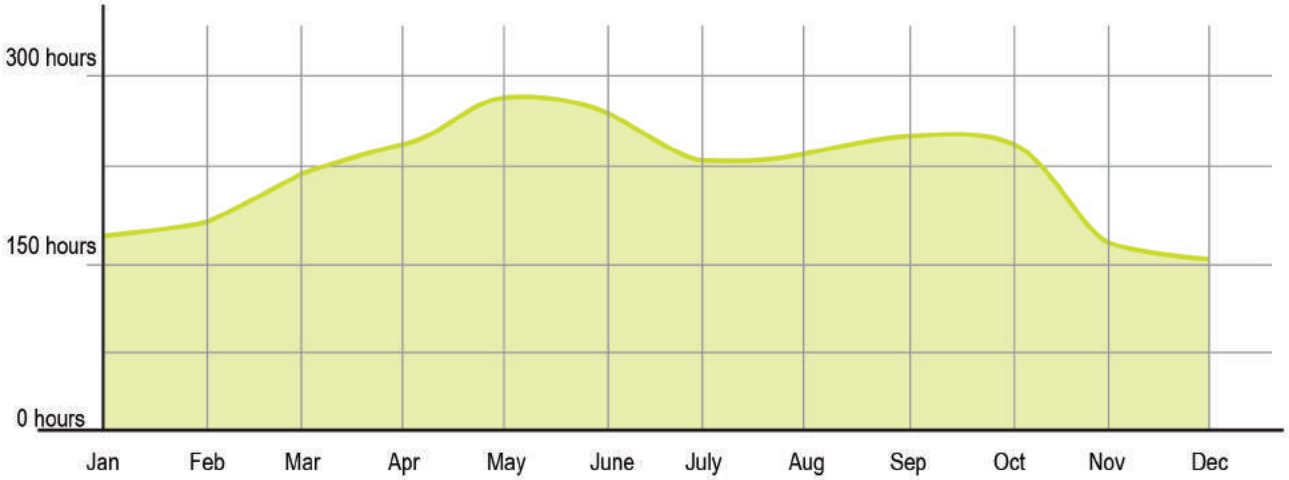
CLIMATE - TEMPERATURE

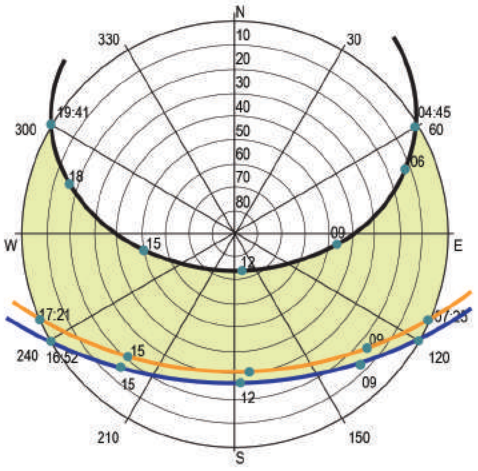
The monthly 24-hour average temperature ranges from −3.4 °C (25.9 °F) in January to 26.8 °C (80.2 °F) in July, with an annual mean of 12.90 °C (55.2 °F).



CLIMATE - SOLAR ENERGY POTENTIAL

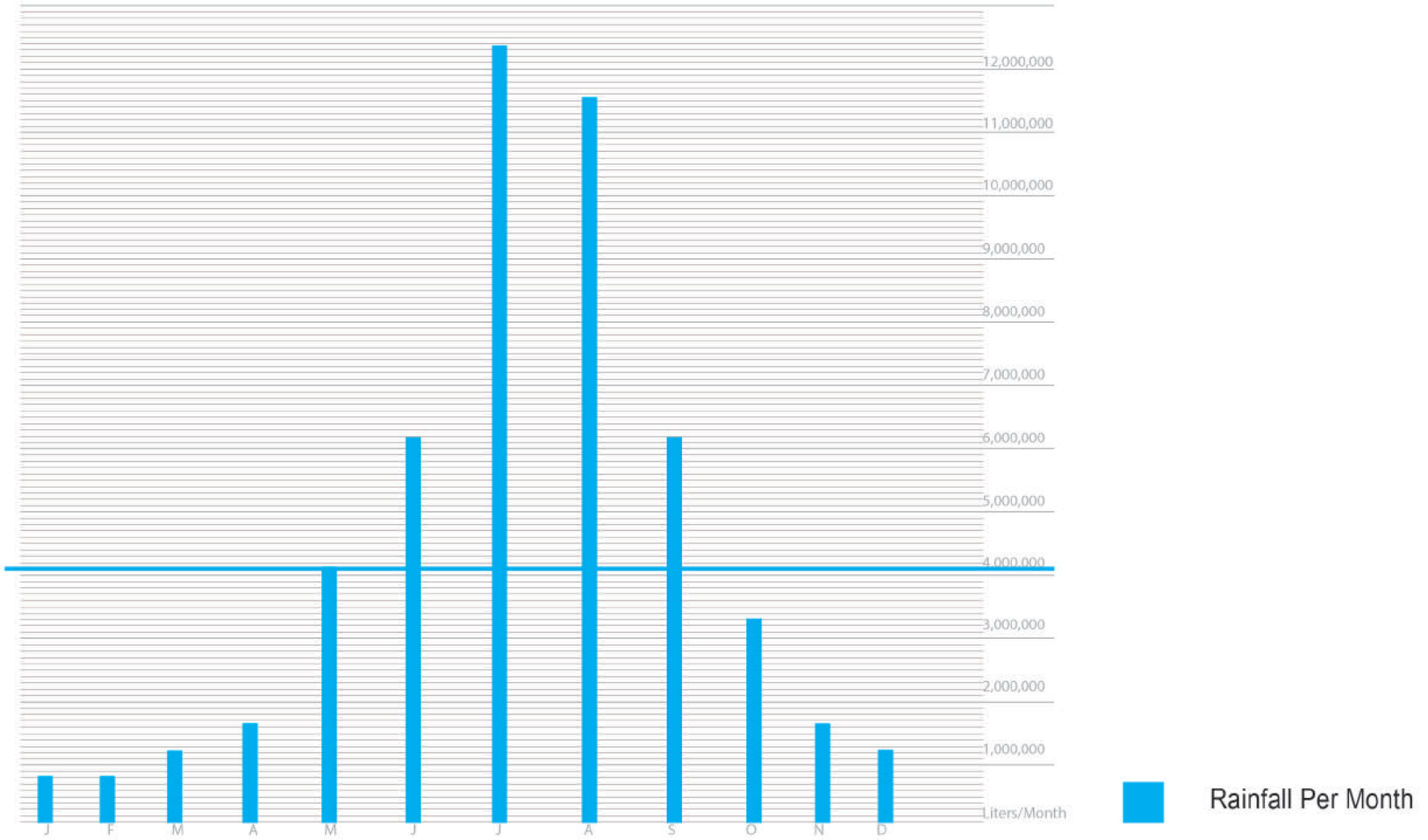
With monthly percent possible sunshine ranging from 48% in July to 61% in October, the city receives 2,522 hours of bright sunshine annually.





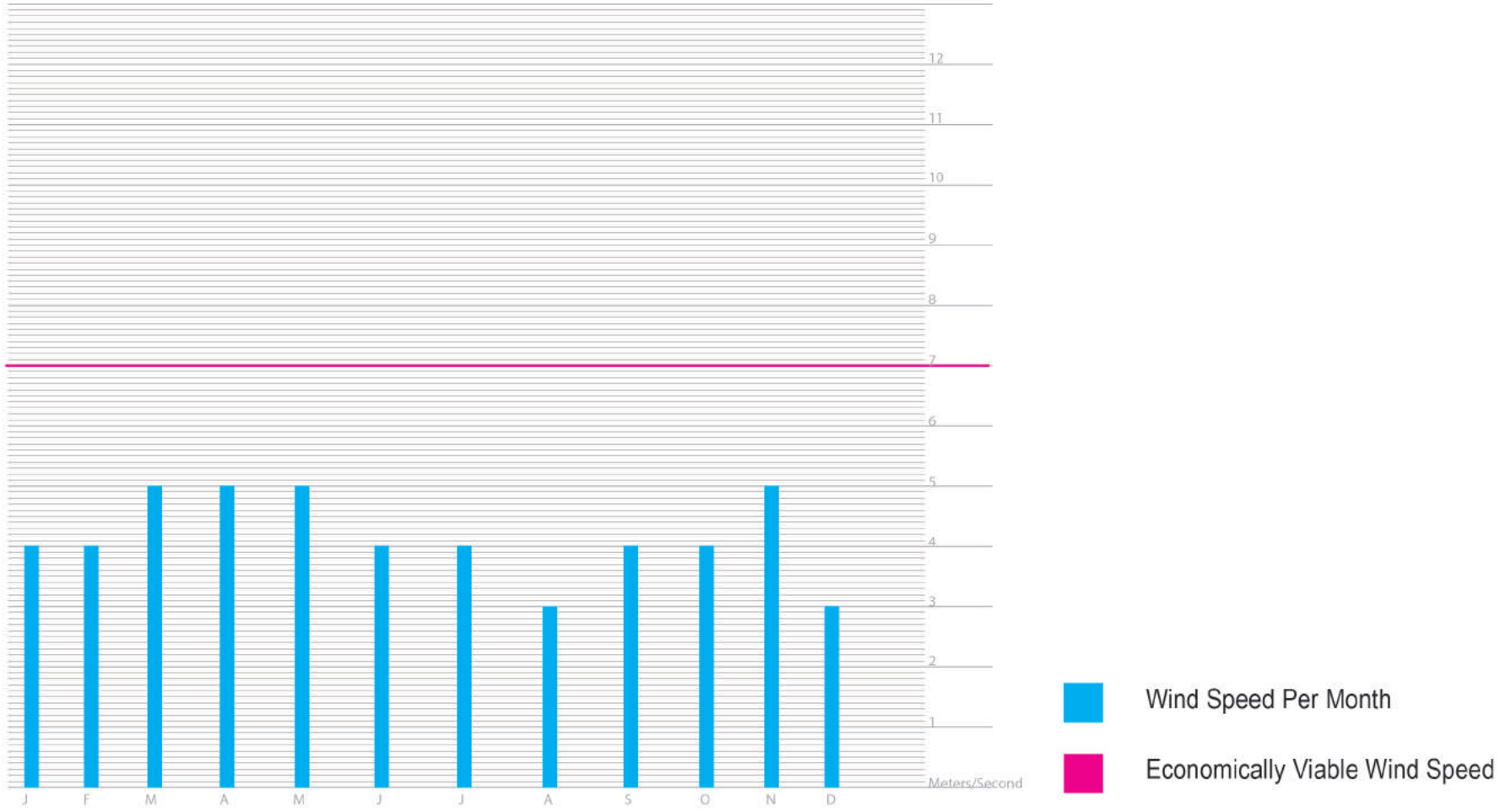
CLIMATE - WATER CONSERVATION POTENTIAL

Having a low annual total precipitation of 511 millimetres (20.1 in), and nearly three-fifths of it occurring in July and August alone, the city lies within the semi-arid zone, with parts of the municipality being humid continental. Rainfall is heavy during the months of July and August. Water collection and retention may be possible during these months.



CLIMATE - WIND ENERGY POTENTIAL

Tianjin features a four-season, monsoon-influenced climate, typical of East Asia, with cold, windy, very dry winters reflecting the influence of the vast Siberian anticyclone, and hot, humid summers, due to the monsoon. Spring in the city is dry and windy, occasionally seeing sandstorms blowing in from the Gobi Desert, capable of lasting for several days. Tianjin recieves a decent amount of wind each day. This ranges between 0-5 meters per second.



PROJECT STATEMENT

The basic task for this project is the creation of a habitat for creative people. Habitats are complex constructions in nature, comprised of many different residents and environmental contributors. All the elements necessary for a particular community to thrive, be resilient and adaptable to changing conditions need to be part of a connected ecology.

The intention for this development is to create a connected community where synergies can occur as a serendipitous moment or an arranged encounter. Where sharing is a normal occurrence and connectivity happens on many levels.

Traditionally research activity in China has been carefully managed by the government, but in order to transcend predictable or basic production, the government has recognized it needs to empower individuals and organizations to innovate in ways that will allow China to make the next big leap forward. Creative exploration can be an open ended proposition (basic research) or can be governed by particular goals (applied research). In the digital realm there are open source environments and close sourced environments. Each has their benefits and liabilities. The Innovation Institute will need to support both types of exploration, but in general since the intent is to open things up to innovate, the campus should reach out to the larger local, national and global community. This means the public dimension of the new campus should engage and excite the people who work there and the visiting public.

The notion of a high quality of life in China has become increasingly tied to improved environment conditions. In recent years, concern about the environment has become the most important issue on the minds of the Chinese public. The built environment has been broadly identified as the largest contributor of carbon in the atmosphere, surpassing industry and transportation. As cities continue to grow, it becomes increasingly important that they are designed in ways that reduce the carbon footprint of settlement. To achieve these expectations, designs must consider innovative ways of organizing program, managing resources, integrating new and old technologies, and connecting human settlement with the natural environment.

PROJECT PROGRAMS

The project as illustrated about, has a singular purpose that can only be realized through the integration of multiple players. Many of the major elements have been identified above, but the specific quantitative mix has yet to be determined. The planning authority has designated the site to have a FAR of 4.5 and expects it to be a very dense site.
The specific definition of the project program will be one of the initial activities of the studio. The following is offered as a point of departure for those efforts.

- PROGRAM:
  - Start-up Business Incubator Space
  - Commercial Office Space
  - Maker Spaces
  - Hotel with Meeting Facilities
  - Exhibition Facility
  - Support Commercial

- TOTAL LAND AREA: 110,000 sqm
- PROGRAM LIMITS: 495,000 sqm
- COVERAGE (40%): 40% x 110,000 sqm
= 44,000 sqm
- GREEN SPACE (25%): 25% x 110,000 sqm
= 27,500 sqm
- OPEN SPACE (35%): 25% x 110,000 sqm
= 38,500 sqm

GROUP: INTELL


LIDA LU


LEUL YOSEPH


MORTEN LYDISEK


MINA GENG

GROUP: PBAMM


ABDUL NAHAS


PHUONG NGUYEN


MEGHAN JANOUSEK

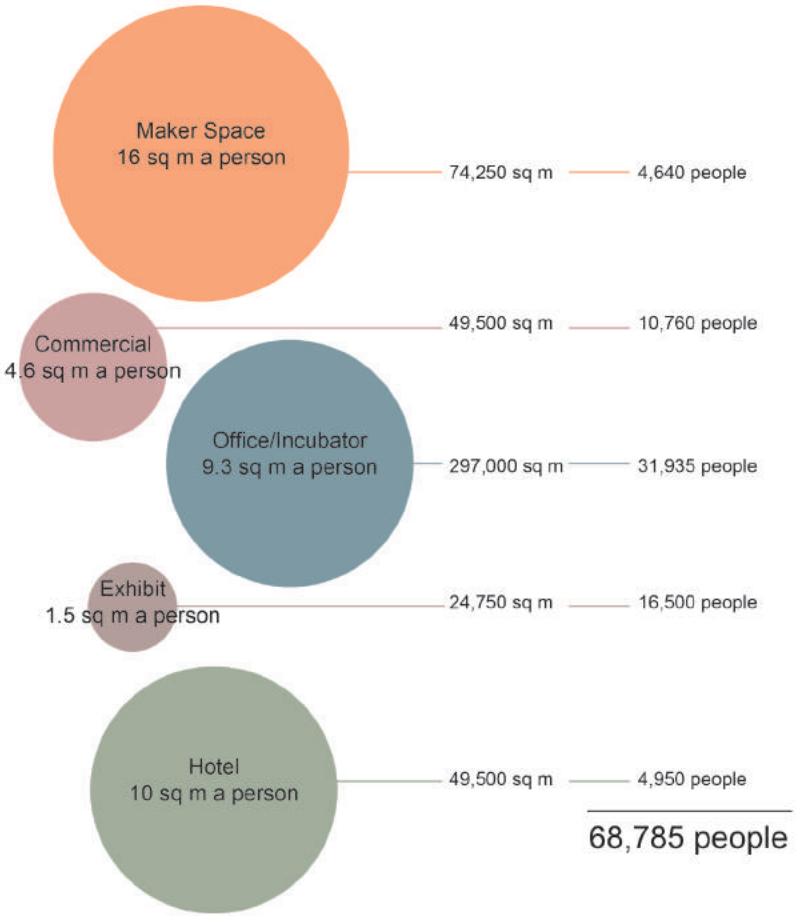

MATT KRUTZER

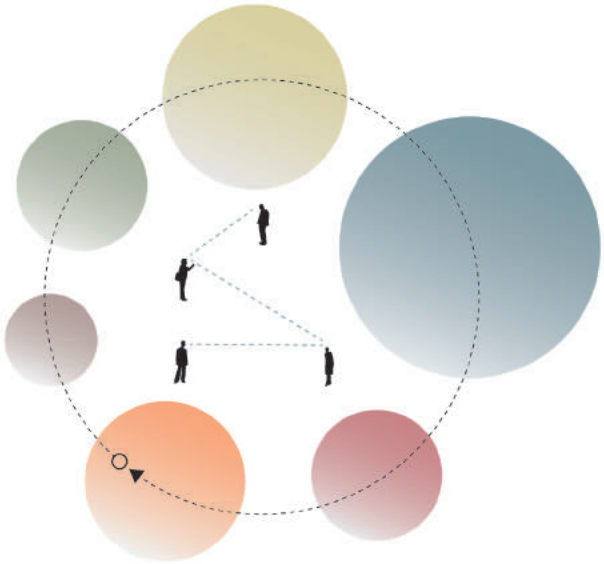

BEN BEDELL

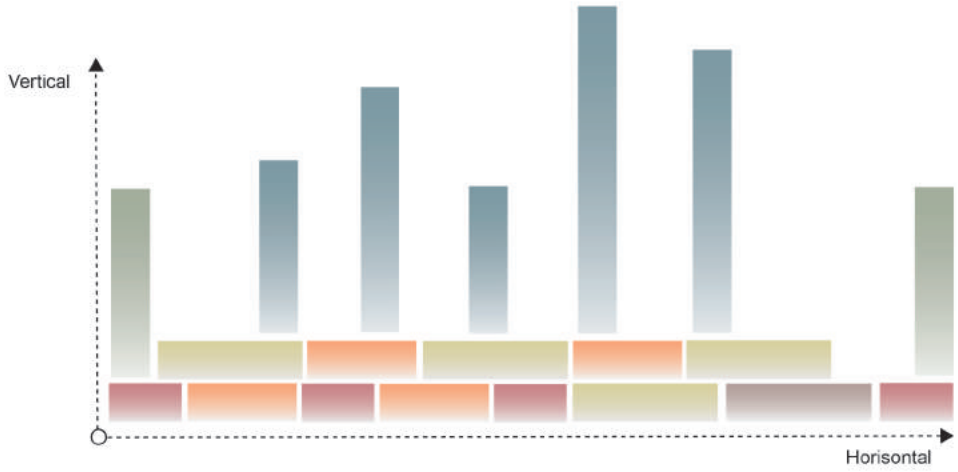
03 MASTER PLAN

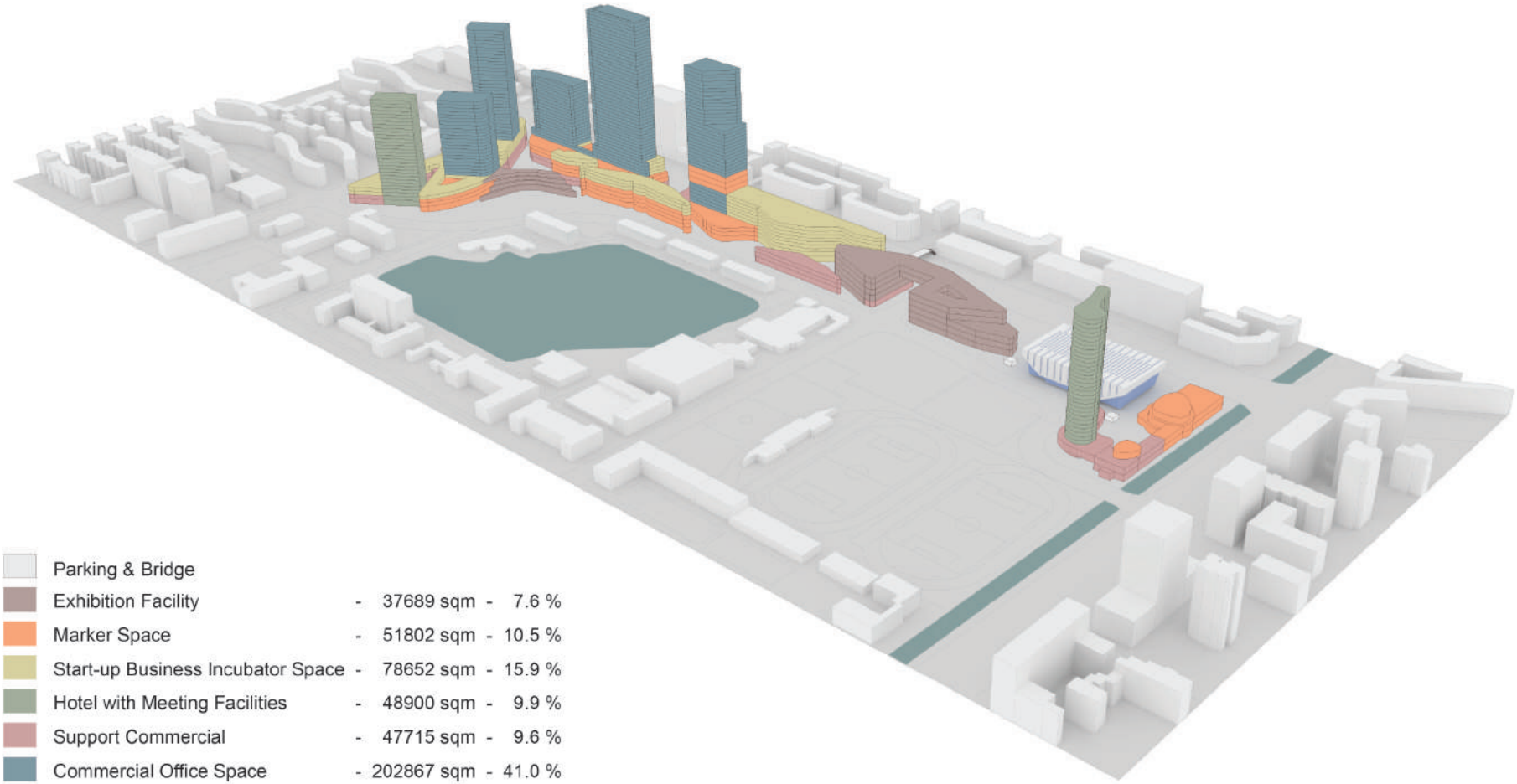
MASTER PLAN | INTELL

- Dynamic building systems, capable of adapting to real time conditions
- Provide public spaces for a variety of functions
- Encourage cross program collaboration and interaction
- Link Innovation Center with neighboring community







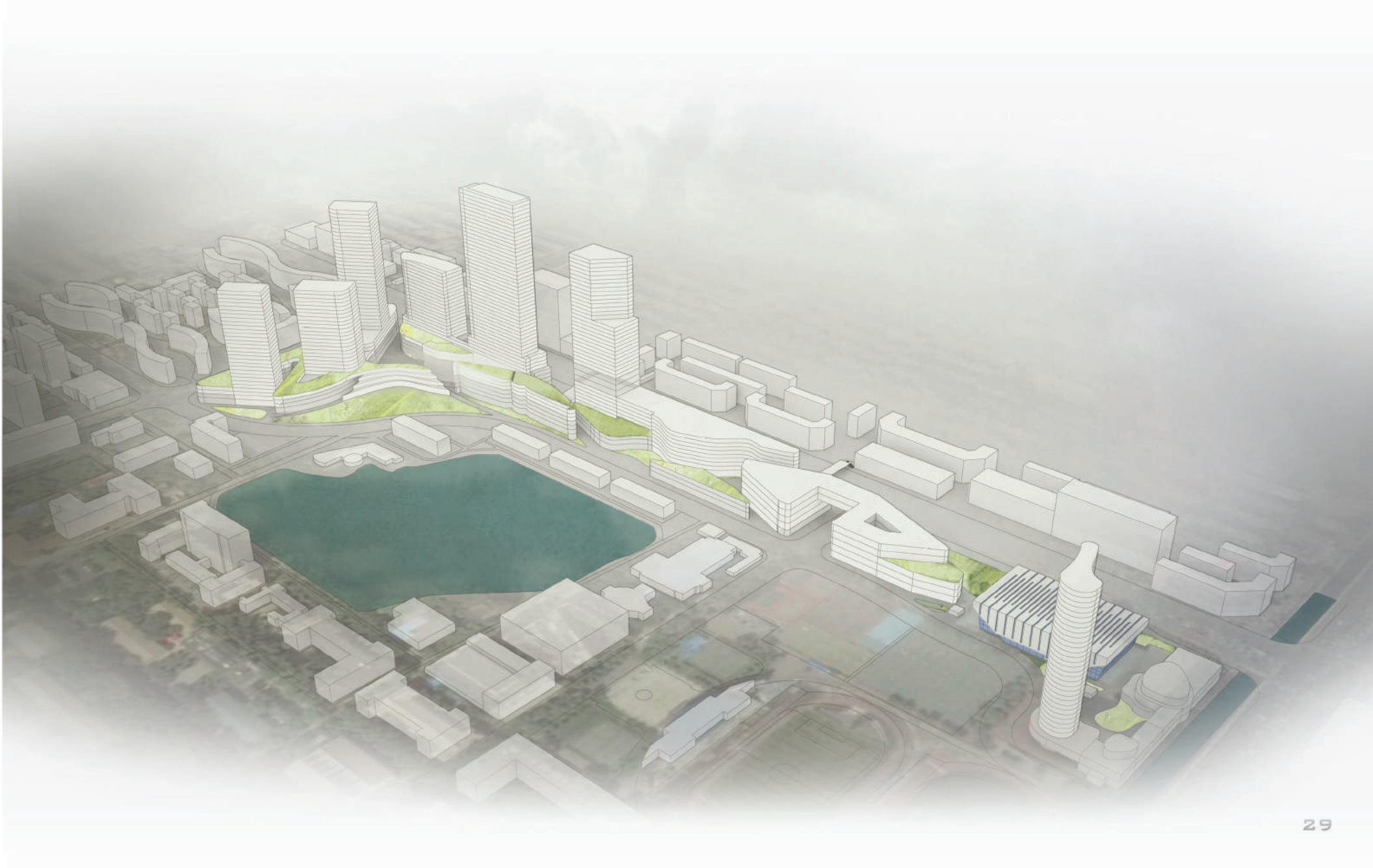


Parking & Bridge			
Exhibition Facility	- 37689 sqm	- 7.6 %	
Marker Space	- 51802 sqm	- 10.5 %	
Start-up Business Incubator Space	- 78652 sqm	- 15.9 %	
Hotel with Meeting Facilities	- 48900 sqm	- 9.9 %	
Support Commercial	- 47715 sqm	- 9.6 %	
Commercial Office Space	- 202867 sqm	- 41.0 %	
	- 467625 sqm	- 94.5 %	

MASTER PLAN | INTELL - SITE PLAN

SCALE: 1:3000

MASTER PLAN | INTELL - BIRDEYE PERSPECTIVE



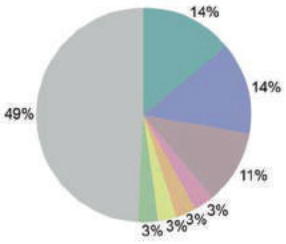
PERFORMANCE GOALS | INTELL

- Reduce energy usage by 65%. Find methods to offset energy demand
- Water Treatment system to purify river and provide potable water (Living Machine)

Offices/Incubator: Typical energy Use

Benchmarks: 200 kWh/m2
Total area: 297,000 m2
Occupants 31,935

Total Energy Demand:
5940000 kWh/m2

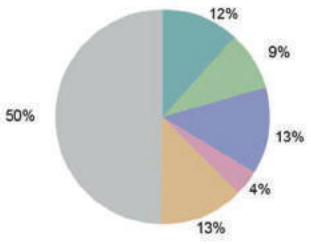


- Cooling/Heating
- Fans & Pumps
- Lighting
- Office Equipment
- Catering
- Other
- Servers
- Hot Water

Hotels: Typical energy Use

Benchmarks: 250 kWh/m2
Total Area: 49,500 m2
Occupants: 4,950

Total Energy Demand:
12375000 kWh/m2

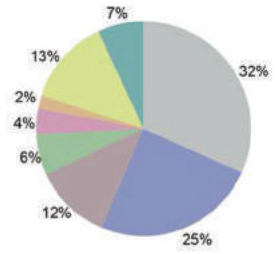


- Cooling/Heating
- Vents, Pump, and Fans
- Hot Water
- lighting
- Other
- Catering

Commercial: Typical energy Use

Benchmarks: 80 kWh/m2
Total Area: 49,500 m2
Occupants: 10,760

Total Energy Demand:
3960000 kWh/m2

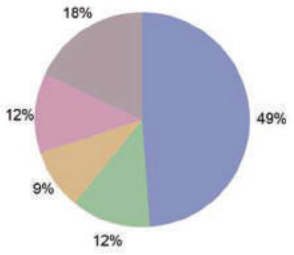


- Cooling/Heating HAVC
- Lighting
- Equipment
- Hot Water
- Refrigeration
- Catering
- Other
- *

Maker Space: Typical Electricity Use

Benchmarks: 250 kWh/m2
Total area: 74,250 m2
Occupants: 4,640

Total Energy Demand:
18562500 kWh/m2

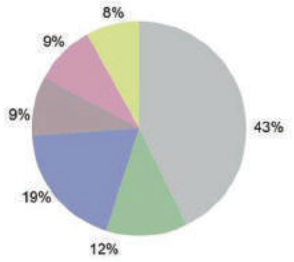


- Lighting
- Hot Water
- Server & Specialist Computing
- Catering
- Equipment

Exhibition: Typical energy Use

Benchmarks: 150 kWh/m2
Total area: 24,750 m2
Occupants: 16,500

Total Energy Demand:
3712500 kWh/m2



- Cooling/Heating
- Hot water
- Lighting
- Computer & Electronics
- Aplliances
- Other

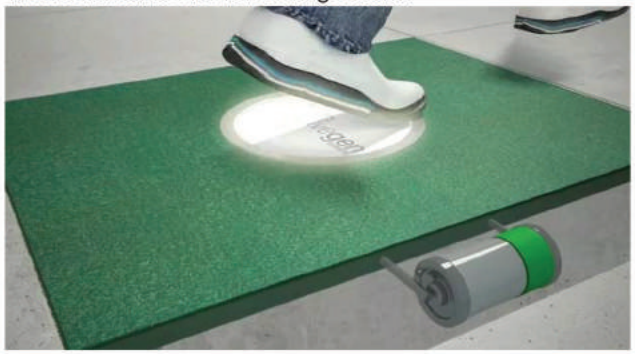
Total energy demand for all programs: 98010000 kWh/m2

Photovoltaics

Solar Panels: Harvests the energy of the sun, limited to areas with direct sunlight.
Generates about 140 Watts per sq m. under good conditions.

Human Powered Energy

Pavegen Tile: Designed to harvest the kinetic energy generated from people walking on it. Generates 8 watts for one footstep, making it capable of illuminating an LED light for 30 seconds. Uses a battery to store excess energy, but it is better suited for low voltage tasks.



Living Roof

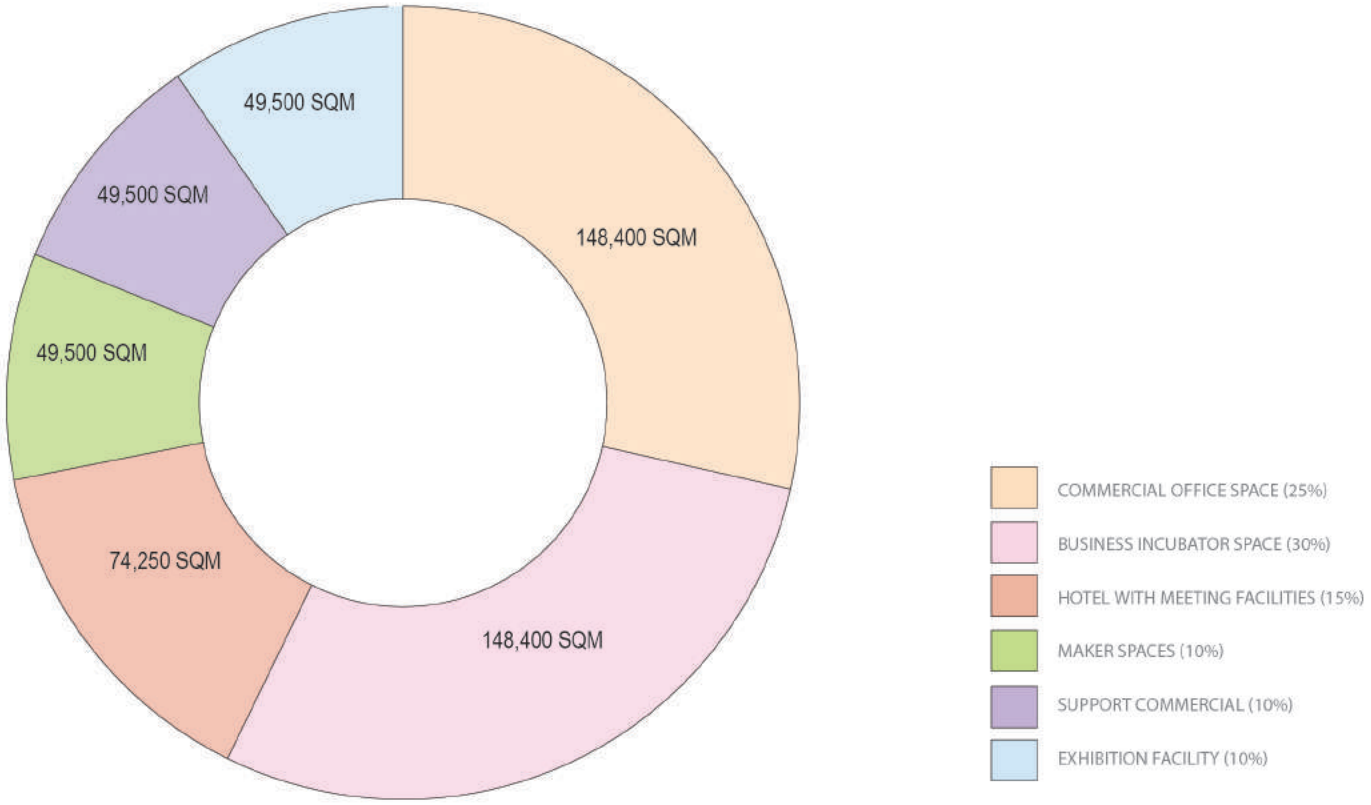
Green spaces on the top of buildings that is meant to collect rainwater, sometimes filtering it through into the building as a means to collect water for inhabitants. Requires a large, flat roof to be effective. Lessens thermal loads in warm seasons and reduces the urban heat island effect.

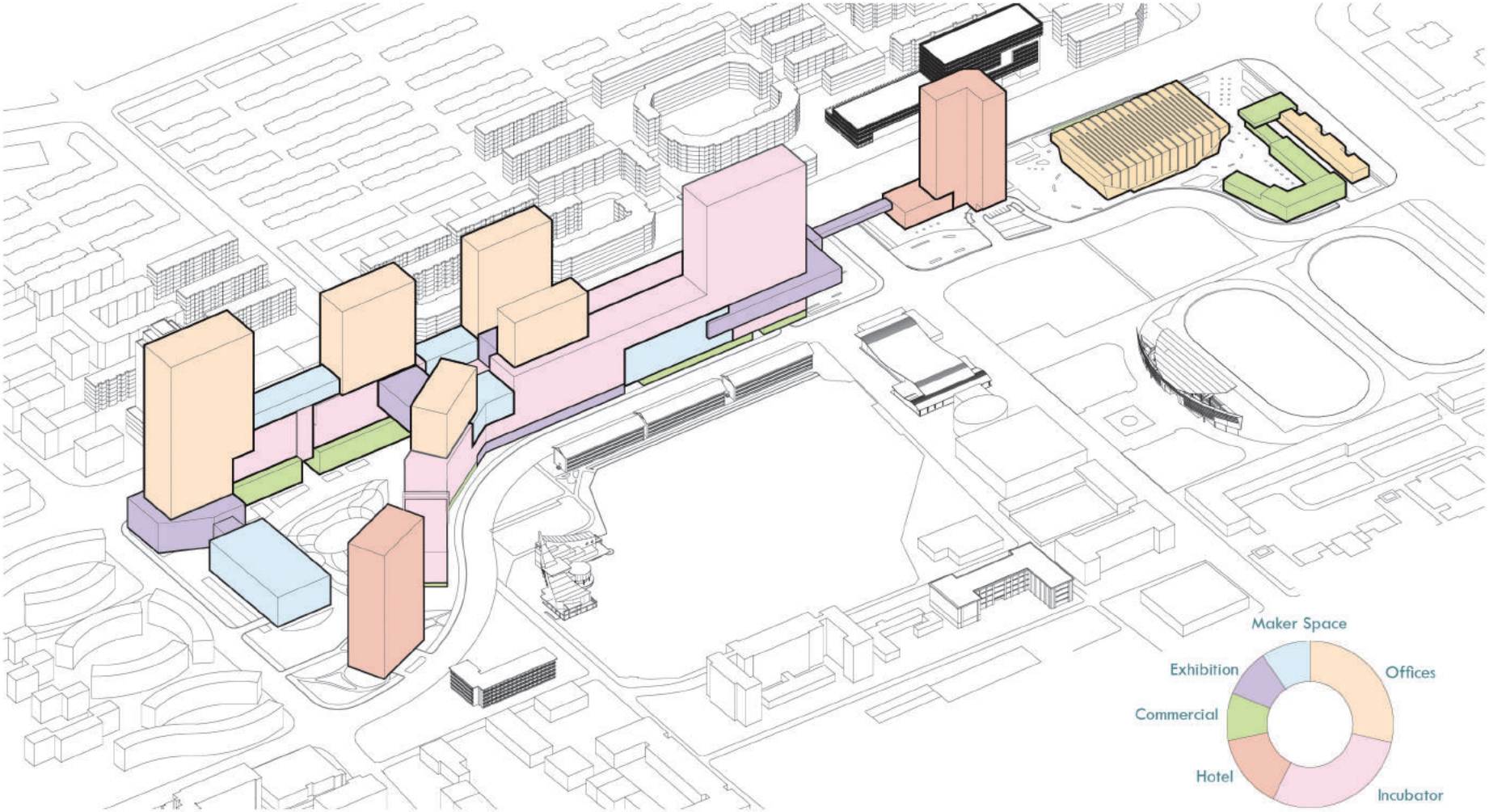
Living Wall

These walls are extremely versatile- they can be installed along nearly any vertical service, exterior or interior. They can improve air quality, provide shade, and create texture on flat surfaces through the introduction of plants.

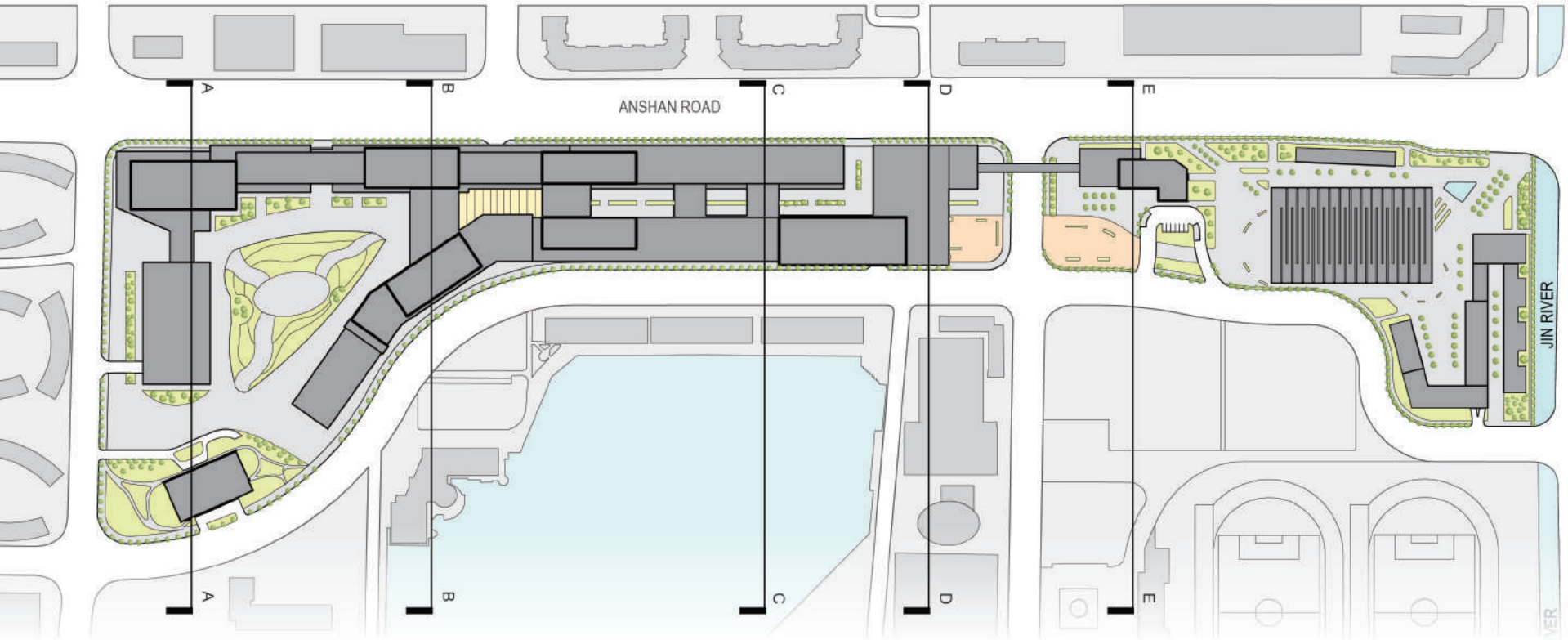
MASTER PLAN | PBAMM

- Utilize Surrounding context as means for locating programs
- Utilize Maker Space as a mixing point on campus
- Locate office spaces closer to the more public end of campus
- Create Collaborative Environment
- Interaction of office with commercial
- Hotel/conference tied to sports stadium




Maker Space
Offices
Incubator
Hotel
Commercial
Exhibition

MASTER PLAN | PBAMM - SITE PLAN



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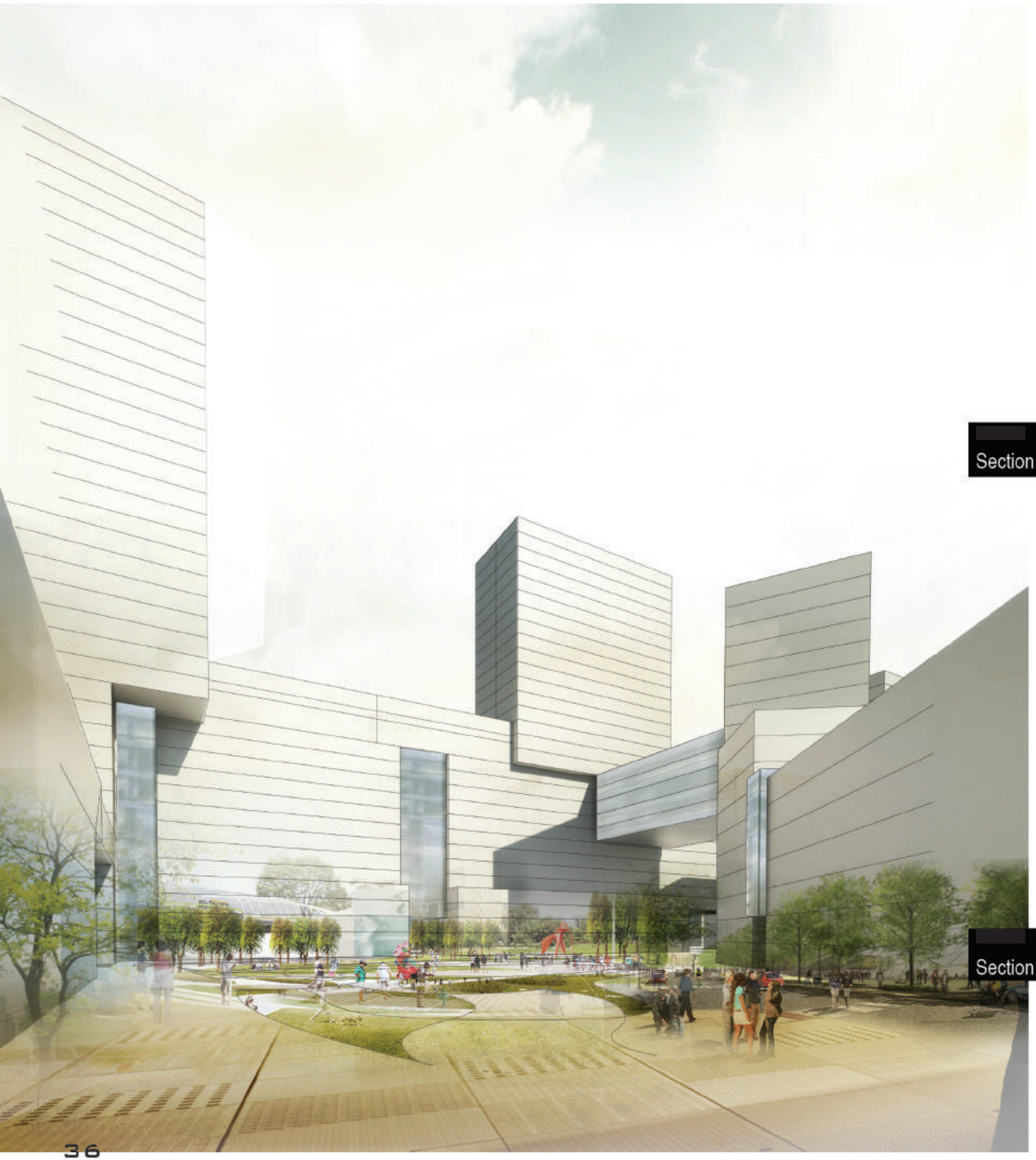
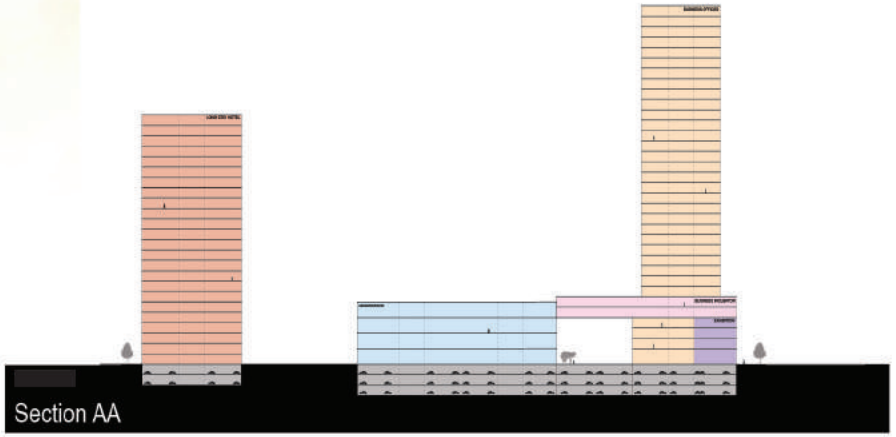
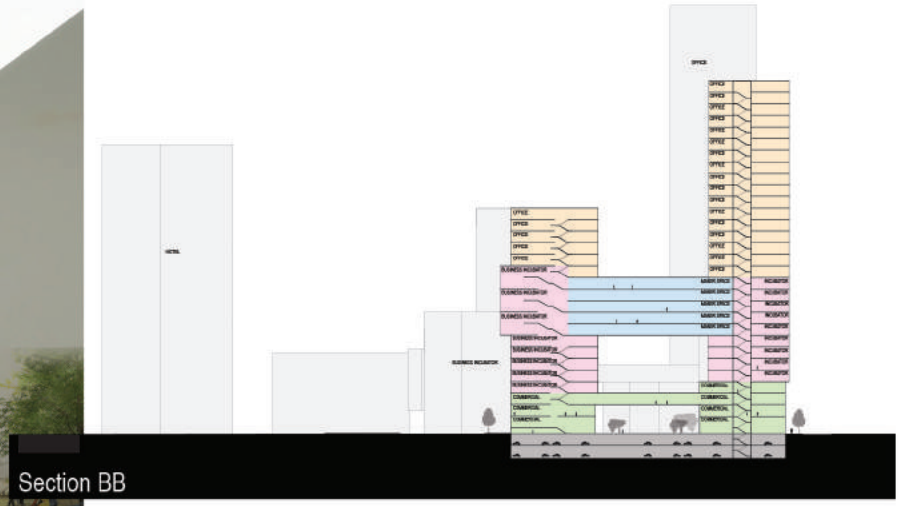
MASTER PLAN | PBAMM - BIRDEYE PERSPECTIVE





Section AA



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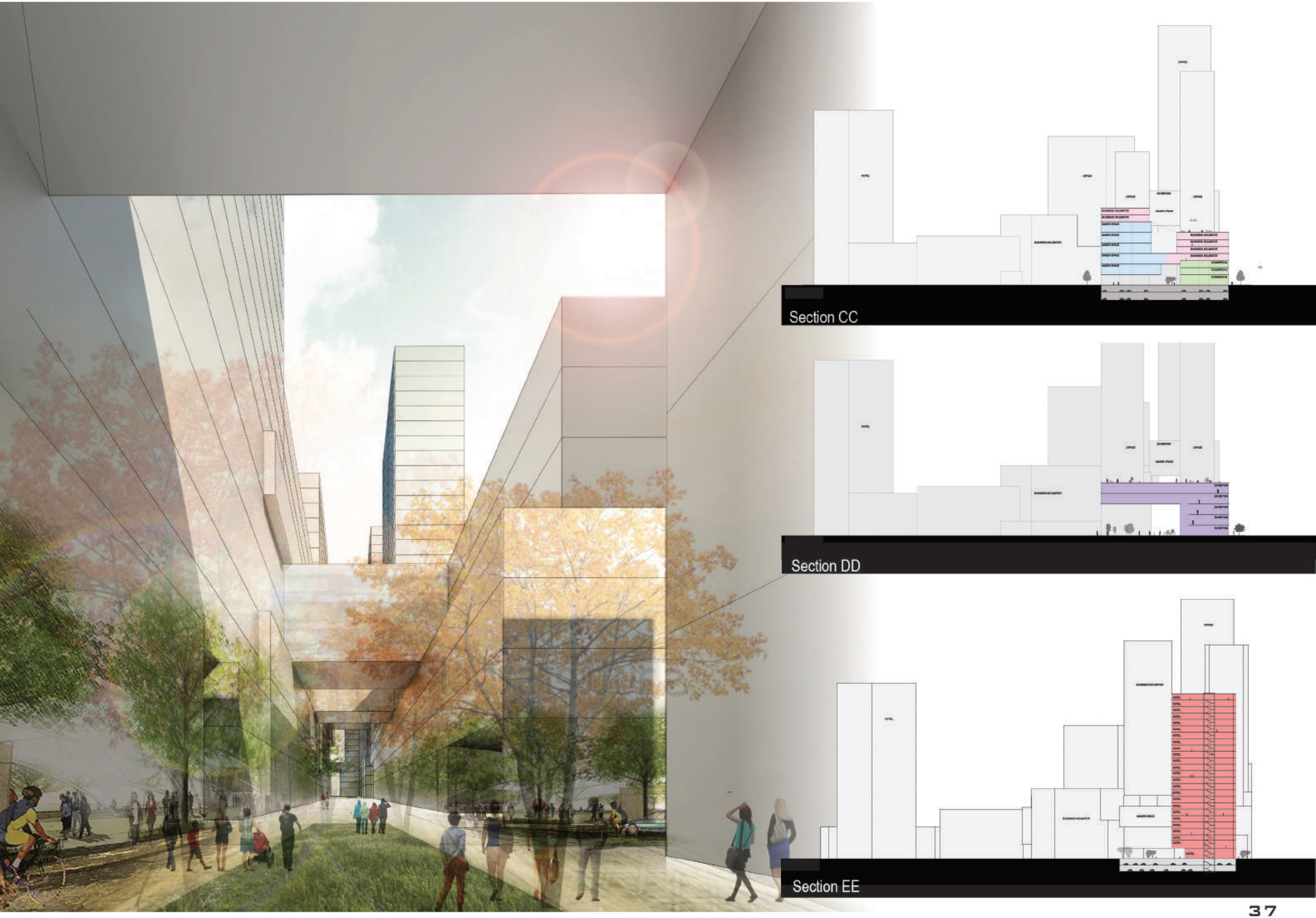


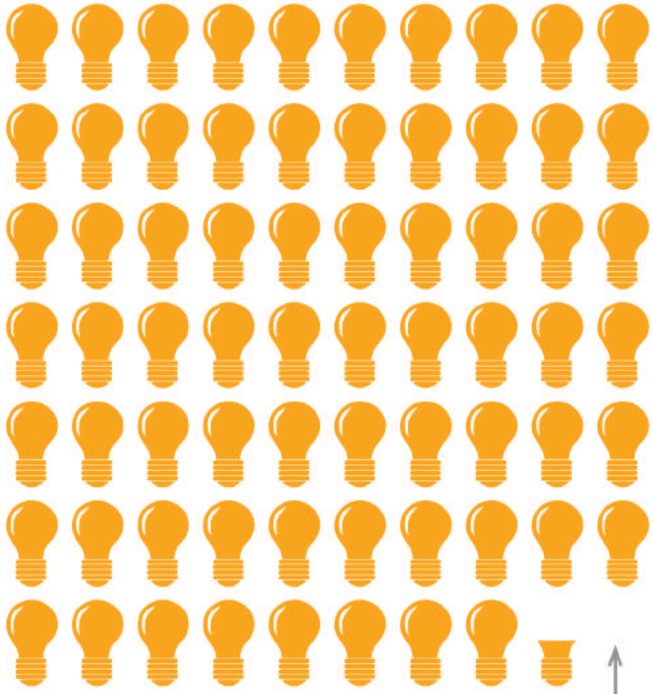
Section CC

Section DD

Section EE

PERFORMANCE GOALS | PBAMM

- Come as close to Net Zero Energy As Possible
- Produce 50% of Energy on Site



= 1,000,000 kWh / year

ENERGY RESOURCES

GEOTHERMAL PLANTS

SOLAR PANELS

WIND TURBINES

COMMERCIAL

Area:	49,500 sq m (532,814 sqft)
Kilowatts per hour/ m2:	**7,343,765 kWh/m2**
Estimated annual cost:	$1,751,111

MAKER SPACE

Area:	49,500 sq m (532,814 sqft)
Kilowatts per hour/ m2:	**5,255,846 kWh/m2**
Estimated annual cost:	$1,256,751

EXHIBITION

Area:	49,500 sq m (532,814 sqft)
Kilowatts per hour/ m2:	**5,257,474 kWh/m2**
Estimated annual cost:	$1,256,346

BUSINESS INCUBATOR

Area:	148,500 sq m (1,598,441 sqft)
Kilowatts per hour/ m2:	**24,879,486 kWh/m2**
Estimated annual cost:	$5,789,923

OFFICES

Area:	123,750 sq m (1,332,034 sqft)
Kilowatts per hour/ m2:	**20,732,902 kWh/m2**
Estimated annual cost:	$4,824,936

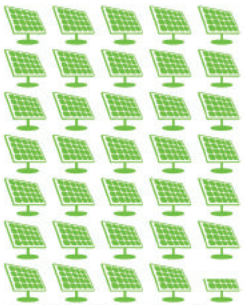
HOTEL

Area:	74,250 sq m (799,220 sqft)
Kilowatts per hour/ m2:	**4,848,300 kWh/m2**
Estimated annual cost:	$1,185,749

TOTAL Area:	**495,000 sq m (5,328,136 sqft)**
TOTAL KWh/m2:	**68,317,773 kWh/m2**
TOTAL estimated cost:	**$16,064,826 annually**

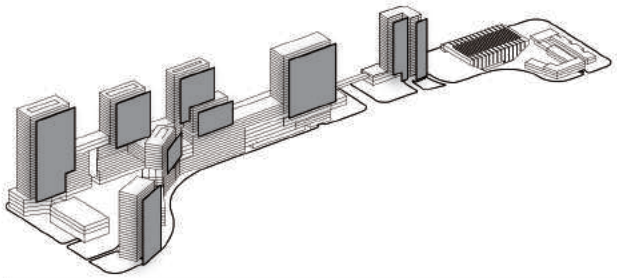
ROOF

Total area: **48,844 sq m** (493,324 sqft)
# of solar panels: **34,551**
Energy produced: **12,922,303 kWh/m2**



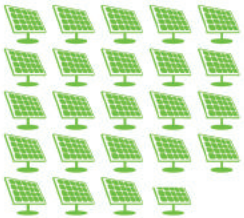
= 34,551 solar panels

SOUTH FACADE



Total area: **29,524 sq m** (298,192 sqft)
# of solar panels: **23,810**
Energy produced: **8,904,819 kWh/m2**

= 1,000 panels



= 23,810 solar panels

SOLAR PANELS: The size of one **BP Solar 175B solar panel** is roughly **1.24 sq m** (13.34 sqft). It can produce about 374 kWhr/year.

The amount produced from 10,000 solar panels in this location would be 3,740,732 kWhr/year of energy. This would cover an area of 12,393 (133,400 sqft).

The reach net-zero with just solar panels this site would require at least **182,668 solar panels.** This is a total area of 226,508 sq m (2,287,734 sqft).

The **total root top area** in this project is 42,844 sq m (432,724.4 sqft). Therefore, the total roof area can hold **34,551 solar panels.** This many panels will produce **12,922,303 kWh/year.**

BP 175B SOLAR PANEL

Cost per panel: **$799.99**
Surface area: **1.24 sq m**
Energy produced: **374 kWh/m2/year**

= 58,361 solar panels
= 21,827,122 kWh/m2

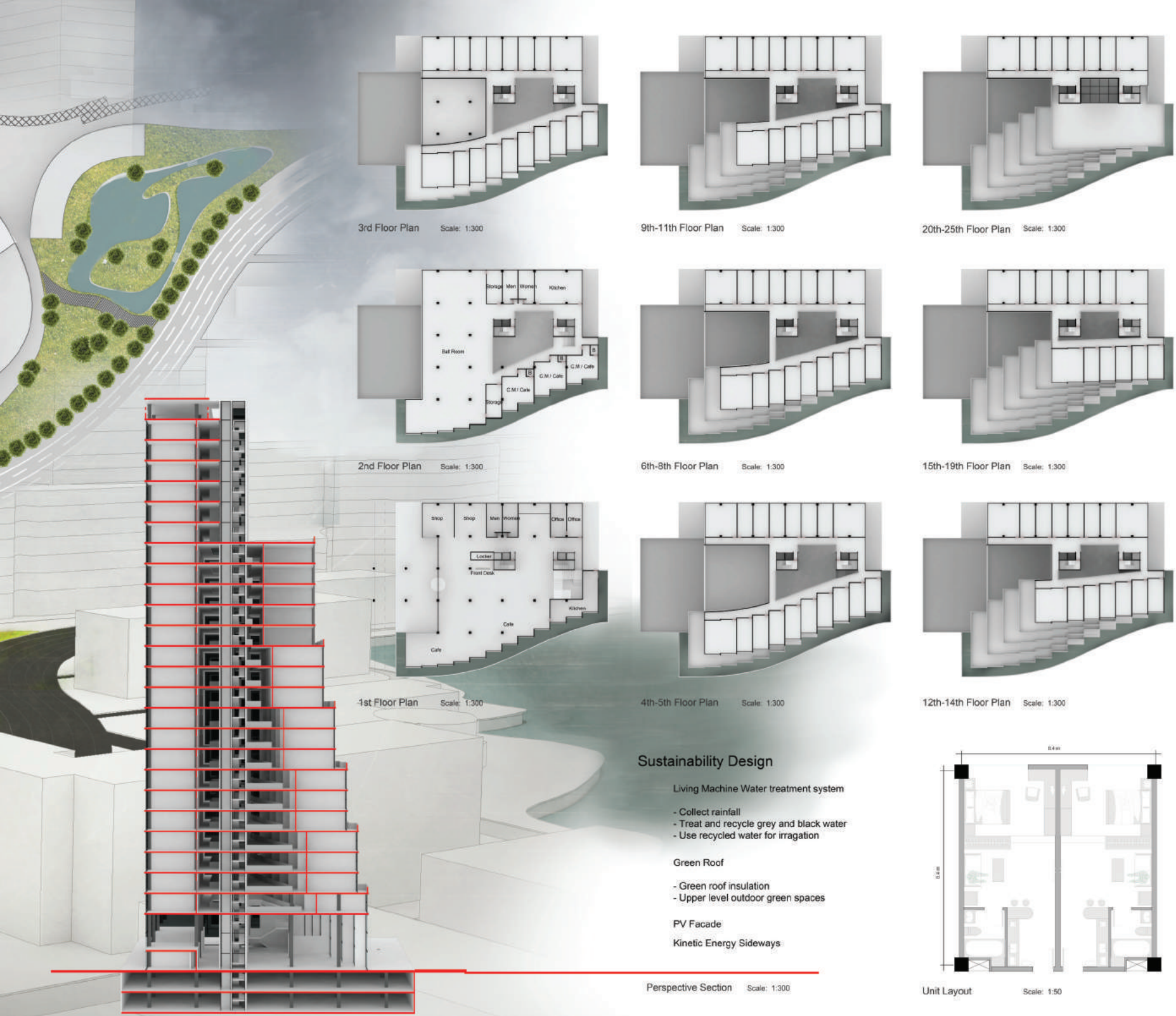
31.95% of TOTAL ENERGY

Putting solar panels on both the roofs and south facades will **cost $46,688,800.** The total energy cost will be **reduced by $5,132,712** every year. It will only take **9.10 years** to pay off the panels.

04 INDIVIDUAL PROJECTS

INDIVIDUAL DESIGN | LIDA LU

In this project, my part of design – the hotel is located in the southwest, which has the first looking who walking along the pedestrian street from the south side university campus will see. It is intended to engage everyone's attentions. The form of the building is step by step which following the city skyline from south to north is growing up, and the green space is continuing and following the "topography" as well, which respect both of city civilization and nature. The strategy of building up the hotel is by stacking and rotating each equal module – the "box", which can use prefabrication technique to build some of the interior installation, is also intended to save energy and construction period. Considered this project as a sustainability design from the entire building and also each module.



3rd Floor Plan Scale: 1:300

9th-11th Floor Plan Scale: 1:300

20th-25th Floor Plan Scale: 1:300

2nd Floor Plan Scale: 1:300

6th-8th Floor Plan Scale: 1:300

15th-19th Floor Plan Scale: 1:300

1st Floor Plan Scale: 1:300

4th-5th Floor Plan Scale: 1:300

12th-14th Floor Plan Scale: 1:300

Sustainability Design

Living Machine Water treatment system

- Collect rainfall
- Treat and recycle grey and black water
- Use recycled water for irragation

Green Roof

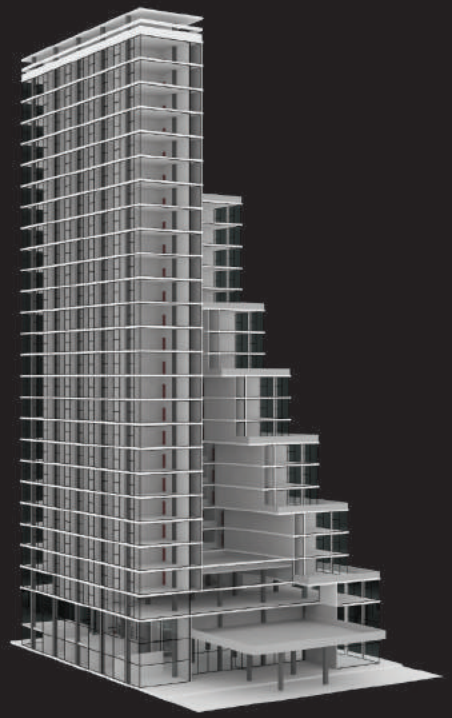
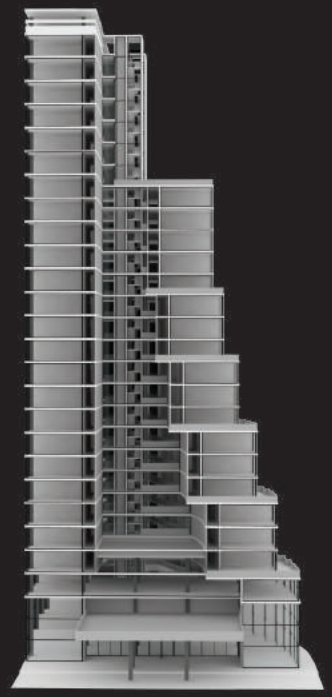
- Green roof insulation
- Upper level outdoor green spaces

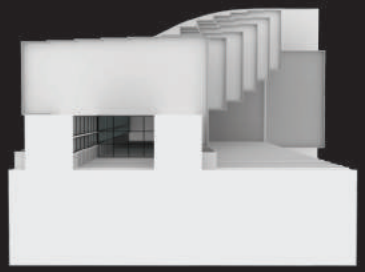
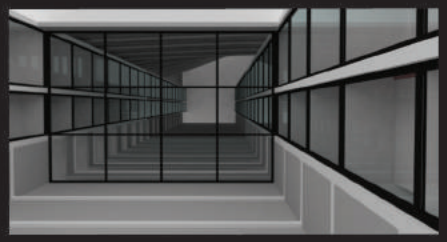
PV Facade

Kinetic Energy Sideways

Perspective Section Scale: 1:300

Unit Layout Scale: 1:50

Living Machine®

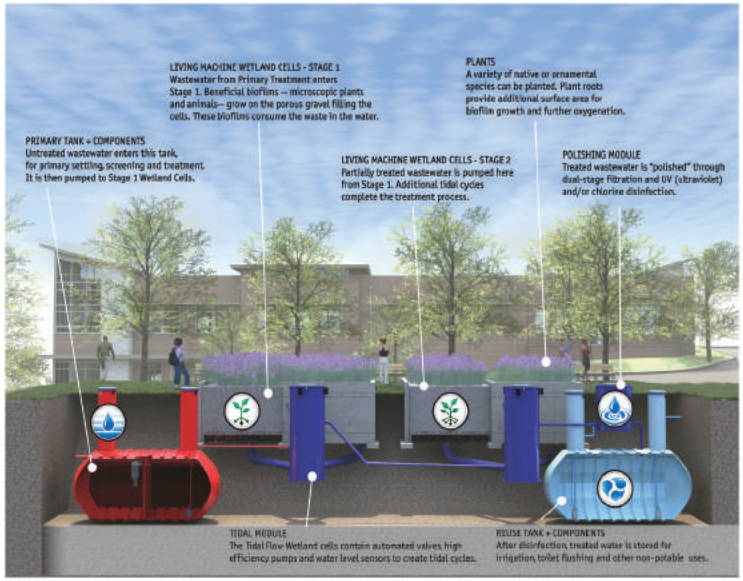
The Living Machine System

Living Machine® Technology blends cutting-edge science and engineering with plants and hard-working bacteria to efficiently treat and reuse wastewater, providing lasting water solutions for communities everywhere. Based on the principles of wetland ecology, the patented tidal process treats wastewater to meet high quality reuse standards, making Living Machine® technology the most energyefficient.

At a glance, the Living Machine® System incorporates a eries of wetland cells, or basins, filled with optimized gravel that promotes the development of micro-ecosystems. As water moves through the system, the cells are alternately flooded and drained to create multiple tidal cycles each day, resulting in high quality reusable water.

The Living Machine Process

The Living Machine® System treats water through several stages. While mimicking the processes of natural coastal wetlands, the patented components are more efficient than any other system available – giving the technology a smaller physical footprint and a lighter carbon footprint.



The Living Machine Benefits

- Opportunity for on-site wastewater reuse.
- Energy efficient design means lower operations and maintenance costs than other on-site systems.
- Reduction in construction costs when compared to other reuse technologies.
- Provides a living laboratory with on-site educational opportunities.
- Integrates with rainwater collection to increase reuse benefits.
- Attractive interior and/or exterior foliage that safely integrates into public space.
- Accepts all wastewater and produces high quality water that an be reused
- Helps save water in remote or drought prone areas.
- Regularly exceeds target water quality standards.
- Helps projects attained LEED certification by the U.S. Green Building Council.
- The Living Machine System's modular design can expand commensurate with new construction, significantly cutting initial building costs.
- Helps communities maintain lasting water resources.

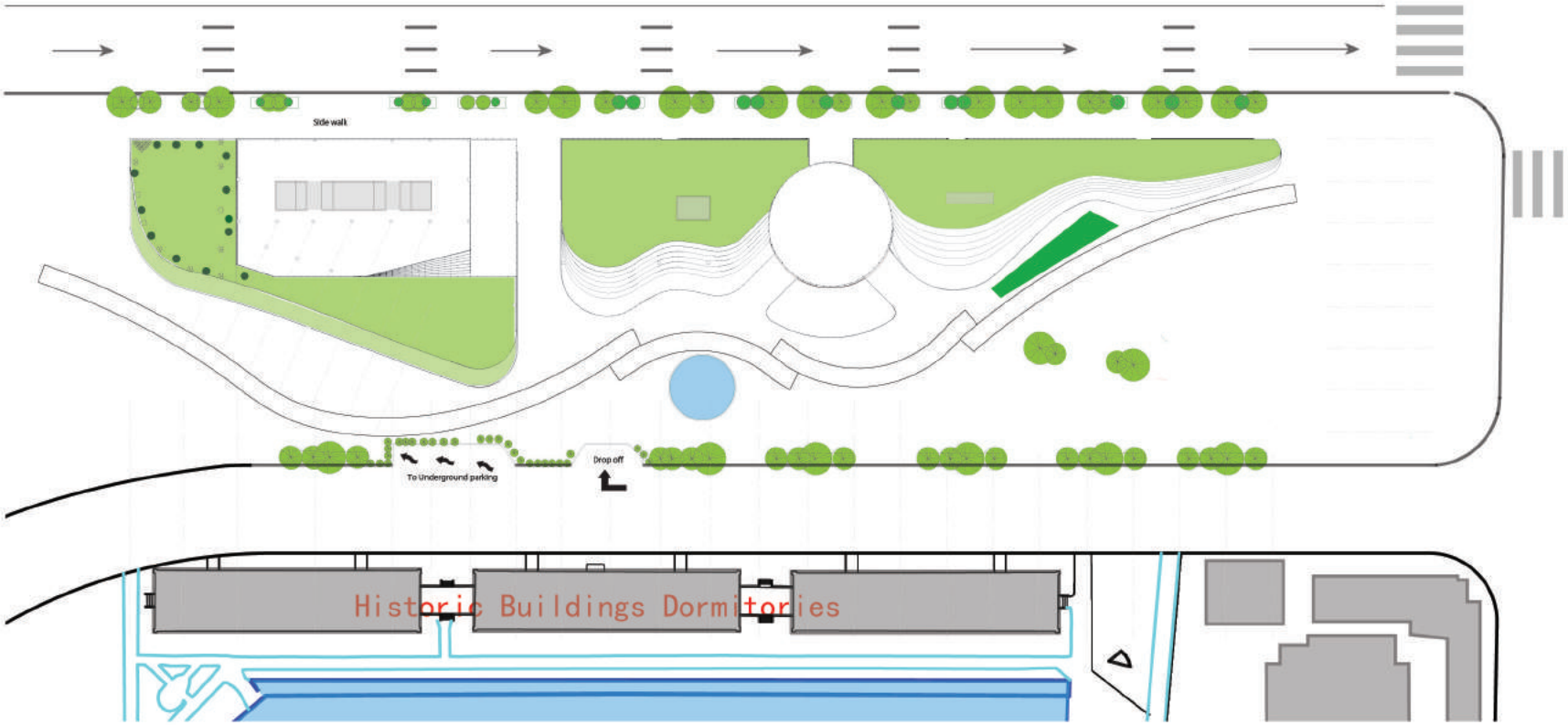
Hotel water usage on site

Number of Units (total)	379
Water use (gallon) / day	150
Total water use (gallon) / year	150 x 379 x 365 = 20750250
Total grey water (gallon) / year	20750250 x 60% = 12450150

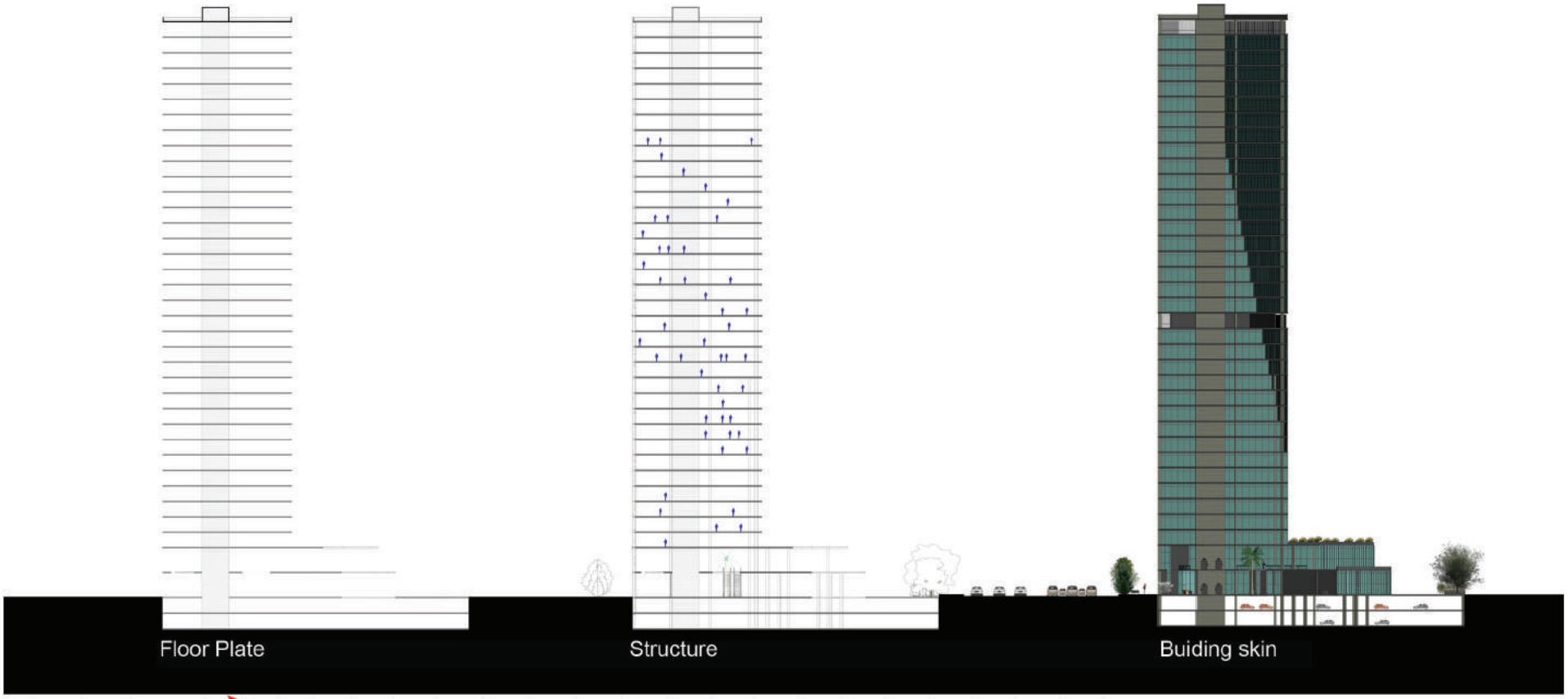
The Living Machine can recycle and save 12450150 gallon for irrigation

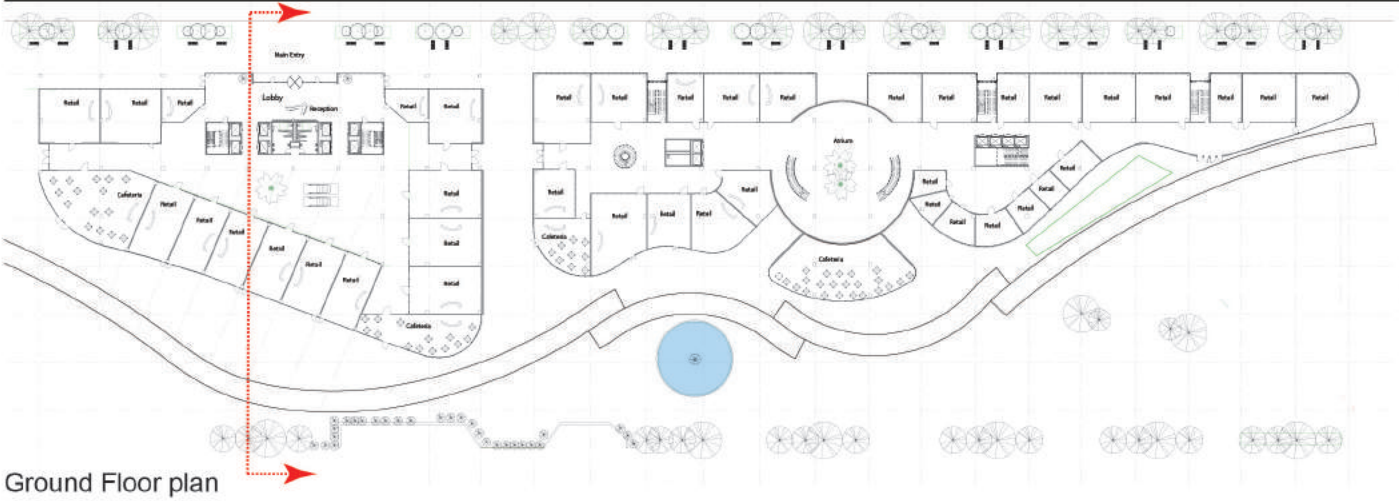
INDIVIDUAL DESIGN | LEUL YOSEPH

This design will create an environmentally friendly innovation campus in Tianjin, China that bonds the surrounding communities to a new technology through numerous levels of innovation. The project will focus on many levels of sustainable ideas that target carbon foot print reduction by creating a dynamic building environment to reduce energy load on heating and cooling, expanding green areas, proper management of water usage and used water recycling.

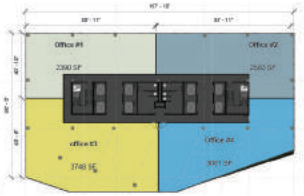


SCALE: 1:1000





Ground Floor plan

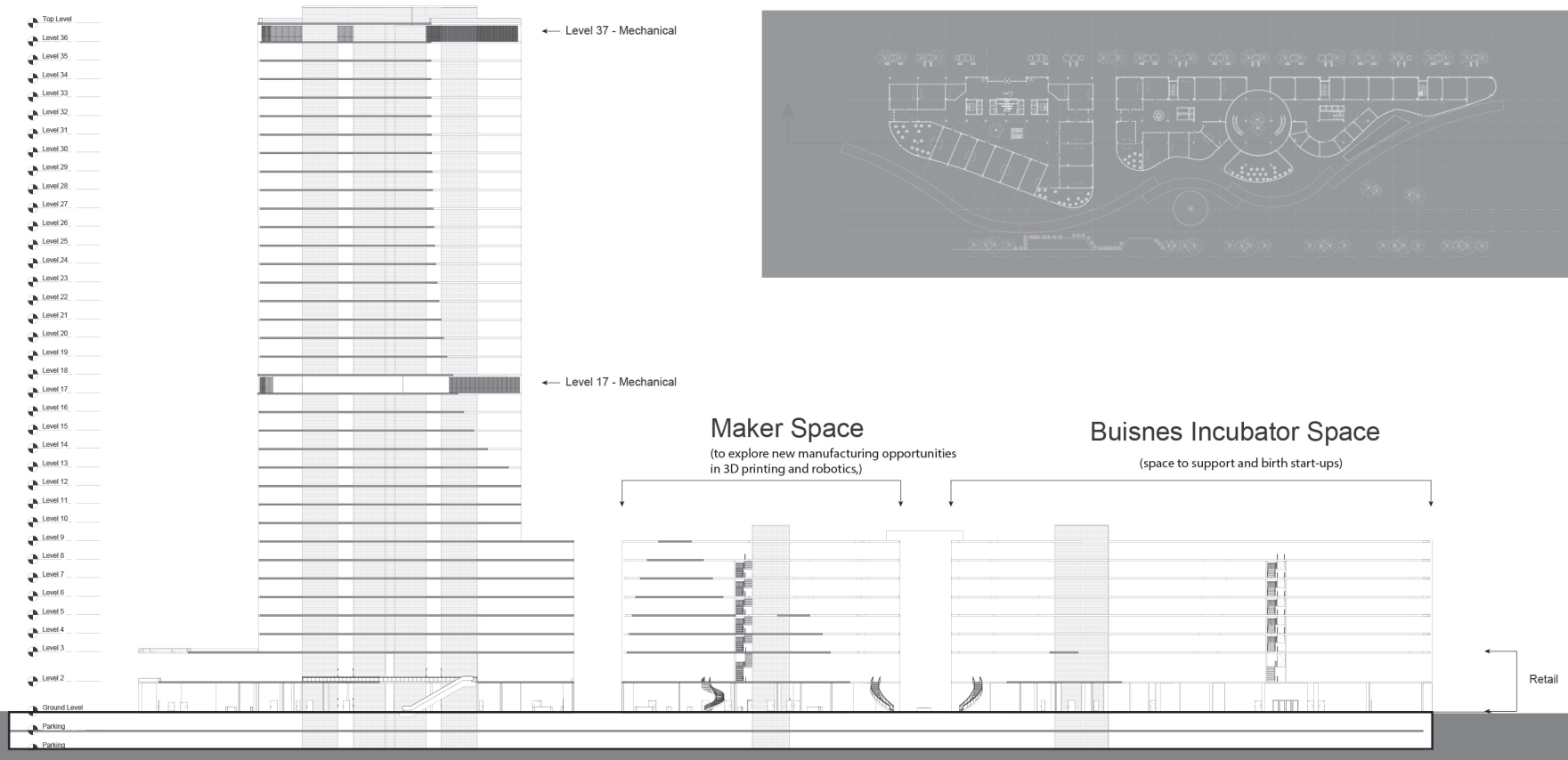


Office Floor plan

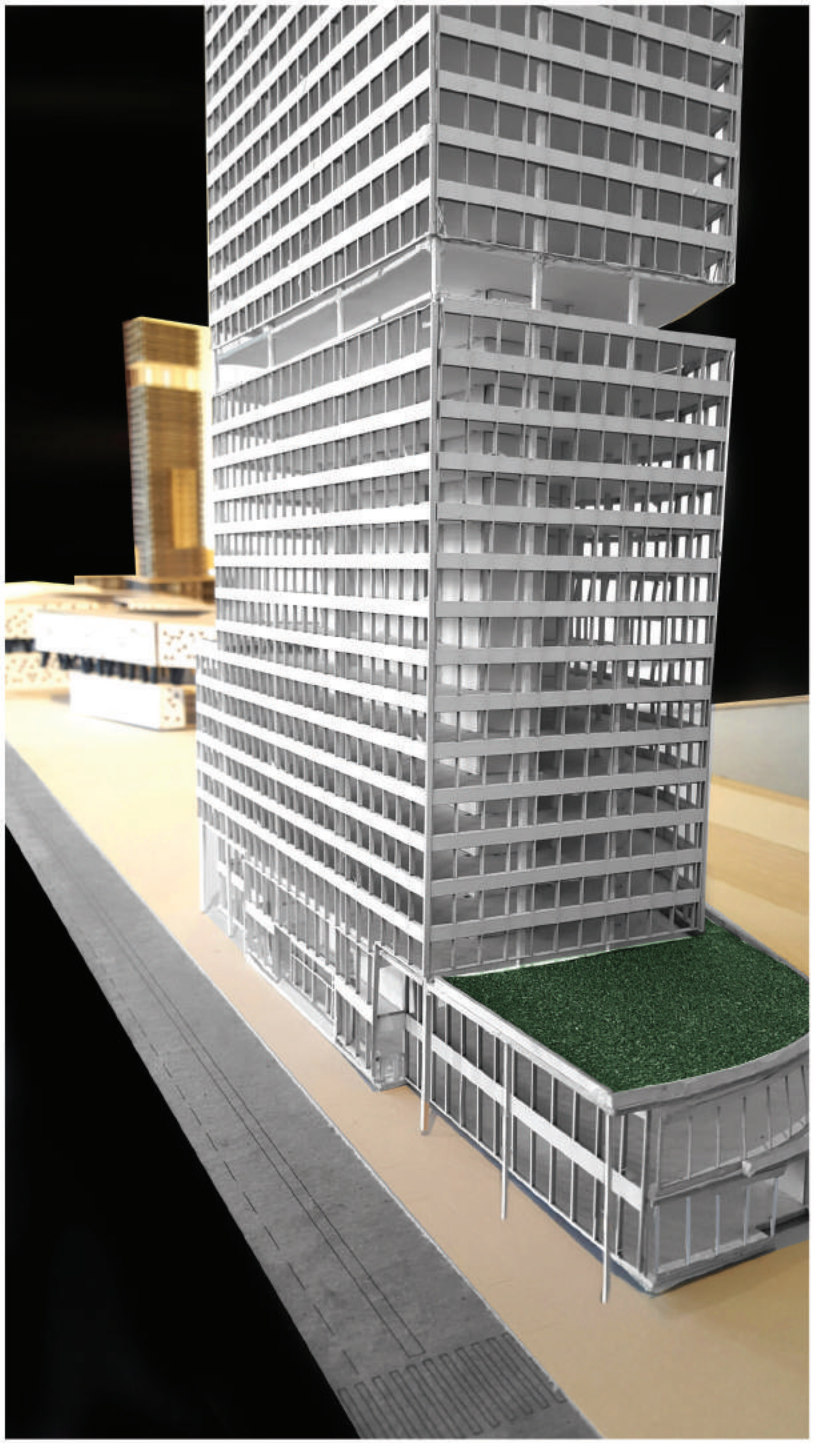
SCALE: 1:1000

Commercial Office Tower

(to house a growing businesses
that emergs from the incubator)

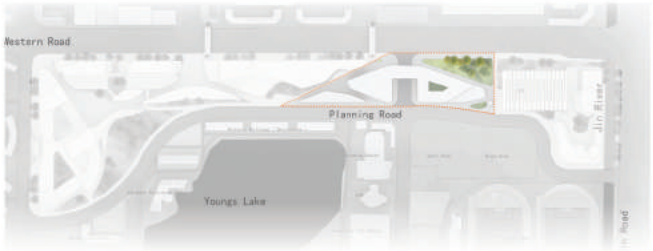


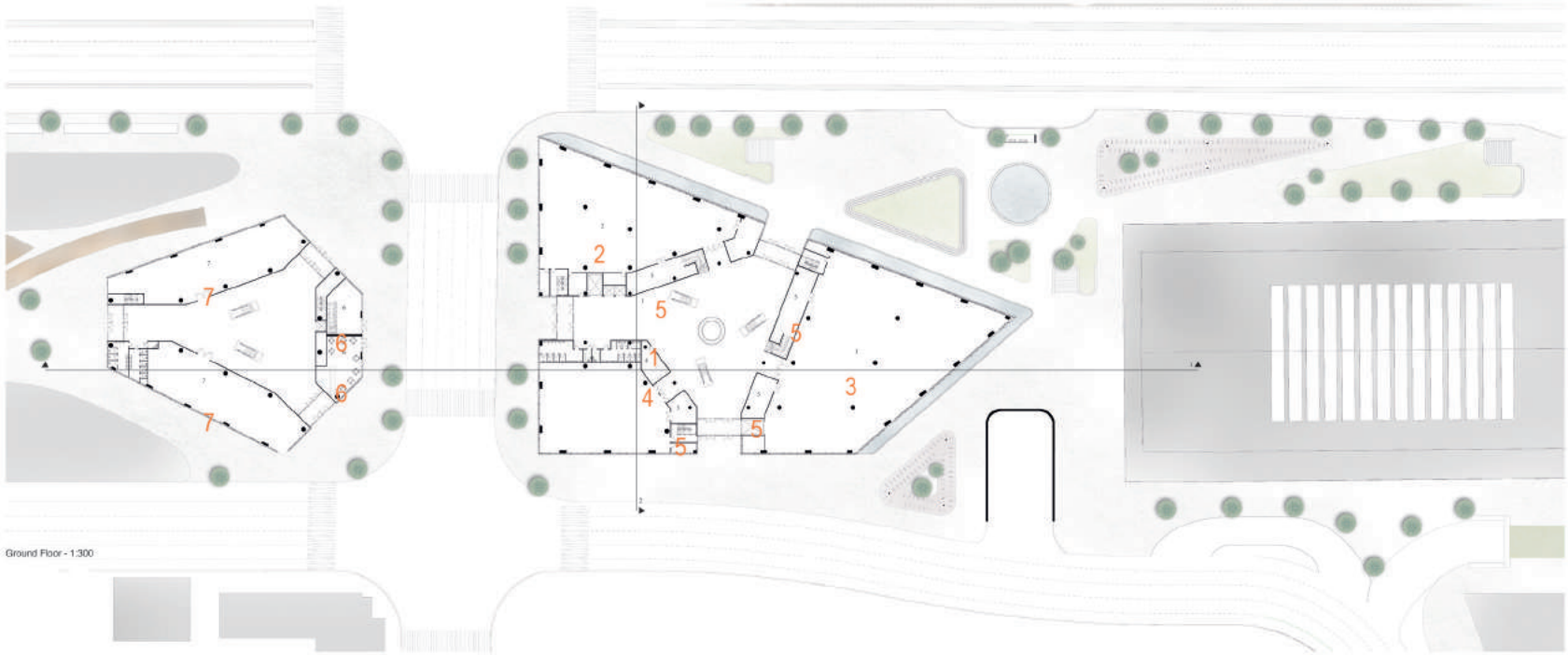
SCALE: 1:1000



INDIVIDUAL DESIGN | MORTEN LYDIKSEN

The intention for this development is to create a connected community where synergies can occur as serendipitous moments. The Exhibition center proposes a mixture of big open exhibit areas down to galleries and smaller installations from upcoming creative people. The Idea was to create a building that engages and excite people visually and invites people into an excitement of open public flow space that is visually exposed from the outside while the exhibit areas are more closed and promotes curiosity.

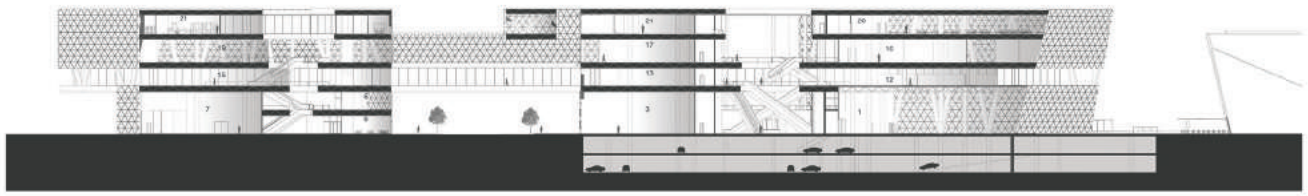




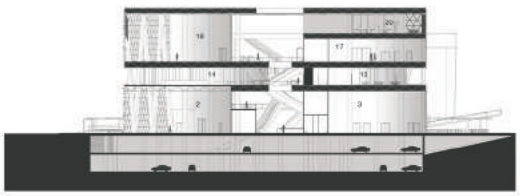
1. Exhibition Hall 1
2. Exhibition Hall 2
3. Auditorium
4. Mechanical room
5. Storage
6. Commercial
7. Exhibit space

Ground Floor plan

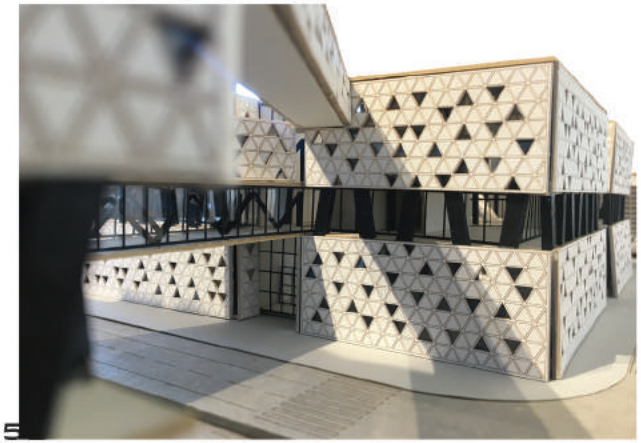
SCALE: 1:1000

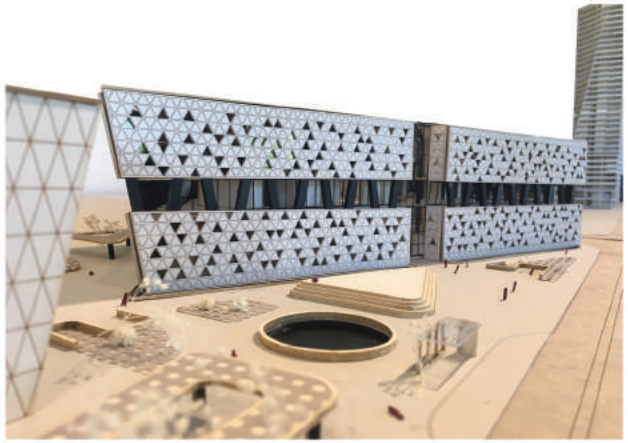


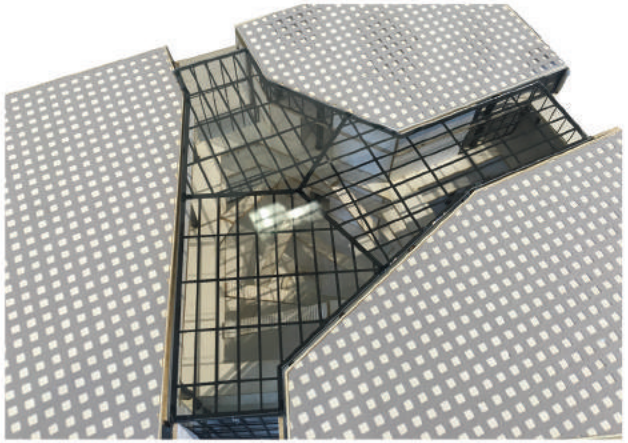
Section 1

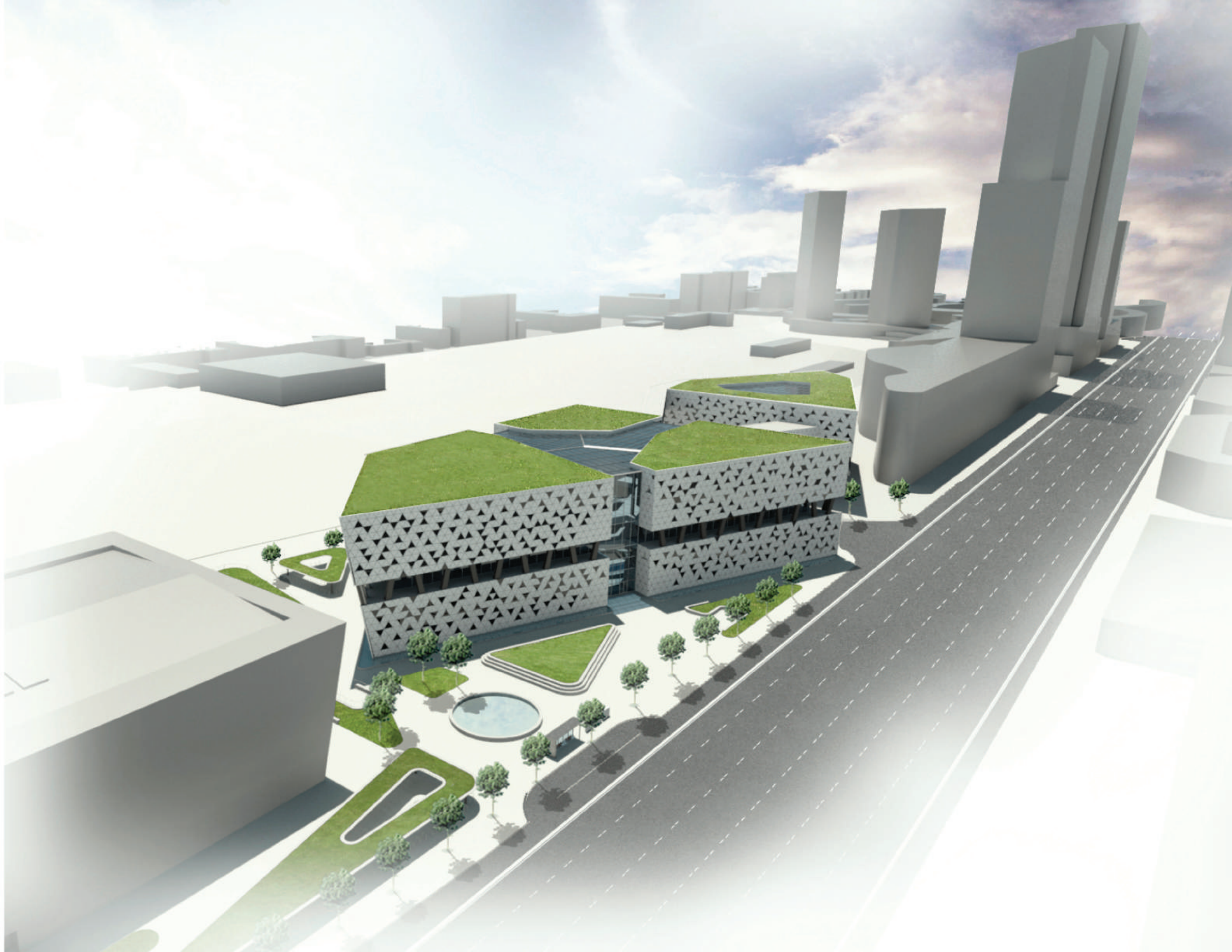


Section 2



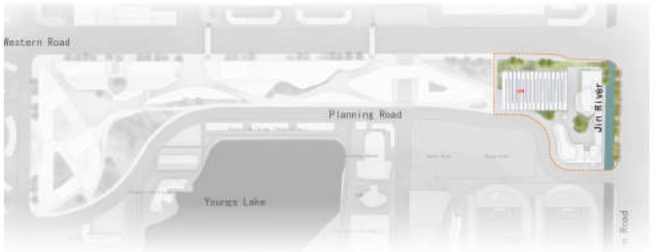


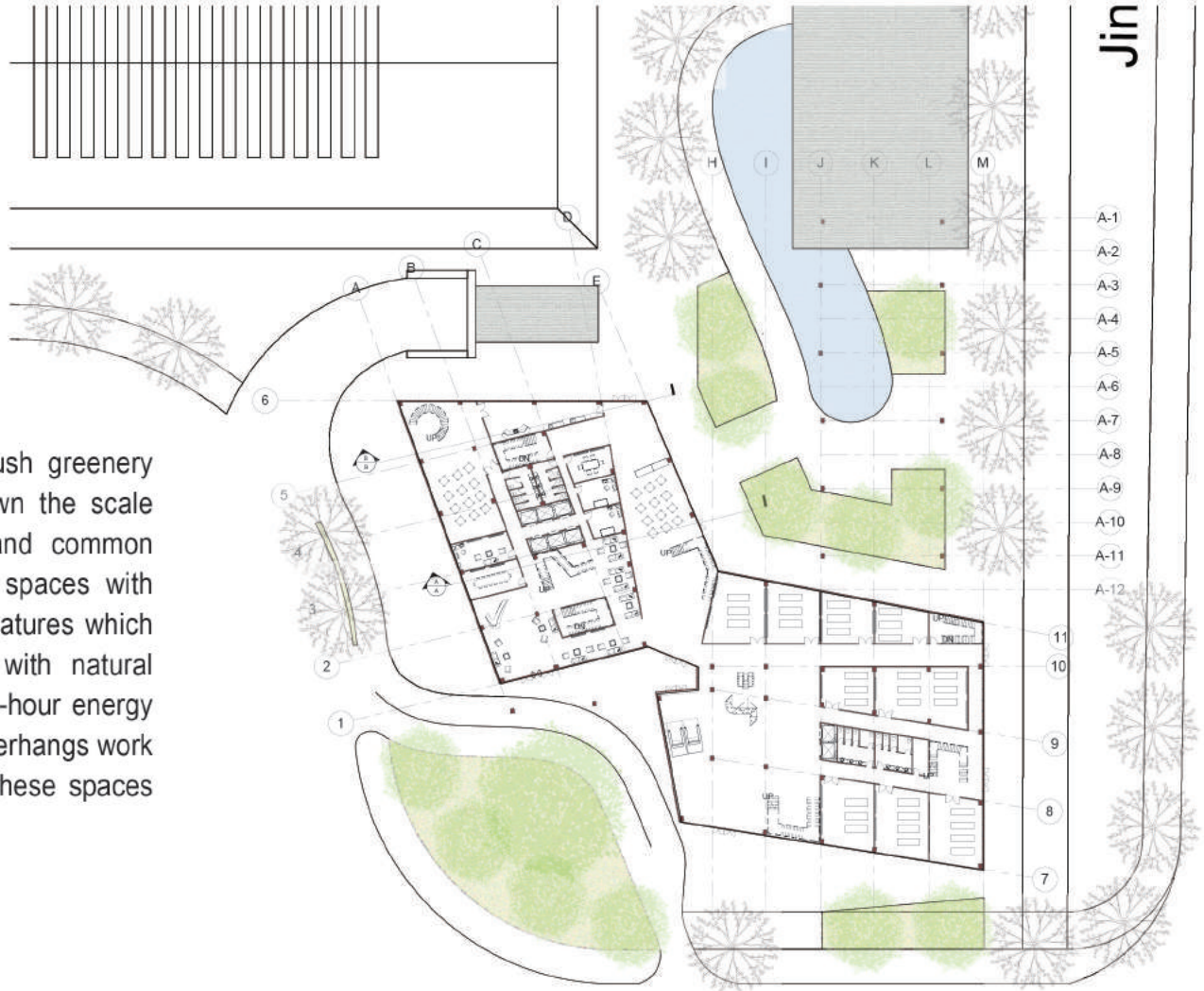




INDIVIDUAL DESIGN | MINA GENG

Designed as a hotel and comercial store in a garden, the project is a study of how we can increase the green replacement in a high-rise development in the city centre and multiply it in a manner that is architecturally striking, integrated and sustainable.

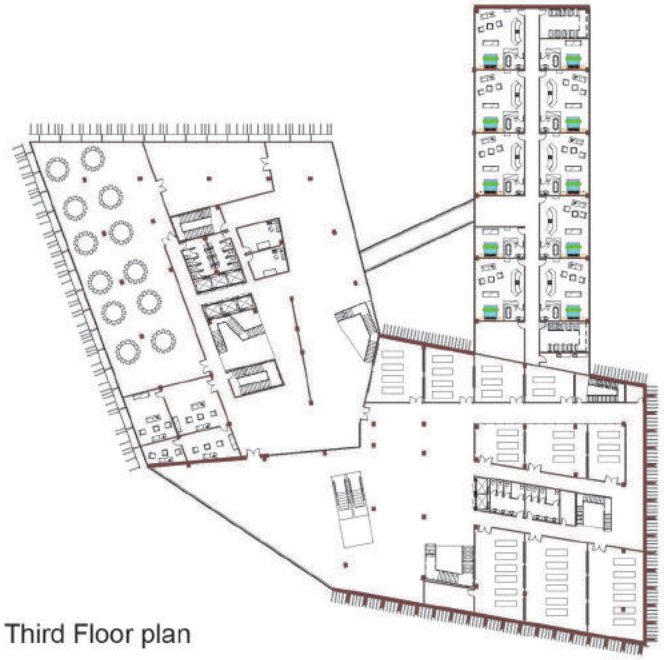




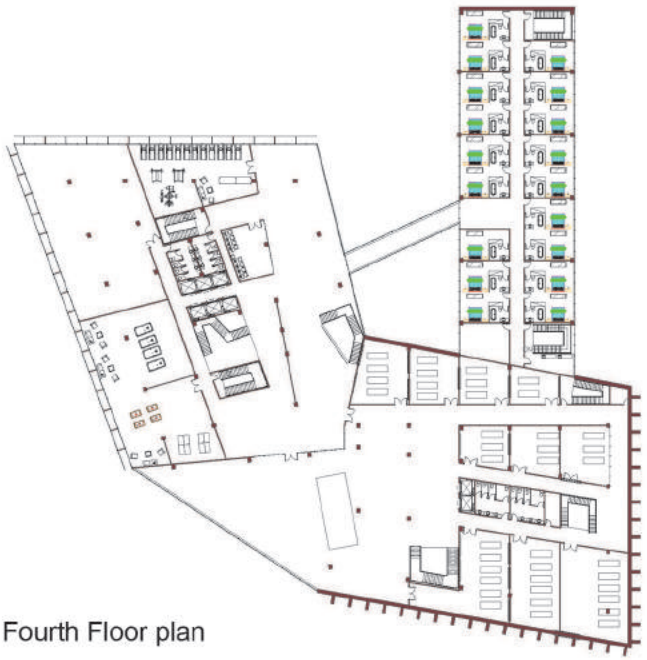
20 storey sky gardens which bring lush greenery directly to the rooms and breaks down the scale of the building. Corridors, lobbies and common washrooms are designed as garden spaces with stepping stones, planting and water features which create an alluring resort ambiance with natural light and fresh air, instead of being 24-hour energy guzzling air conditioned spaces. Tall overhangs work together with leafy foliage to screen these spaces from the weather and direct sun.

SCALE: 1:1000

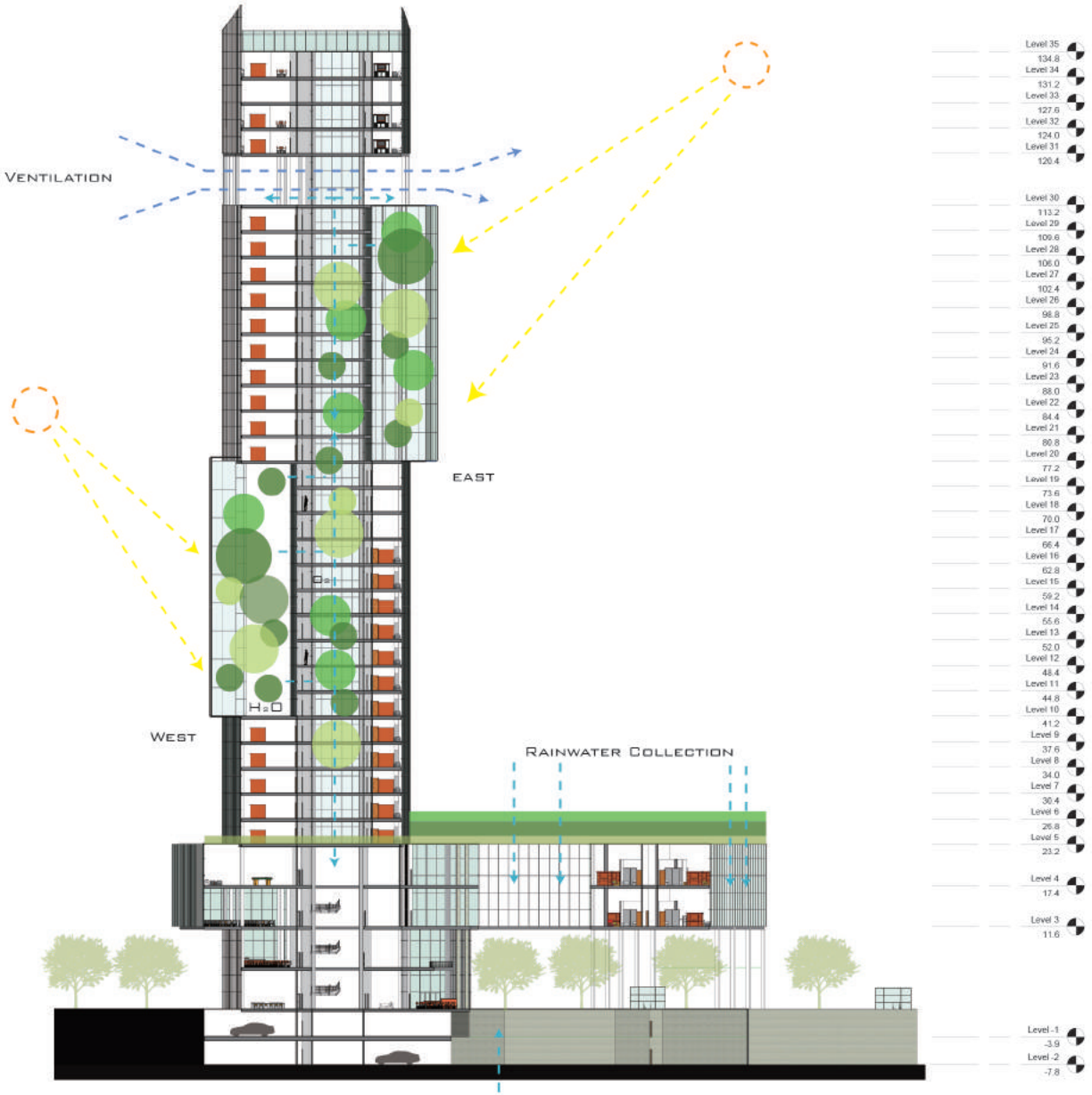
Ground Floor plan



Third Floor plan



Fourth Floor plan

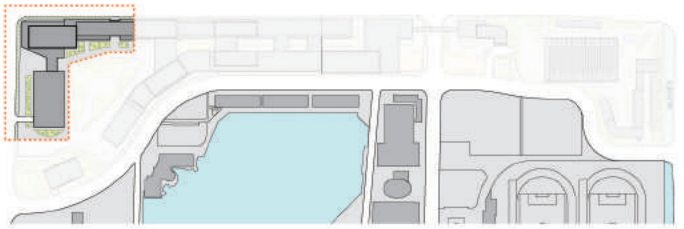


SECTION A-A SCALE 1:300

SECTION B-B SCALE 1:300

INDIVIDUAL DESIGN | ABDUL NAHAS

- Providing environment for social interaction and knowledge gain.
- Designing buildings loaded with sustainable performance features.
- Encouraging knowledge gain by providing visual and physical learning experience for users.



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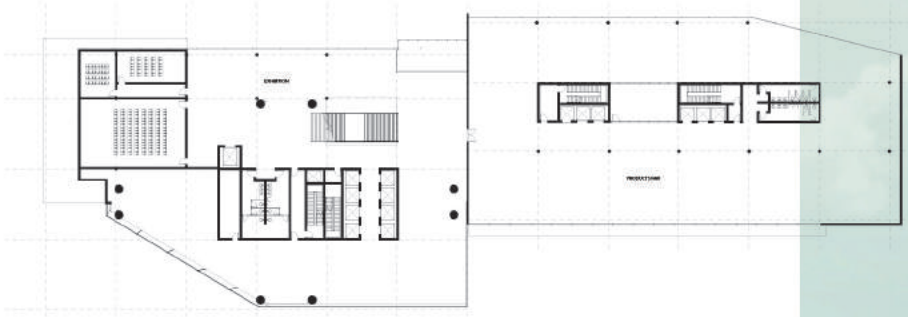
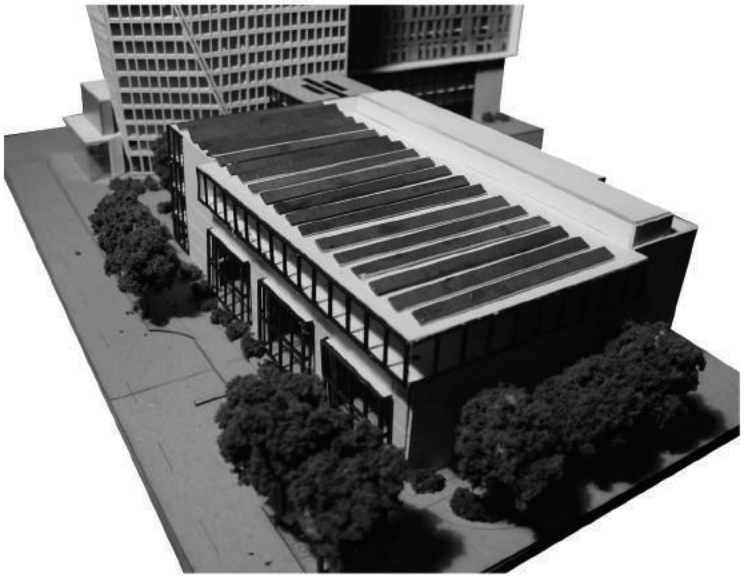
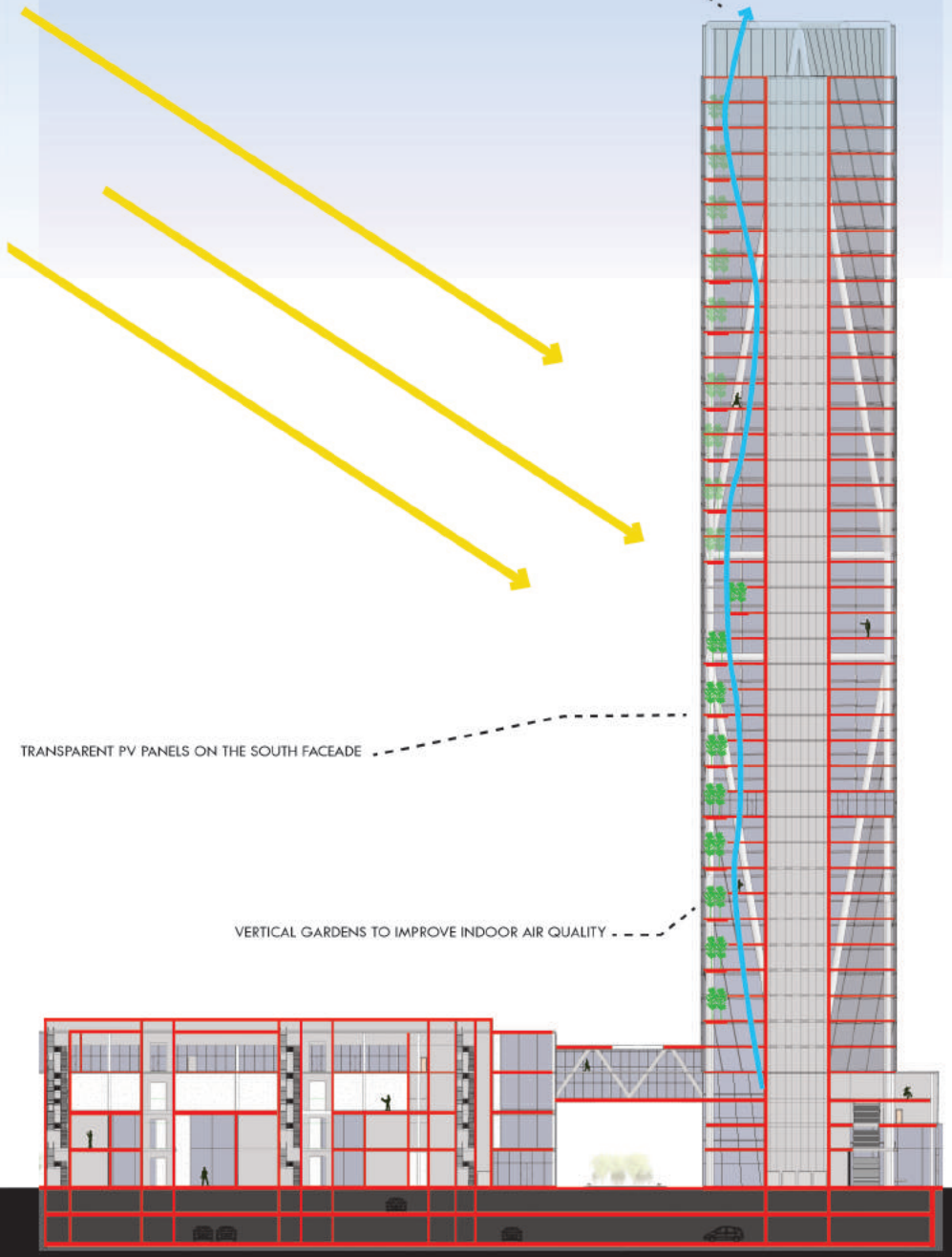


Third Floor plan

15th Floor plan

SCALE: 1:1000

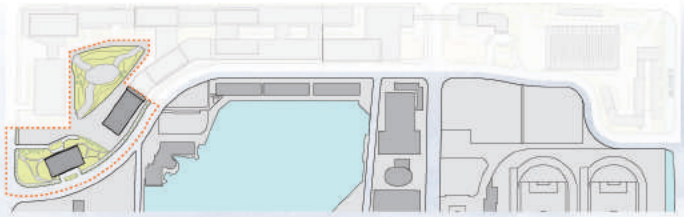


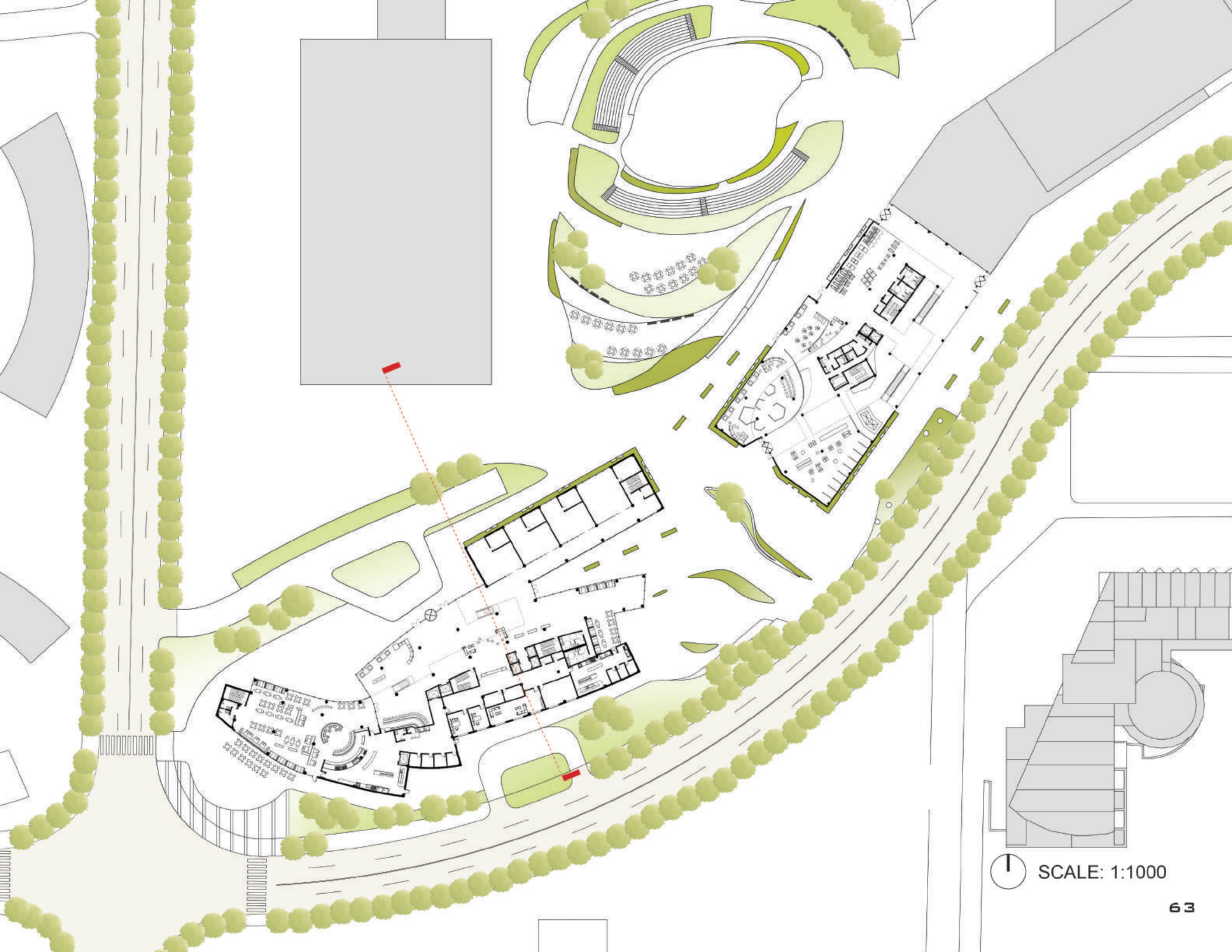


SECTION AA 1:300

INDIVIDUAL DESIGN | PHUONG NGUYEN

This sector of the master plan features a complex of a long stay hotel, long stay suite units, restaurant, retails, ballrooms and an entertainment center. The programs work unitedly to promote the development of interation between people in the innovation campus.



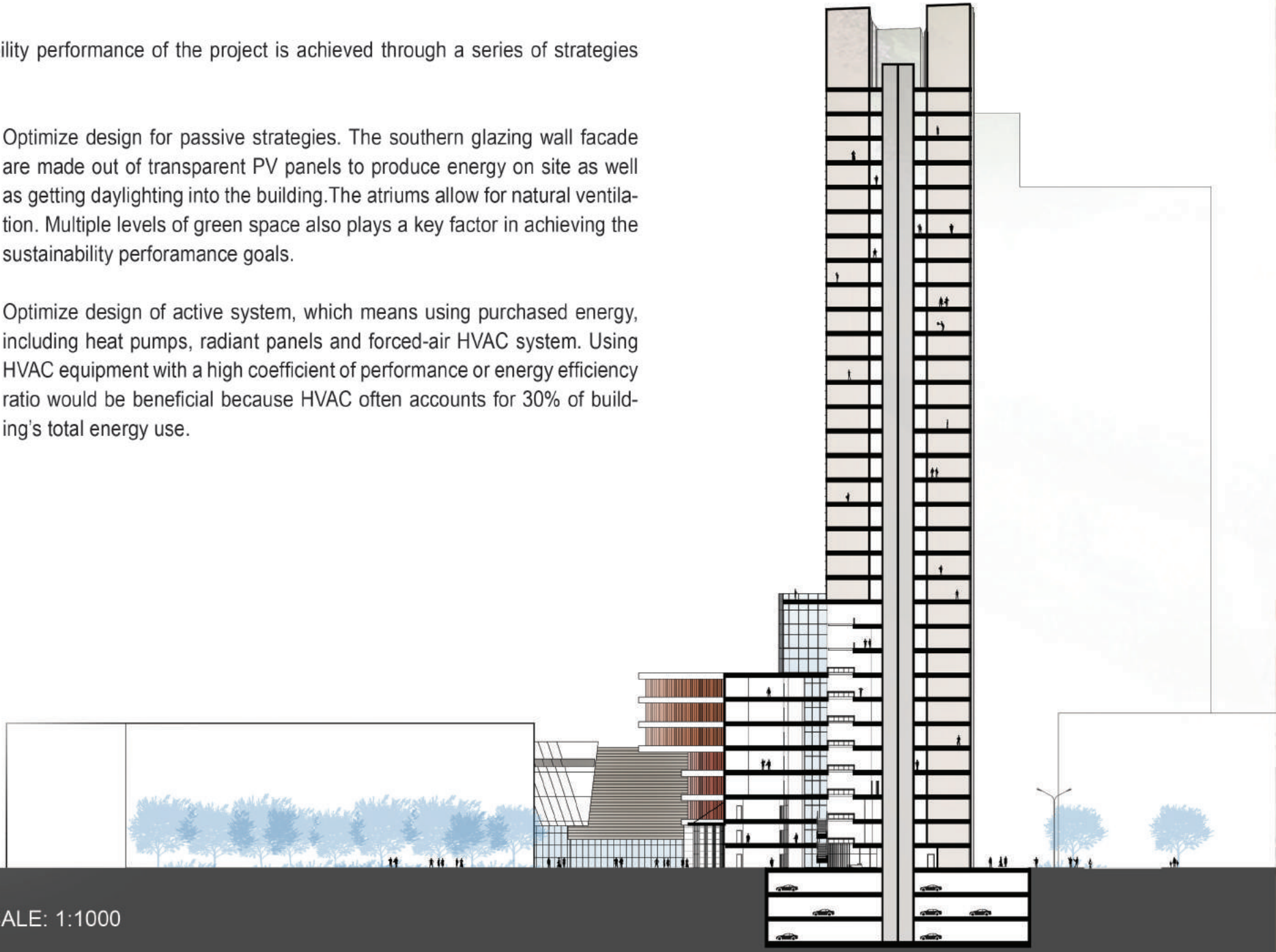


SCALE: 1:1000

Sustainability performance of the project is achieved through a series of strategies such as:

Optimize design for passive strategies. The southern glazing wall facade are made out of transparent PV panels to produce energy on site as well as getting daylighting into the building.The atriums allow for natural ventilation. Multiple levels of green space also plays a key factor in achieving the sustainability perforamance goals.

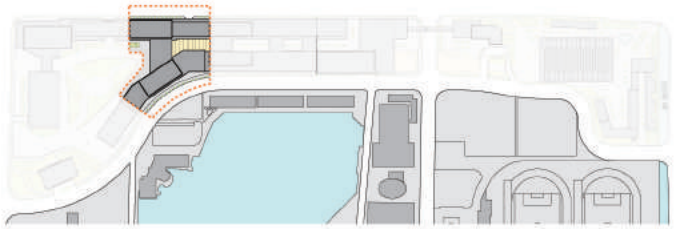
Optimize design of active system, which means using purchased energy, including heat pumps, radiant panels and forced-air HVAC system. Using HVAC equipment with a high coefficient of performance or energy efficiency ratio would be beneficial because HVAC often accounts for 30% of building's total energy use.

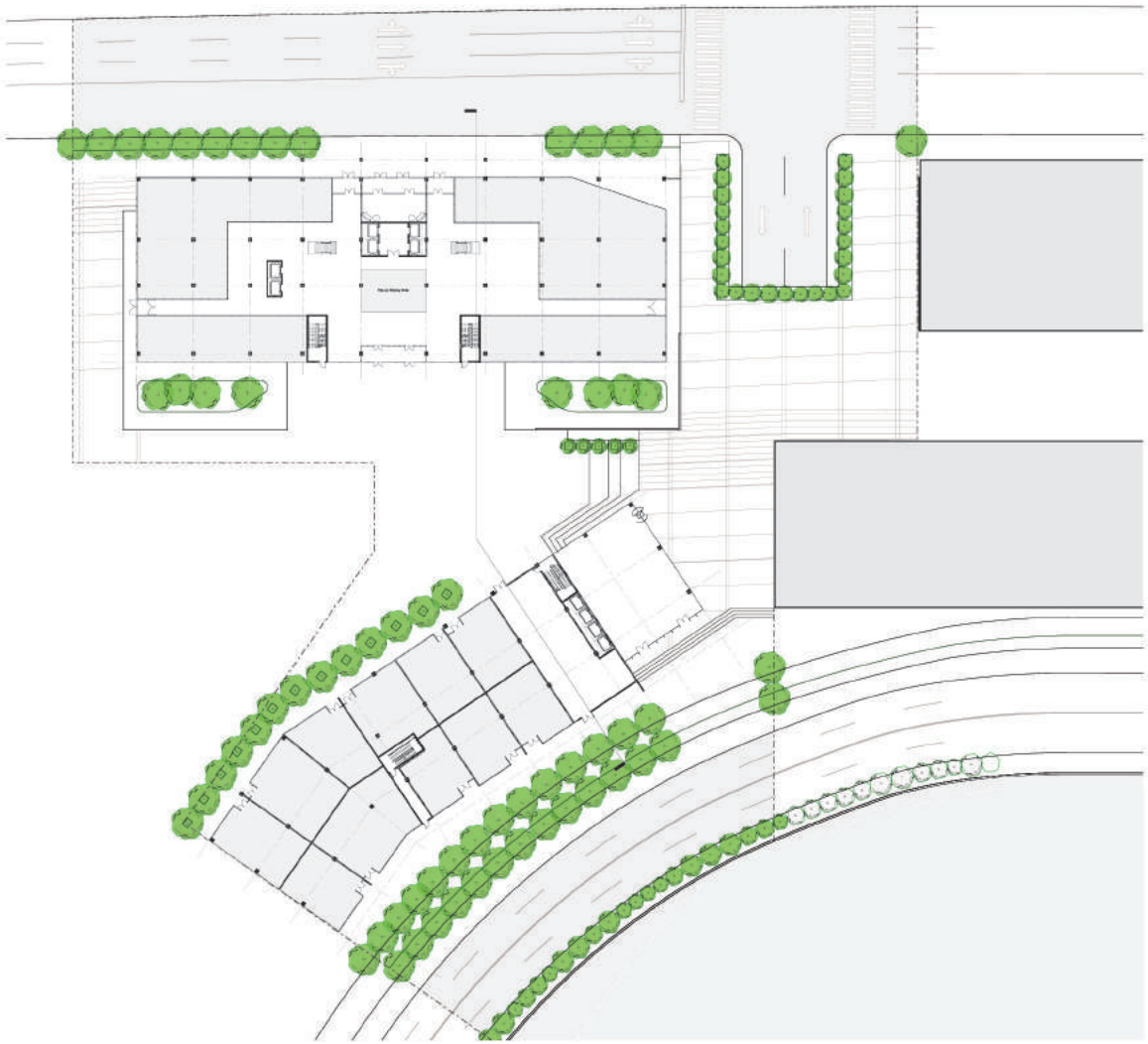


SCALE: 1:1000

INDIVIDUAL DESIGN | MEGHAN JANOUSEK

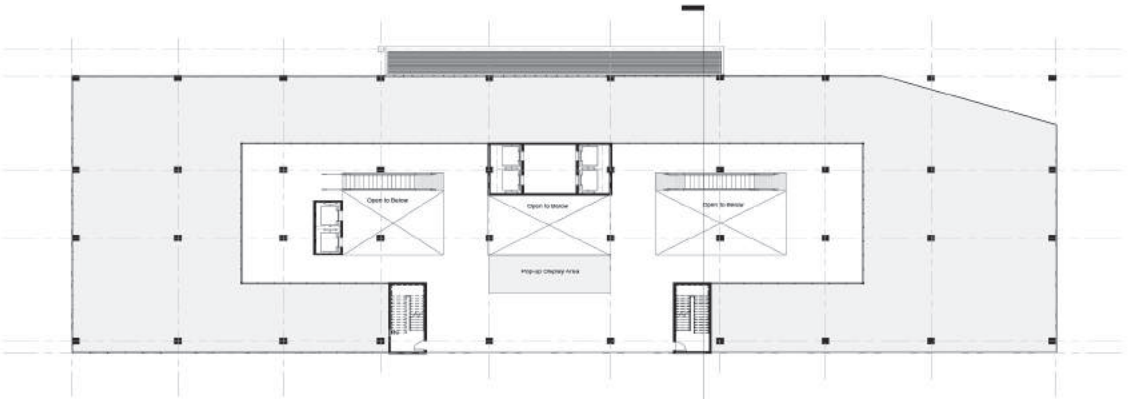
- Create a commercial main entrance easily accessible to the street
- Program division of more private to public
- Easily accessible to the pedestrian
- Take advantage of views of the lake and interior courtyards that are buffered from the street

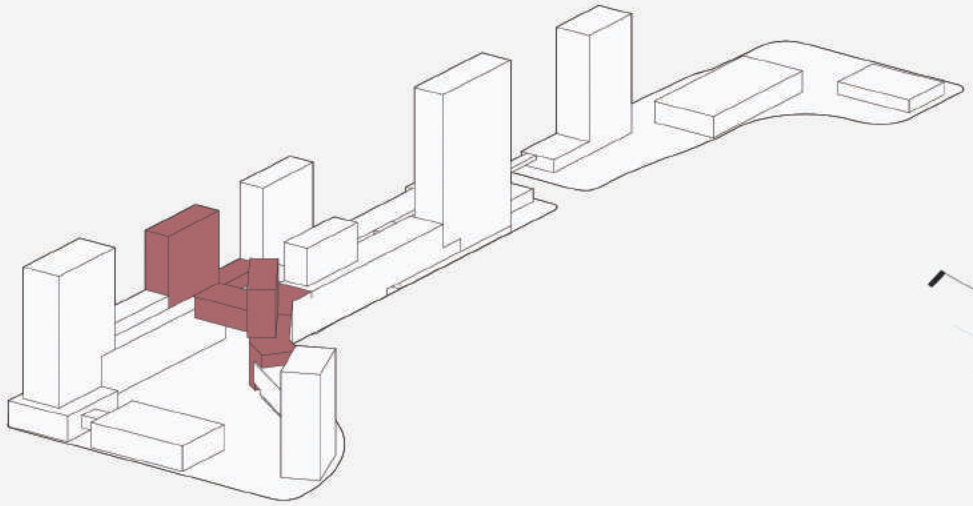




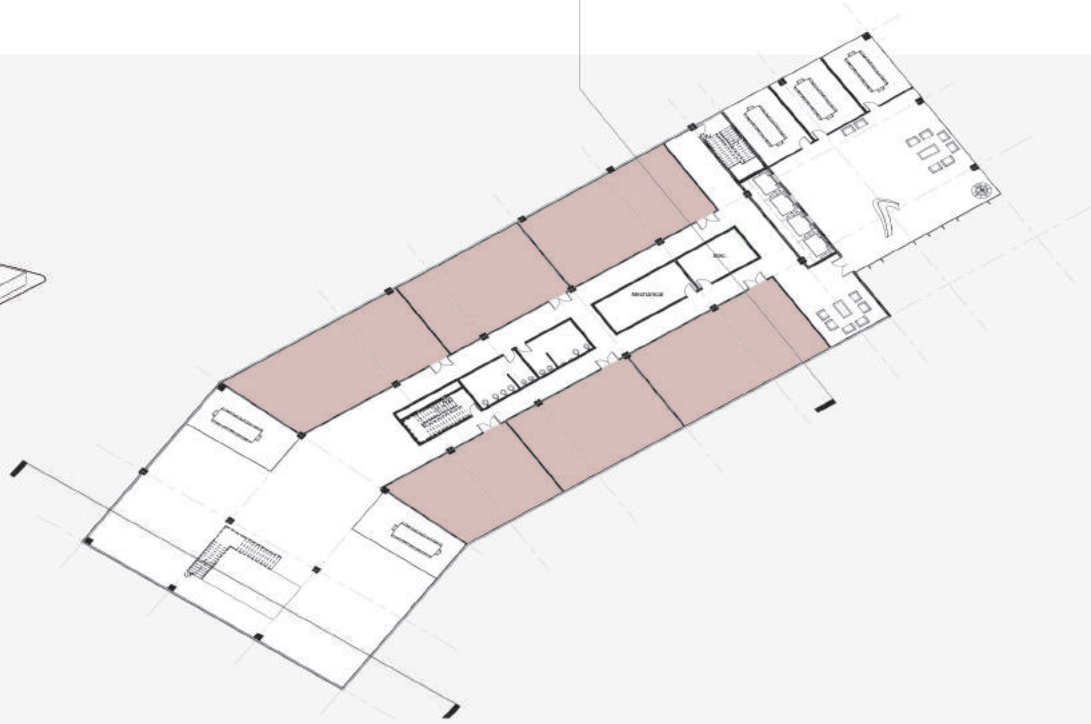
Tianjin's new Innovation Campus is a highly collaborative atmosphere that start up businesses and stable businesses alike will want to occupy. This scheme emphasises the importance of collaboration and moment of interaction by the users. The Business Incubator, Offices, and Makerspaces are sprinkled throughout the entire site which allows for users to cross paths frequently. This portion of the master plan acts as the 'heart of campus'. It becomes multiple gates for different areas of the project. The primary vehicular access coming off of Ashan Road enters into a parking garage situated below the project. The primary pedestrian spine that flows through the center of the project opens up to the main plaza at this kink as well. The Makerspaces float above this pedestrian spine which allows for views into the space to see the interaction and movement in the project.

SCALE: 1:1000

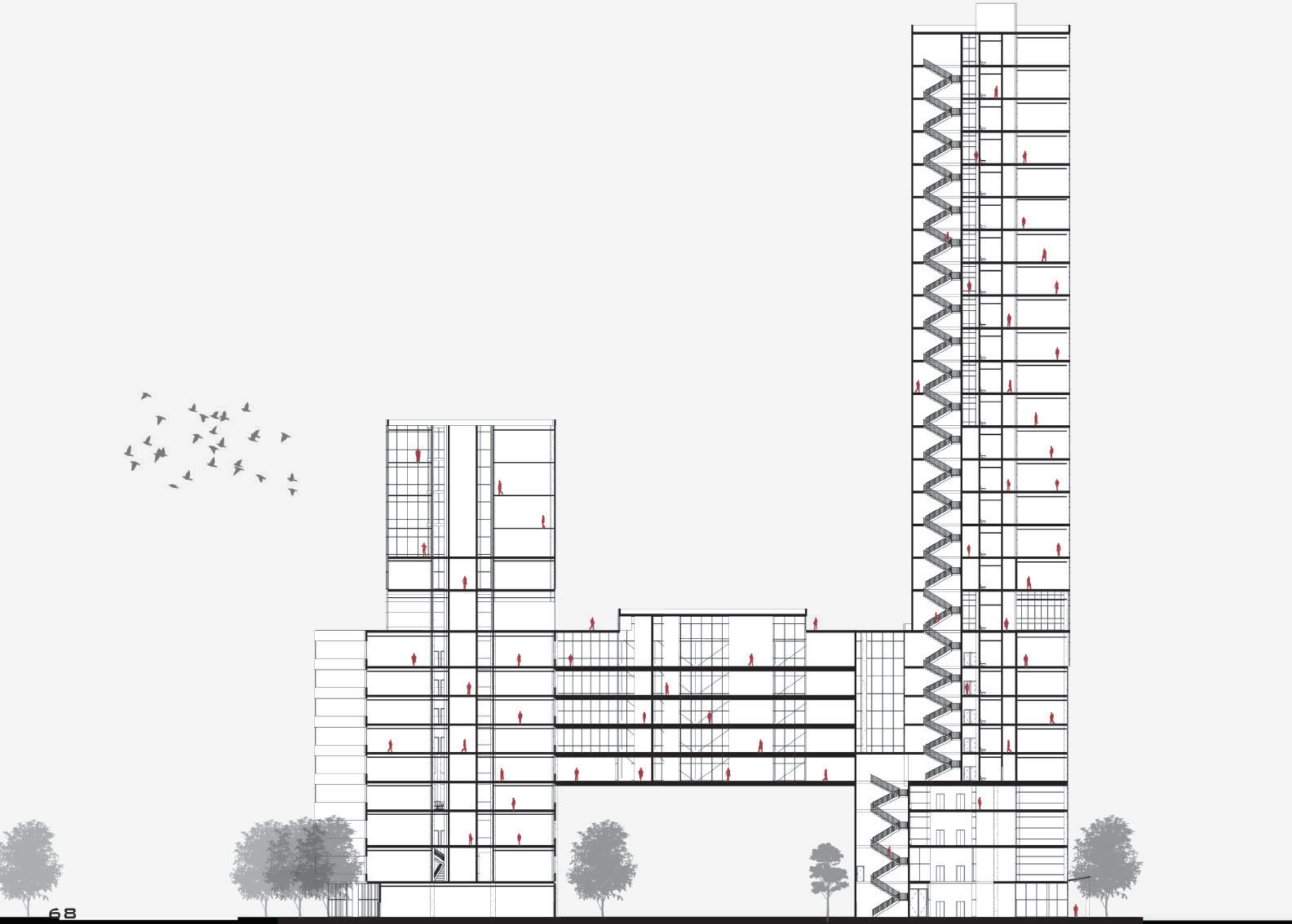




Massing Axonometric



Second - Fourth Floor plan



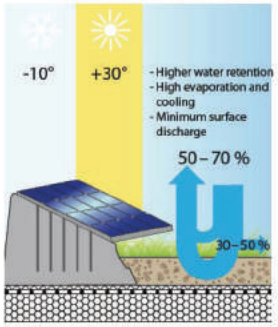
LONGITUDINAL SECTION
1m = 300m

SUSTAINABILITY

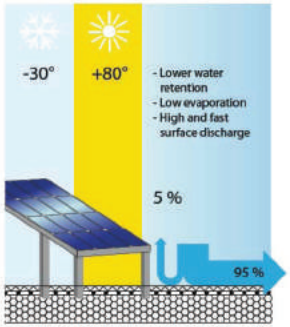
SOLAR GARDEN ROOF

Adding planting around the solar panels on a roof not only makes for a more pleasent look but they also act like small air conditioners for the heat sensitve PV elements. The green roof technology also helps retain 50% more annual rainfall and prevents in from running off into our sewer systems. The PV elements are then able to produce more reliable power during high summer temperatures. Green roofs can also reduces the amount of pollutants and dust that is given off of a traditional roof system. Reducing the enviromental footprint of the building and the energy that this large project will consume is important to sustainability in Tainjin. The combination of solar and green roofs is the best investment that can be made for the environment and the building.

http://www.greenrooftechnology.com/Solar_PV_Greenroofs



A combination of solar power and green roof.: "SolarGreenRoof" secured by a superimposed load.



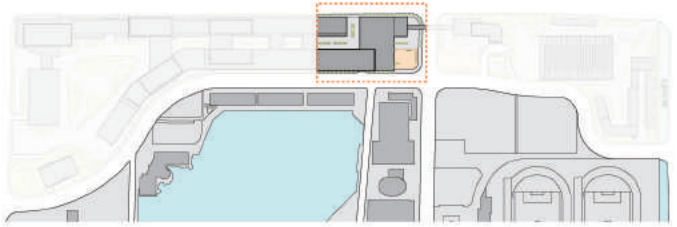
Solar power plant anchored in the roof substructure without roof greening.

PHOTOVOLTAIC PANELS

PV Panels placed directly on the roof would be located on the tops of the business office towers. Green roofing was not located in these portions for maintenance purposes. The plants would need to be taken care of and the tops of the towers are not easily accessed. These PV panels would still collect a large amount of energy to be produced for the entire building.

INDIVIDUAL DESIGN | MATT KRUEZER

The design intention is to bring together various programs into a synergistic amalgamation of parts that provided for the chance encounter among inhabitants and also provided a public face through exhibition and retail spaces.



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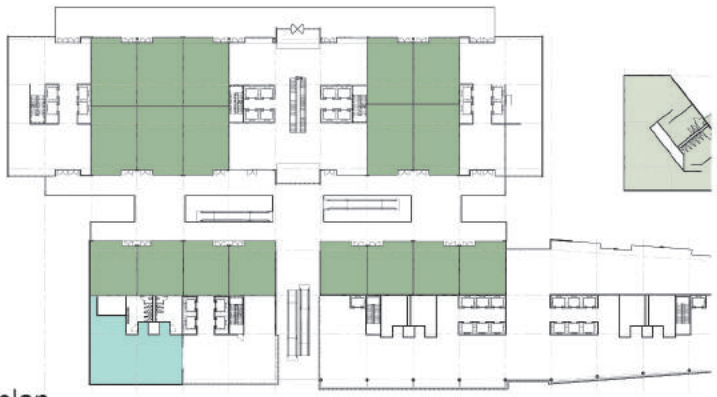
Ground Floor plan

Floor 5-7



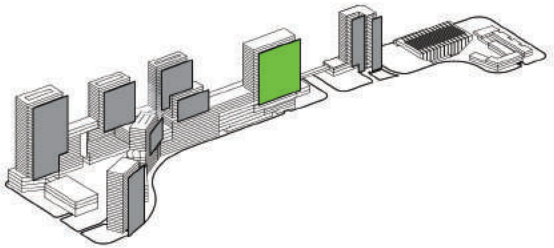
Second Floor plan

ROOF

Total area: **3797.408 sq m**
# of solar panels: **3062 panels**
Energy produced: **1,145,347.25 kWh/m2**

= 3,062 solar panels

SOUTH FACADE



Total area: **9,720.3 sq m** (298,192 sqft)
# of solar panels: **7,838 panels**
Energy produced: **2,931,767.9 kWh/m2**

= 1,000 panels

= 7,838 solar panels

ROOF

Total area: **9000 sq m**
Water collected: **675,000 liters/month**

Water collected: **8,100,000 liters/year**

COLLECTIBLE RAINFALL (based on a population of 2,000): What becomes apparent is a need for the ability to pull water from other resources, to be able to supply the campus with the resources it needs. There are only two months where the campus can collect enough water to be able to support the various water uses.

A **21.4%** reduction in water from the LEED baseline, through use of low flow fixtures, is necessary to entirely use rainwater to be able to facilitate the basic functions of the proposed buildings on campus. LEED baseline would would not be adequate to supply water through rainfall collection.

Thus, with a 49% reduction from LEED Baseline, we have a surplus of water, possibly facilititating water movement to harness energy.

The water collection area is the maximum area not devoted to green space.

[1] Produce Energy On Site

= 10,900 solar panels
= 4,077,115.15 kWh/m2

5.79% of TOTAL ENERGY USED

[3] LEED Gold

See attached LEED checklist

[5] Reuse Materials

Reuse of materials for paving of plaza and exhibition concrete

[2] Water Consumption

	Building Usage	LEED Average
Liters/person/day:	9.1	7.9
Liters/day:	1,827.0	3,580.0
Liters/month:	55,571.9	108,892.9
Liters/year:	475,020.0	930,800.0

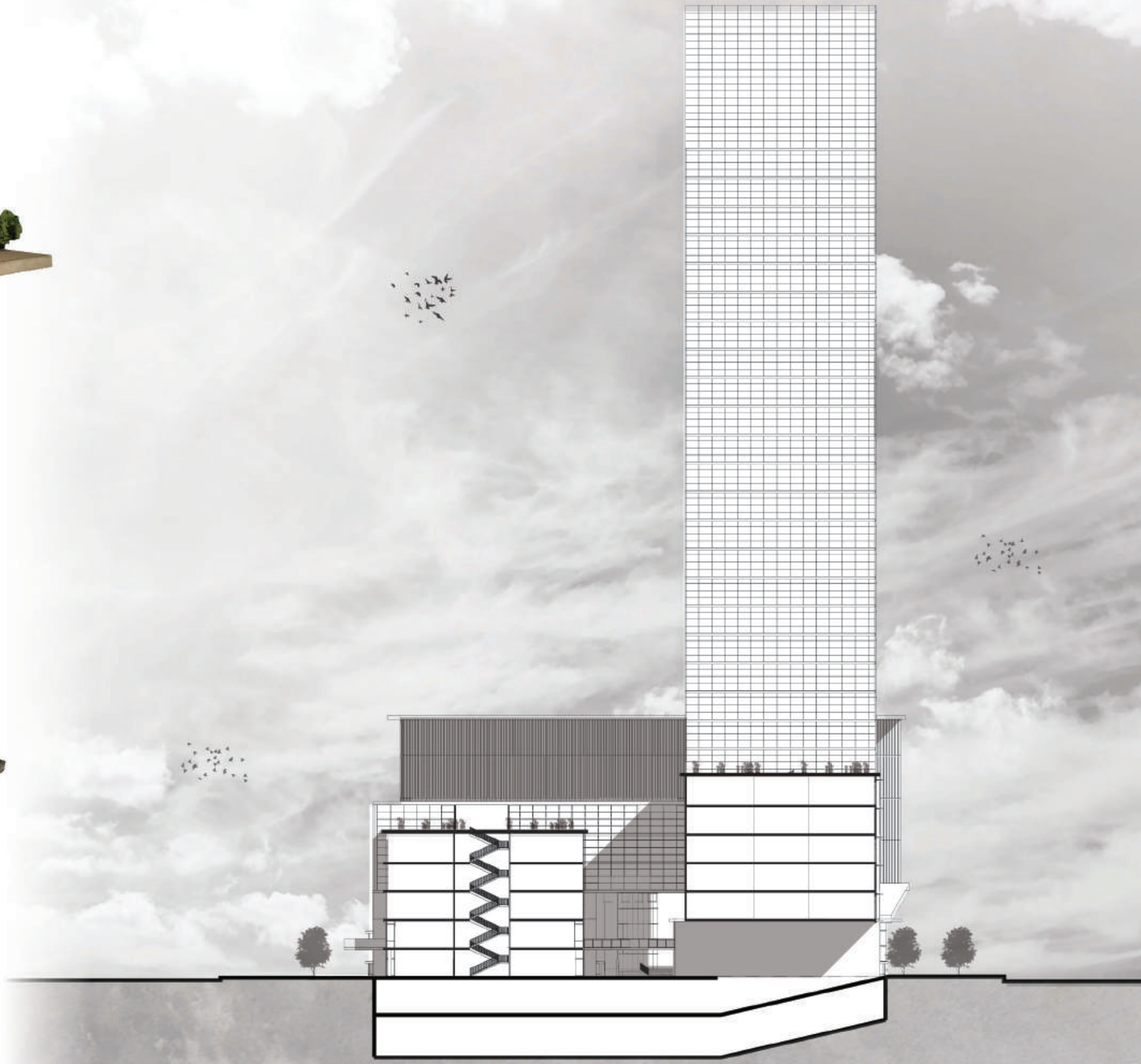
Reduction vs. average:61.5%%
Reduction vs. LEED Baseline:49.0%

[2] Water Treatment On Site

Treatment done in Living Machine

[2] Improve IAQ

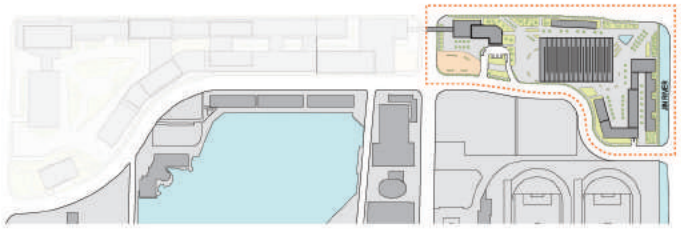
Methods: Cross-ventilation
Floor to Floor Heights
DOAS system
Dedicated exhaust in copy rooms

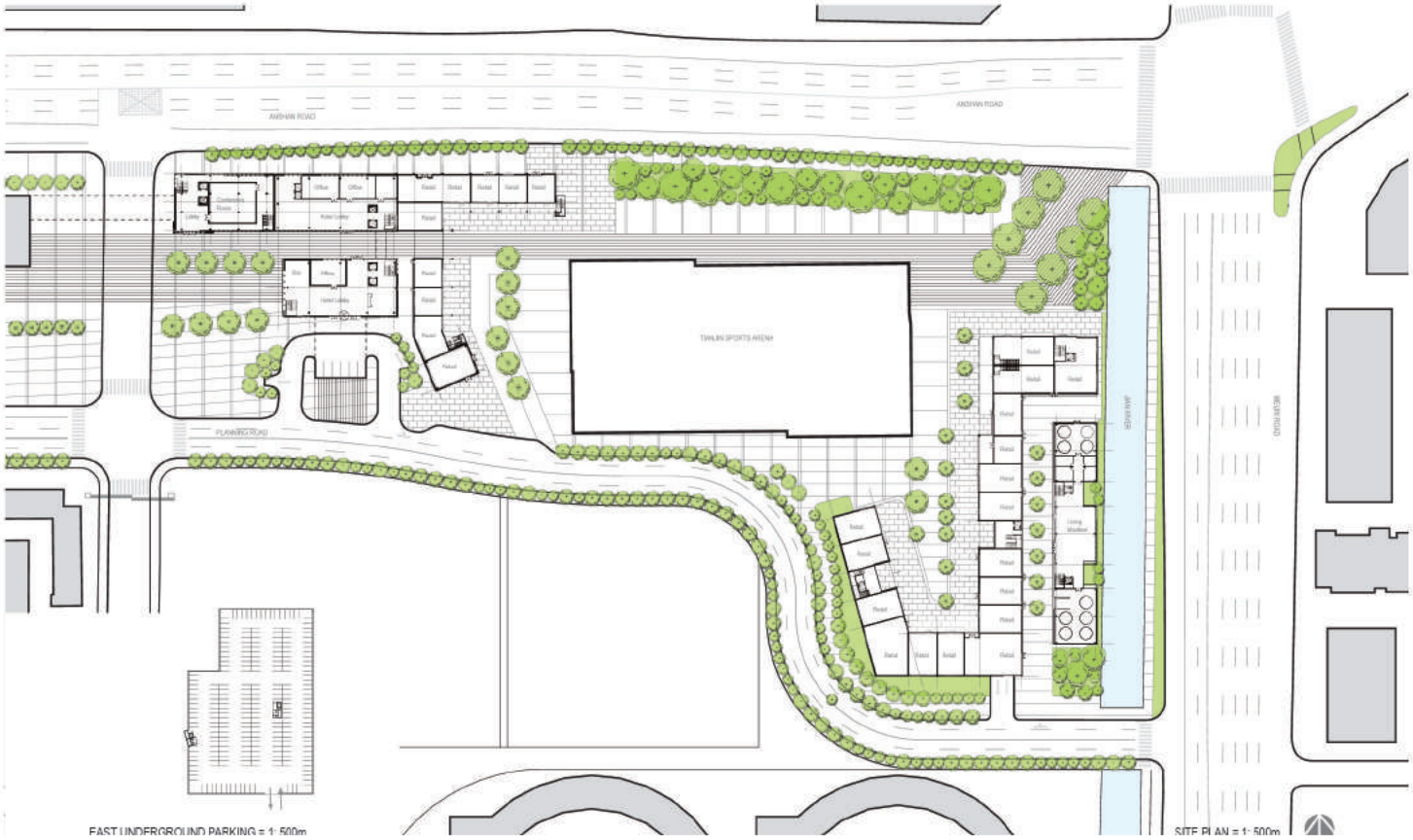


BUILDING SECTION 1:300

INDIVIDUAL DESIGN | BEN BEDELL

1. Maximizing program (short stay hotel and conference center).
2. Initial massing model creating a terminus to the extended site.
3. Opening up pathway and dispersing the program.
4. Using GrassHopper to alter the form and make it more welcoming.
5. Finalizing the form and adding the facades.





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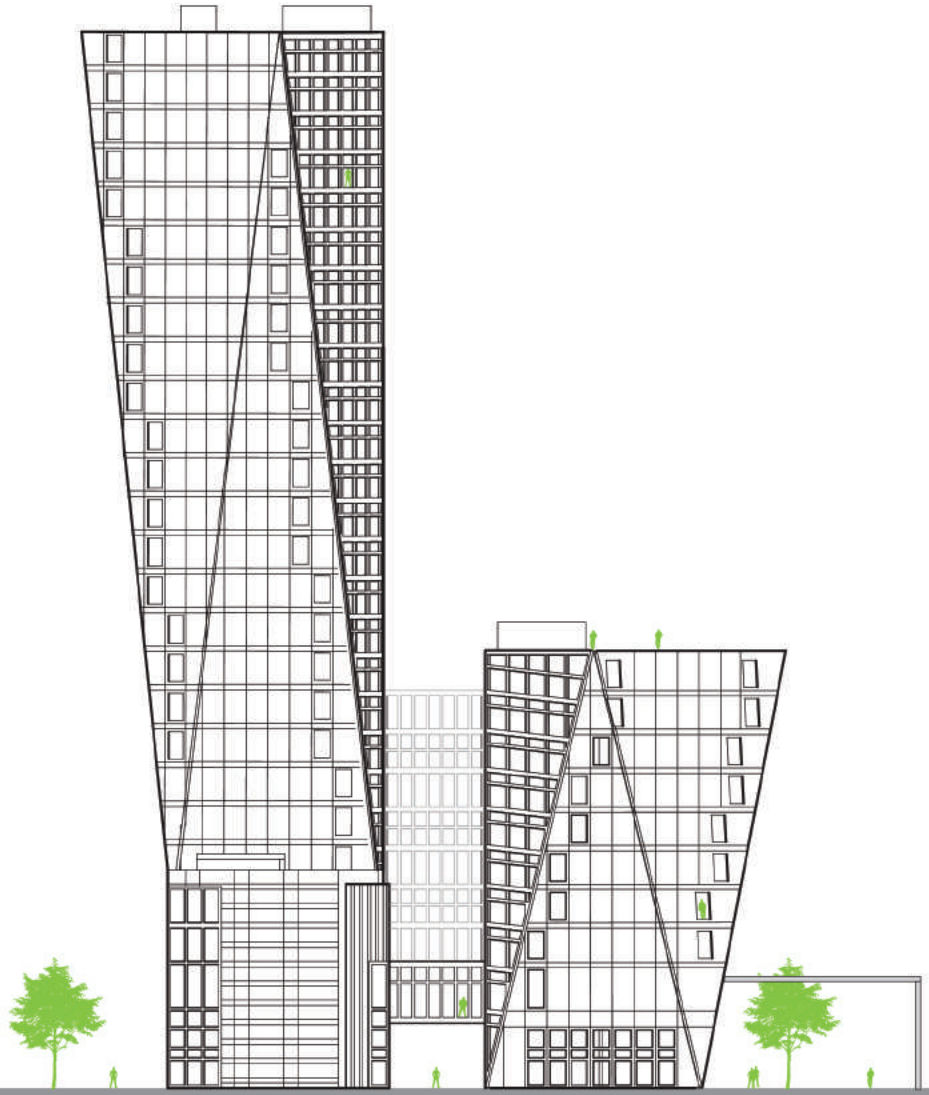
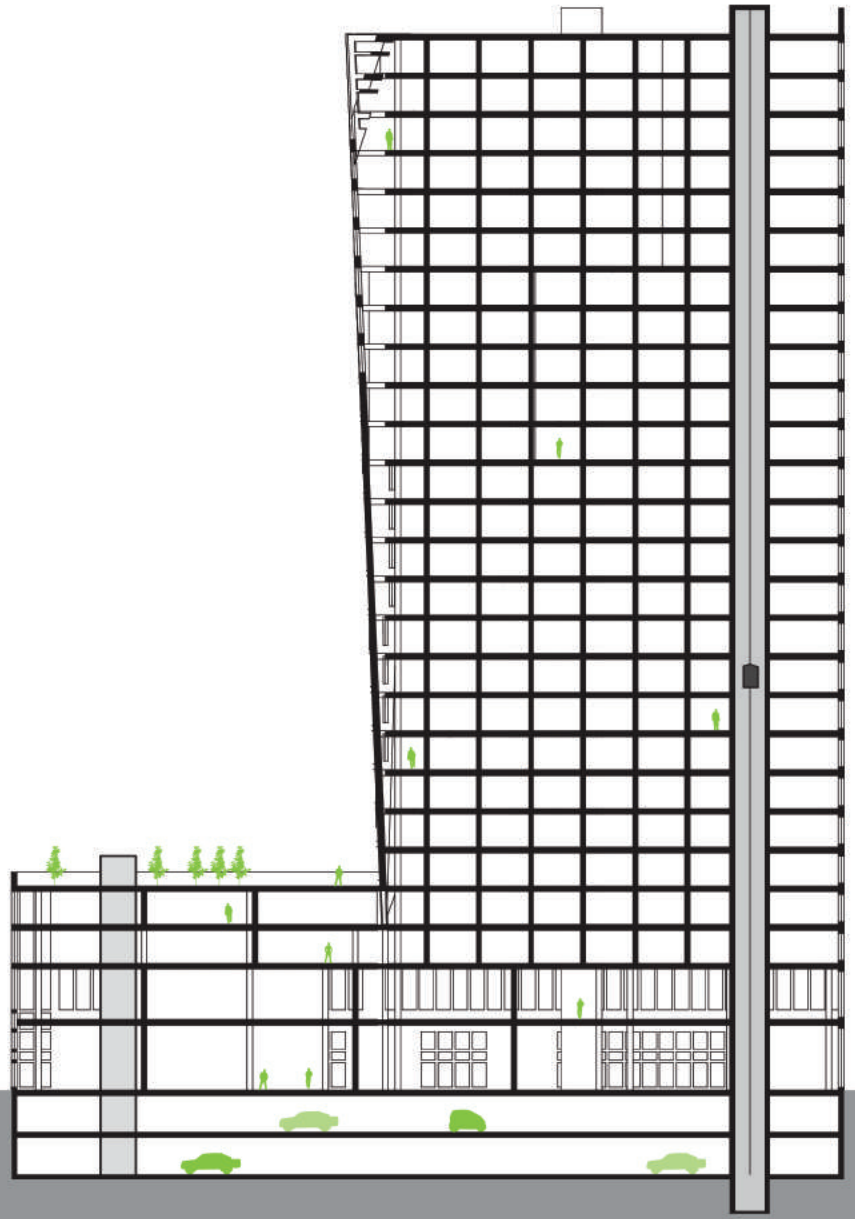
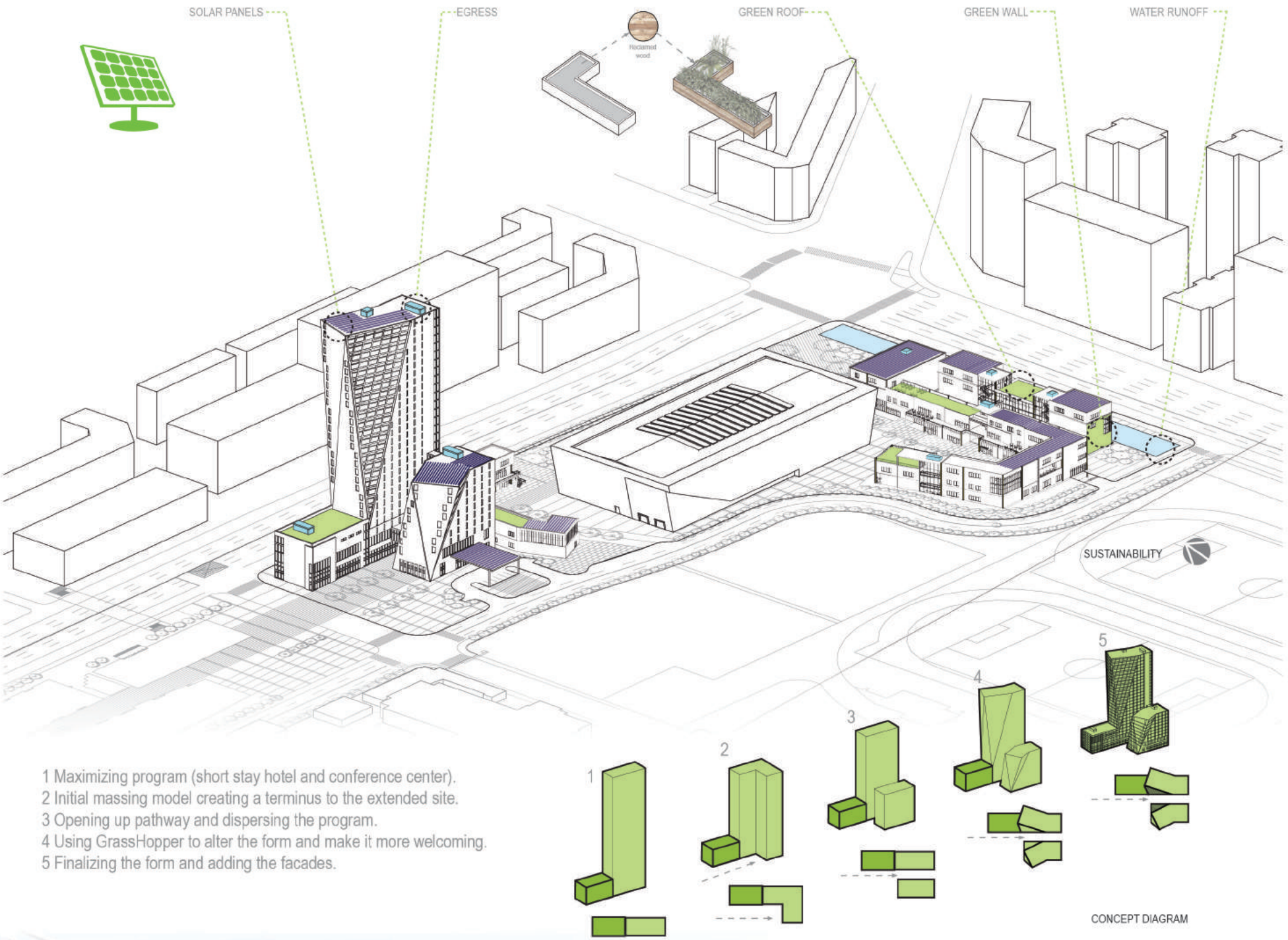


WEST ELEVATION= 1: 200m



SOUTH HOTEL SECTION = 1: 200m



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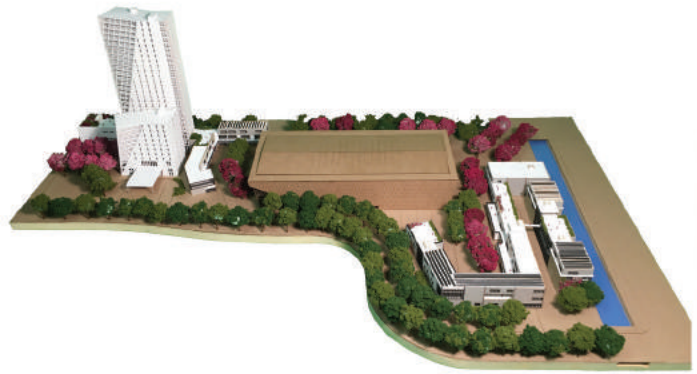
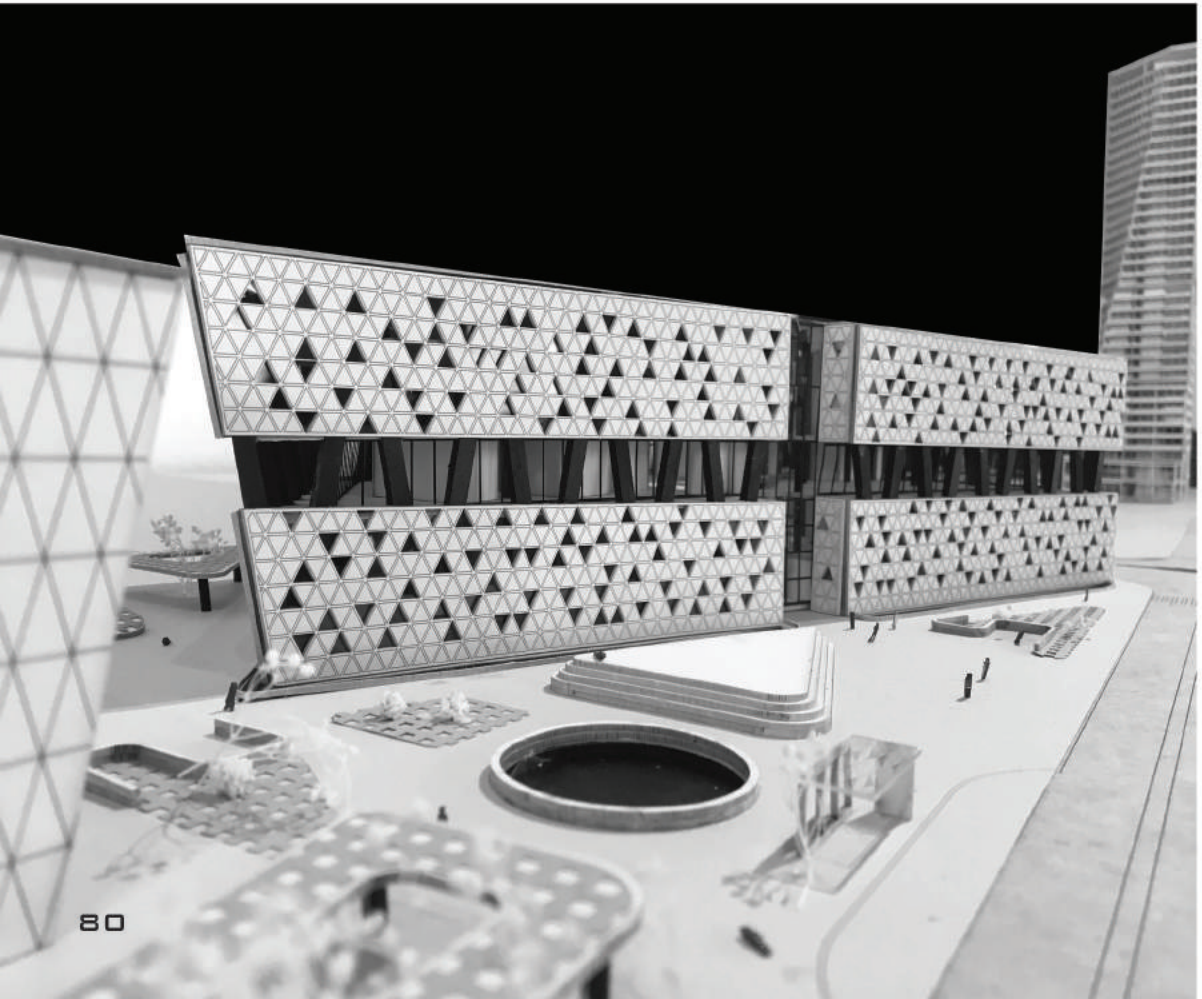
巢鸭地藏通商店街



05 STUDIO CULTURE

INTELL - STUDENT TESTIMONIES

The keyword to mention after taking the sustainable Urbanism studio is Teamwork. We worked as a team, five members, from three different countries, have diverse culture understandings. A variety of different ideas gathered together and crashed into each other, condensed out of a unique result which not any individual one can be done. Of course, the “teamwork” is not only for people but also for the project itself. Sustainable urbanism design has complicated systems and interrelated elements, the relationships in amount of human beings, infrastructures, environment, climate, history, culture, economic and policy are as a group which all need to be considered in the design and find out a long term solution.



LIDALU

In Mark Hoistad's Studio, I learned a lot about the sustainable aspect of the design, such as the black water treatment and recycling, energy efficiency, capture or generate the nature energy. The most important goal is exploit local environment resources, and nature conditions, energy-related factors such as daylight, solar heat or ventilation is the use of site analysis.

LEUL YOSEPH

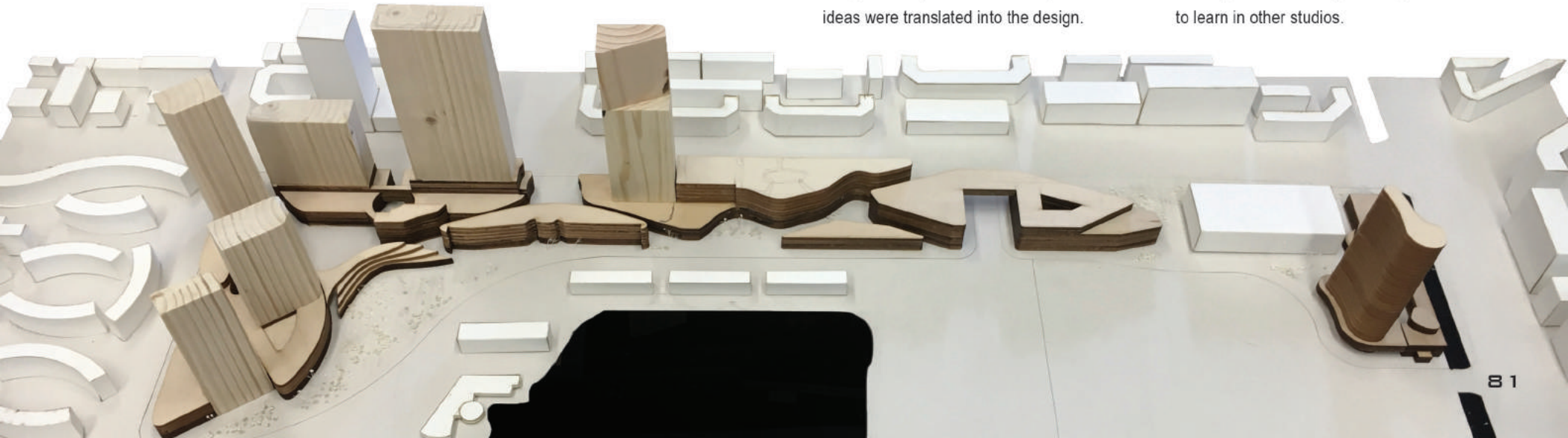
Being in Prof. Mark's studio helped me see and understand the relationships between design, users and environment. Throughout this project I was able to identify those relationships and seek possible innovative solutions which would provide safety, comfort and lessen the carbon footprint of the building.

MORTEN LYDISEK

I'm an International student from Denmark. Mark helped me gain a better understanding of the human relation to the built and natural environment. The studio provided me a wide range of knowledge in how to approach a dense urban cityscape and how it can influence the city image. I found the individual supervisions very helpful where I learn to be critical to my own architectural design development and how my ideas were translated into the design.

MINA GENG

Mark Hoistad's studio is always my number 1 choice. I've been taking it for 3 semesters. I learned so much thanks to a comprehensive design challenge including site research, site massing design, architecture design which approach to energy, ecology conservation and built environment. I especially appreciate the aspect of seeking to minimize the energy consumption of the building. It is something I never get to learn in other studios.



PBAMM - STUDENT TESTIMONIES

It was challenging for most of us to work in such a large group at first. However, it really helped to foster creativity and learning, as well as brought our complementary strengths together. We were emotionally, intellectually, and aesthetically engaged in solving problems, creating products, and making meaning to the project. Making design decision as a team, taking healthy risks made our project even stronger. Spending time together during and after studio learning and having fun absolutely added to the success of the project.

ABDUL NAHAS

Sustainable Urbanism Studio helped me to engage with different aspects of design and environment to find long term solutions. I become more aware of other fields and topics that integrate with sustainable designs; such as population, ecosystems, global change, energy, water conversation, policy, and cultural history.

PHUONG NGUYEN

My favorite thing about the studio this semester was the pizza treat every Saturday before a big review came up and the dog therapy sessions. The studio was intense, but I learned so much more from Mark compared to other studios I had. The design challenge ranges from big idea massing to intricate level of details. Mark was so passionate about teaching and he really cared about our learning progress. I'm so happy to have a good big scale project in my portfolio!

MEGHAN JANOUSEK

Being in professor Hoistad's "Sustainable Urbanism" studio helped me become a better designer by exposing me to masterplanning. Architecture is more than designing the buildings. It is about the exterior interstitial spaces we create in between the buildings. The masterplanning phase allowed for the design of those interstitial spaces.

MATT KRUTZER

I appreciated how the studio gave the opportunity to look at architecture from masterplanning phase up through design realization. Additionally, I gained a better understanding of how sustainable design can be implemented on a large scale, as was the case for this project.

BENJAMIN BEDELL

"I really enjoyed the collaboration aspect among our team throughout the entire semester. I am extremely proud of how our models came together showing the project as a holistic development. That could not have been possible without the dedication and effort from all the five of us."