

POLITECNICO DI MILANO



School of Architecture Urban Planning and Construction Engineering
Master of Science in Sustainable Architecture and Landscape Design

POSITIVE IMPACT ARCHITECTURE

Using Net Positive Approach to Regenerate a Complex of Abandoned Buildings in Piazzale Accursio,
Milan

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Academic Year 2018/19

ACKNOWLEDGMENTS

I would like to express the deepest appreciation for my supervisor professor Karin Hofert for her invaluable guidance throughout the course of this study. Her critique have been crucial to the development of this project. The lessons that I have learnt from her will stay with me throughout my career in architecture. I thank her for the support even through the months of holiday, constant motivation and enthusiasm.

I would like to thank professor Paco Melia for sharing his expert knowledge on ecology in view of the project with me.

I would like to thank professor Alex Lambruschi for his support in developing the structural aspects of the project.

I also thank professor Sara Protasoni, the department head of the course for her support.

I thank Sara Vignali for sharing her experience and information on the project.

I would not have been able to pursue this study without the love and support of my family.

ABSTRACT

Key Words: Net Positive, Regenerative, Bio-centric, Holistic

Architecture and Design is shifting from an anthropocentric world-view to a bio-centric world-view. We have witnessed varied approaches to green building design in the past two decades. The underlying theme in green building approaches is to do less bad than to do good. Many authors have suggested that ecologically sustainable development is an Oxymoron. (Redclift, 2005) Development has already exceeded the earth's 'ecological carrying capacity' (ability to maintain biodiversity); a-third of the earth's species have been exterminated during a human lifespan; and one-third of the human population is without adequate means of survival or health. To correct these social, physical and ecological liabilities, truly 'sustainable' cities would need to not only regenerate nature and communities, but increase the life support system well beyond pre-industrial condition. An ethically and ecologically-positive urban environment is possible, but only with a new positive paradigm of design. (Birkeland, 2012)

As we shift to a bio-centric approach, we tend to think of buildings as a means to add value to the context. Net-positive extends beyond the mechanical approach of net zero. The proposition of net-positive design is seen not simply as one of consuming less and generating more energy but of adding "Value" and identifying the purpose and designing how the values will be deployed beyond the site boundary to the adjoining buildings, neighbourhood etc. The values are understood in the context of place, time and relationships within the whole living system within which the project plays a role. (Pamela Mang, 2015) .

The aim of this study is to understand and apply Net-Positive thinking. The complex of abandoned buildings in Piazzale Accursio in Milan has been used as an experiment. It holds a potential to be redesigned using its existing structure and possibly add value to the surroundings and the city.

ABSTRACT *(Italian)*

Key Words: Net Positive, Rigenerativo, Biocentrico, Olistico

La visione del mondo in Architettura e nel Design si sta spostando da antropocentrica a biocentrica. Negli ultimi due decenni abbiamo assistito a vari approcci alla progettazione di edifici ecologici. Il tema di fondo negli approcci di bioedilizia è fare meno male piuttosto che fare bene. Molti autori hanno suggerito che lo sviluppo ecologicamente sostenibile è un ossimoro. (Redclift, 2005) Lo sviluppo ha già superato la “capacità portante della terra”; un terzo delle specie terrestri è stato sterminato durante una vita umana; e un terzo della popolazione umana è privo di adeguati mezzi di sopravvivenza o di salute. Per correggere queste responsabilità sociali, fisiche ed ecologiche, città veramente “sostenibili” dovrebbero non solo rigenerare la natura e le comunità, ma aumentare il sistema di supporto vitale ben oltre le condizioni preindustriali. È possibile un ambiente urbano eticamente ed ecologicamente positivo, ma solo con un nuovo paradigma positivo del design. (Birkeland, 2012)

Mentre passiamo a un approccio biocentrico, tendiamo a pensare agli edifici come un mezzo per aggiungere valore al contesto. Il netto-positivo va oltre l'approccio meccanico del net-zero. La proposta di un design net-positive non è vista semplicemente come un minor consumo abbinato ad una generazione maggiore di energia, ma come aggiunta di “valore”, identificazione dello scopo e progettazione di come i valori stessi verranno distribuiti oltre il confine del sito agli edifici adiacenti, al quartiere ecc. I valori sono compresi nel contesto del luogo, del tempo e delle relazioni, all'interno dell'intero sistema vivente nel quale il progetto ha un ruolo. (Pamela Mang, 2015).

Lo scopo di questo studio è comprendere e applicare la strategia Net-Positive. Il complesso di edifici abbandonati in Piazzale Accursio a Milano è stato utilizzato come esperimento. Possiede un potenziale per essere riprogettato usando la sua struttura esistente e possibilmente aggiungere valore al contesto circostante e alla città.

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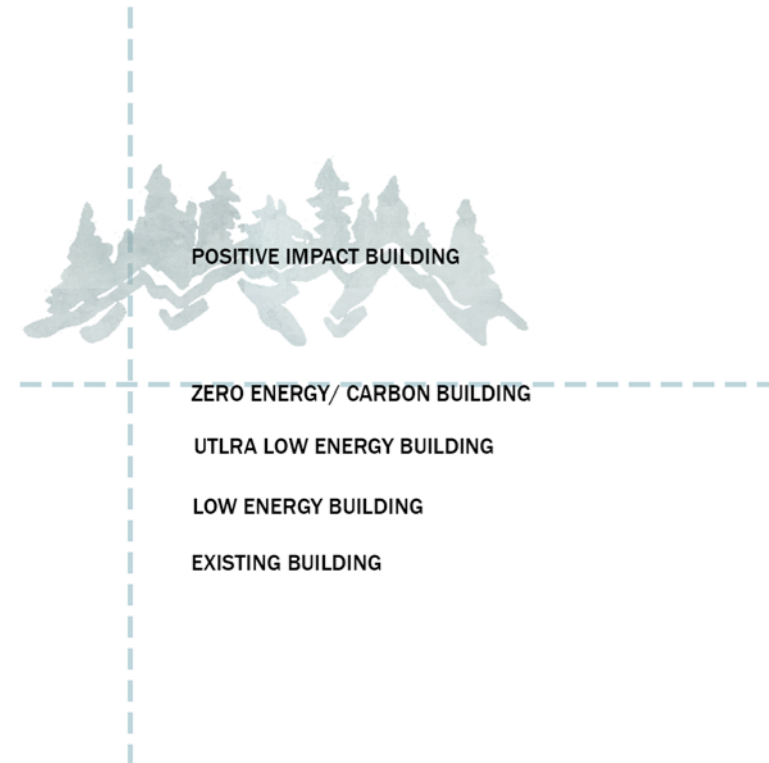
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1 . NET POSITIVE

Do good rather than do less bad

PARADIGM SHIFTS IN SUSTAINABLE ARCHITECTURE 1.1



Architecture is always meant to be sustainable but the role of sustainability in architecture became more important after the age of industrialization and the following ecological crisis.

The green building break even approach is limiting by nature. It focuses on doing less bad.

This reductionist approach operates with a fossil fuel paradigm that does not recognize the importance of renewable, regenerative resources and building design mechanism that can reverse the climate change root cause. (Attia,2016)

1.2 NET POSITIVE PARADIGM

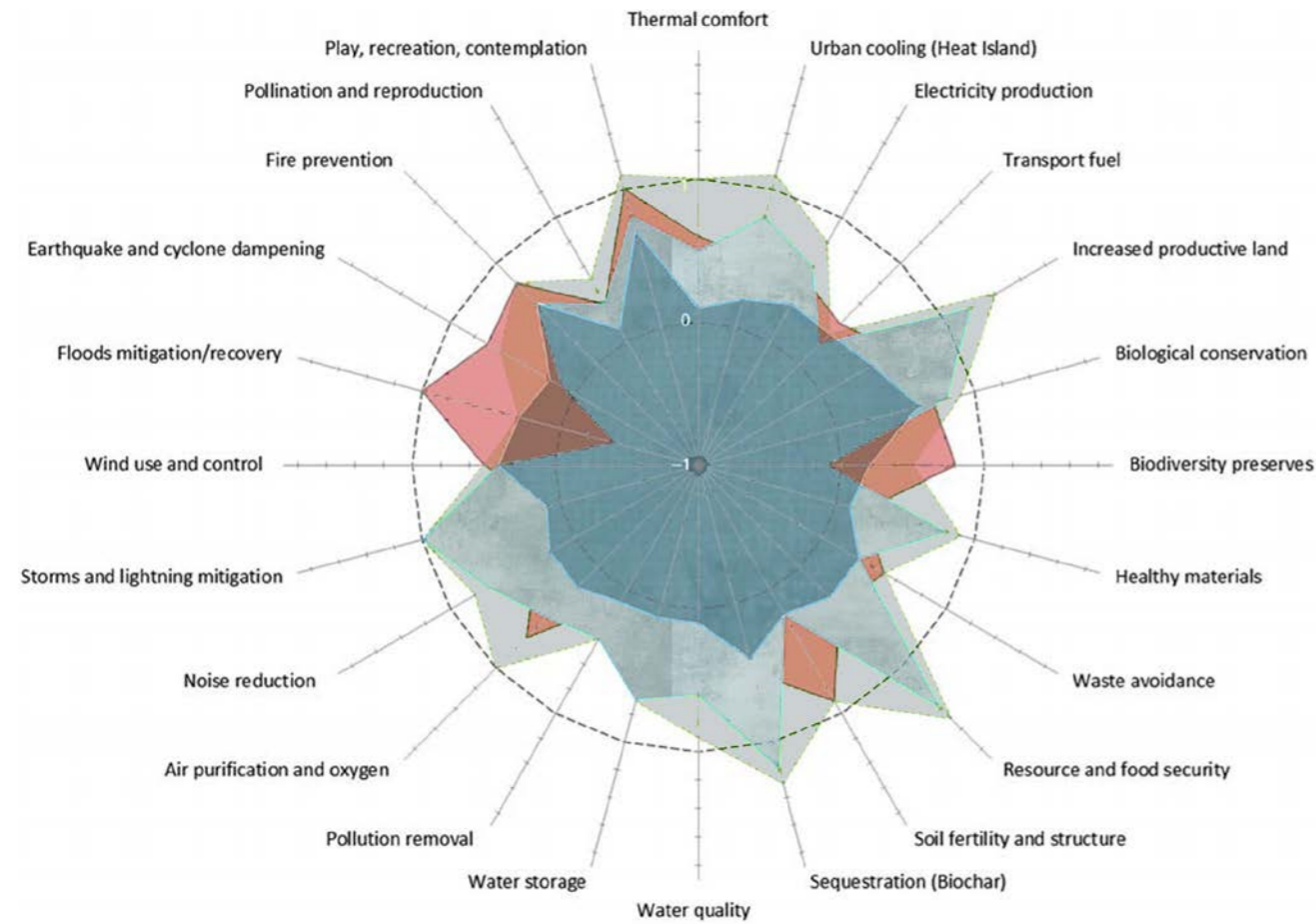
Channing from a reductionist paradigm to a recovery paradigm.

Over the past years, regenerative positive development paradigm has been garnering increasing influence on the evolution of architecture. The progress is dramatic: plus energy-plus, earth buildings, healthy buildings, positive impact buildings. This new way of thinking entails the integration of natural and human living systems to create and sustain greater health for both accompanied technological progress. (Attia,2016)

DESIGN AND DEVELOPMENT METHOD

1.3

The Eco positive Design Tool was developed by J. Birke-land. It measures values that can go beyond break even limit. In this study this tool has been taken as a bench mark to understand which are the values that can be considered.



1.4 OUTCOMES

Net positive is indicative of growing responsibility. (Cole,2014)

The ecological world-view roots of regenerative development and design are evident in very different ways of thinking, seeing and engaging with the world than those that have dominated green building and eco-efficiency approaches to sustainability. Regenerative thinking redefines the built environment – from the old, building-centric definition to one that includes the relationships between and among buildings, infrastructure and natural systems, as well as the culture, economy and politics of communities. It redefines what sustainability means and requires – within the context of a dynamic, interdependent, evolving world

It sets goals accordingly based on the perceived need to re-weave human and natural communities into a co-evolutionary whole, where humans exist in symbiotic relationship with the living lands they inhabit. To that end, it envisions development and design as the means for forming sophisticated, mutually beneficial partnerships between humans and their constructed environment, and the natural systems of their place. (Mang and Reed, 2011)

2 . PROJECT AND SCOPE

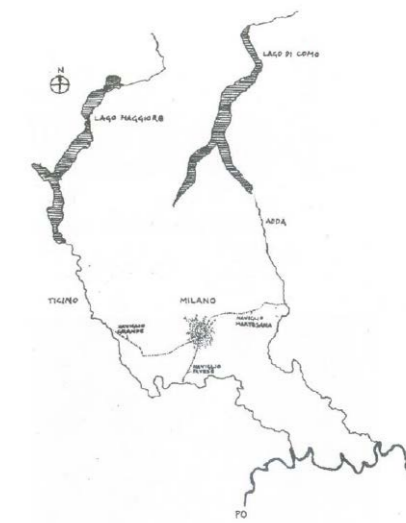
Piazzale Accursio

WHY PIAZZALE ACCURSIO

2.1

The complex of abandoned buildings facing Piazzale Accursio has a potential to be redesigned using the existing structure. Considering its urban setting, a program most relevant can be proposed incorporating the Net Positive design approach. The project also has the potential to regenerate the surrounding area by becoming a focal point and a catalyst to active urban life.





3 . UNDERSTANDING PLACE

Milano and Piazzale Accursio

MILAN AND ITS MORPHOLOGICAL EXPANSION

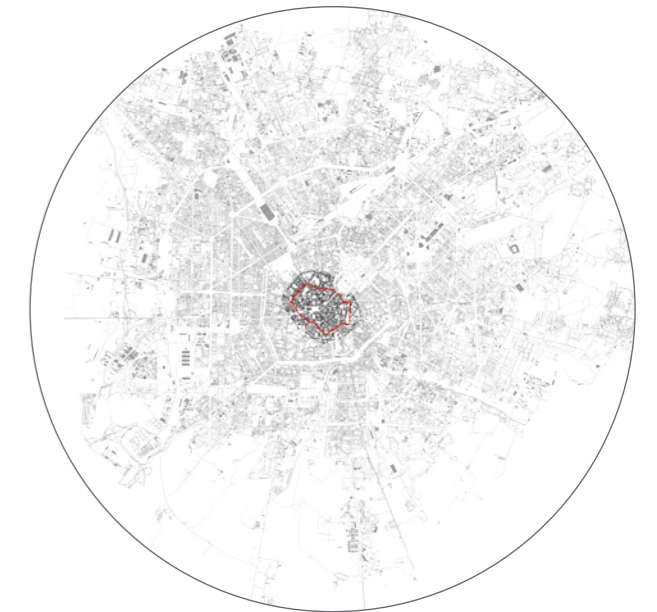
3.1

The city of Milan reached the highest population in 1973 as a result of industrial revolution, after which it started declining, witnessing a de-growth moment. 2011 was a landmark year in which the population started rising again. The city stands today on the cross roads of expansion and innovation. The challenge is to do it better than before.

Milan's origin goes back to 400 B.C., when Gauls settled and defeated the Etruscans against Celts who were about to overrun the city.

Mediolanum

In 222 B.C. the city was conquered by Romans and it was annexed to the Roman Empire, getting the name of Mediolanum. It became a permanent Latin colony in 89 B.C.



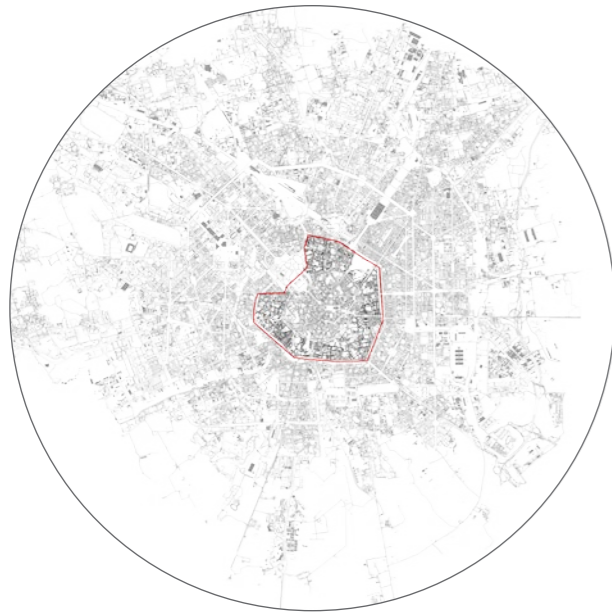
Foot notes Ref:<http://www.aboutmilan.com/history-of-milan.html>



Spanish and Austrian Duchy

In the early 16th century (the last years of Sforza rule) northern Italy was one of the territories contested by the Spanish and the French monarchies.

The Accademia di Brera was founded in this period; the theatre La Scala (where Giuseppe Verdi had his debut) was built in 1778, together with other neoclassical buildings and the Arco della Pace (1807).

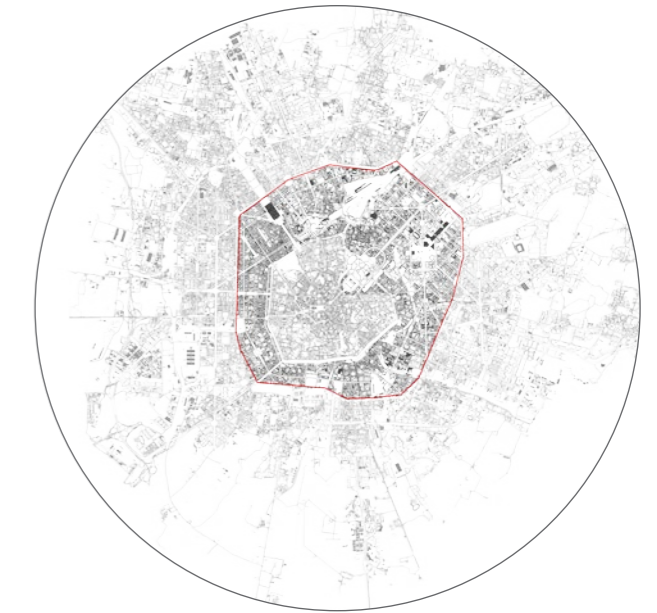
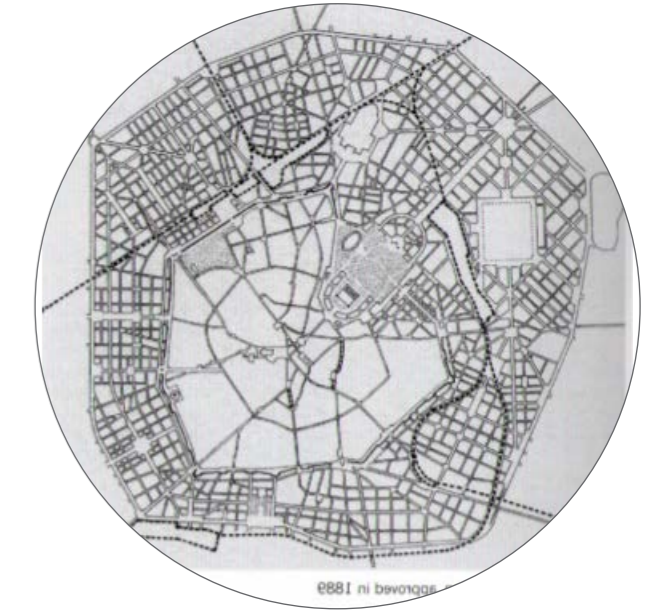


Foot notes; <http://www.aboutmilan.com/history-of-milan.html>

Beruto Expansion Plan, Milan's first city plan

The Accademia di Brera was founded in this period; the theatre La Scala (where Giuseppe Verdi had his debut) was built in 1778, together with other neoclassical buildings and the Arco della Pace (1807).

Beruto called for a series of interventions that closely resemble the notorious "gutting" proposed by Baron Haussmann for Paris: strategic demolitions aimed at rationalizing the circulation network, leading to the destruction of many neighborhoods. Fortunately this approach was applied to a much lesser degree than in the French model, and the demolitions (for example, the one permitting the creation of today's Via Dante) also contributed to generate physical ties between the historical center and the growth sectors, with the sole exception of the area around the Castle, which had been the focus of the initiation of the plan: overcoming exceptional resistance on the part of the real estate companies, the administration approved a solution that called for the construction of a modern public park designed by Cesare Alemagna and now known as Parco Sempione.



Foot notes; <http://www.storiemilanesi.org/en/insight/the-beruto-plan/>



Scheme of the Pavia-Masera plan, 1912



Pavia Masera Plan

The 20 Square kilometers of the Beruto Expansion plan was increased to 44 square kilometers of the urban territory earmarked for urban development under the 1912 plan known as the Pavia-Masera plan after the municipal engineers responsible

Milan's growth meant a new leap in scale, not so much to complete the beruto plan as to modernize a system of infrastructures now inadequate for the city's expansion and essential to create links with a much wider area beyond the city's confines.

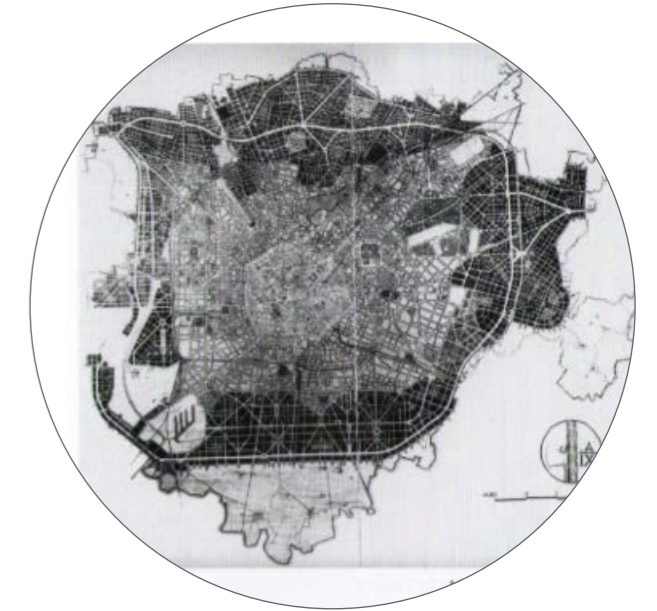
Foot notes: Ref:(Corinna Morandi,2007)

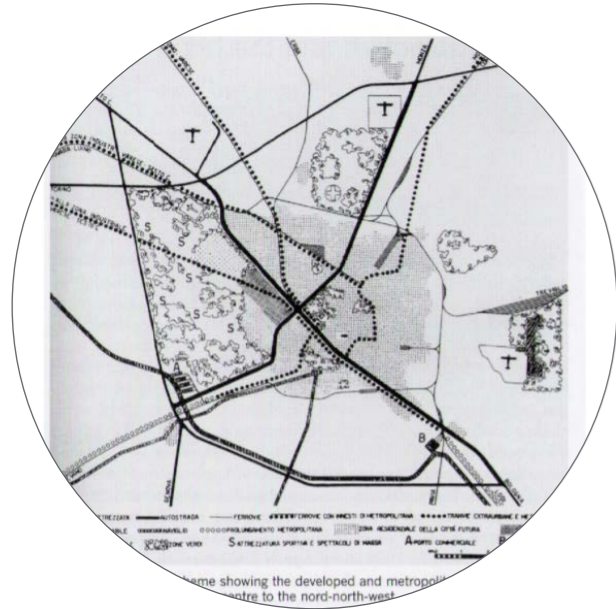
Albertini Town Plan

The plan provided for expansion by general urban development across almost the whole urban area, so fueling the formation of urban rent. In the inner city it planned to open in new roads, some of which were actually built, demolish the old established urban fabric, altering the functions and ousting residents.

Outside the Bastioni (Ramparts), the plan created a continuous grid of streets and unimaginatively geometrical squares, studied at rare intervals by more interesting patterns. Out of this pattern rise the bug working class housing estates.

Foot notes: Ref:(Corinna Morandi,2007)





AR Plan

The AR Plan presented its synthesis - disruption of the ring shaped mono centric form of the city and its northward development were underpinned by the creation of two “equipped axes” urban freeways running through the city, intersecting in tis heart near the arco della pace, along which were arranged the most important services.



Foot notes: Ref:(Corinna Morandi,2007)

Different Morphological Characters



- The Roman City
- The Spanish Walls
- The Beruto Plan
- The Masera Plan
- The Albertini Plan
- Other New Developments

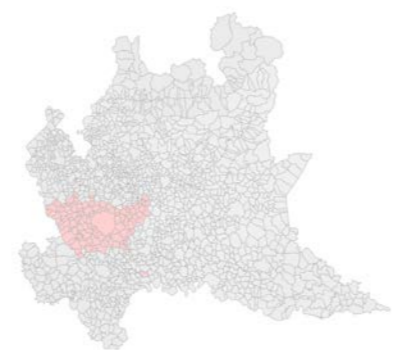
CLIMATE OF MILAN 3.2



Temperate climatic zone



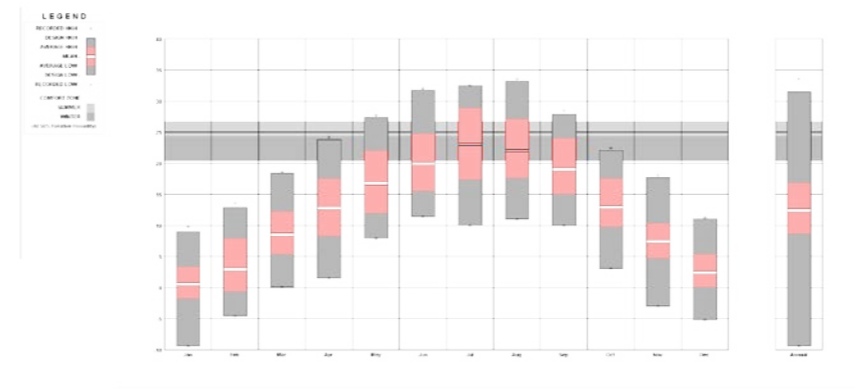
Lombardy Region



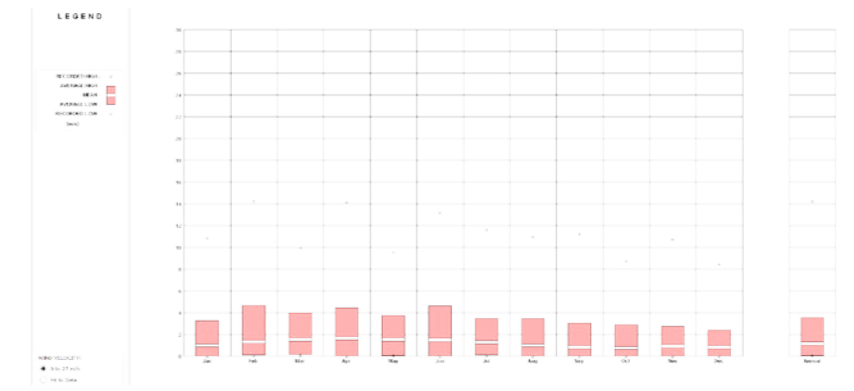
Province of Milan



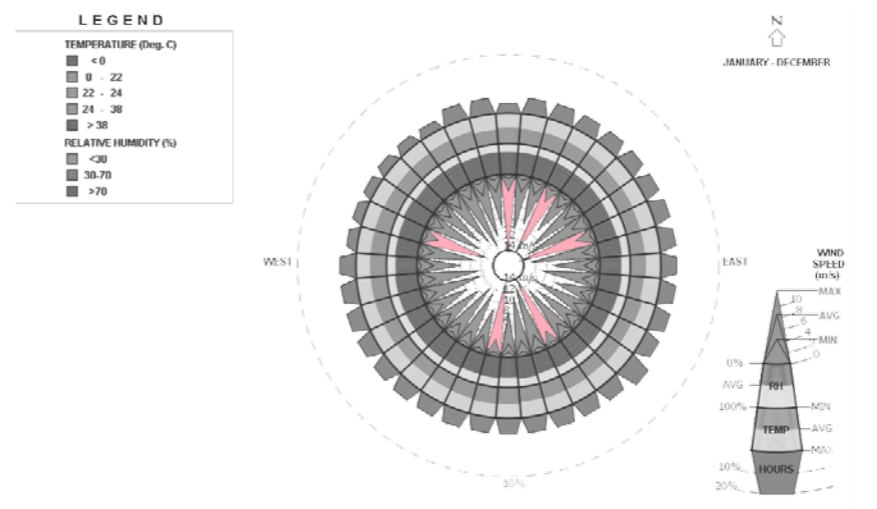
Milan City



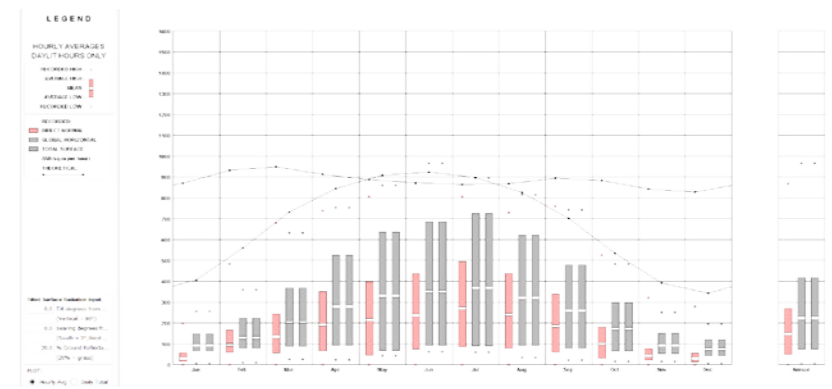
With mean annual temperature of 12.5 Celsius. For the majority of time, heating is required. In the summers the temperatures go beyond 30 degrees, hence cooling will be required



Avg. wind speed of 3m/s, with a small difference between summer and winter months



Wind Chart - N S wind seems dominant

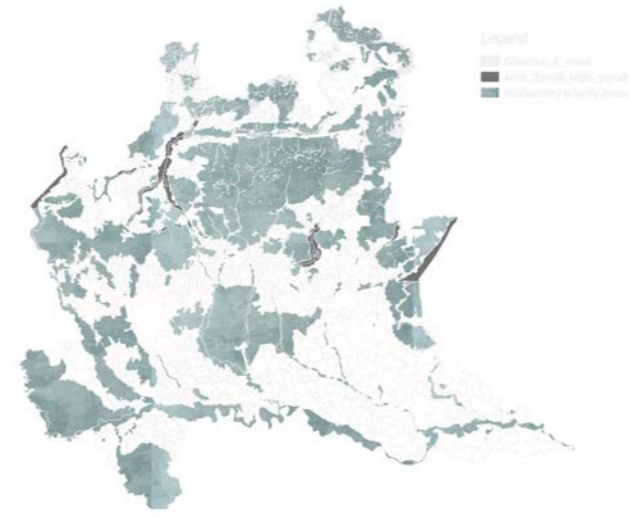


Radiation range and daylight hours

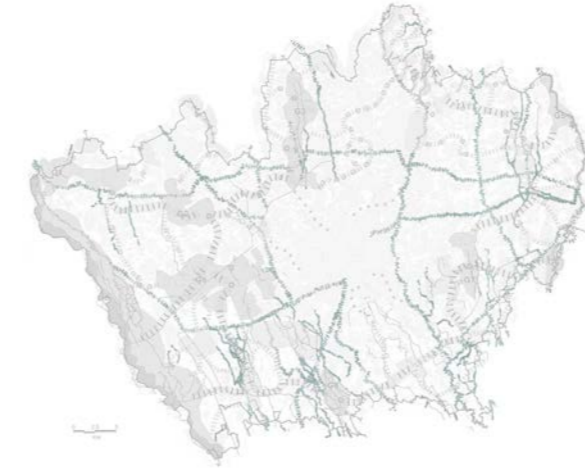
ECOLOGICAL SITUATION 3.3



Soil: Quaternary alluvial and glacio-fluvial deposits



Biodiversity Priority Areas in Lombardy



Ecological Corridors within Comune of Milan



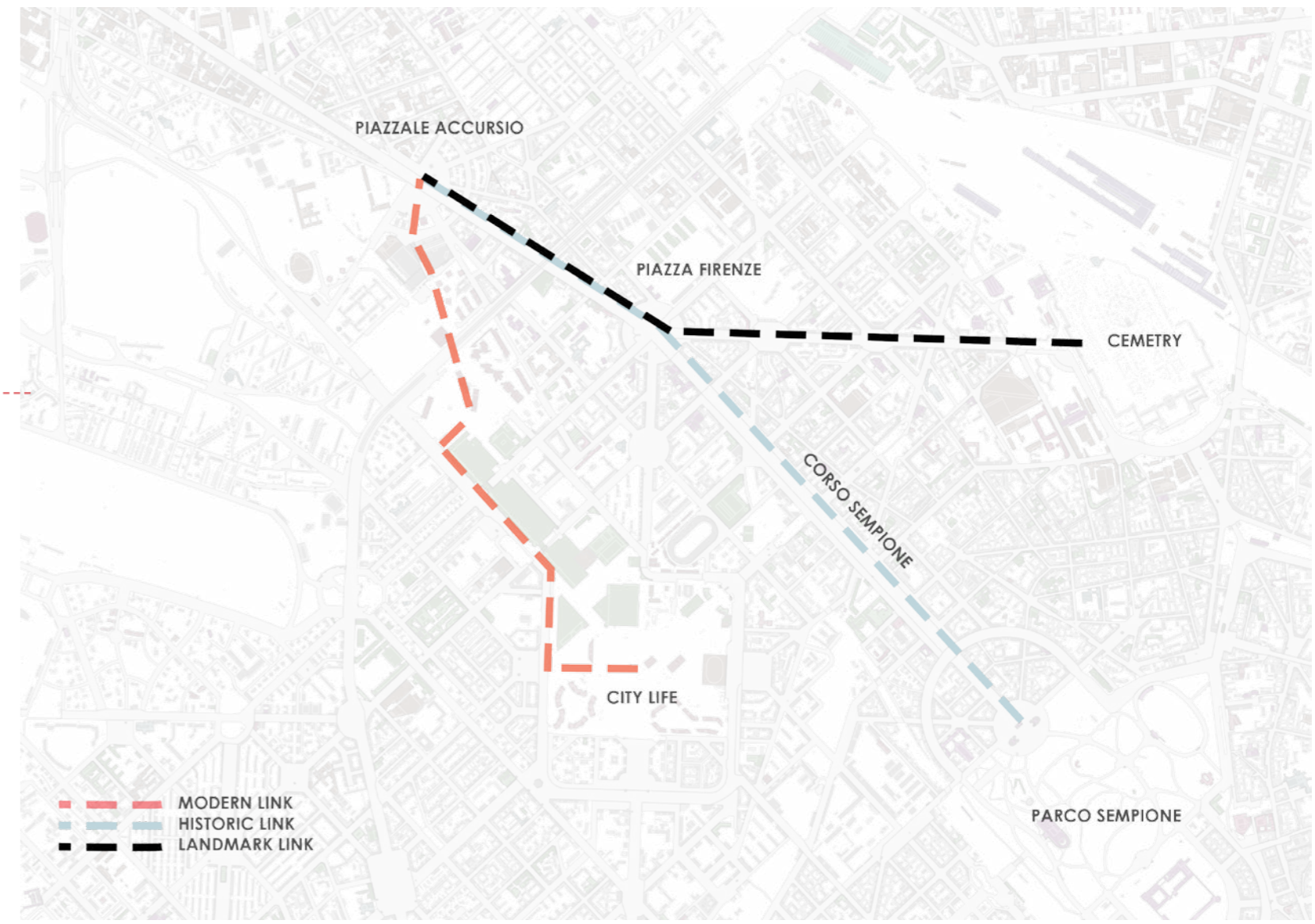
Rivers Going through City of Milan



Transportation Network



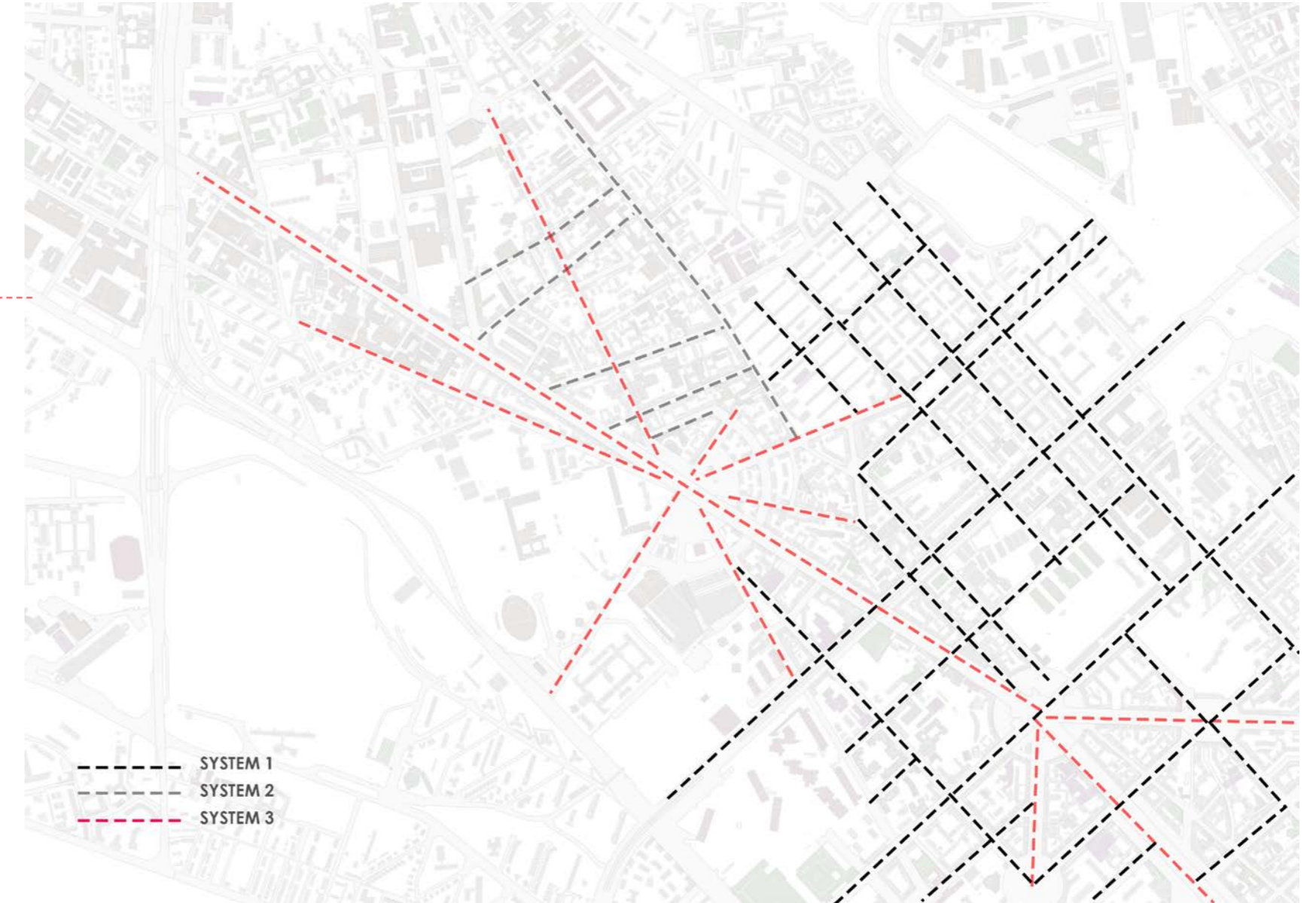
Identifying Links



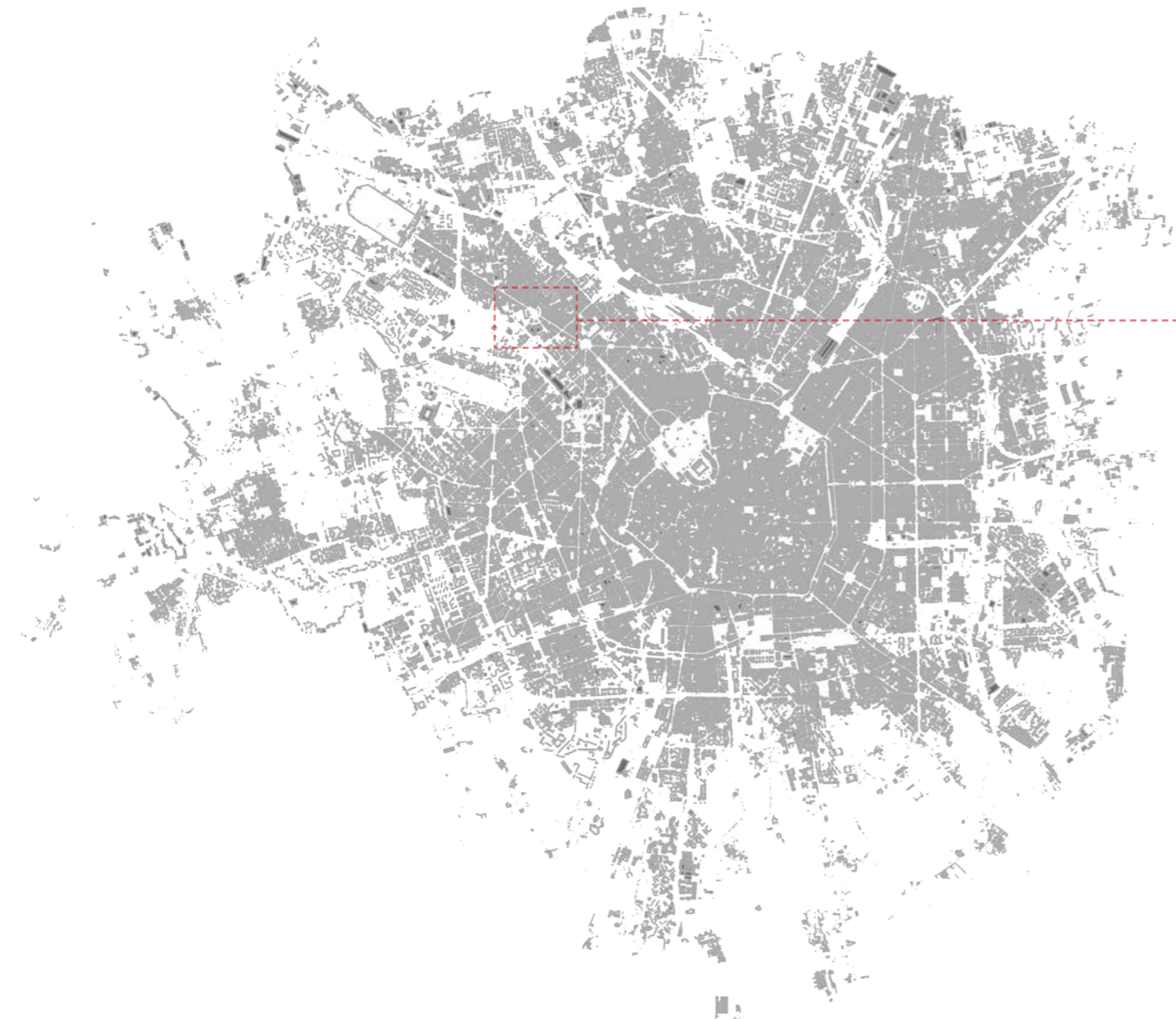
Avg Surface temperatures indicating amount of activity



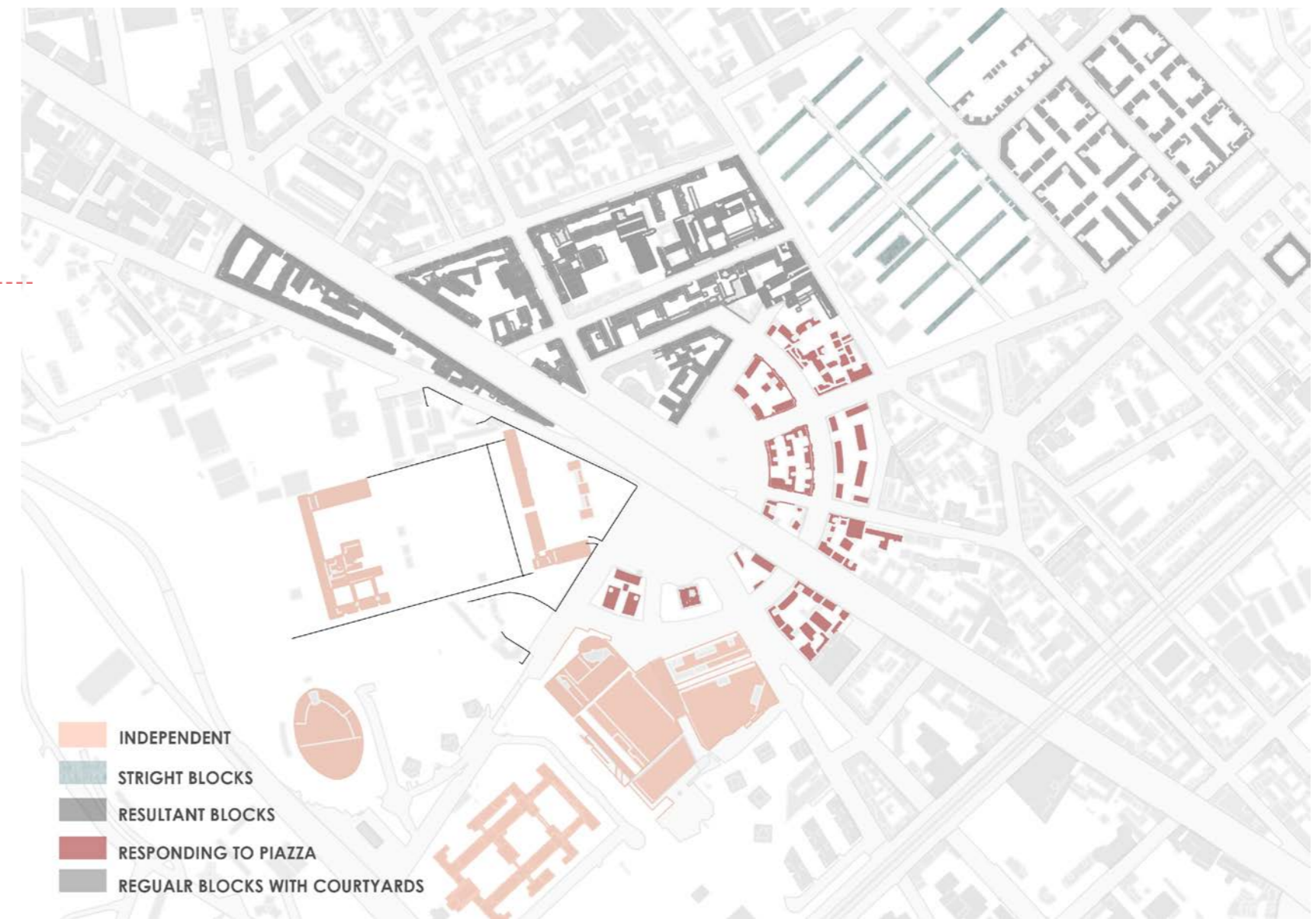
Urban Patterns



Built Network



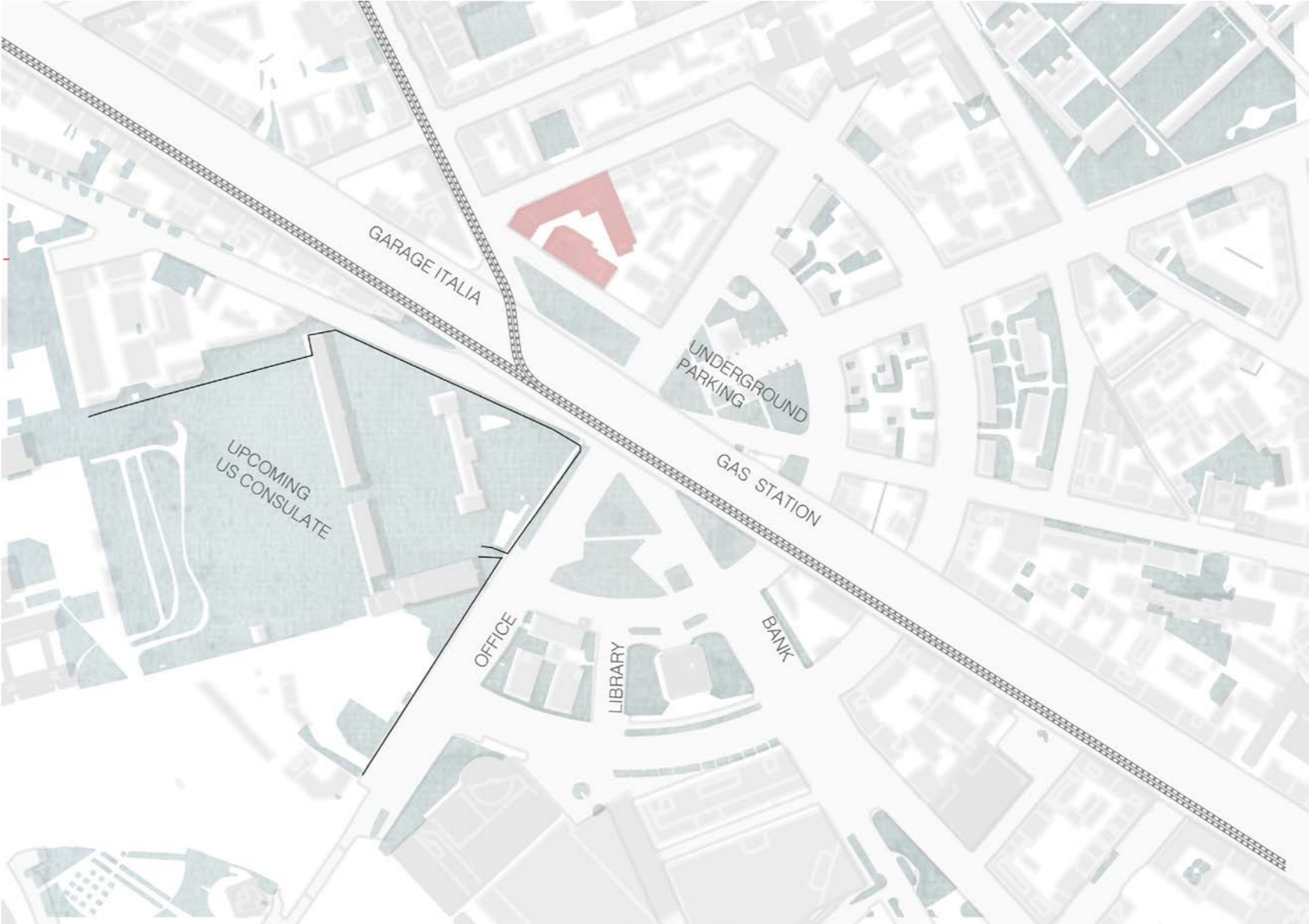
Morphological Patterns

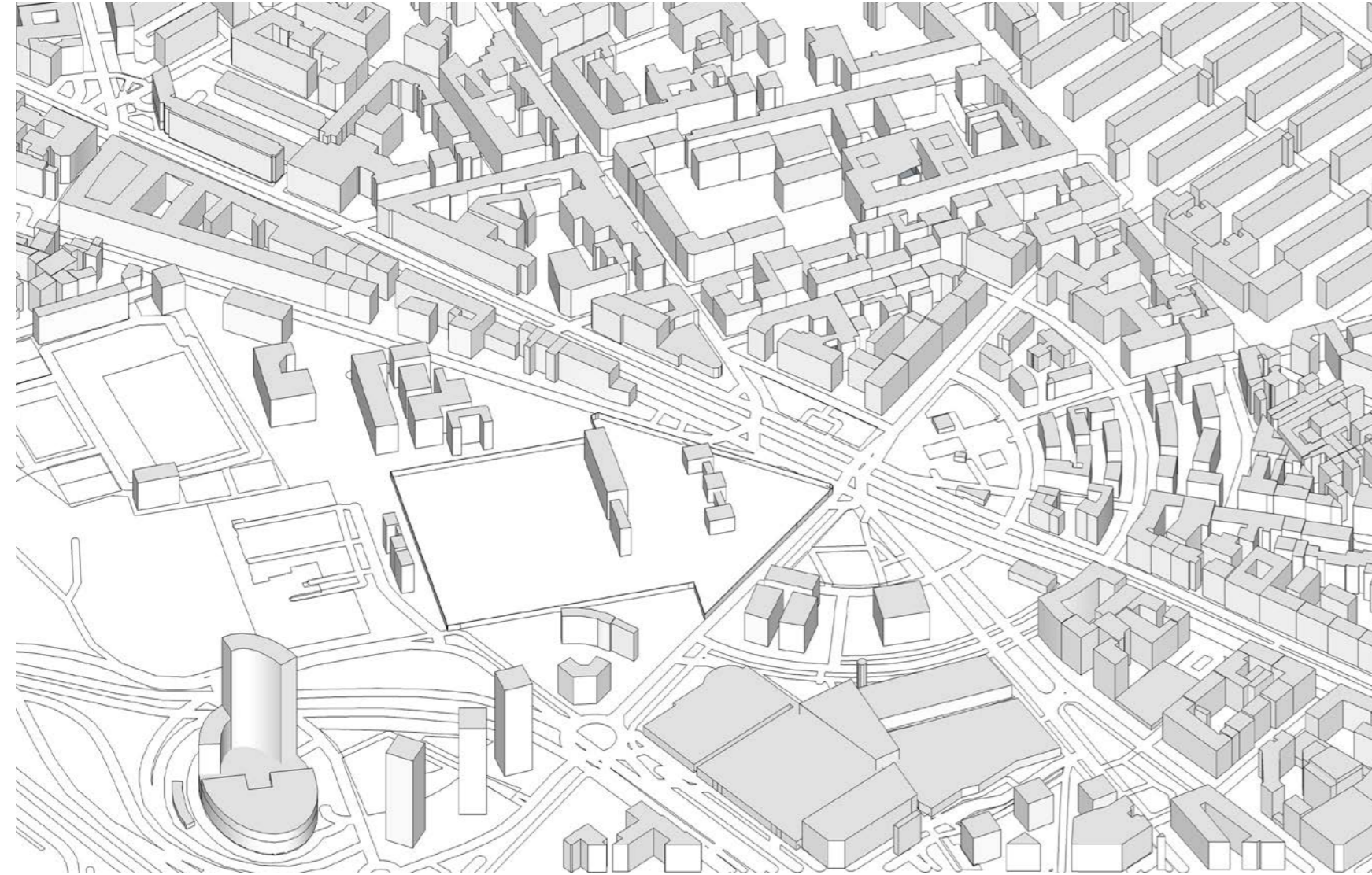


Green Network



Elements





3.5 PIAZZALE ACCURSIO - IDENTIFYING POTENTIAL

The series of existing buildings in Piazzale Accursio have the ability to form a convergent space that brings together scattered elements.

The former fuel station has recently undergone a redevelopment project and is now used as the headquarter for Garage Italia Customs Company.

The former Shooting Range is currently undergoing renovation to become the US Consulate of Milan.



Ex shooting line to be developed as future U.S.A. consulate



Former Fuel Station Recently refurbished to Store and Restaurant



Abandoned Office Complex



Piazzale Accursio

Piazzale Accursio



UNDERGROUND PARKING



BASKETBALL COURT ON NORTH OF PIAZZALE



GAS STATION



STUDIO



PARK ON SOUTH OF PIAZZALE



STUDIO

Buildings of Particular Character



IPER SHOPPING MALL



BUILDING CUT IN SECTION



WORLD JOIN CENTRE



GARAGE ITALIA BUILDING



UPCOMING US CONSULATE



92, VIALE CERTOSA RESIDENCES



28, VIALE ACHILLE PAPA RESIDENCES

Former Fuel Station



Address : Piazzale Francesco Accursio (In the inhabited center, isolated) - Milan (MI)

General typology : infrastructures and installations

Specific typology : service station

Structural configuration : Building with a mixtilinear polygonal-shaped plant with concrete pillar-bearing structure on plinth-based foundation, masonry and interior brick partitions, flat roof not practicable.

Construction period : 1951 - 1953

Authors : Bacciocchi, Mario , project

The building has a completely underground basement floor and two floors: a purely commercial one with the service station, the other on the first floor, with a group of offices and the manager's home, spaces never actually occupied. The terrazzo covering, waterproofed with asphalt, has never been practicable due to the absence of protection railings.

The supporting structure is in reinforced concrete, with masonry infill in brick with a double planking. Even the eaves are in reinforced concrete: the overhang of the shelter on the ground floor, already considerable at the sides (7 m) becomes by 14 meters in the head. The building has symmetrical fronts of almost 40 meters on Viale Certosa and Via Espinasse; on the first floor the shelter is replicated with 3 meter light at the sides and a maximum overhang of almost 9 meters towards the headboard. Facades and eaves are covered with vitrified stoneware tiles, also extended to the floors

Foot notes Ref: (<https://www.idealwork.it/progetti/garage-italia/>)

Former Shooting Range

The two beautiful Liberty buildings, dated 1906, constitute the polygon of the Cagnola , in the former Piazza Bersaglio, today Piazzale Accursio in Milan . The complex of the former National Sign Shoot , which fell into disrepair for decades, was put under protection in 1985 as a monumental asset, in 2013 it was sold by the Municipality of Milan to become the headquarters of the new US Consulate in Milan. The former shooting range dates back to the beginning of the last century. The entire complex is made up of shooting structures with wooden trusses and two joint " Liberty", Recognized in 1985 as historical monuments and included in the Protection of Monumental Heritage , with law 1089 of 1939, entrusting it to the Regional Superintendency for Public Works . Following this constraint and excessive maintenance costs, the area was left in a state of neglect and was " recovered " by the Carabinieri as a service and storage facility for the vehicles to be demolished.

Designed in 1906 by the major of the Genio Silvio Gariboldi , the polygon initially extended over an area of about 70,000 square meters. During the Second World War it was spared from the bombing and in the following years it hosted several international competitions. In the seventies it became the most crowded section of Italy with 25,000 members. Immediately afterwards a restructuring was decided to adapt the systems to the new requirements and to improve safety, the area of the polygon was scaled away from Piazzale Accursio. In 1972 a part of about 80 thousand square meters was " declassified " and sold to the Public Property Office while the new site was built in the next area, which has been in operation since 1978, and is still today one of the best in Europe.

Foot notes : Ref:(Mauro Vezzoli, <https://www.flickr.com/photos/95893200@N07/albums/72157650377150836>)



4 . INTERVENTION

Adding Value

CREATE SPACE - URBAN VALUE 4.1



Existing



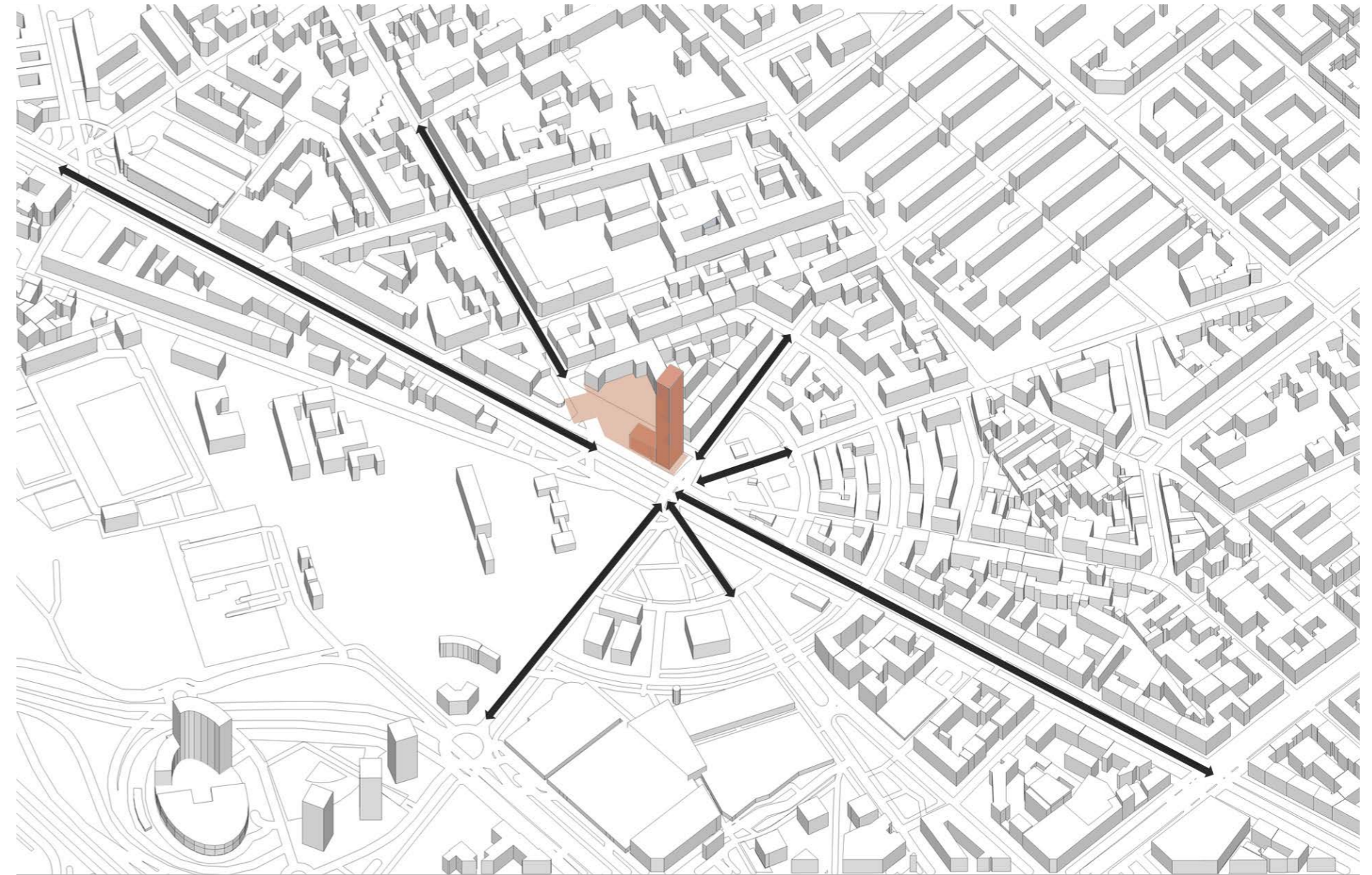
Creating Space



Completing Square



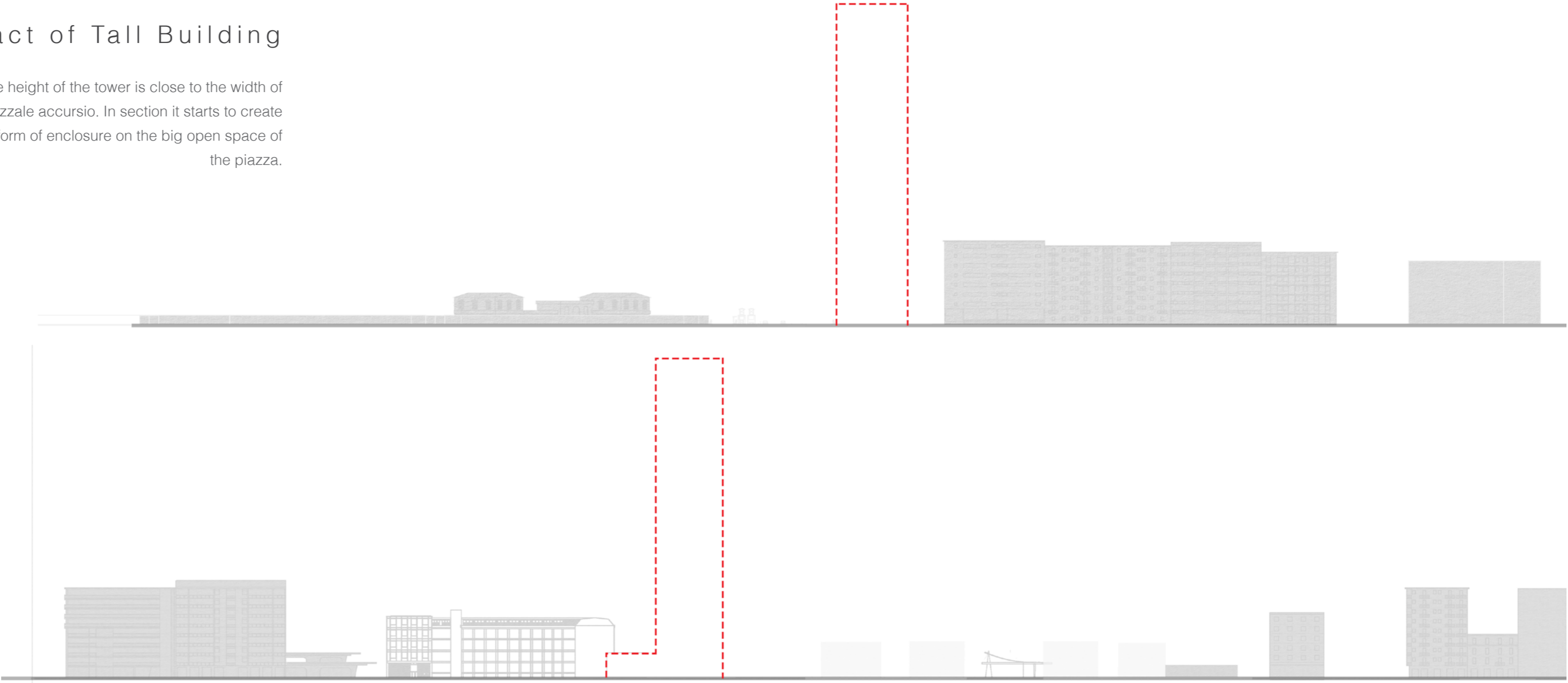
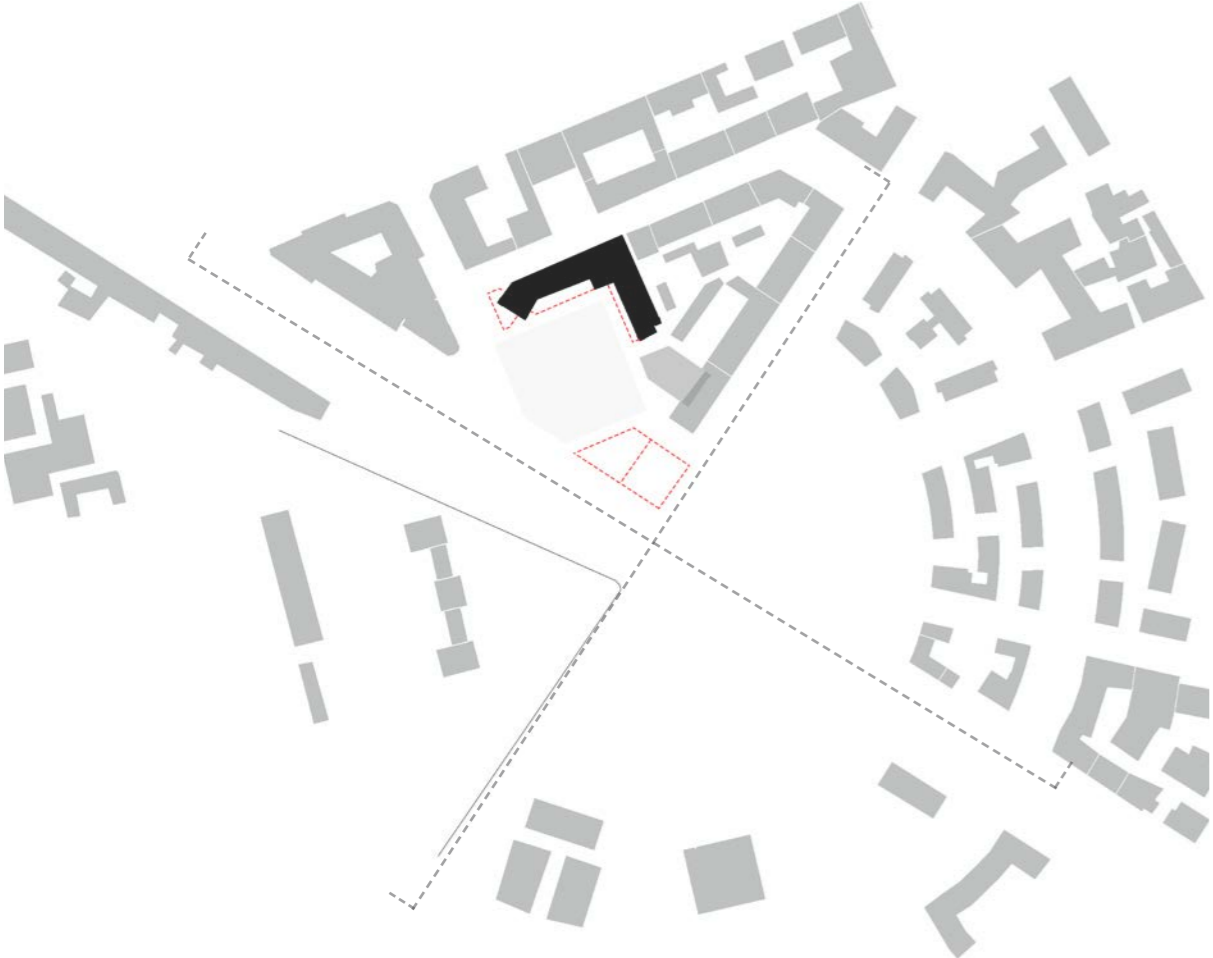
Creating Interaction



Creating Identity

Urban Impact of Tall Building

The height of the tower is close to the width of piazzale accursio. In section it starts to create a form of enclosure on the big open space of the piazza.



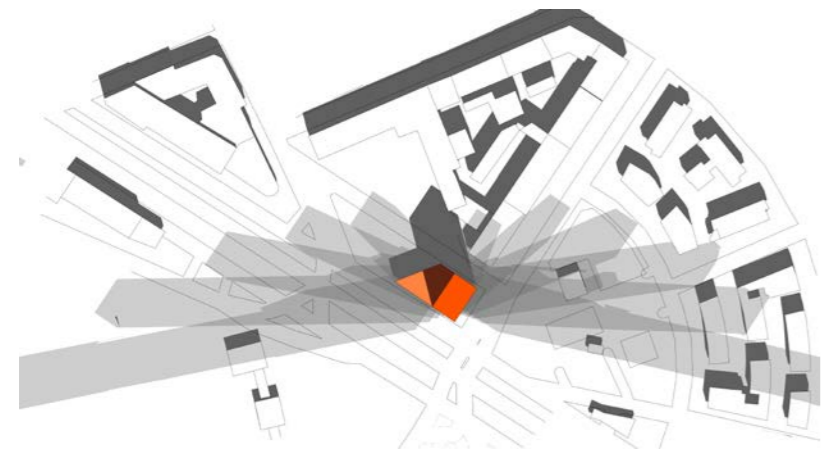
Shadow of Tower

In the Summers, the shadow does not impact many buildings around as the sun is more overhead.

In the winters however, the shadows is cast over other buildings. Since the tower is slender, there is no part of the surroundings that are in shade for the majority of the day.

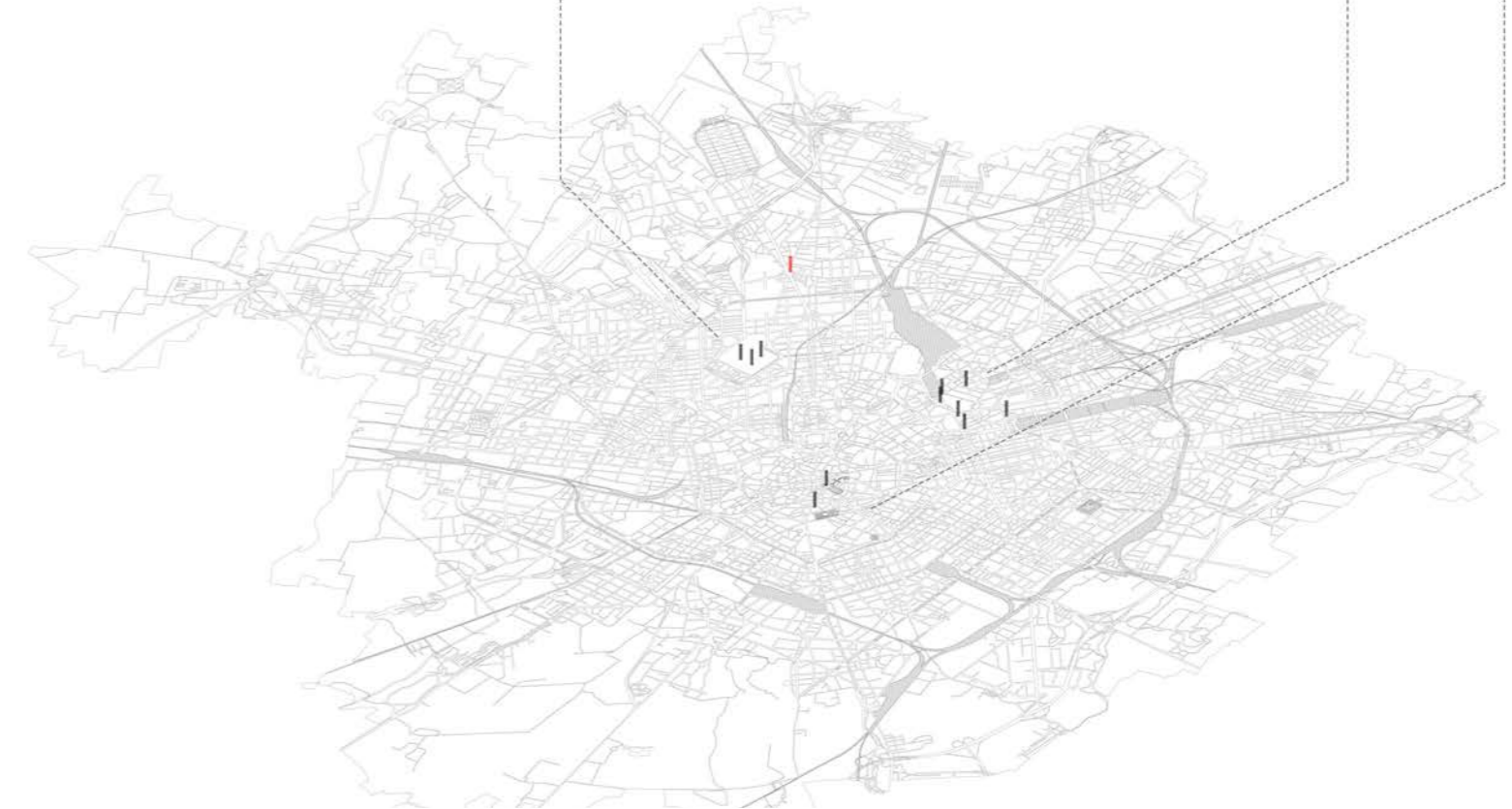
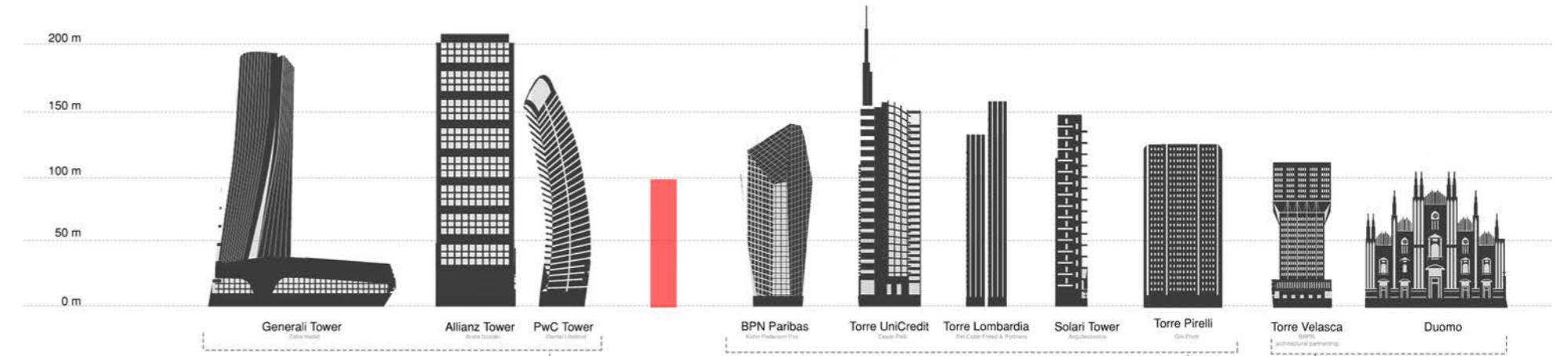


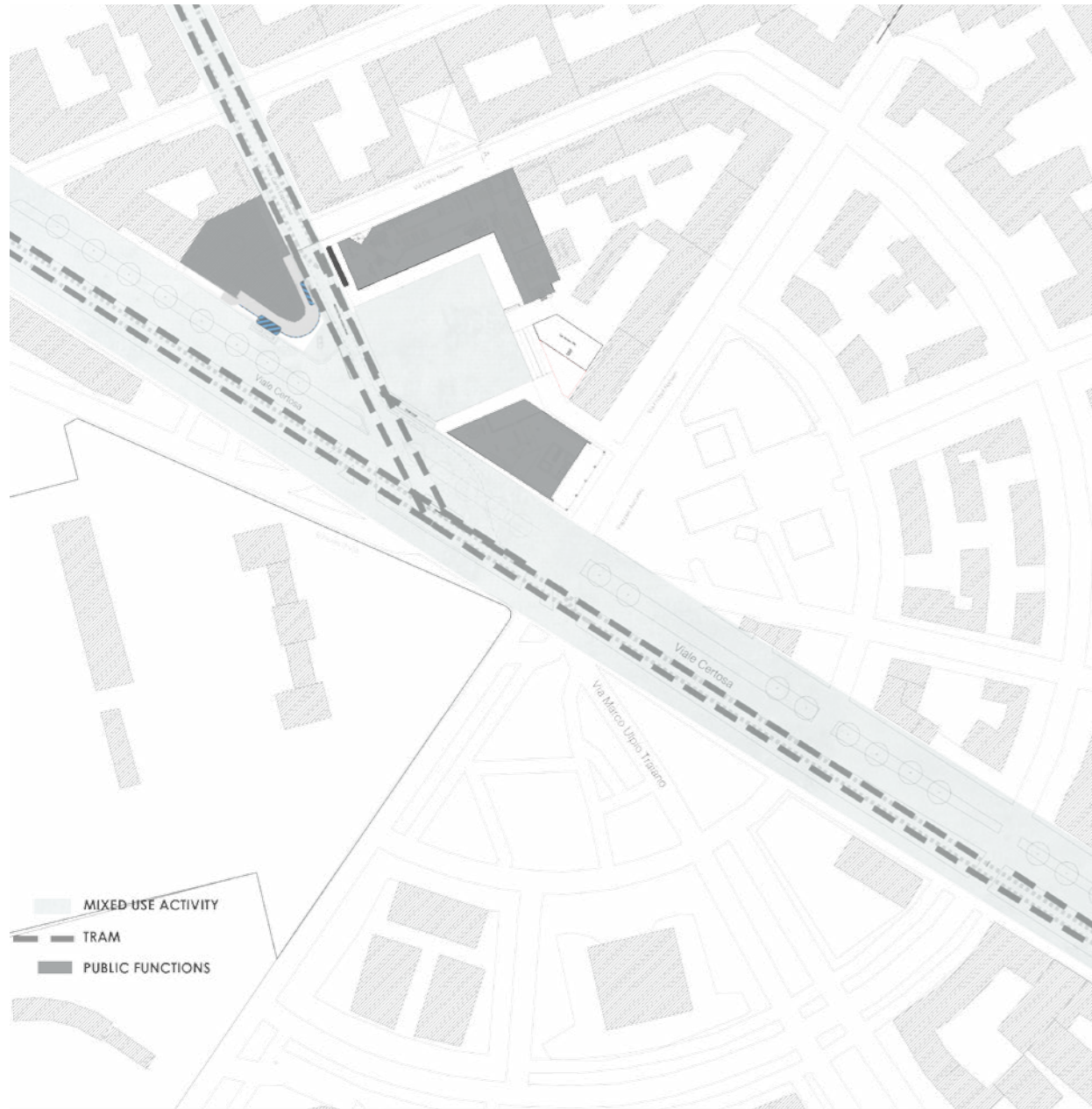
Shadow Pattern in January



Shadow Pattern in July

Comparative Study of Tall Buildings in Milan





Continuity of Public Realm

The Viale Certosa has developed as mixed use fabric as a result of the tram line passing by.

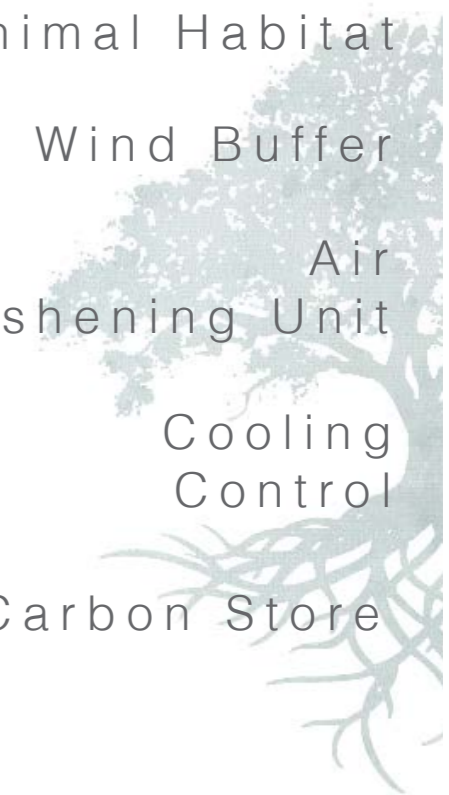
The space formed by the proposed and existing blocks engulf the public activity and provide additional public function.

4.2 ANIMAL AND PLANT HABITAT - ECOLOGICAL VALUE

Planting trees in the city can synergistic benefits.

Choosing the correct species can benefit the surroundings as well as the soil. In this project we choose tree species that are native and fruit bearing. The rain gardens consist of water purifying plants that are found in the north Italian region. The Roofs in the building will be planted with species that attract animals to promote ecological biodiversity.

Animal Habitat
 Wind Buffer
 Air Freshening Unit
 Cooling Control
 Carbon Store





BELIS PERENNIS



TRIFOLIUM PRATENSE



VERONICA PERSICA



LAMIUM PURPUREUM



PLANTAGO LANCEOLATO



BROMUS HORDEACEUS



POA PROTESIS



STELLARIA MEDIA



CAPSELLA BURSA-PASTORIS



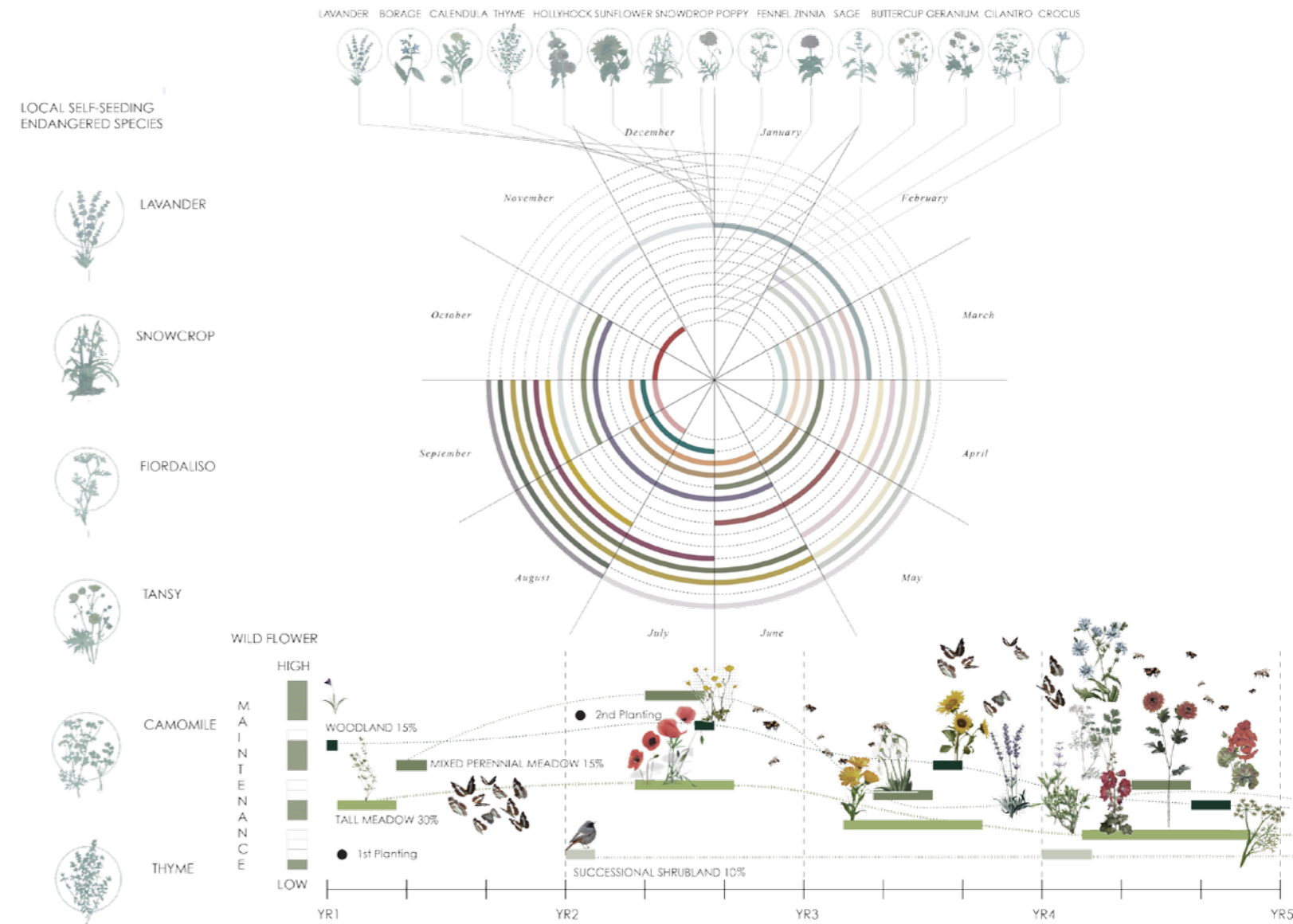
TARAXACUM OFFICINALE



GERANIUM MOLLUGO

Promoting Ecological biodiversity

Plants to Support Animal Habitat



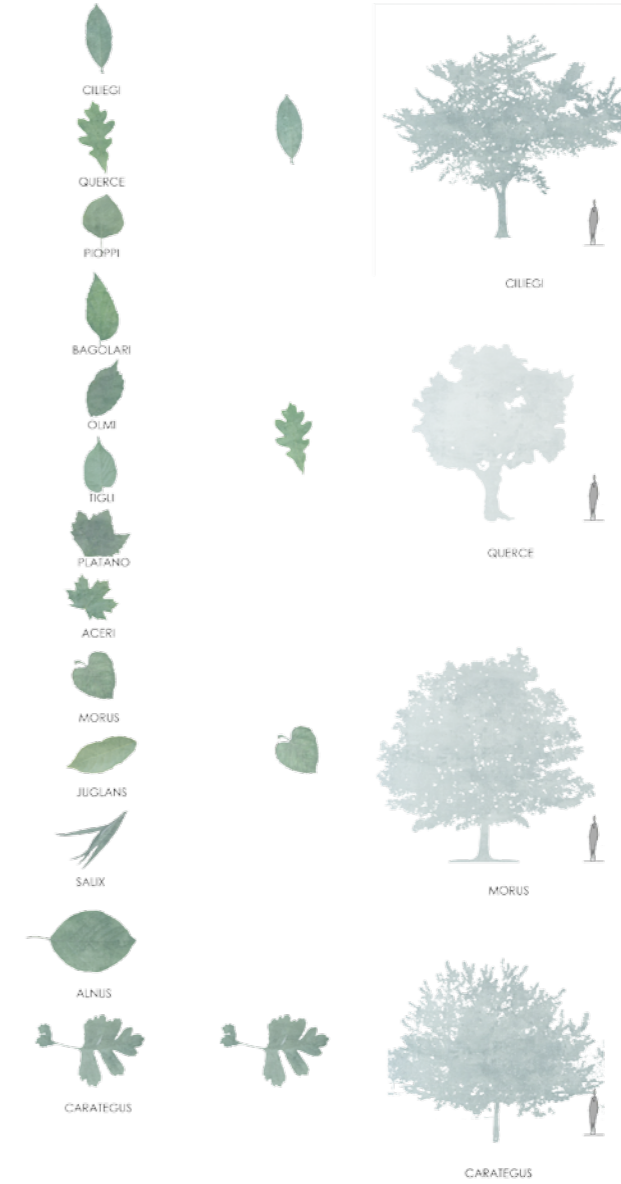
Rain Gardens

Strips of vegetated areas that redirect and filter storm water. A typical rain garden is a long, linear strip of vegetation in an urban setting used to collect runoff water from large impermeable surfaces such as roads and parking lots .



Most Suitable Tree Species

Invasive	Native		Plant Species
		Big Trees	Quercia Rossa
			Platano
			Noce del Caucaso
			Cipresso Calvo
	x	Majority	Pioppi
	x		Querce
	x		Olmi
	x		Bagolari
	x		Ciliegi
	x		Tigli
	x		Aceri
		Other Tre	Carpinus
x			Robinia
x			Liquidambar
			Aesculus
			Sophora
			Cercis
x			Lirodendron
			Cedrus
	x		Morus
x			Pyrus
			Ailanthus
			Pinus
			Ginkgo
			Hibiscus
	x		Juglans
			Magnolia
	x		Salix
			Malus
x			Gleditsia
	x		Alnus
x			Paulownia
			Fagus
			Betula
			Picea
	x		Caragmus
x			Catalpa
			Lagerstroemia



WOOD AS BUILDING MATERIAL - CARBON STORING VALUE

4.3

Wood is the only renewable building material. Cross Laminated Timber or CLT is fire resistant by nature. It provides resistance by 'charring'. As the wood layer burns and loses strength, it becomes char. This char acts as an insulating layer to the unburnt panel.

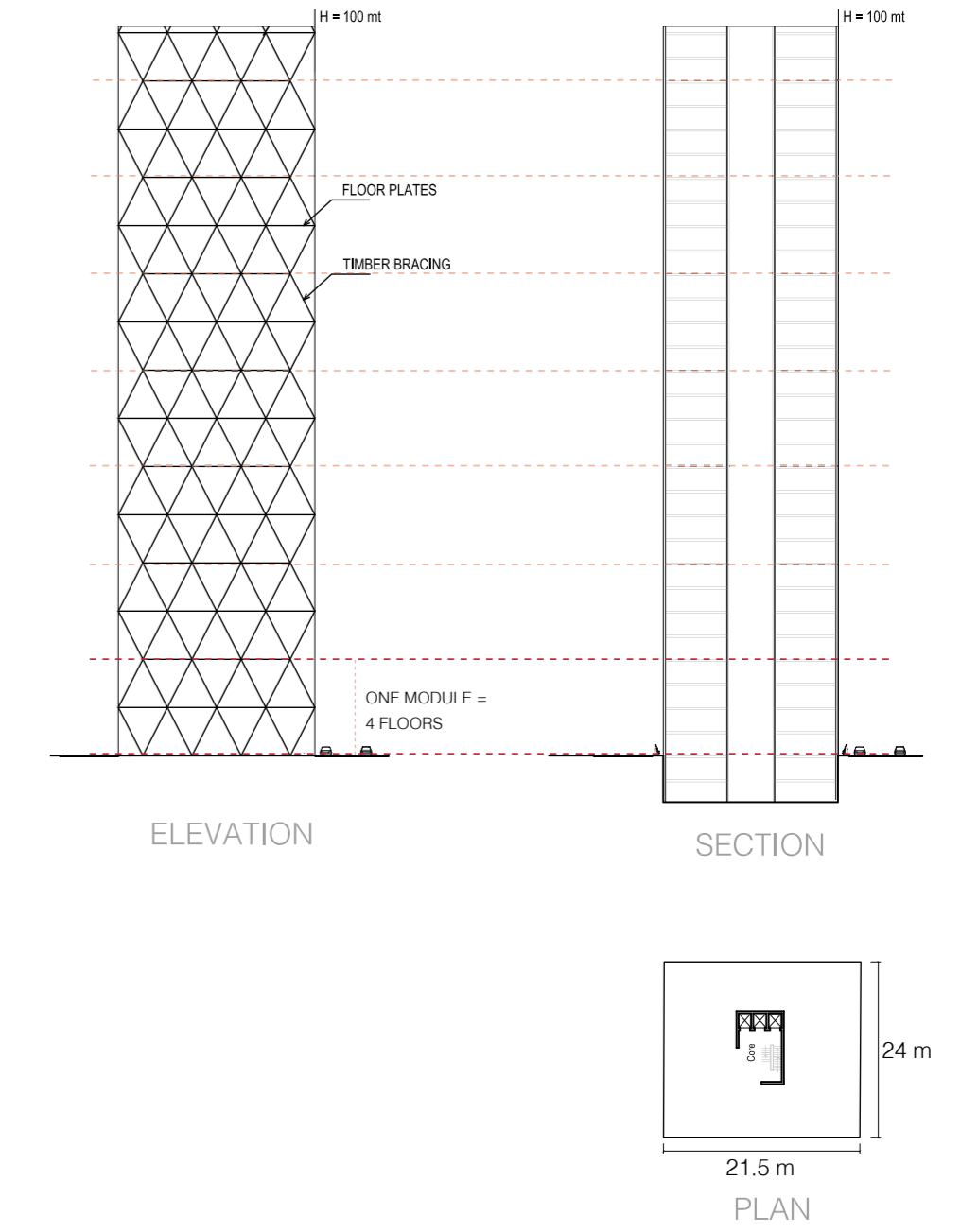
As a rule of thumb, each cubic meter of wood has 1 tonne of carbon stored in it.

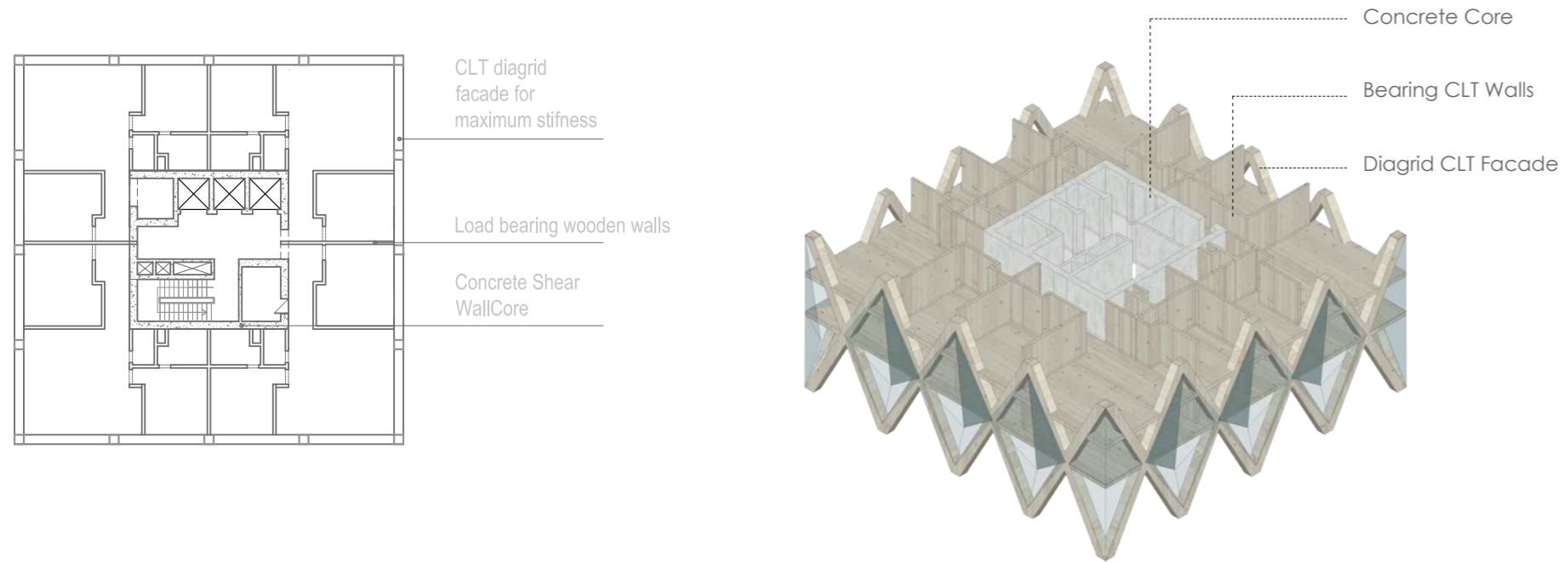
At the end of its life cycle, wood can be used to generate energy or it can degrade without causing pollution.

Going Tall with Timber

The word "diagrid" is a blending of the words "diagonal" and "grid" and refers to a structural system that is of single thickness in nature and gains its structural integrity through triangulation. Diagrid structural systems have enabled significant transformation in the design of tall buildings. (Terri Meyer Boake, 2018)

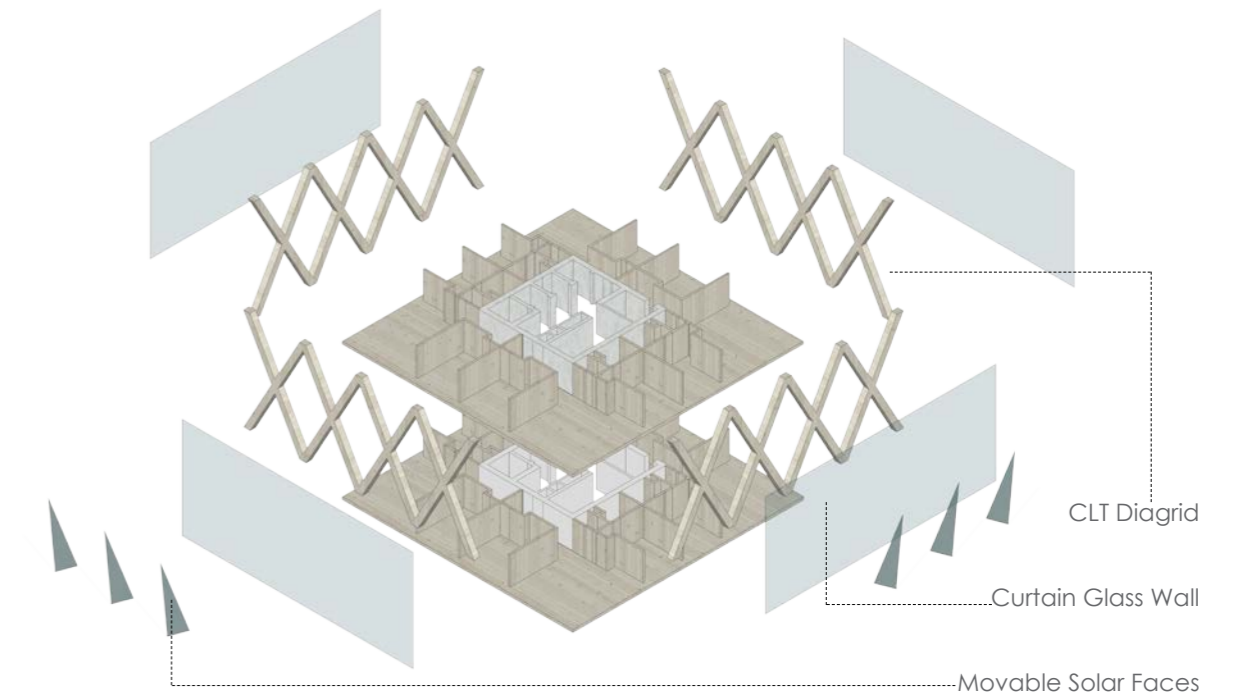
Wood has a tendency to bend. As the tower is quite slender, we use a central concrete core to strengthen the building against lateral forces.





Exploded View

The hybrid structure of concrete and wood provides resistance against lateral forces and the rest of the structure is made of wood, which is considerably light weight.



ADDING MORE FUNCTIONS- FUNCTIONAL VALUE

4.4

Giving to the place the functions that capture the surround activities and resonate them to create unique spaces that can have varied users.

Existing Area					
Functions	Area (\$qm)	Block	Function	Area (\$qm)	Floors
Office	9650	Blocks A	Office	1200	6
Bank	630	Blocks B	Office		
Parking	1700		Bank		
Total	11980				

Proposed Area					
Functions	Area (\$qm)	Block	Function	Area (\$qm)	Floors
Office	9000	Tall Block	Office	560	16
Residential	6600		Residential	560	10
Bank	200		Public	1000	3
Gym	330				
Food Court	215				
Book Shop	130				
Parking	6200				
Total	22675				

4.5

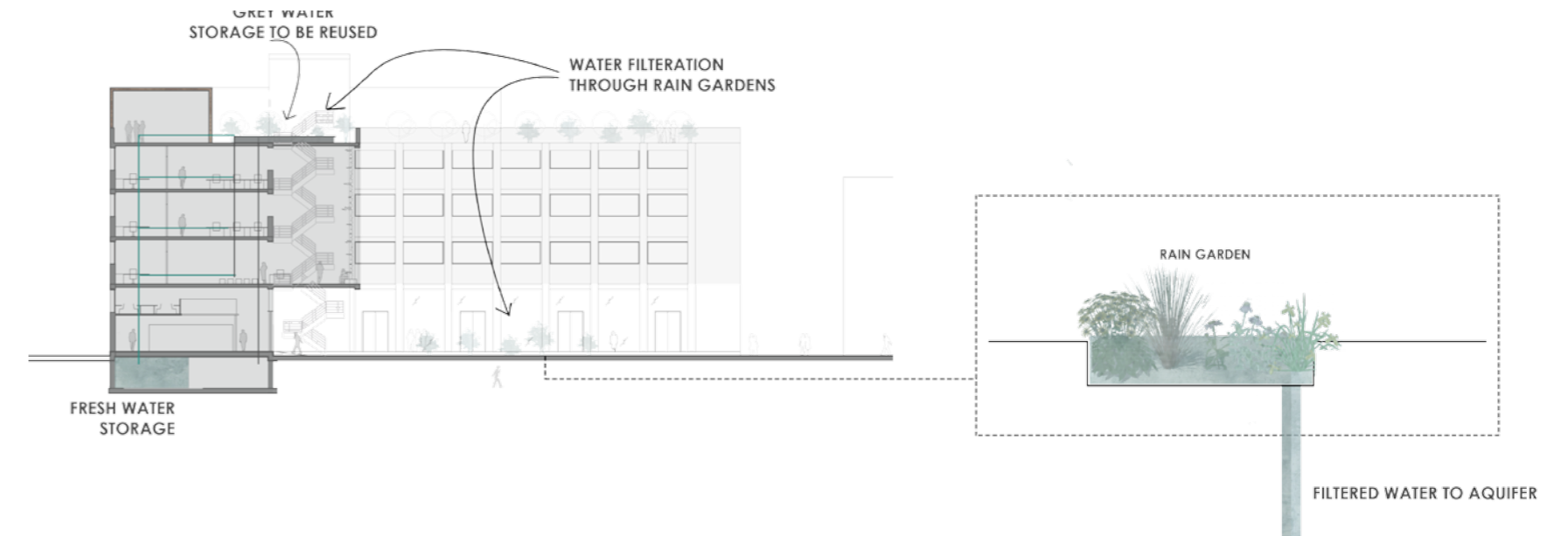
WATER PURIFICATION - ENVIRONMENTAL VALUE

Grey Water And Storm Water System

The project reconnects the hydrological cycle by infiltrating clean water back into the ground.

Water from sinks and showers is stored in a greywater tank and cleaned in a constructed rain-gardens.

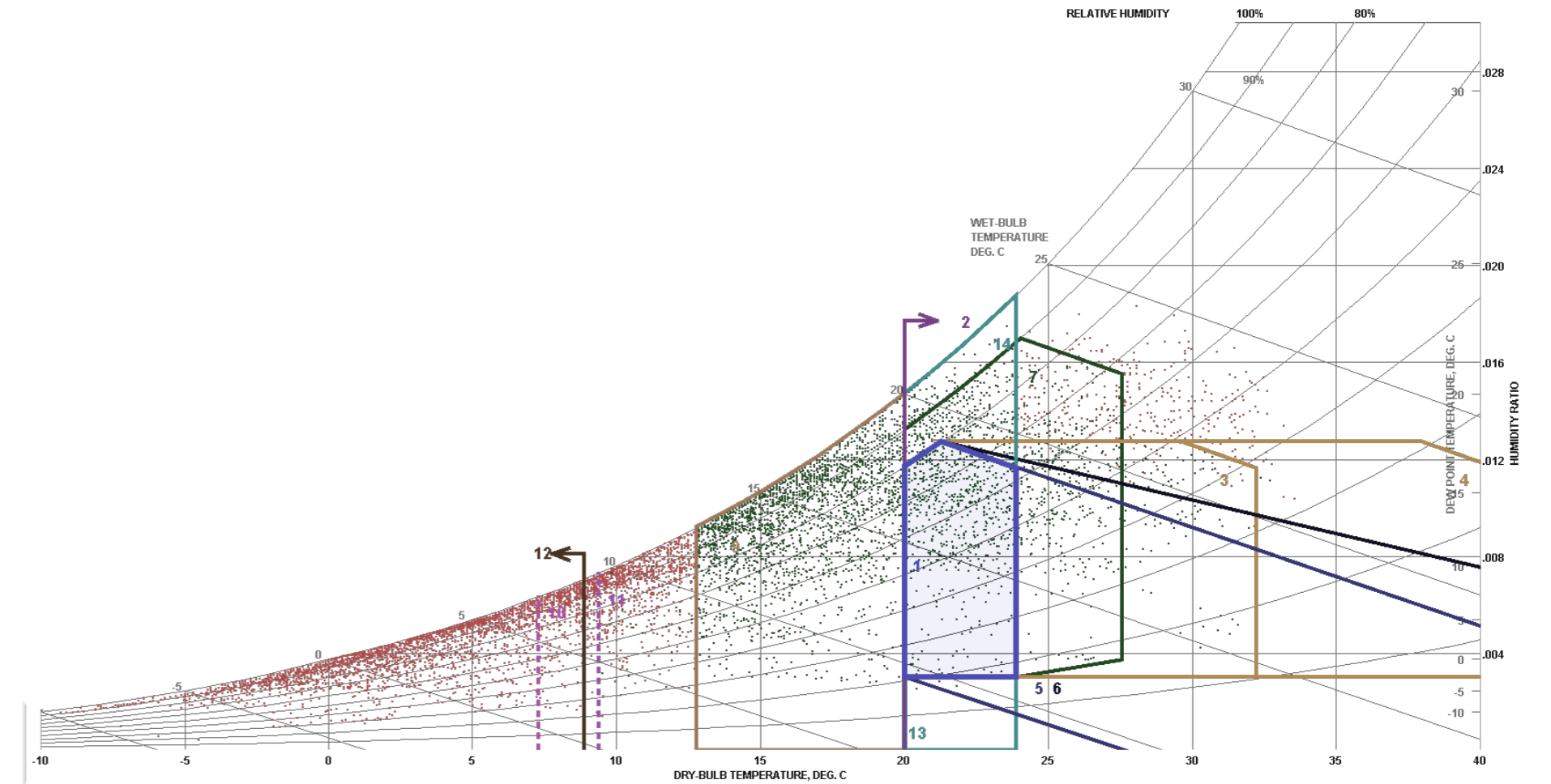
Clean grey water is infiltrated back into the soil to recharge the local aquifer.

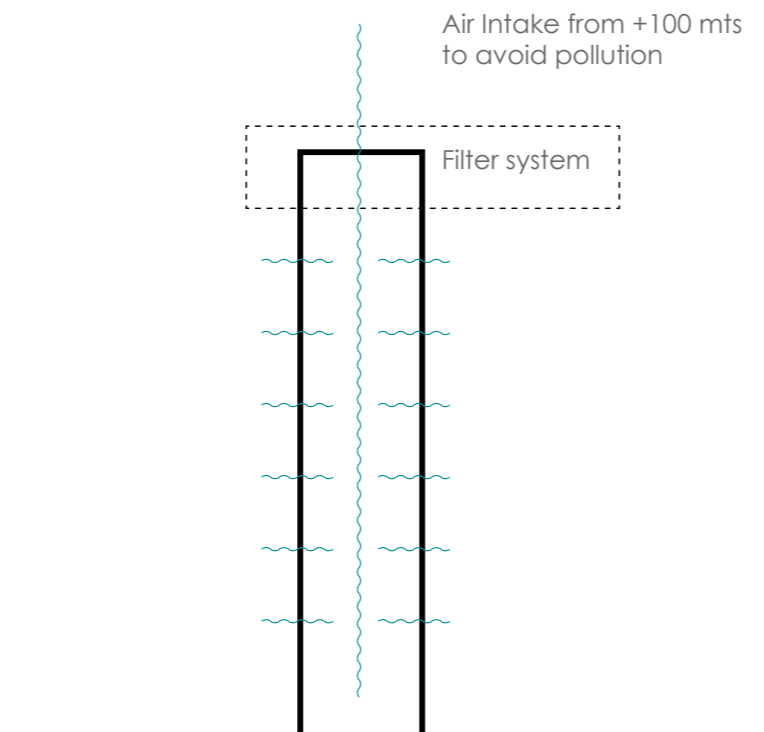
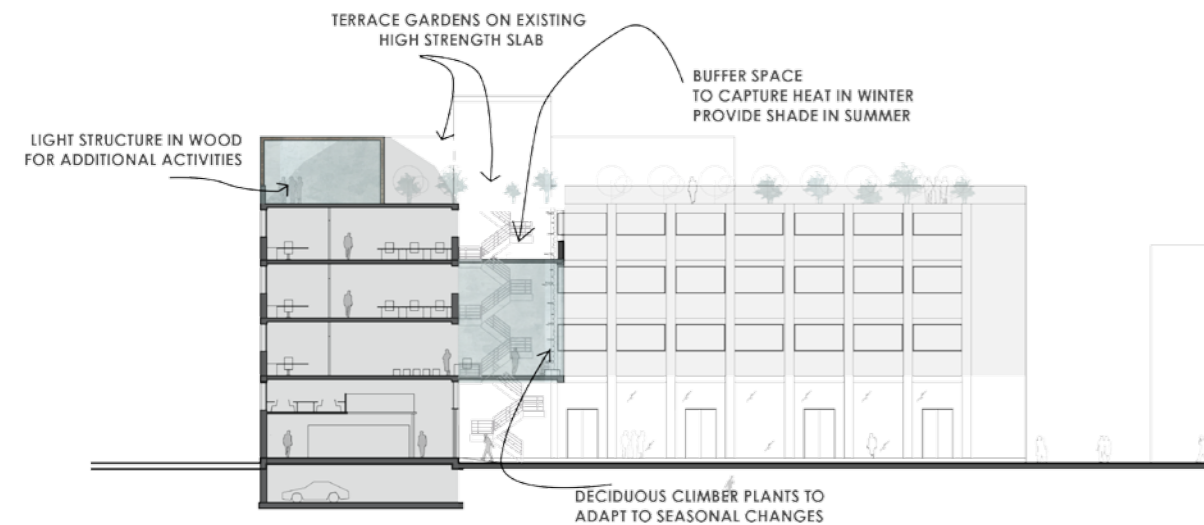


Channing from a reductionist paradigm to a recovery paradigm.

Over the past years, regenerative positive development paradigm has been garnering increasing influence on the evolution of architecture. The progress is dramatic: plus energyplus, earth buildings, healthy buildings, positive impact buildings. This new way of thinking entails the integration of natural and human living systems to create and sustain greater health for both accompanied technological progress.

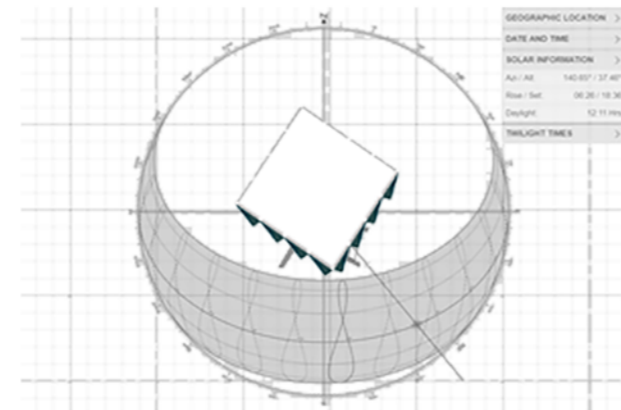
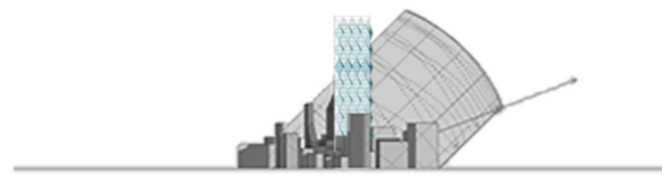
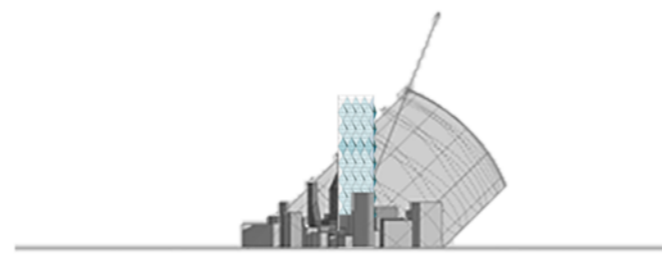
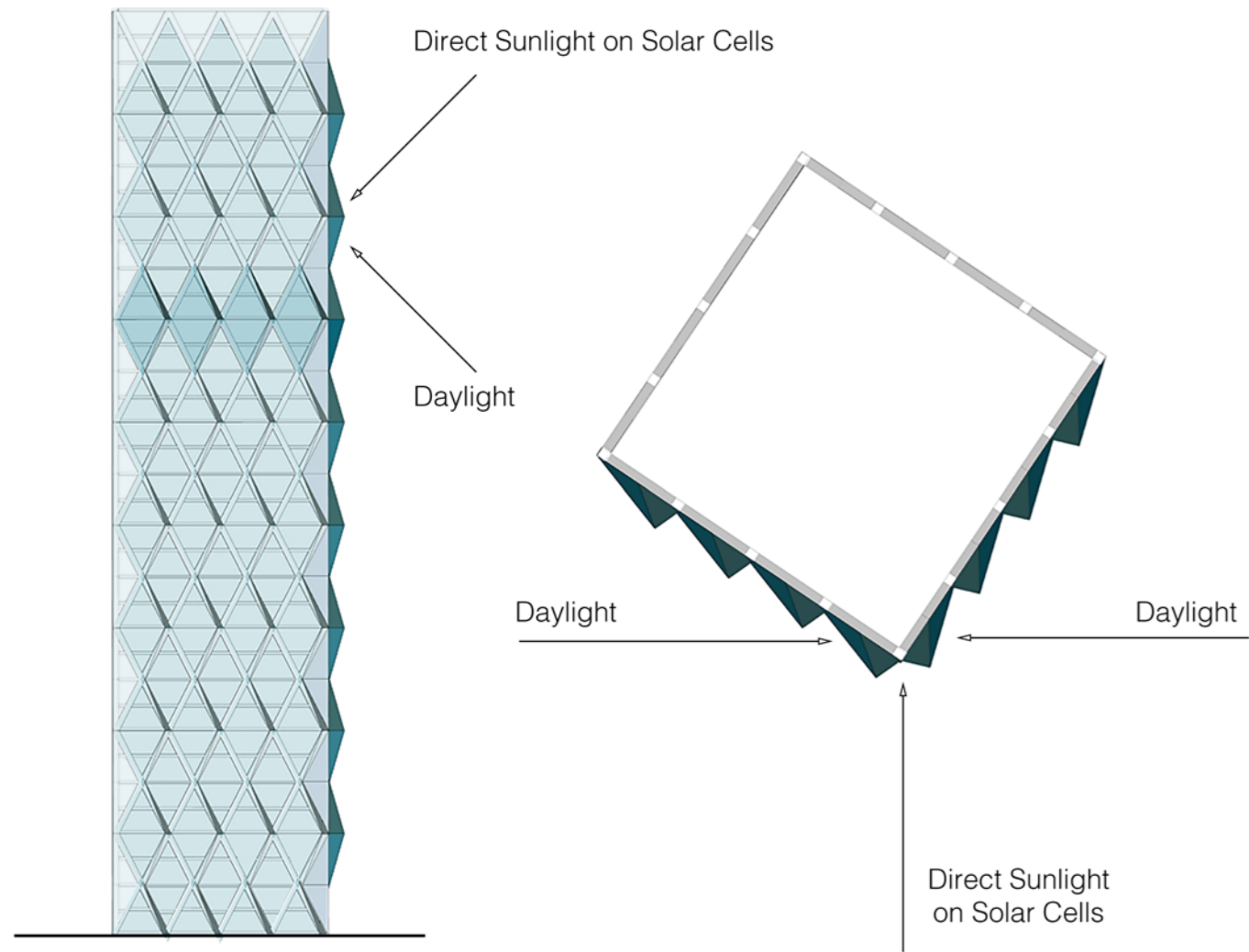
Psychrometric chart





Passive Strategies

Agenda	Action	Temperature range when req	Months Required
1. Maximize solar heat gain	South for maximum passive solar gain	less than 20	Except jun, july, August
2. Reduce thermal loss	Provide double pane high performance glazing (Low-E) on west, south and east but clear on High thermal insulation captures heat from lights, occupants and equipment Stores, winter solar heat and summer night cold		All
3. Solar shading in the summer months	Retractable overhangs in the summer months	20 +	jun, july, August
4. Natural ventilation cooling	Design wind current for maximum cooling and wellbeing	20- 27.5 C	jun, july, August
5. Evaporative cooling	Evaporative cooling internally	20 +	jun, july, August
6. Dehumidification		20 +	



Active Strategies

Comfort to be achieved by Active/ Other Strategies - 55.4 %

Agenda	Action
1. Heating and Humidification	Solar panels Dynamic flooring Biogas
2. Cooling and De humidification	Alternative heating cooling system - heat store as in pulse building
3. Ventilation by Fan	

5 . PROJECT

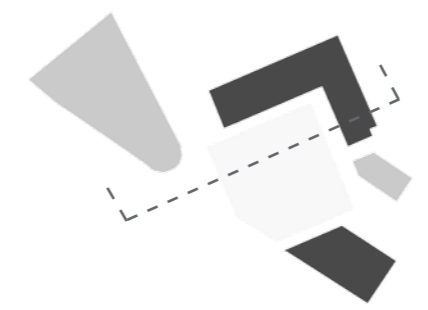
Drawings and Visualizations



Ground Floor Plan
Scale 1:500

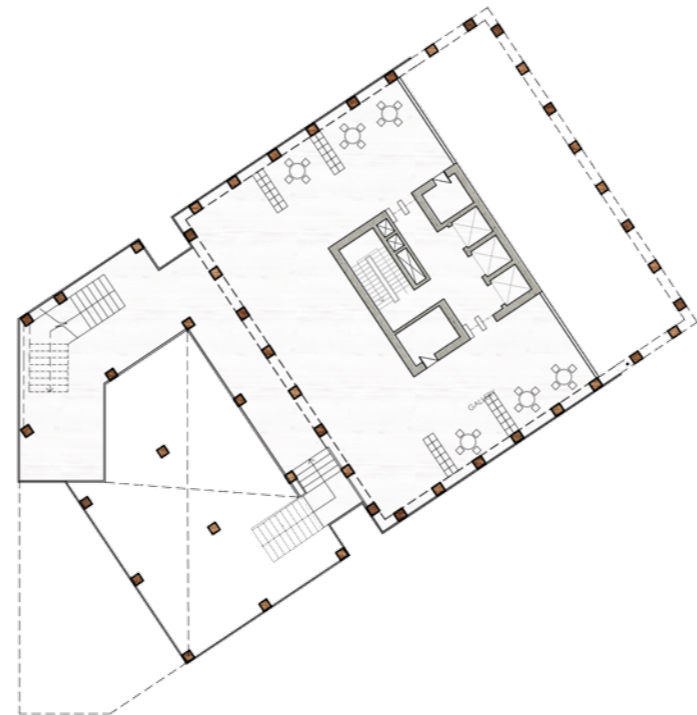


Section

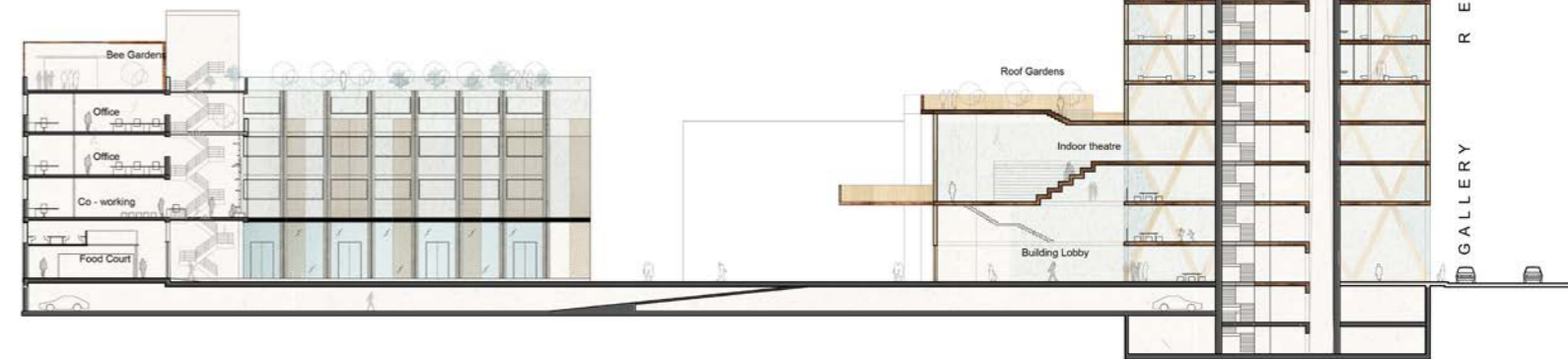
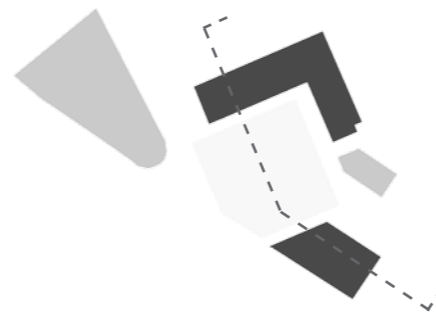




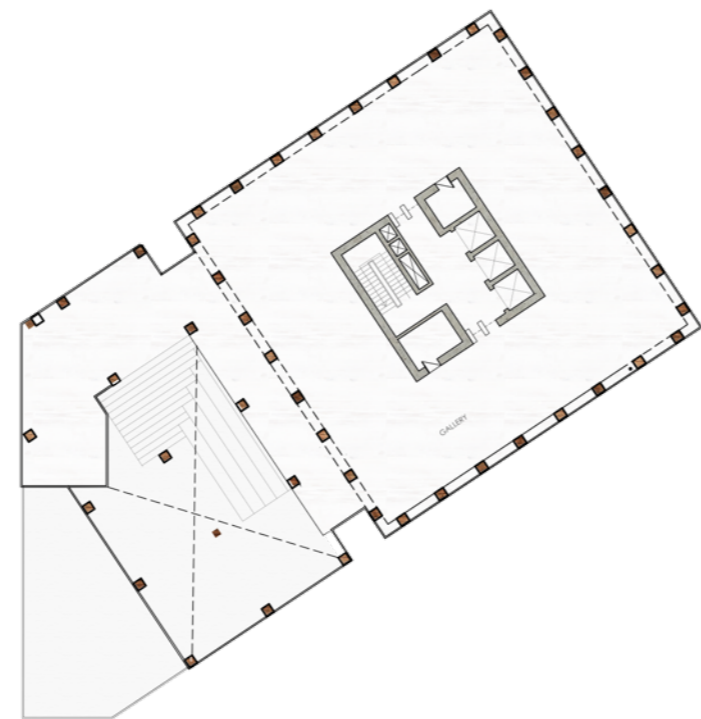
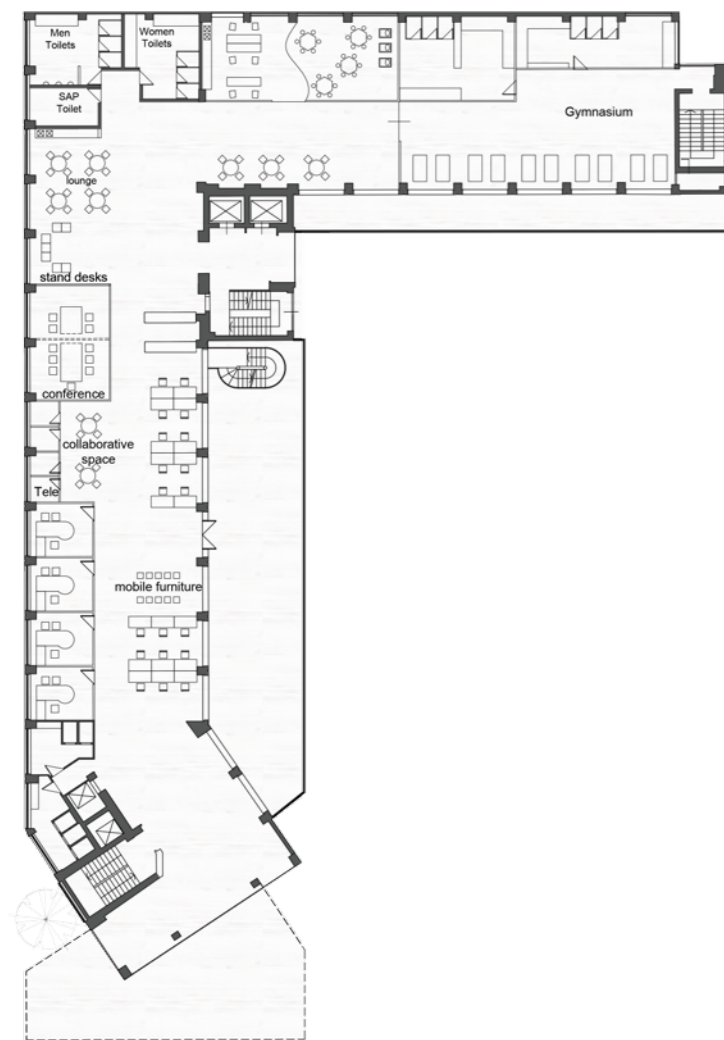
First Floor Plan



Section

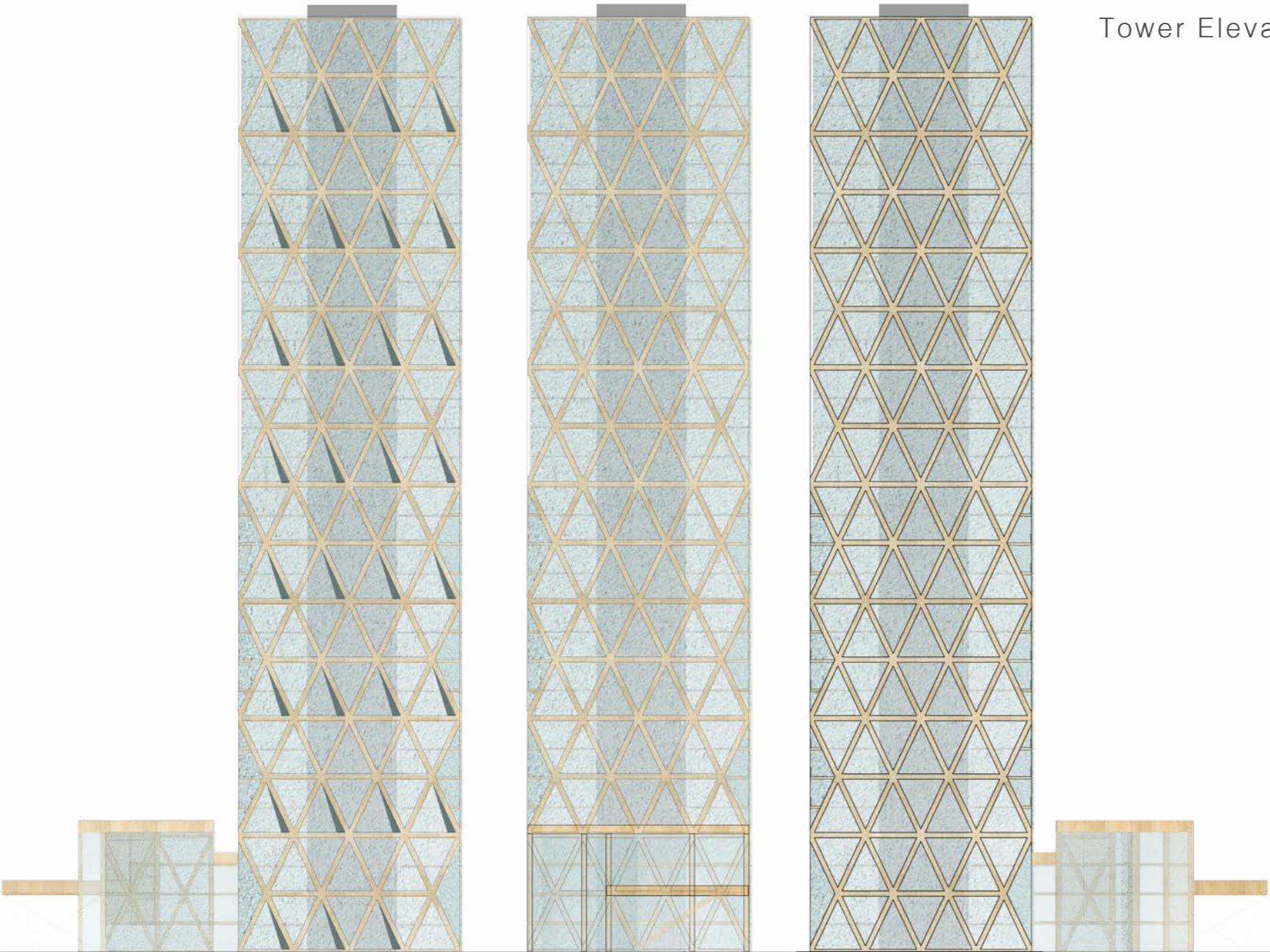


Third Floor Plan



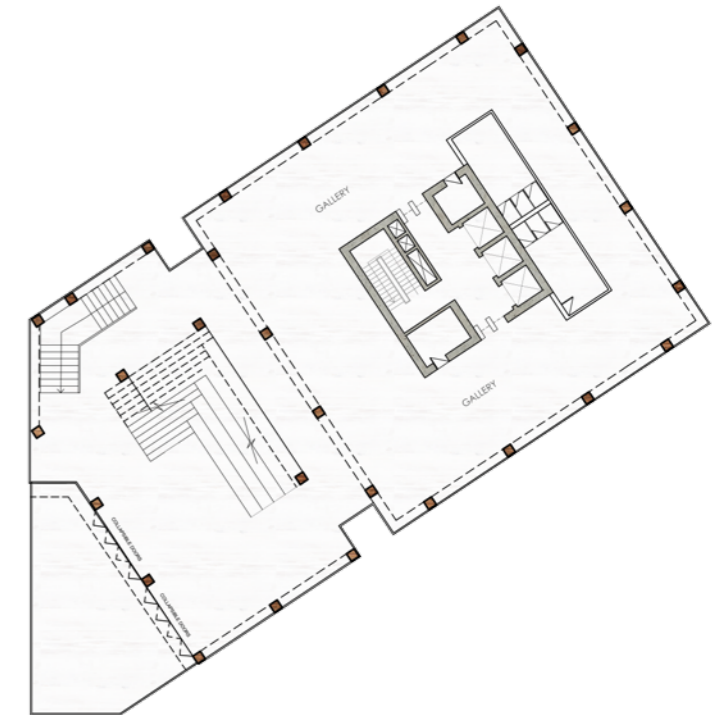
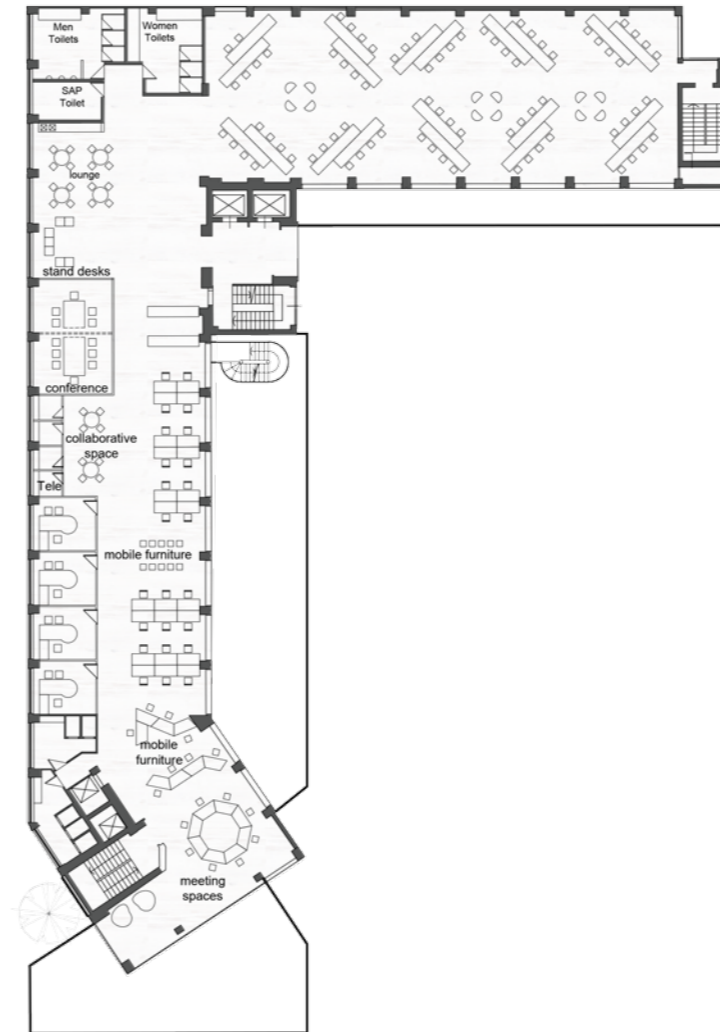
Visualization of Indoor Theatre



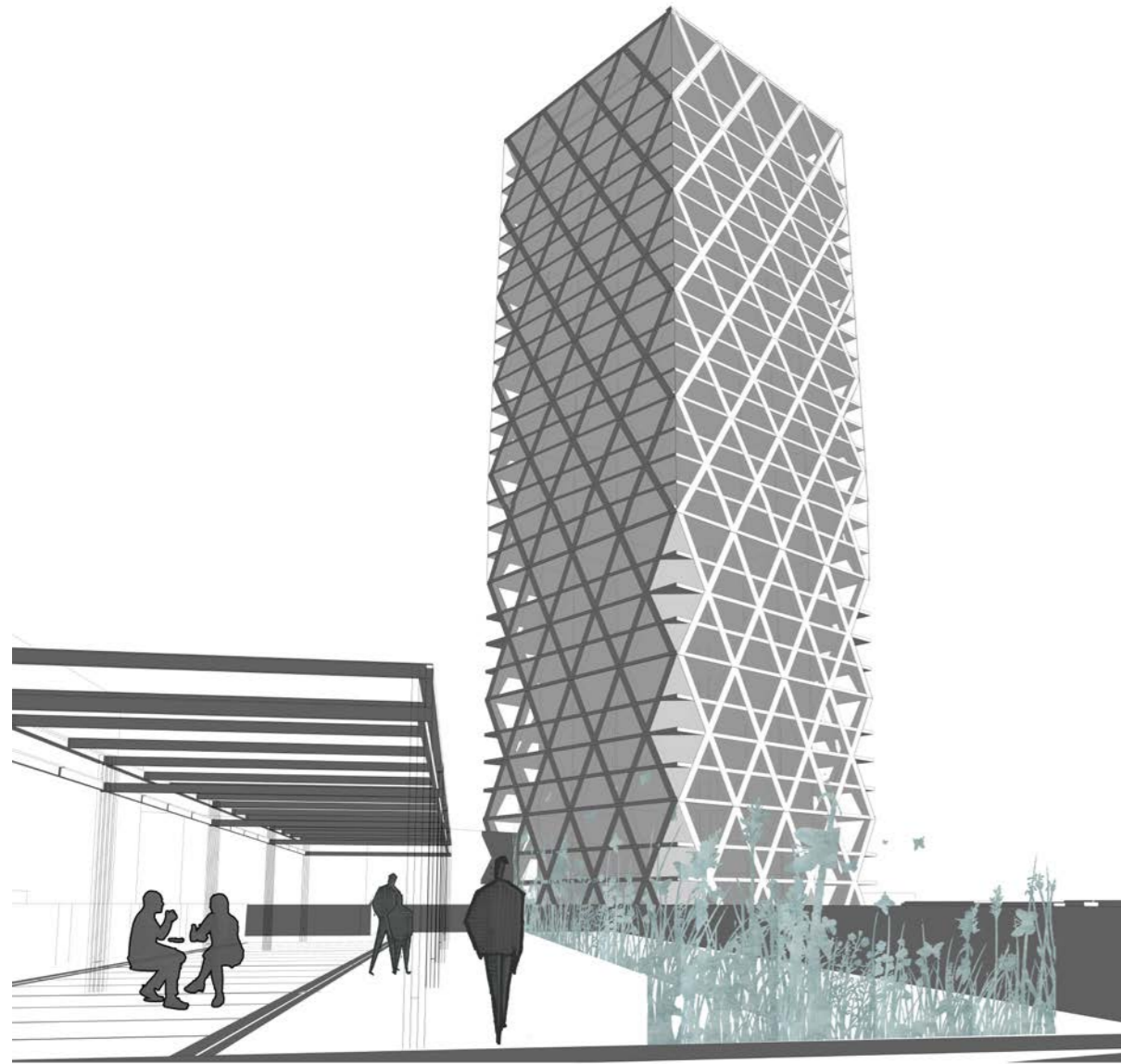


Tower Elevations

Fourth Floor Plan

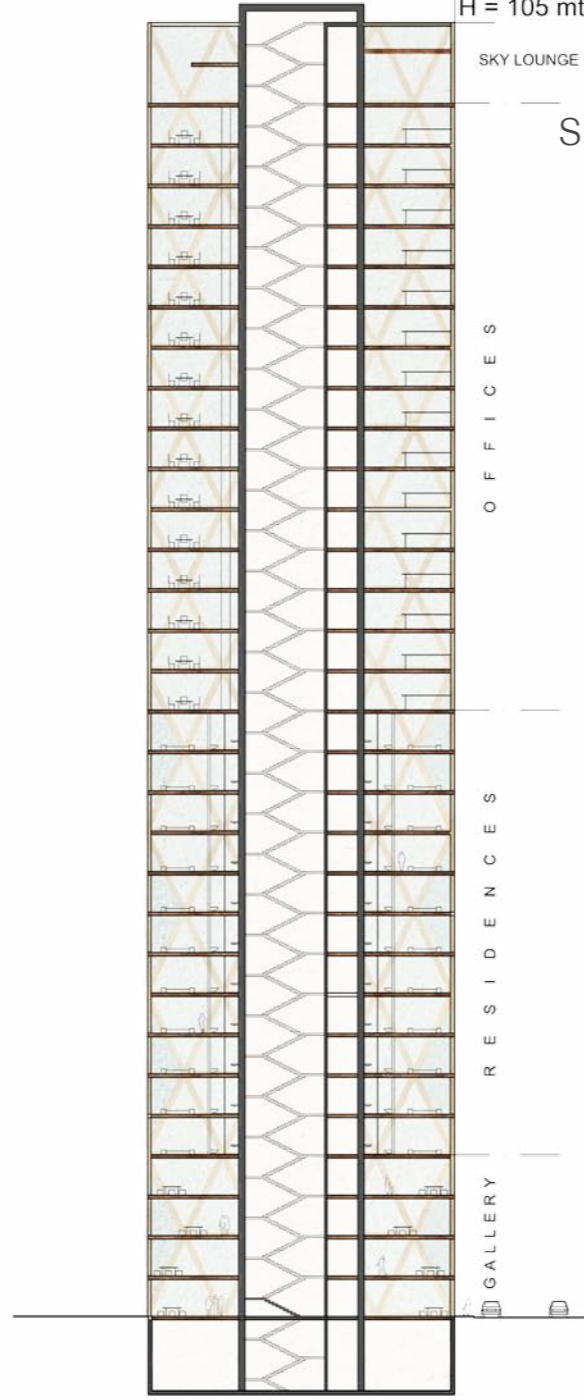


Visualization from Terrace



Terrace Floor Plan





H = 105 mts

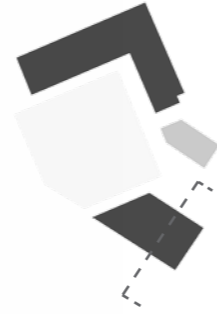
SKY LOUNGE

Section and Elevation

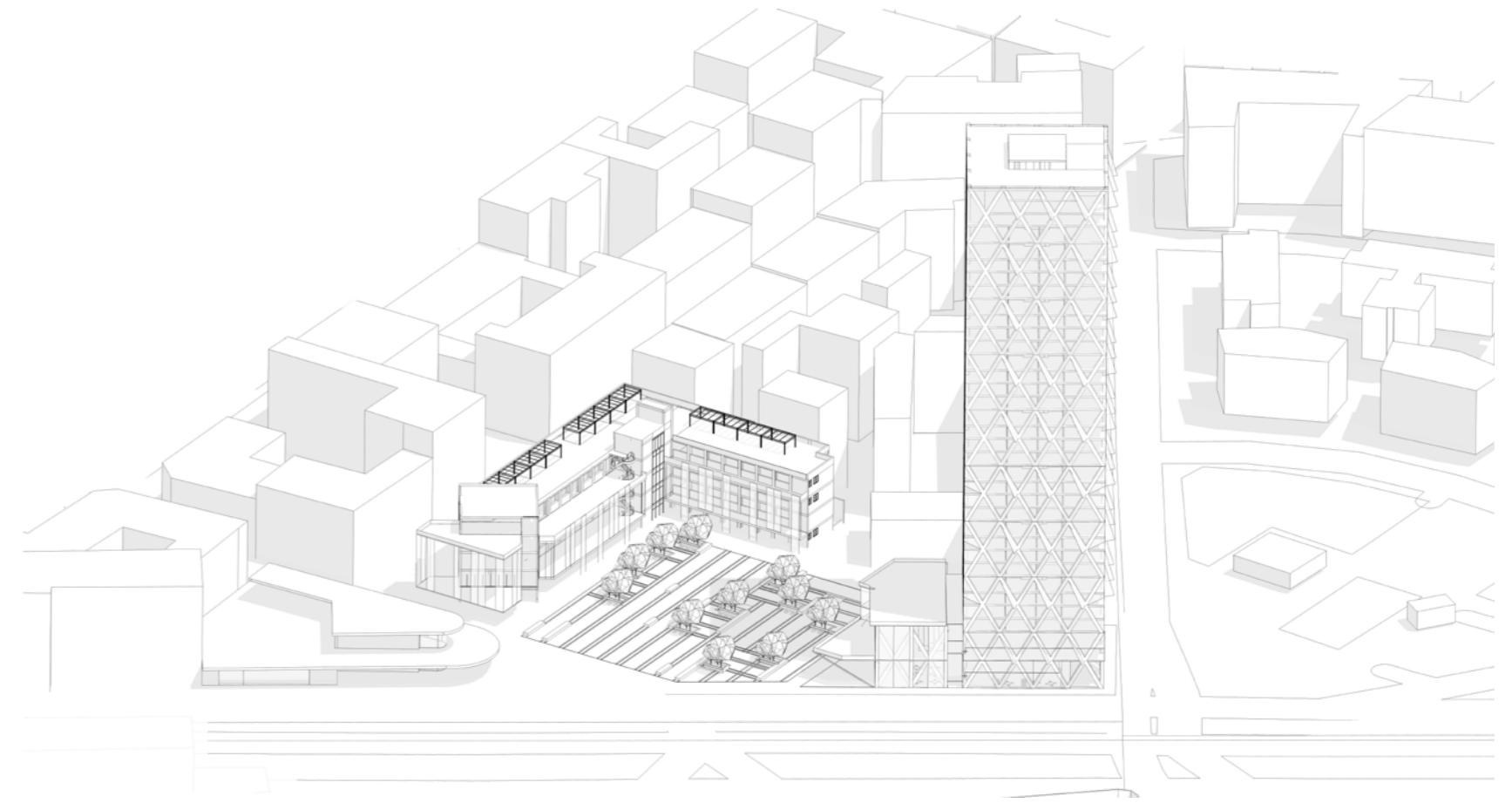
O F F I C E S

R E S I D E N C E S

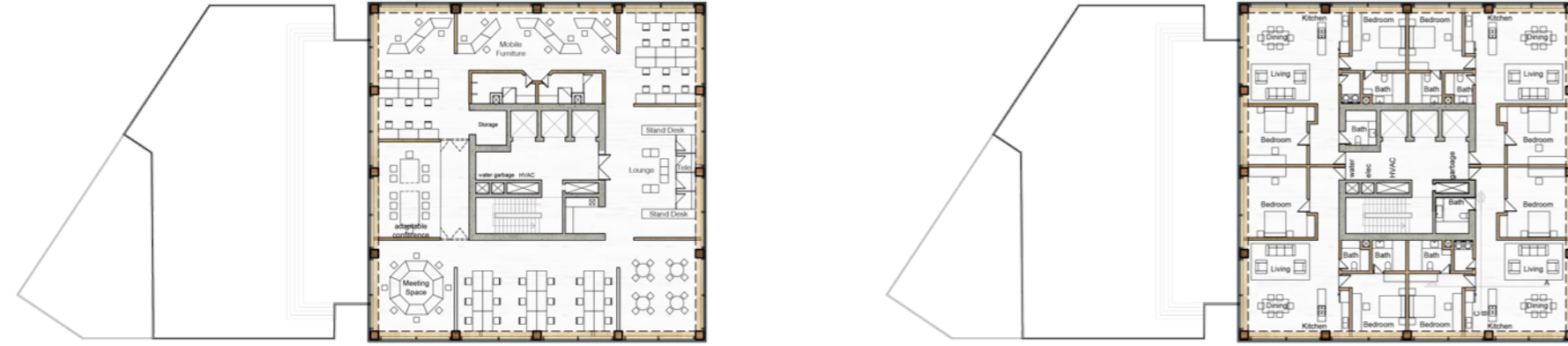
G A L L E R Y



Axonometric Visualization



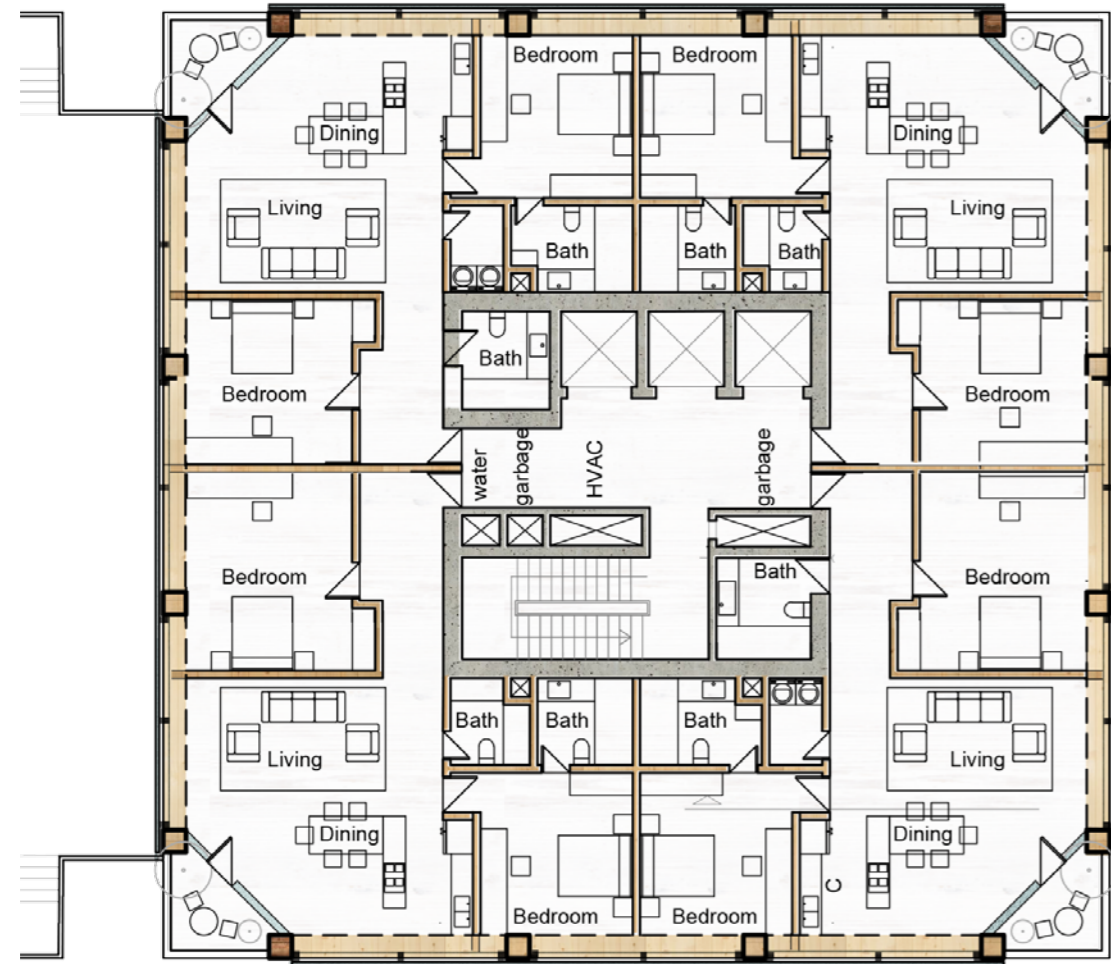
Typical Floor of Office and Residences



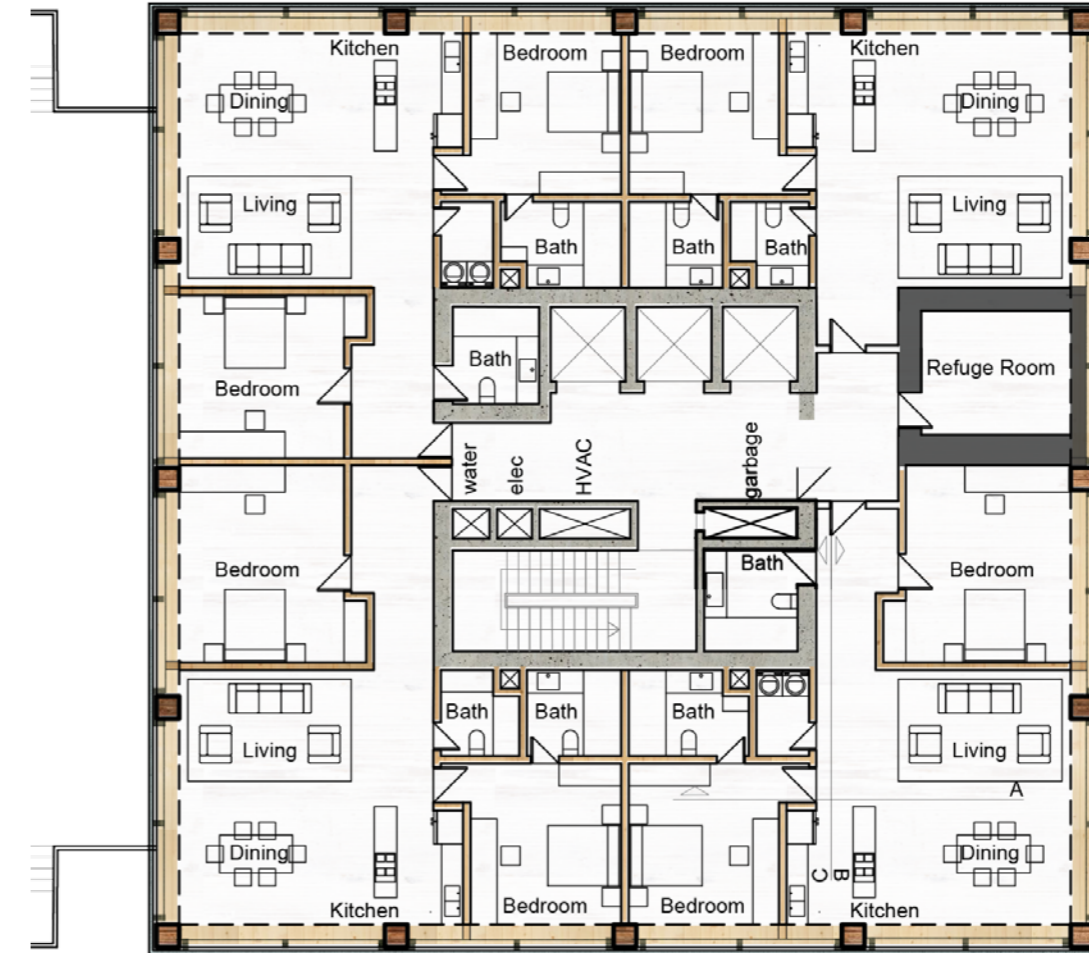
Visualization of Sky Lounge

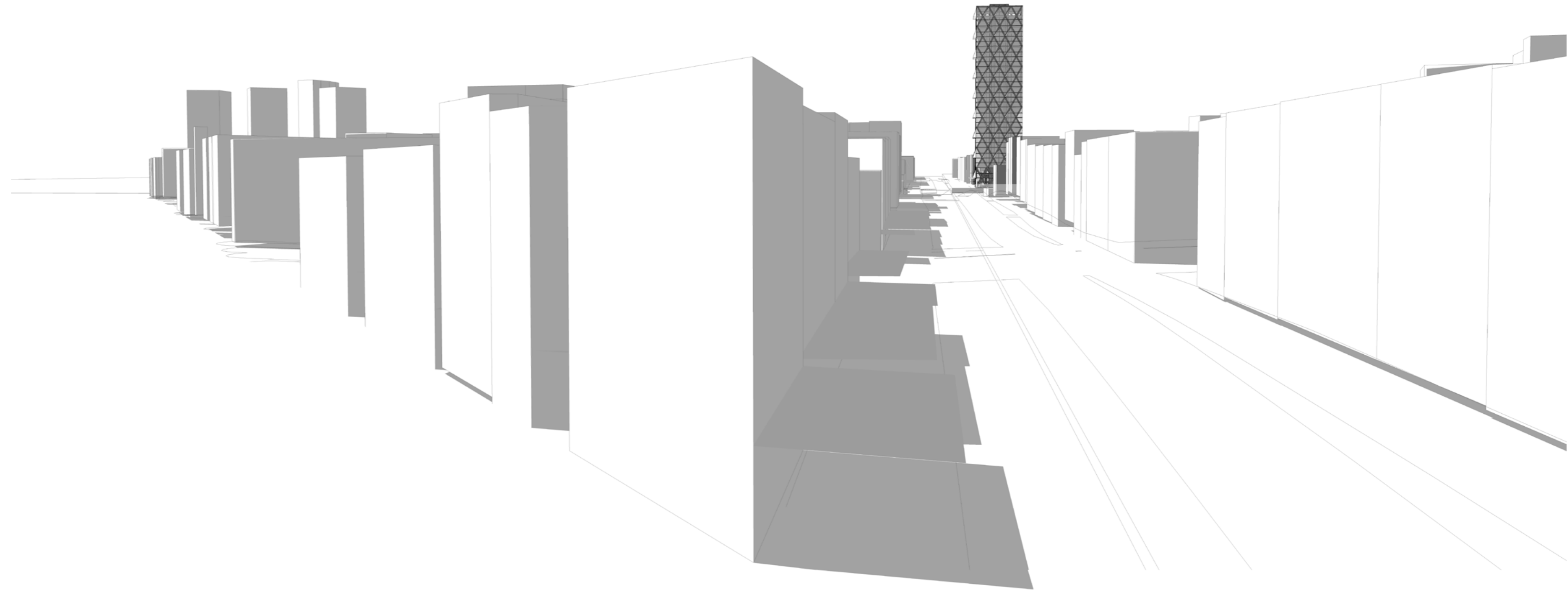


Typical Floor of Residences
Scale 1:200



Typical Floor with Refuge Area
Scale 1:200





6 . EPILOGUE

This project is an experiment that is aiming to capture the essence of net positive thinking which is the next step for us responsible architects to recover from the ecological crisis humankind has created.

7 . REFERENCES

AIA, 2014. Net-positive Design: Creating Regenerative Buildings and Communities. s.l., AIA.

Attia, S., 2016. Towards regenerative and positive impact architecture: A comparison of two net zero energy buildings. Elsevier, Volume 26, pp. 393-406.

Birkeland, J., 2012. Design Blindness in Sustainable Development:. Journal of

Urban Design, Volume 17, p. 163–187

Boake, T. M., 2018. De-mystifying Diagrids: Expressive Structural. *Structural Engineering International*.

Cole, R. J., 2014. Net zero and Net Positive Design: a question of Value. *Building Research & Information*, Volume 43, pp. 1-6.

KYOUNG-SUN MOON, J. J. C. J. E. F., 2007. DIAGRID STRUCTURAL SYSTEMS FOR TALL BUILDINGS: THE STRUCTURAL DESIGN OF TALL AND SPECIAL BUILDINGS.

Moon, K. S., 2011. Optimal Grid Geometry of Diagrid Structures for. *Architectural Science Review*.

Moon, M. M. A. & K. S., 2011. Structural Developments in Tall Buildings: Current. *Architectural Science Review*.

Pamela Mang, B. R., 2015. The Nature of Positive. *Building Research & Information*, Volume 43, pp. 7-10.

Redclift, M., 2005. Sustainable Development (1987–2005):. *Sustainable Development*, Volume 13, p. 212–227.