

TOWER OF BOOKS:
The New European Library of Information and Culture



POLITECNICO
MILANO 1863

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ABSTRACT

ENGLISH

Tower of Books: The New European Library of Information and Culture project stems from the search for the role of a public library in a time of rapid changes led by technological advancements. The new library emerges as a keeper of books and also a collection of laboratories, as well as open and built social spaces, that are curated to accommodate the complex and interdisciplinary nature of knowledge today.

Located on the decommissioned railway station of Porta Vittoria in Milan, the project is situated in an area governed by Corso XXII Marzo from a morphological point of view, where the urban fabric has developed orthogonal to this axis. Re-purposing the railway station as a public library presents the opportunity demonstrate an accessible and sustainable vision for the re-development of Eastern Milan, while complimenting the planned development in nearby districts of Ex-Macello and Ortomercato, as well as becoming part of the larger urban network of green infrastructure and cultural venues of the city.

In response to the ongoing urban transformations, the conception of the project deals with themes of fragmentation and compactness, opting for compactness to convey the civic presence of the library. The new laboratories and social spaces are organized within a compact volume around a recognizable feature, i.e., the Tower of Books.

The Tower of Books rises above the surrounding built forms as a symbol of the tangible value of analog materials, while its 'roots' diffuse underground which speaks of expanding the library's potential, its place in the digital network of libraries, possibilities granted by technology and the immense knowledge accessible that is beyond one's immediate comprehension.

The Tower of Books—recognizable in height, technological features, and material quality—appears as a beacon of light in the evenings, which is perceived as both a point of reference and a source of inspiration.

ITALIAN

Il progetto La Torre dei Libri: La Nuova Biblioteca Europea di Informazione e Cultura nasce dalla ricerca sul ruolo di una biblioteca pubblica in un momento di rapidi cambiamenti guidati dai progressi tecnologici. La nuova biblioteca emerge come un custode di libri e anche come una raccolta di laboratori, nonché di spazi sociali aperti e costruiti, curati per accogliere la natura complessa e interdisciplinare della conoscenza odierna.

Situato presso la dismessa stazione ferroviaria di Porta Vittoria a Milano, il progetto è situato in un'area governata dal punto di vista morfologico da Corso XXII Marzo, dove il tessuto urbano si è sviluppato ortogonalmente a tale asse. La riqualificazione della stazione ferroviaria come biblioteca pubblica offre l'opportunità di dimostrare una visione accessibile e sostenibile per la riqualificazione della zona est di Milano, integrandosi allo sviluppo pianificato nei vicini quartieri di Ex-Macello e Ortomercato, oltre ad entrare a far parte della più ampia rete urbana di infrastrutture verdi e luoghi culturali della città.

In risposta alle trasformazioni urbane in corso, la concezione del progetto affronta i temi della frammentazione e della compattezza, optando per la compattezza per trasmettere la presenza civica della biblioteca. I nuovi laboratori e spazi sociali sono organizzati all'interno di un volume compatto attorno a un elemento riconoscibile, i.e., la Torre dei Libri.

La Torre dei Libri si erge sopra le forme costruite circostanti come simbolo del valore tangibile dei materiali analogici, mentre le sue "radici" si diffondono nel sottosuolo e parlano di espansione del potenziale della biblioteca, del suo posto nella rete digitale delle biblioteche, delle possibilità offerte dalla tecnologia e dell'immensa conoscenza accessibile che è oltre la comprensione immediata.

La Torre dei Libri – riconoscibile per altezza, caratteristiche tecnologiche e qualità dei materiali – appare come un faro di luce nelle serate, percepito sia come punto di riferimento che come fonte di ispirazione.

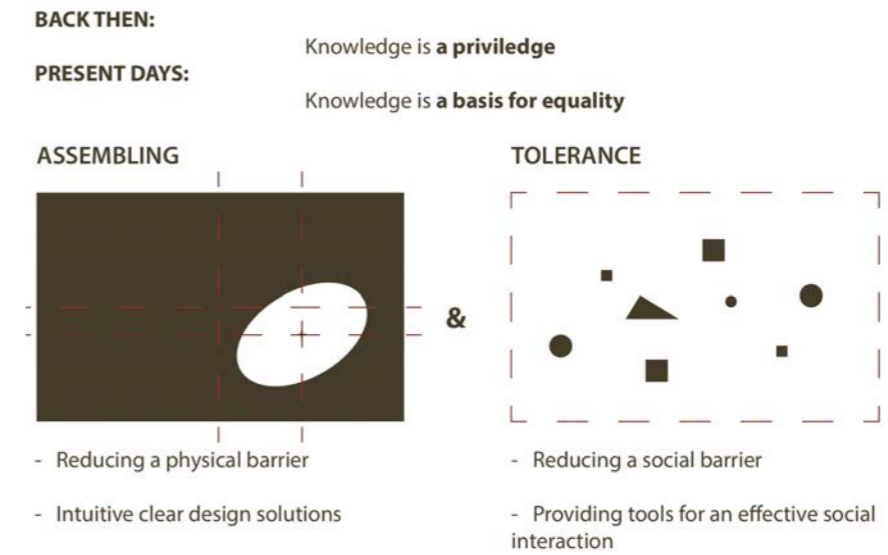
WHAT IS A LIBRARY TODAY?

Libraries are evolving from being the keeper of the city's cultural and historical record to being a much more connected, lively, and open institution. Their primary role is shifting from collecting knowledge to providing equal access to free information. While this shift reinforces the civic importance of libraries as institutions, it also presents a fundamental challenge since knowledge today is an inter-disciplinary entity; composed of a variety of mediums of expression and communication. Therefore, the library needs to accommodate the multi-media material and allow for access to users under tailored conditions.

As the society transitions from a predominantly analog to a predominantly digital world, public libraries as places of free access to information play a role in managing this transition. To satisfy the growing expectations, a broadened definition can be considered. **Libraries are to be thought of as both keepers of books and as interactive public spaces, such as laboratories and auditoriums, enriched by the presence of gathering areas, reading areas, green areas and increased mobility.**

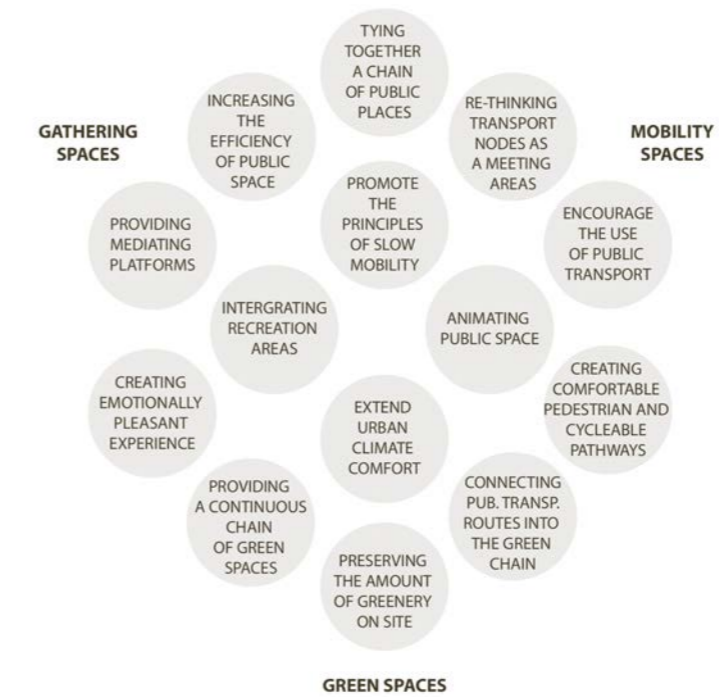
KNOWLEDGE TODAY

Figure 1: Knowledge Today



A LIBRARY TODAY: broader definition includes

Figure 2: A Library Today



more specifically, public spaces that achieve a balance of:



THEME: A Library Today

Library today is an interactive public space revolving around an element that is the keeper of books.

CHARACTER OF PUBLIC SPACES

Enriching the library with new laboratories, gathering spaces and open areas means reflecting on what has been broadly referred to as 'public space'. Whether in the case of the Greek Agora or the Renaissance Piazza, the public space exists in relation to the surrounding. It is possible to list a few principles that define the character of public spaces:

OPENNESS: The relationship with the surrounding context is a fundamental aspect of any kind of public space. The agora was an open space surrounded by public buildings and temples or framed by stoa. The forum was a more precise rectangular open space, once again surrounded by public buildings and colonnades. The medieval market took place on open public squares or wide roads. Divided by functions in medieval cities, and later joining the political, religious, and social aspects of daily life, piazzas are open urban centers of public life. Fairly recently, abandoned industrial sites have become grounds for public parks as well, enriching the design of landscaped parks, and aiding in the mitigation of density of the urban fabric by providing open recreational areas.

ACCESSIBILITY: Central location played a role in the perception of the importance of ancient places such as the agora and the forum, but it was also a strategic economic goal in the case of the department store. The railway yard is a transportation hub in itself, demonstrating the suitability of such places to become frequently used, safe environments.

SUSTAINABILITY: On the one hand, the 21st century city is experiencing changing rain patterns and rising temperatures, and on the other high energy consumption of buildings. New public spaces, especially reclaimed ones, are opportunities for addressing this divide and building more resilient.

The principles of public space align with those of a public library since they both aim for accessibility, openness, inclusivity, and sustainability. For these ideas to be perceived by users, large open areas, continuity of green, signage, and transparency are aspects to be implemented in the design of the library. Moreover, to avoid the creation of a generic open space, the new library is to be characterized by an innovative element dedicated to book-keeping.

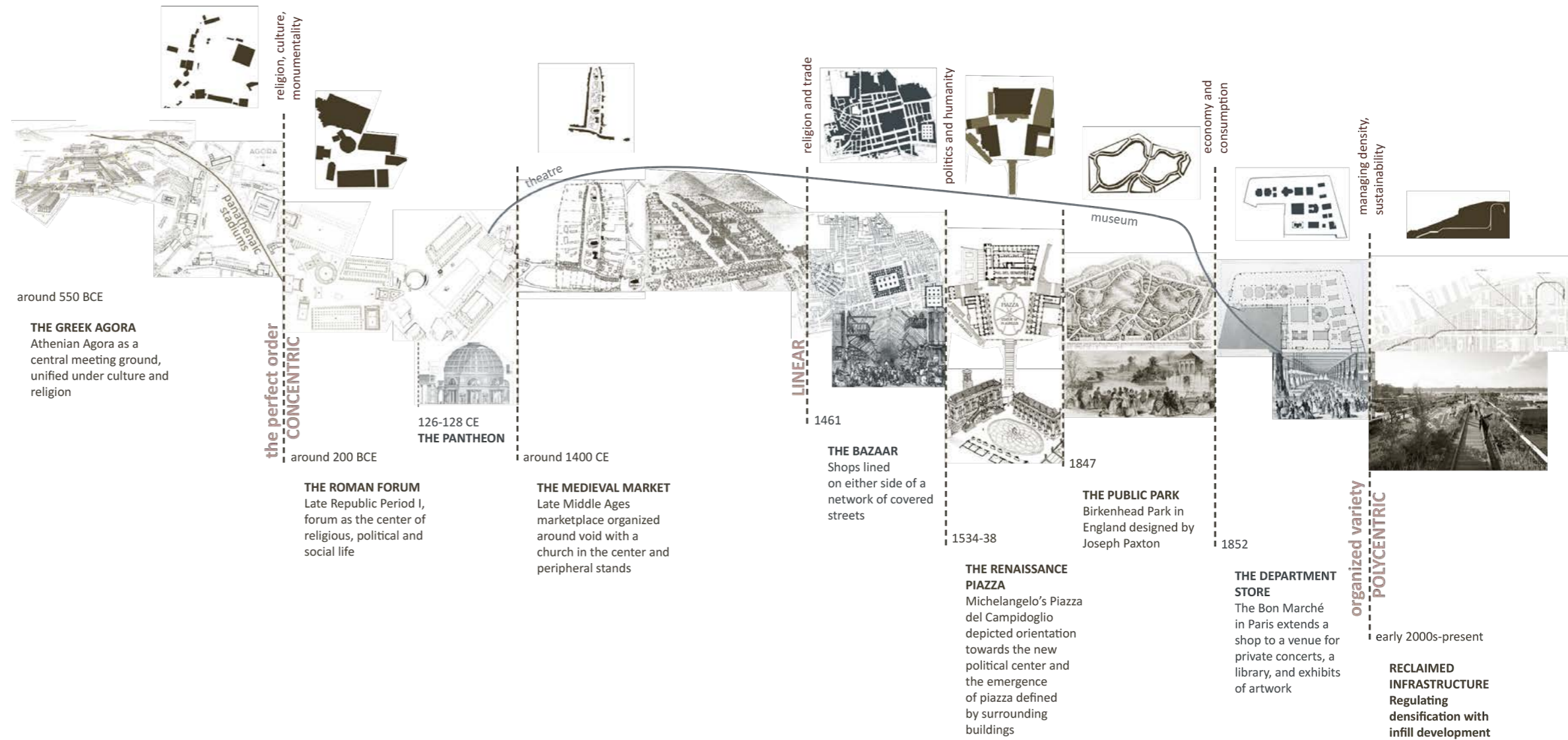


Figure 3: Character of Public Spaces

THEME: A library within the contemporary architectural debate

In *Library as Infrastructure*, Mattern proposes the idea that the library is “a network of integrated, mutually reinforcing, evolving infrastructures” where “**informational and social infrastructures intersect within a physical infrastructure that (ideally) supports that program.**” (Mattern, 2014)

Libraries have long been collectors and organizers of knowledge however, modes of distribution and access to materials has been changing so rapidly that libraries had to reinvent themselves, reshape their spaces, and extend their architectural program to fulfill their current roles as institutions providing open access to knowledge. The metaphor of the infrastructure implies, first and foremost, linkage to a wider network of information, and some of the notable efforts by libraries include integrating automated storage systems, digitalizing materials, and incorporating learning centers.

The library is not merely a technological device or a network of wires. In fact, libraries have been tasked with a wide range of social responsibilities that include sheltering homeless, gathering seniors, entertaining the youth and children, finding jobs or help with preparing resumes, etc. The physical spaces and budget allocated to libraries often don't meet these high expectations. Hence, thinking of libraries as infrastructures goes beyond planning a high-tech library; it means to embrace their identities as “knowledge institutions” while incorporating infrastructures that support them, to help the users access and navigate a fragmented digital world. Considering how the library places the user at the center of its existence, growing and adapting for them, one can look at libraries as social infrastructures.

As for the physical infrastructure supporting the program, the bookstacks themselves and the storage/retrieval system can be considered. The tangible quality of manuscripts, archives, printed text held in special collections is still significantly valuable. Moreover, long-term digital storage poses certain risks such as data rot, leaving libraries with the task of hosting significant volumes of physical material.

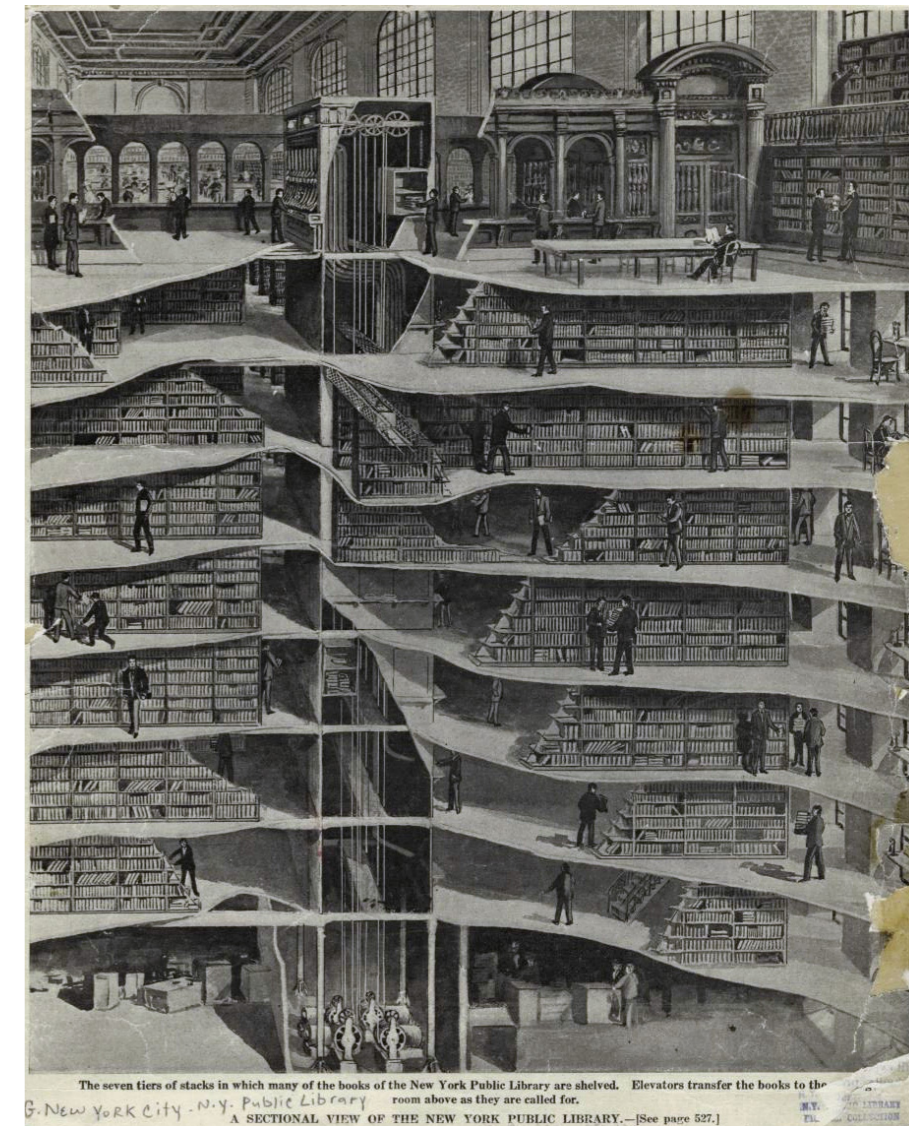


Figure 4: Stacks at the Stephen A. Schwarzman Building, New York Public Library [Published in a 1911 issue of *Scientific American*] from Mattern, 2014

THEME: A library within the contemporary architectural debate

Three libraries capture the evolution of libraries from keepers of books, to public spaces as part of the city's infrastructure, to bridges between the analog and the digital world. Each of the libraries demonstrates a unique way of storing physical and digital materials.

1—THE BEINECKE RARE BOOK AND MANUSCRIPT LIBRARY (built between 1960-1983; modernized in 1990) in Connecticut, United States by SOM hosts 180,000 copies of books and manuscripts in a central 'tower', putting emphasis on the control of light and temperature for ideal preservation conditions. The project speaks of the idea of **a library as a protector of rare books and special collections** for which there was a growing interest at the time and manifests the symbiotic relationship between architecture and structure. *"The structural façade of the hall consists of Vierendeel trusses that transfer their loads to four massive corner columns. The trusses are composed of prefabricated, tapered steel crosses covered with gray granite on the outside and pre-cast granite aggregate on the inside. Fitted into the bays between the crosses are panels of white translucent marble that admit subdued daylight into the library while blocking the heat and harsh rays of the sun."* (SOM, 2023)



Figure 5: Beinecke Library

2—THE NATIONAL LIBRARY OF FRANCE (1989-1995) in Paris, France by Dominique Perrault embraces the role of **the library as an urban square, as "an initiatory place and not some monster of a building, part-temple and part-supermarket. A place of reference for the East End of Paris. A place that is part and parcel of the continuity of the sequence of large empty spaces along the Seine [...]"** (Dominique Perrault Architects, 1989). The library is a composition of 4 open-book-like towers that define the rectangular sunken garden between them, while the implied tension between them activates the space.

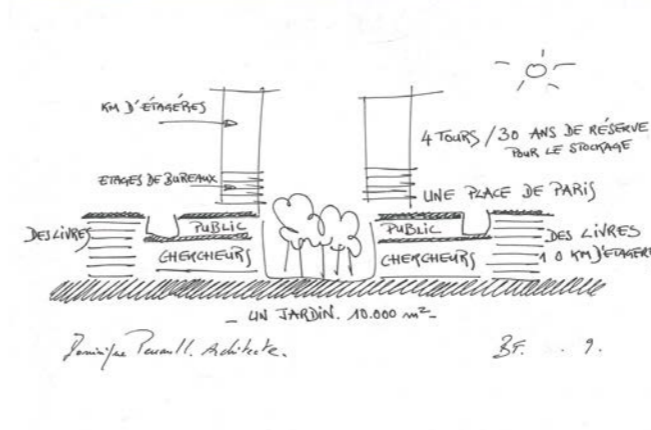


Figure 6: National Library of France

3—THE SEATTLE CENTRAL LIBRARY (1999-2004) in Seattle, United States by OMA in collaboration with LMN Architects represents the library as **"an institution no longer exclusively dedicated to the book, but rather as an information store where all potent forms of media-new and old-are presented equally and legibly."** (OMA, 2023) As a solution to the new social tasks libraries need to accommodate and the ever-growing physical collection of the library, the design offers "the Books Spiral", which is a continuous ramp on which librarians accompany readers, that showcased 780,000 books with **the potential of growth** up to 1,450,000 books. The library offers a unique approach to programming as well, where 5 "stable" programs (parking, staff, meeting, spiral of books, headquarters) and 4 "unstable" programs (children, living room, mixing chamber, reading room) are stacked on platforms, the different spatial conditions of which result in some protruding the facade.

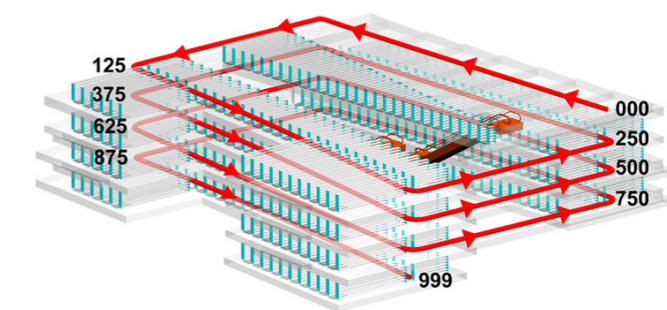
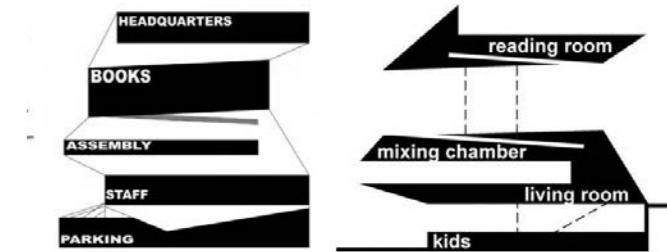


Figure 7: Seattle Central Library

On an article in The Architectural Review, Prizeman concludes *"Recurring references demonstrate a shift from the pragmatic concerns of capacity that dominated the design agenda of the 1960s and economic preoccupations of the early public library movement. It is clearly the symbolic value of enabling the physical browsing of books that is celebrated today."* (Prizeman, 2011)

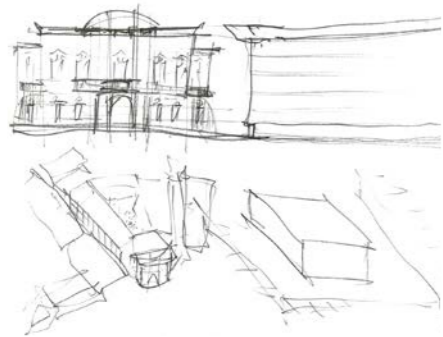
What could be the role of a public library in Milan?

Of the 24 local libraries that compose the Milano Library System, Ambrosian Library, Library of the Metropolitan Chapter of Milan, Sormani Library, Braidense National Library, Leonardo Campus Library of Politecnico di Milano, and Parco Sempione Library are noted to paint the picture of the state of existing public libraries in Milan.

The synthesis of the research related to the design of contemporary libraries and the existing libraries in Milan revealed that **the city needs a clear and timeless volume at a suitable scale with respect to the surrounding, with a recognizable identity that is familiar yet innovated, and plans that connect users to each other and to the city, as opposed to confining them in rooms.**

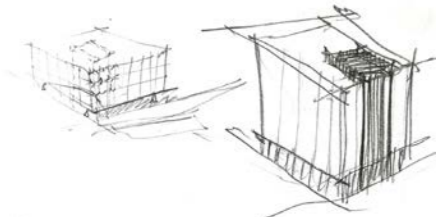
CLARITY OF THE VOLUME

timeless, compact, at appropriate scale



RECOGNIZABILITY

familiar yet innovated



CONNECTIVITY

surrounded not confined

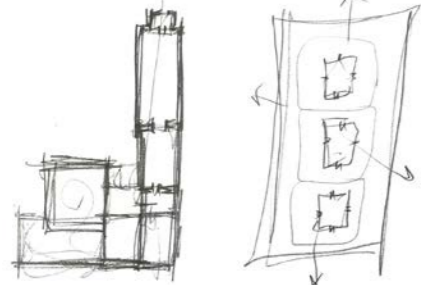


Figure 11: The Character of a New Public Library in Milan

AMBROSIAN LIBRARY (1607-1609) which was founded by Cardinal Federico Borromeo, was one of the earliest public libraries in which **books were arranged in rows of cases along the walls**, which was an innovation compared to the medieval library where books were chained to tables. The building houses the Ambrosian Library, the Ambrosian Art Gallery (1618), and the Academy of Drawing (1620), conceived with the purpose of *“raising the Ambrosiana to the level of an Agora.”* (Ambrosiana, 2023) The **multi-faceted composition** of the library makes this place *“a veritable treasure chest in which one can search for Truth, which has always charmed the human soul, in all regions and at all times.”* (Ambrosiana, 2023) The library hosts nearly 40,000 manuscripts—among which is Leonardo’s Codex Atlanticus—12,000 drawings—including works by Raphael Pisanello and Leonardo —and 22,000 engravings, **collecting literary studies and art under one roof.**

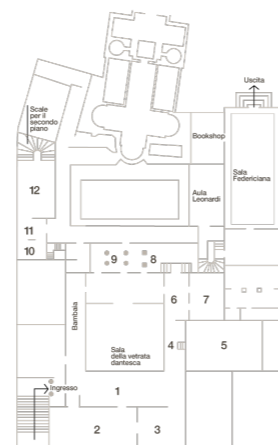


Figure 8: Plan of the Ambrosian Library by Veneranda Biblioteca Ambrosiana

SORMANI LIBRARY (1949-1956) is currently the seat of the Central Municipal Library of Milan. Architecturally, the library is an example of the **integration of old and new** in the post-war Milanese architecture, which extends the 17th-18th century residence by architect Arrigo Arrighetti with the construction of modern forms in an area destroyed by the bombings of 1943. The volume with an English garden in the courtyard, houses the newspapers and filing cabinets on the ground level, a department store for books on the first level, and a large reading room lit by 96 circular skylights on the top level. It should be noted, though, that the natural light sources were replaced by artificial ones since technical features had to be installed on the roof. *“To the south, in the final part of the building on Via della Guastalla, there is the book tower, a technical volume made up of four levels of shelving with an iron beam structure which originally contained folio publications and which today contains the rarest volumes; it is accessed from a stairwell with book lift positioned between the old building and the new intervention [...]”* (Suriano & Costa, 2017) The grid of the rationalist façade **uses the depth of the individual storage shelves as modules, while considering the diffusion of light and sun rays.** The library accommodates 700,000 books, 20,000 international newspapers and magazines, approximately 70,000 audiovisual supports and 18,000 ancient books; with **emphasis on the façade design for reflecting the spirit of the time and guaranteeing good spatial quality of the reading rooms.**

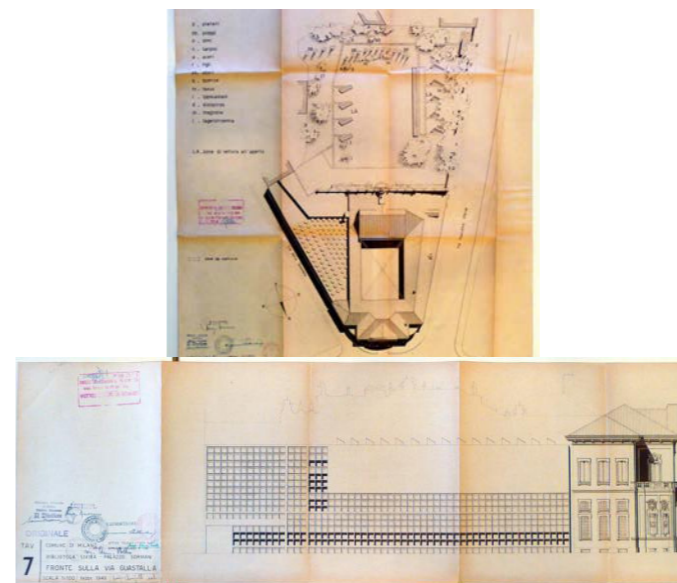


Figure 9: Plan and section the Sormani Library by Lombardia Cultural Heritage

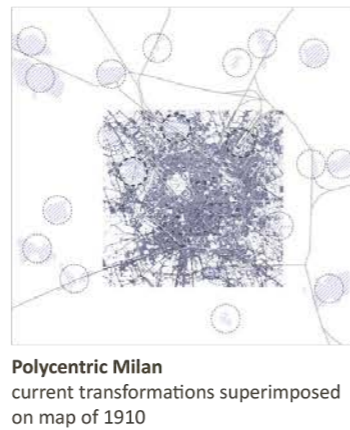
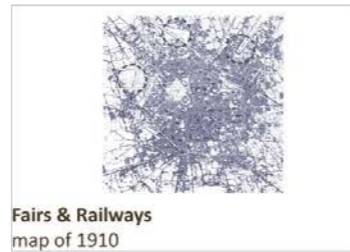
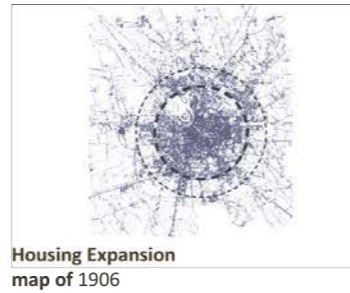
BRAIDENSE NATIONAL LIBRARY (1770) Since opening to the public in 1786, the library has grown its collection to over 1,500,000 volumes, becoming a state library and one of the largest in Italy. **As part of the Pinacoteca di Brera Museum system**, the library cites being **“an exceptional place of cultural exchange”** as one of its unique qualities.



Figure 10: Maria Theresa Room by Braidense National Library

SITE

Eastern Milan



A reinterpretation of Kevin Lynch's 5 elements (paths, nodes, edges, districts, and landmarks) of city *imageability* recognizes the evolution of Milan from a concentric to polycentric entity, on which gradation represents the urban growth in different phases of time. Darkest value marks the medieval city, while increasingly lighter tones represent expansions brought by the Beruto Plan, the Pavia Masera Plan, and recently the PGT 2030 which identifies strategic planned development sites around the city. While the ripple effect of each 'ring' seems to fade, the railway network emerges as a binding agent among planned development sites, allowing former transportation nodes to become catalysts in the emergence of new districts.

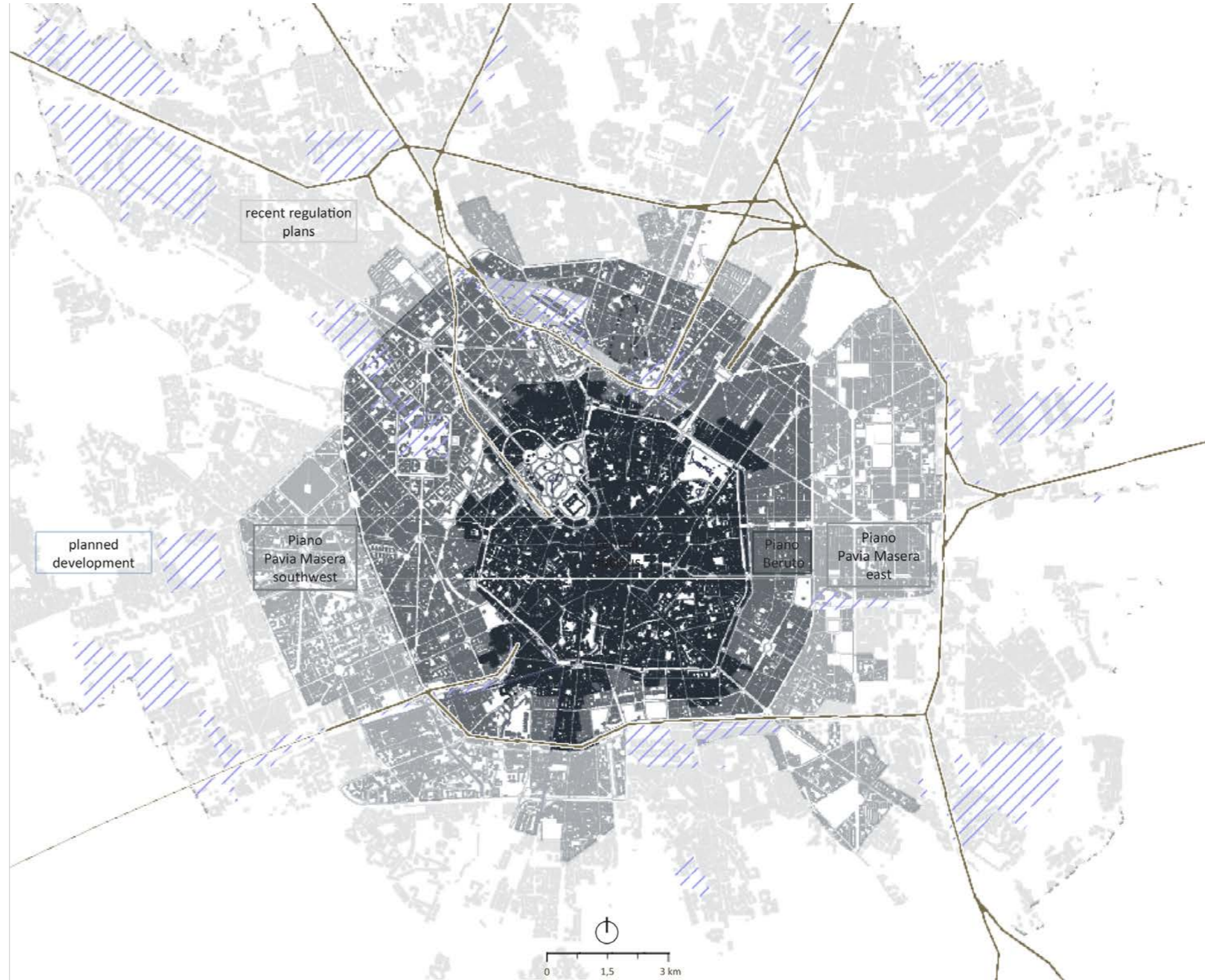
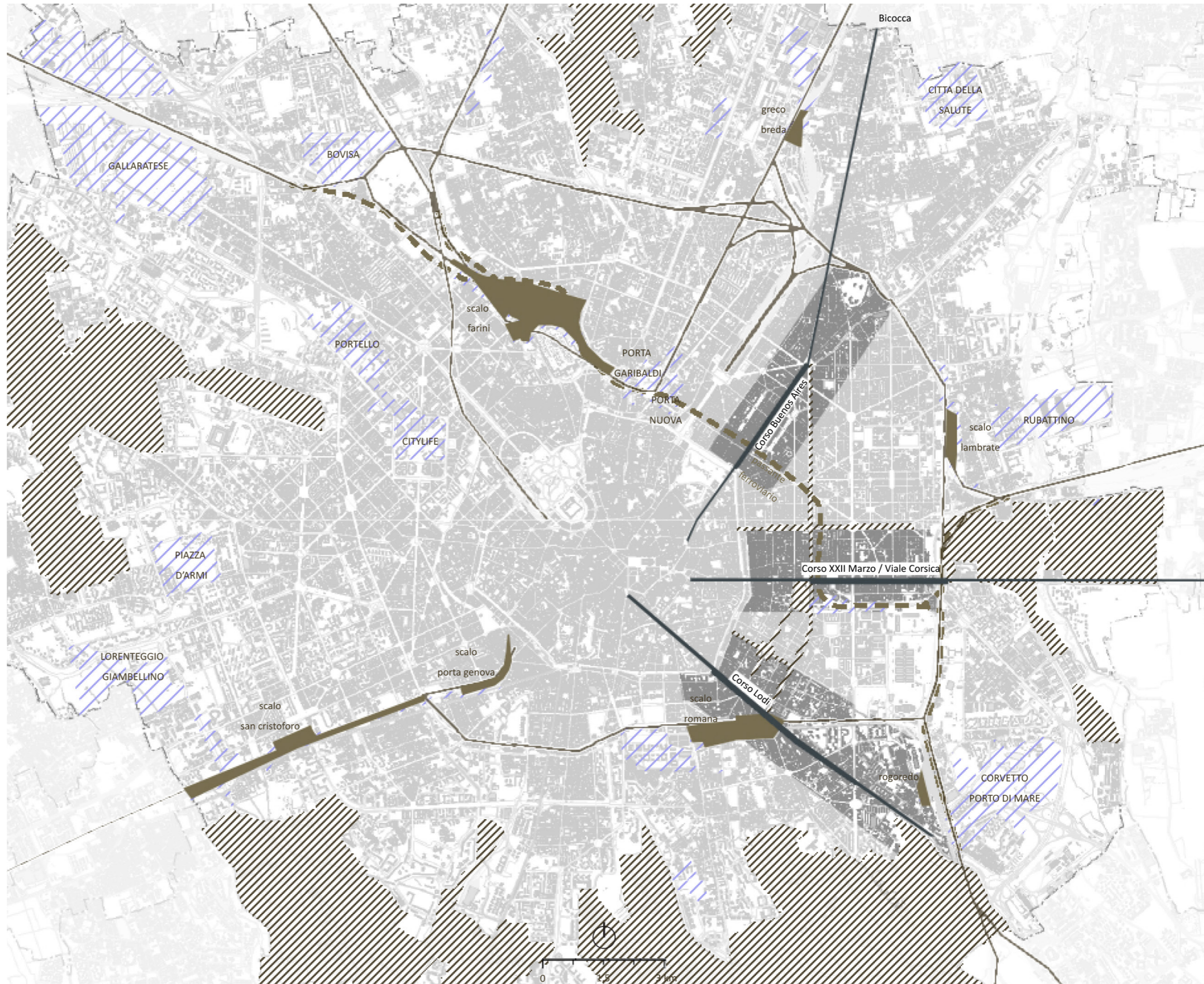


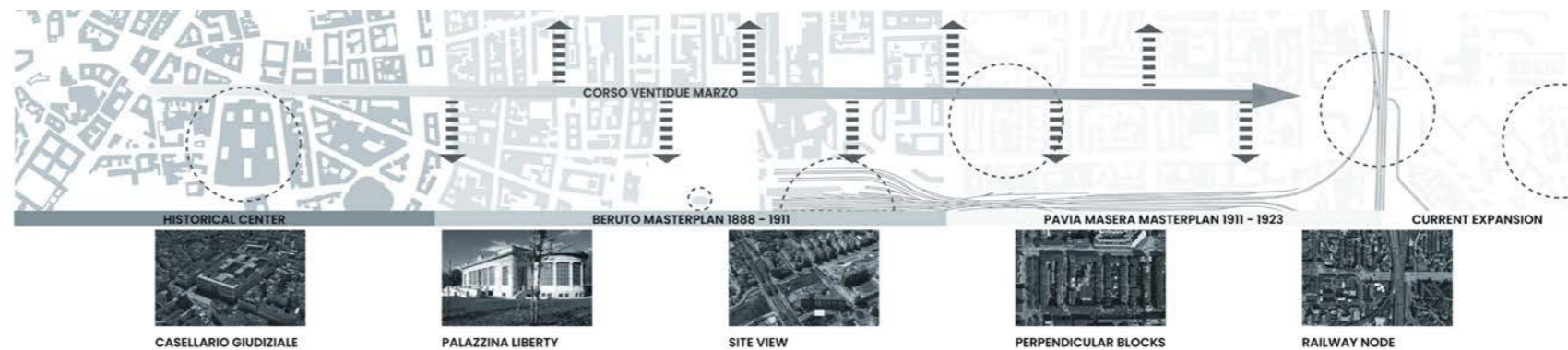
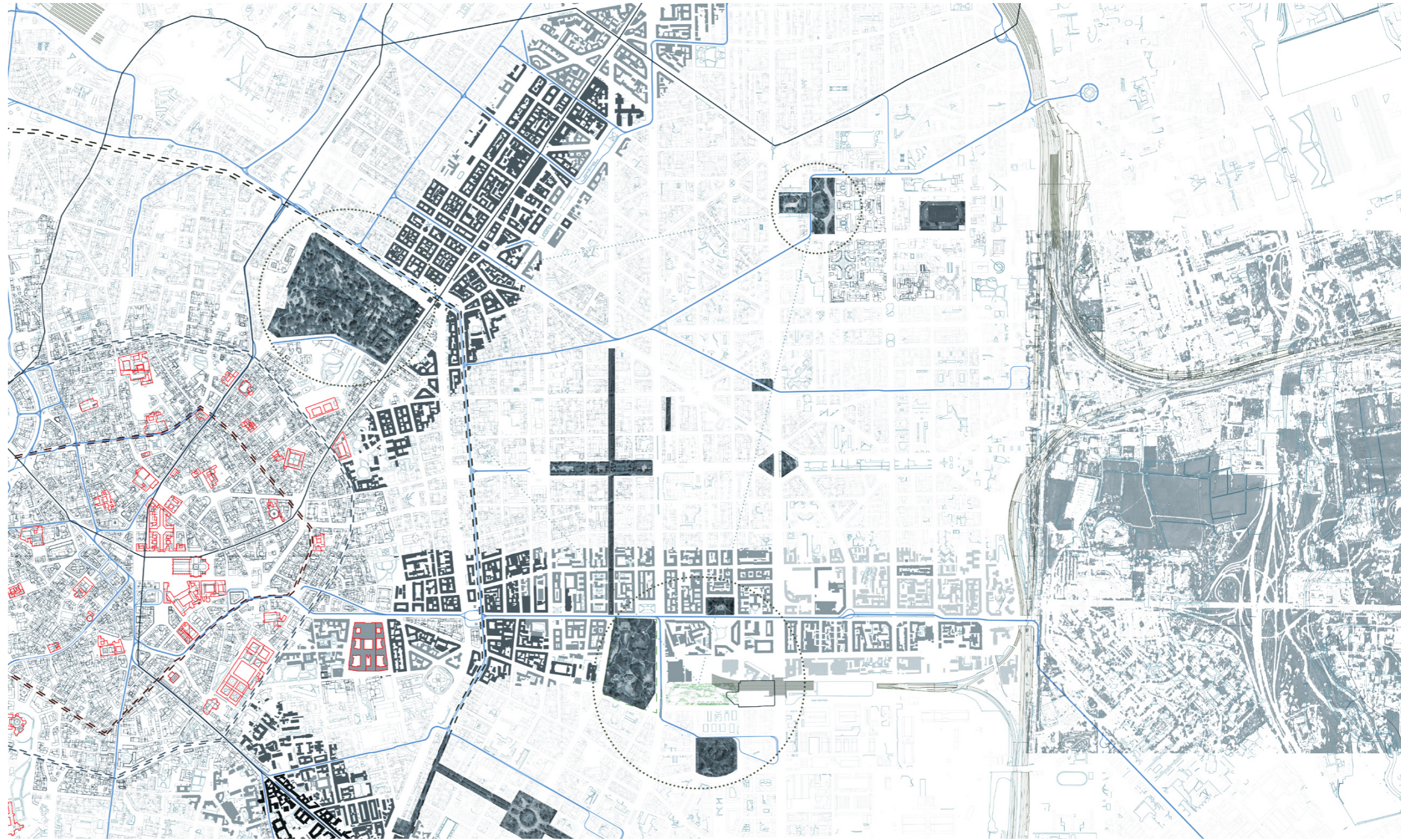
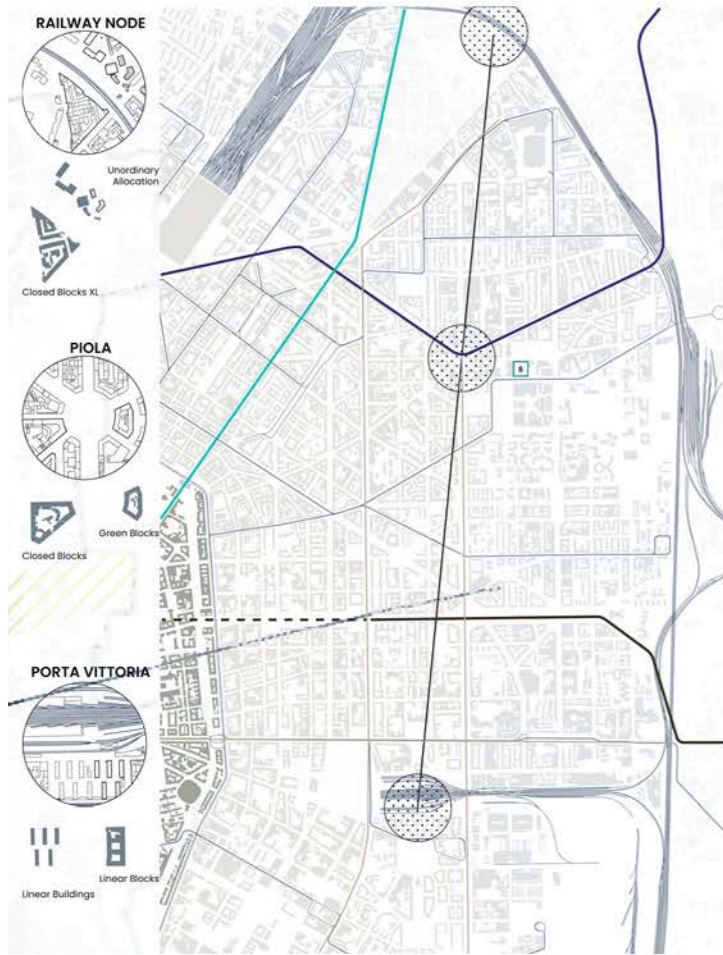
Figure 12: Milan Cognitive Map 1



Continuing with the imageability of a city approach, and reflecting on the character of the new districts, the second cognitive map reveals a significant moment of transition from radial to axial development.

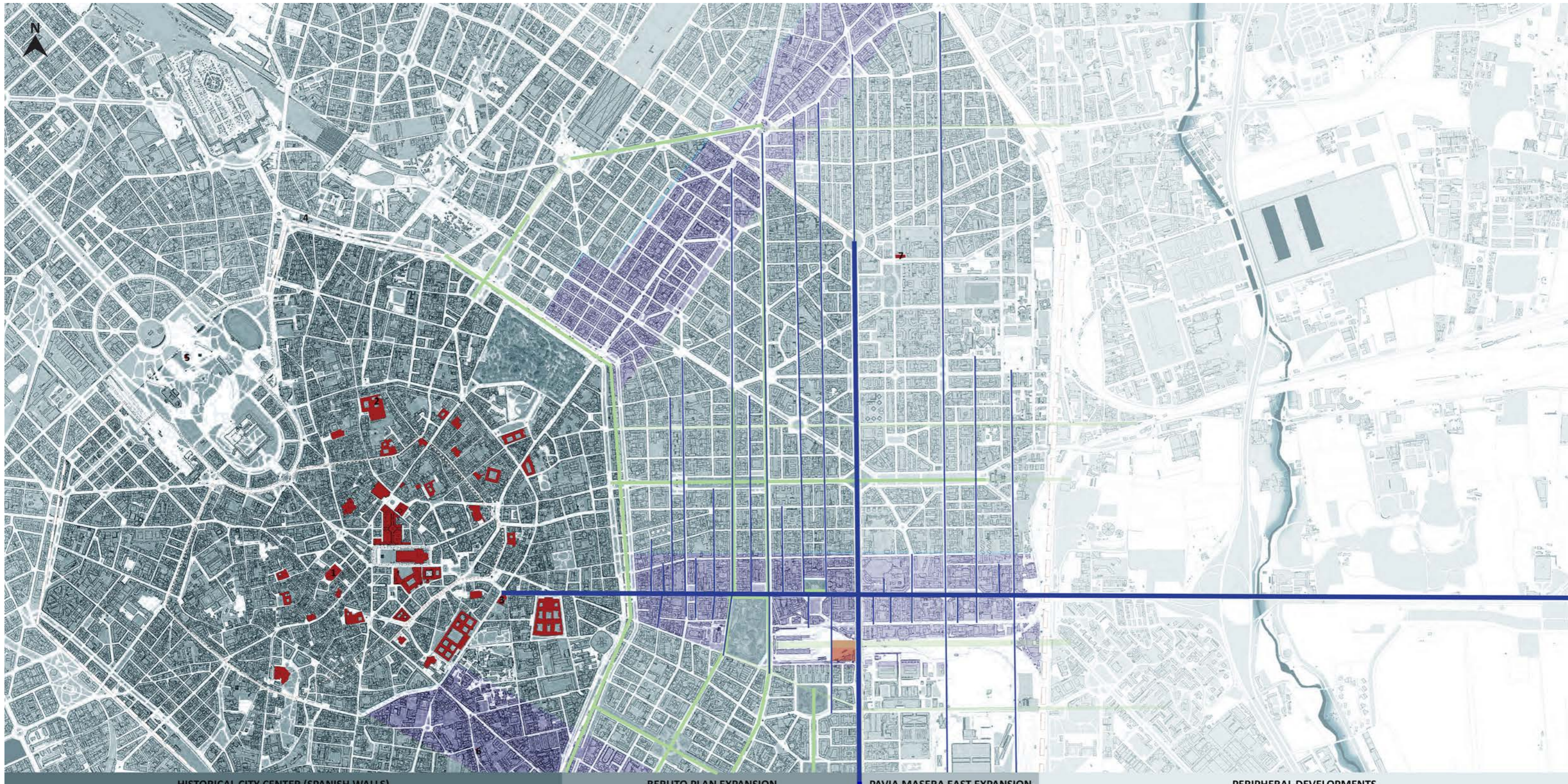
East side development stems from three main axes; namely Corso Buenos Aires towards the northeast, Corso XXII Marzo-Viale Corsica towards the east, and Corso Lodi towards the southeast. The urban fabric and new districts develop perpendicular to these axes. Corso XXII Marzo-Viale Corsica in particular is an E-W axis connecting the urban system of greenery to the peripheral belt, as well as the existing railway network with the city center. This bi-directional pull on the E-W axis creates a dynamic setting for public life.

Figure 13: Milan Cognitive Map 2



The third cognitive map is a reflection on the railway network nodes of the east and the morphology of their immediate surroundings, once again demonstrating linearity in the existing eastern fabric. Moreover, it notes the convergence of landmarks in the city center—calling for **creating a memorable image of east Milan, by introducing a ‘landmark’ fixed into position by dominant orthogonal axes; one that creates pull out towards the periphery and marks a moment of transition in the city.**

Figure 14: Milan Cognitive Map 3



HISTORICAL CITY CENTER (SPANISH WALLS)

BERUTO PLAN EXPANSION

PAVIA MASERA EAST EXPANSION

PERIPHERAL DEVELOPMENTS

Palazzino Liberty in
Vittorio Formentano Park

contemporary commercial blocks
and the new Parco 8 Marzo

contemporary residential blocks
and the project site

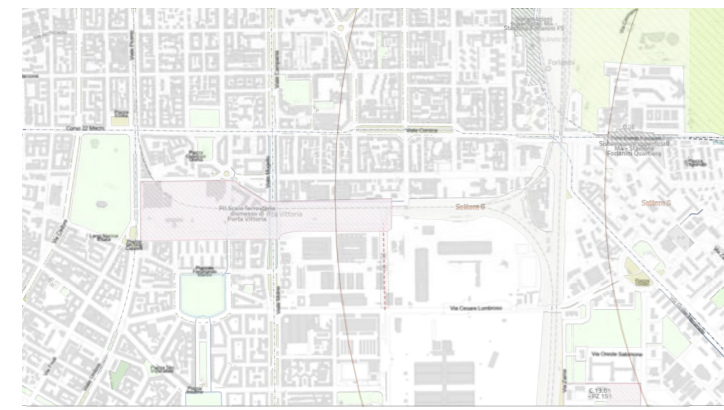
Frigoriferi Milanesi Palazzo del Ghiaccio



A synthesis of conditions defining the project

Figure 14: Milan Cognitive Map 4

SITE: Porta Vittoria Area



SYSTEM OF GREEN AREAS & INFRASTRUCTURE

SYSTEM OF GREEN AREAS

FORMATION

SOIL CONSUMPTION
(AREAS OF RECENT TRANSFORMATIONS)

Widely accessible through the railway system as well as the bus, the site is very well connected to the public transportation infrastructure. New planned bike paths help become part of the smart city vision.

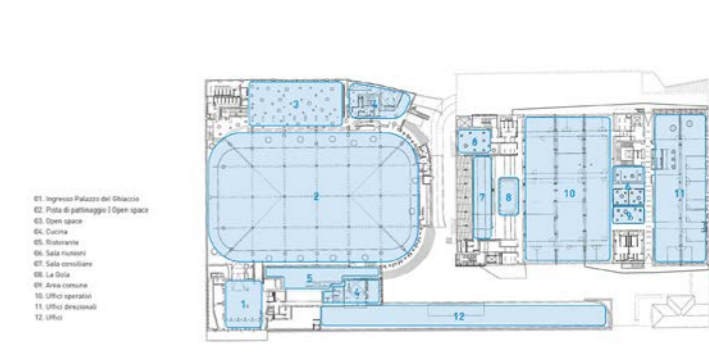
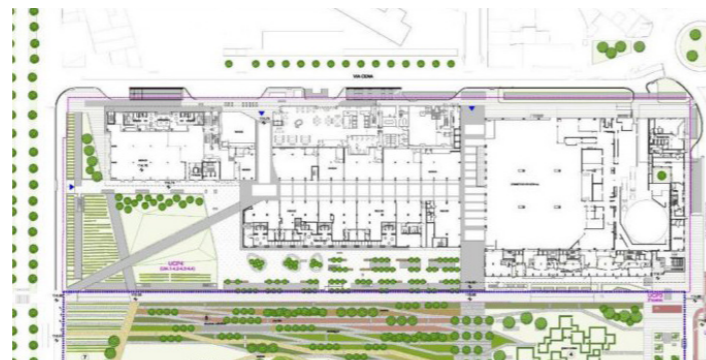
New Parco 8 Marzo needs to be continued across the site to preserve the sense of relief and refreshment, and to initiate the effort of densifying and unifying the scattered patches of greenery in the future.

While it used to be a dominantly residential area, adaptive re-use of buildings and planned public parks are milestones of the emerging cultural district.

Most residential buildings feature a typical Milanese courtyard which provides daylight and natural ventilation and also an integral socializing space. Recent contemporary buildings clash with the adaptive re-use of iconographic ones like Ex-Macello, for example, leaving the task of mediating between historic and futuristic to the new library.

Figure 15: Porta Vittoria Analysis Maps **extracted from PGT 2030**

SITE: Porta Vittoria Area

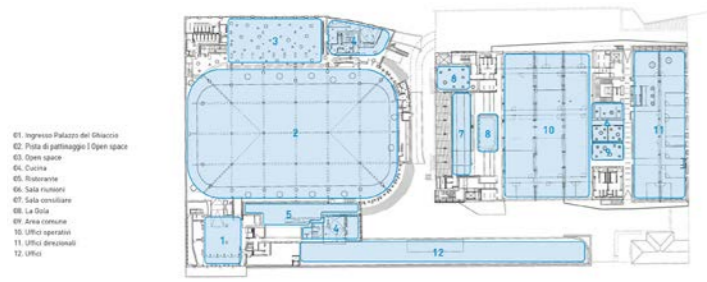


PARCO 8 MARZO (west)

MULTI-USE COMPLEX (north)

RESIDENTIAL COMPLEX (north)

FRIGORIFERI MILANESI
PALAZZO DEL GHIACCIO (northeast)



FRIGORIFERI MILANESI
PALAZZO DEI FRIGORIFERI (northeast)

ARIA PROJECT (southeast)

NEW IED CAMPUS (image above)
EX-MACELLO (image below)
as part of the Aria Project

ORTOMERCATO (southeast)

Figure 16: Porta Vittoria Recent Transformations

RECENT TRANSFORMATIONS IN PORTA VITTORIA

On one hand, there is a strong presence of industry in the area, recalled from the abandoned railway yard and the warehouses/structures of the old market. On the other, there are residential districts. These two currently seem non-related, and efforts are made to 'upcycle' the structures no longer used for market-related purposes as cultural and educational sites for the residents. In doing so, the transformation projects aim to attract a wider and more international audience to the site.

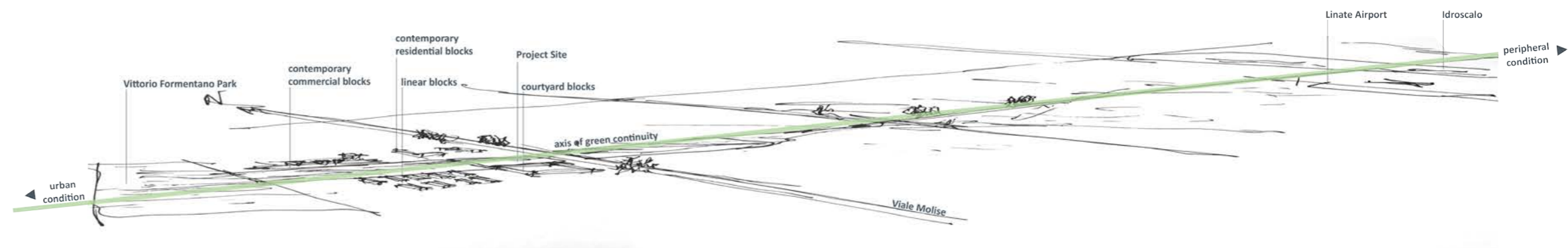
The Frigoriferi Milanesi complex, consisting of two adjacent historic buildings that are the Palazzo dei Frigoriferi and the Palazzo del Ghiaccio, which were an old ice factory/refrigeration warehouse and an ice-skating rink/sports center respectively, now serve as multifunctional spaces operating in the fields of art and culture.

The Aria Project reconfigures the former slaughterhouse area following the winning project of the second edition of Reinventing Cities, which foresees the New IED Campus and laboratories, student and a significant amount of social housing, restoration of the iconic Ex-Macello, and added commercial areas.

The agri-food market of the city (fruit and vegetables, fish, flowers, and meat) known as the Ortomercato is planned to be enhanced with pavilions and grown into a highly competitive agri-food hub based on the project "Foody 2025".

In addition to the rather large-scale projects shown on the previous pages, Palazzina Liberty to the west of the railway station--which used to be the central bar of the old Fruit and Vegetable Market and now used as an auditorium--, the Museum of Comics, Illustration and Animated Image--which used to be the confection factory of the Motta company--, Calvaire Library, and the Artepassante Project which aims to bring art to a new audience, can be cited among those aiming to transfer the area into a cultural and educational hub, while paying homage to the industrial heritage of the site dating back to the old railway station and the old market.

Another noticeable intervention in the area is the so-called Nuova B.E.I.C., the idea of which dates back to the early 2000s for realizing a new head of the Milan Library System **situated between the re-used industrial buildings and residential ones, closing the gap between the two by emphasizing the cultural and educational development.**





THE B.E.I.C. COMPETITION FIRST PRIZE, 2001 by Alterstudio Partners, Bolles + Wilson, AHW
“A great Ark of Culture, stranded in the heart of Milan, to relaunch the cultural vocation of the Lombard metropolis.” Alterstudio Partners

4,750,000 volumes, 150,000 audiovisuals and 3,000 current periodicals

THE B.E.I.C. and NUOVA B.E.I.C. COMPETITIONS and REFLECTION

The project site has been the focus of a competition which rewarded the “Ark of Culture”. With an agenda to meet the various social and cultural needs, the project shows how the library has transitioned from a shed for books to a workshop for people.

The project divides the building into the Near (entrance and heavy traffic spaces), Middle (open-shelf books) and Far zones (departments’ storage).

The original project could not be carried out and given the time that had passed before the initiative could be resumed, the criteria had changed. Therefore, the Nuova B.E.I.C. competition was launched, guided by “the integration of physical and digital materials, a balance between cultural enjoyment and production, a place of transmitting knowledge and cultural production, as well as the expression of creativity and development of critical skills.”



THE NUOVA B.E.I.C. COMPETITION FIRST PRIZE, 2022 by Onsite Studio, baukuh, Yellow Office, SCE Project, Studio Mistretta, Starching, Stain Engineering, Dotdotdot, (ab)Normal, Atmos Lab

2,500,000 volumes

Now the library-laboratory model prevails, one which encourages life-long learning and cultural production in an international setting.

The winning proposal shows a building with two adjacent naves, almost like two long industrial sheds, with trapezoidal cross sections. The reference is made to the aspect of ‘productivity’ which the new library should foster.

A fundamental assumption of the project is that the ‘Forum’ where social interactions are expected to occur, is separated from the ‘Departments’ where there are silent and reserved reading areas. The result is a divided image, that captures the challenge libraries are found in today between the physical and the digital; but doesn’t necessarily remedy it. In fact the two naves are connected only at the ground level.

The project creates ample spaces for production, but the legacy of the library as the keeper of books is grasped only in certain moments. The decision to further compartmentalize the library by designing a third red wooden pavilion for the ‘Imaginarium’ that is the children’s library, dissolves the character of the library as the head of a system of libraries. The extensively visible greenhouse, although environmentally conscious, blurs the identity of the library when coupled with an equally prominent image of an industrial shed.

Figure 18: B.E.I.C. Competition Overview

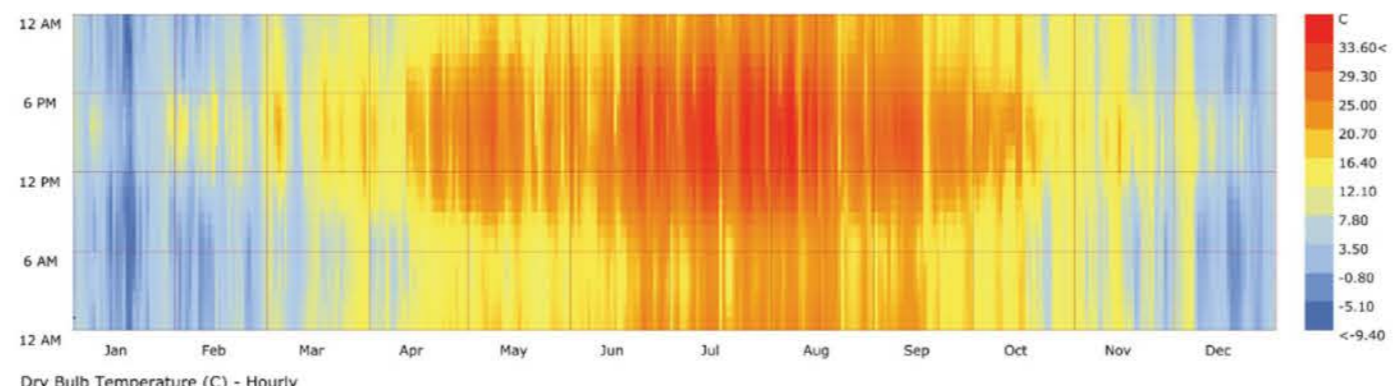
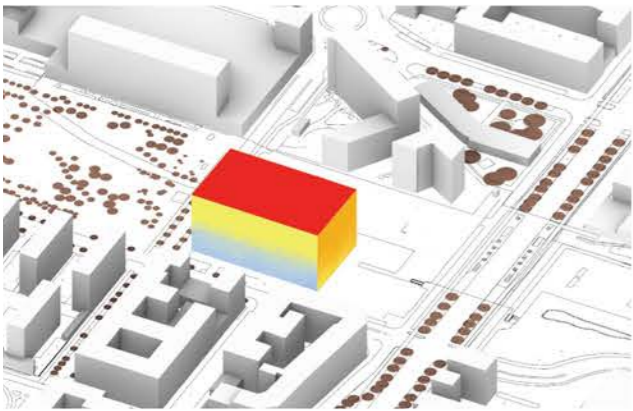
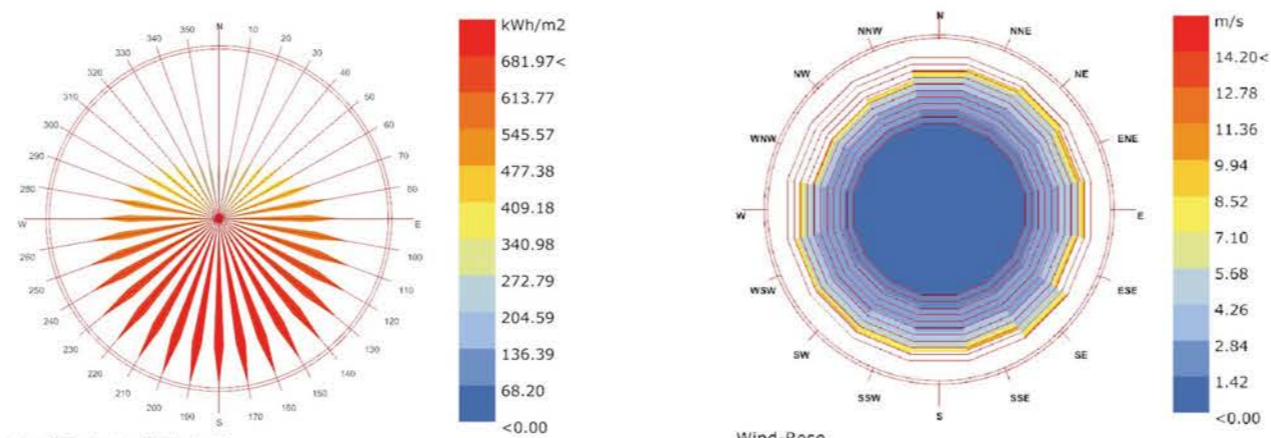
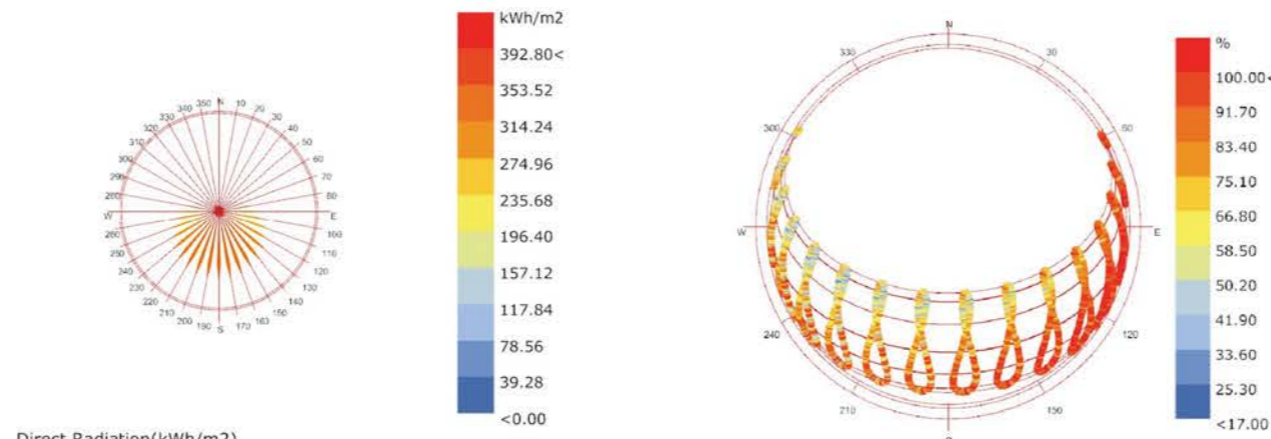
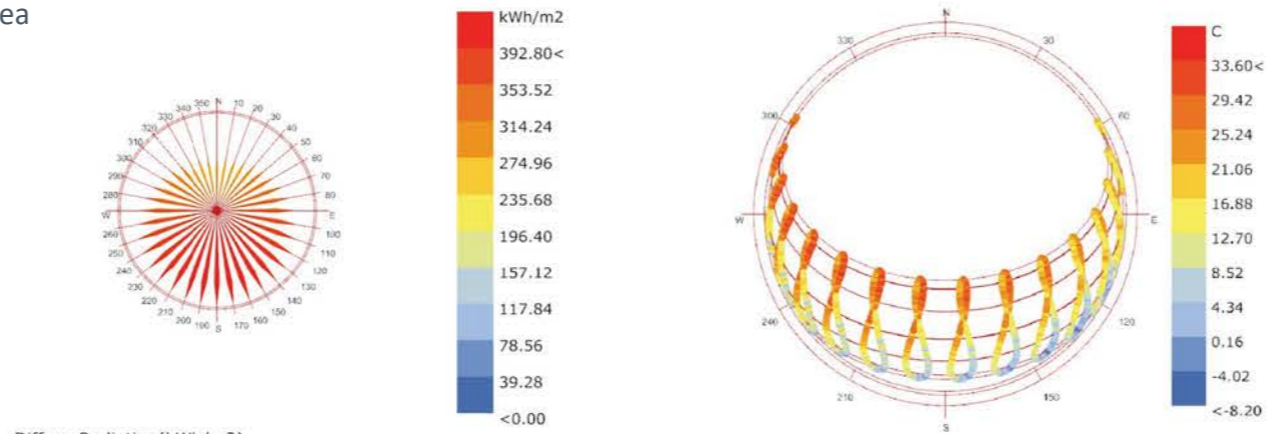
SITE: Porta Vittoria Area

CLIMATIC CONDITIONS

The project is located in Milan, in the moderately continental climate, with cold, damp winters and hot, muggy summers. The average temperature varies significantly throughout the seasons, which directly affects the needs of cooling and heating the volume.

The solar radiation research shows that the roof of our building is a plane of critical importance. It provides the chance of absorbing solar gains in the winter but at the same time, it may cause the overheating of the top floors in the summer. The south and eastern facades also need protection from direct sun rays.

The next important consideration taken from the climate analysis is the lack of wind in Milan. Good natural ventilation occurs in the constant presence of the wind, which requires thinking of a strategy that would evoke the air circulation between the library and surrounding.



AVERAGE MONTHLY TEMPERATURE [°C]			
MONTH	AVERAGE TEMPERATURE (°C)	MINIMUM TEMPERATURE (°C)	MAXIMUM TEMPERATURE (°C)
JANUARY	4	-5.3	15.3
FEBRUARY	6.7	-2.1	16.3
MARCH	8.6	-1.5	18.5
APRIL	12	2.1	22.8
MAY	19.4	8.6	33.3
JUNE	21.9	11.8	31.4
JULY	25.3	14.1	35.9
AUGUST	24.9	13.8	34.3
SEPTEMBER	19.1	10.3	28.7
OCTOBER	14.5	6.1	21
NOVEMBER	9.5	-3.8	20.6
DECEMBER	3.6	-3.2	14.6

MONTHLY GLOBAL HORIZONTAL RADIATION [kWh/m2]			
MONTH	HORIZONTAL RADIATION	MINIMUM HORIZONTAL RADIATION	MAXIMUM HORIZONTAL RADIATION
JANUARY	48.2	0	441
FEBRUARY	92.3	0	604
MARCH	154.7	0	764
APRIL	188.8	0	913
MAY	264.0	0	945
JUNE	293.5	0	941
JULY	255.9	0	944
AUGUST	182	0	873
SEPTEMBER	72.7	0	814
OCTOBER	63.8	0	610
NOVEMBER	69.8	0	521
DECEMBER	63.4	0	380

RELATIVE HUMIDITY			
MONTH	AVERAGE RELATIVE HUMIDITY	MINIMUM RELATIVE HUMIDITY	MAXIMUM RELATIVE HUMIDITY
JANUARY	87.1	23.7	99.7
FEBRUARY	81.9	30.9	100
MARCH	69.6	19.5	100
APRIL	68.3	19.8	98.9
MAY	62	19.6	99.6
JUNE	70.5	35.1	100
JULY	65.6	28	98.3
AUGUST	67.9	32.1	99.4
SEPTEMBER	73.1	26.6	99.8
OCTOBER	83.8	38.8	99.8
NOVEMBER	82	30.1	99.7
DECEMBER	84.5	38.5	100



Figure 19: Climatic Data

SITE: Porta Vittoria Area

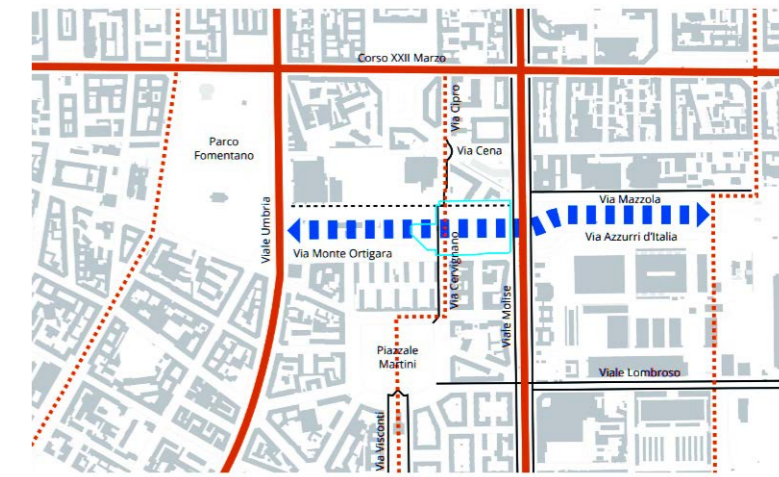
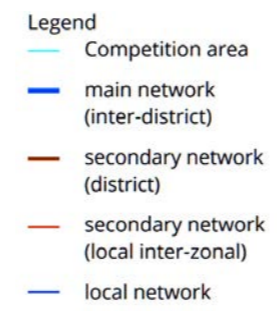
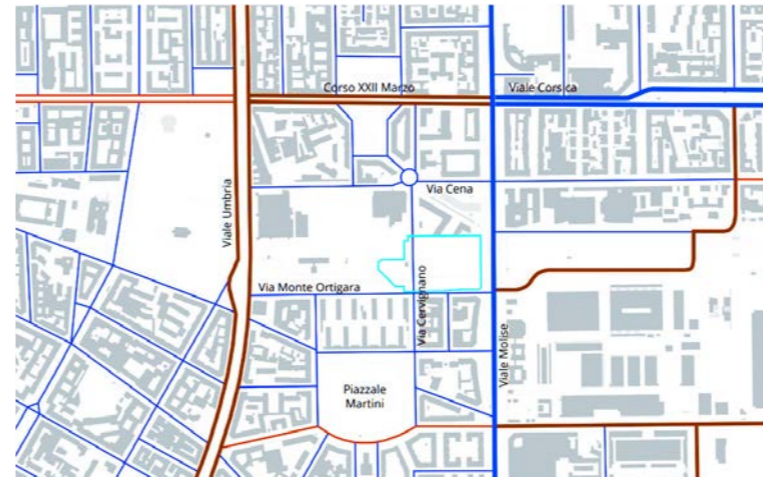
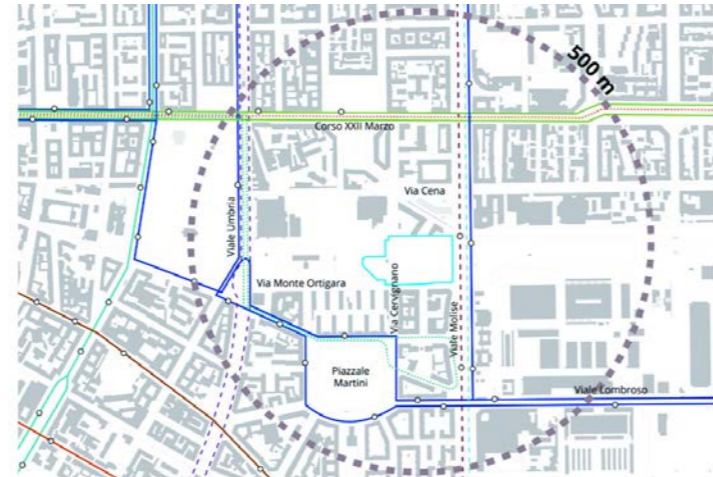
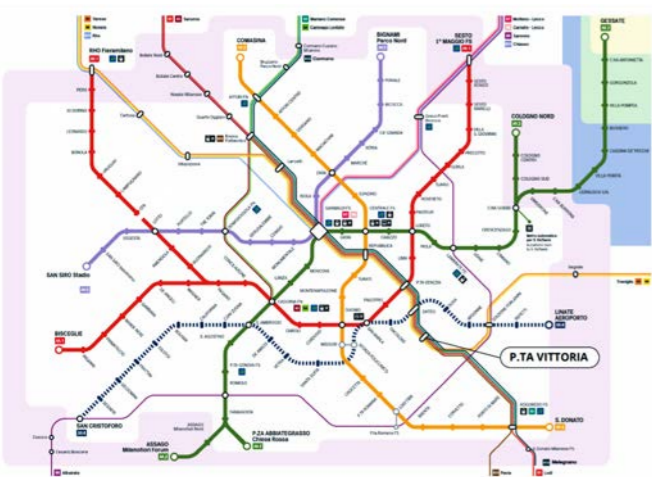


Figure 21: Accessibility of Site as shown on the Preliminary Design Document of the Nuova B.E.I.C. Competition

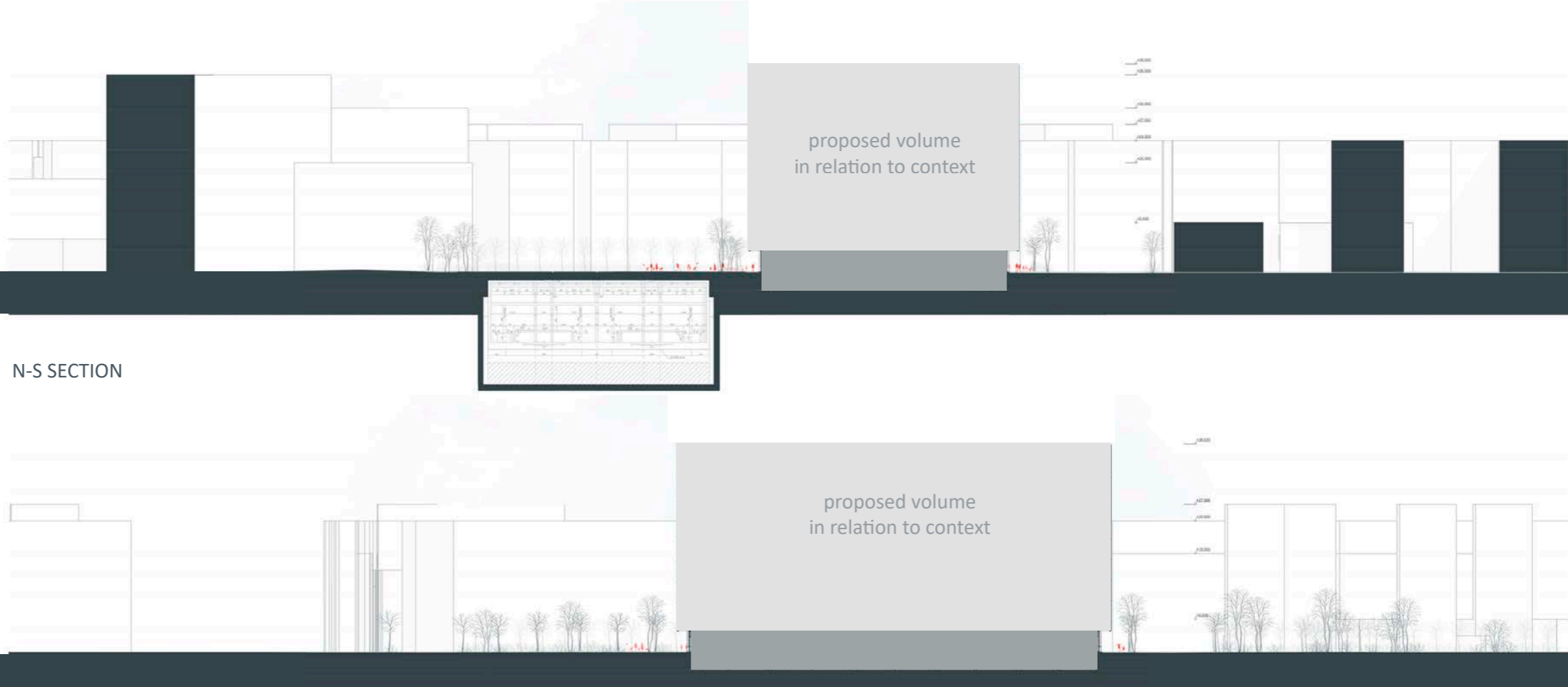
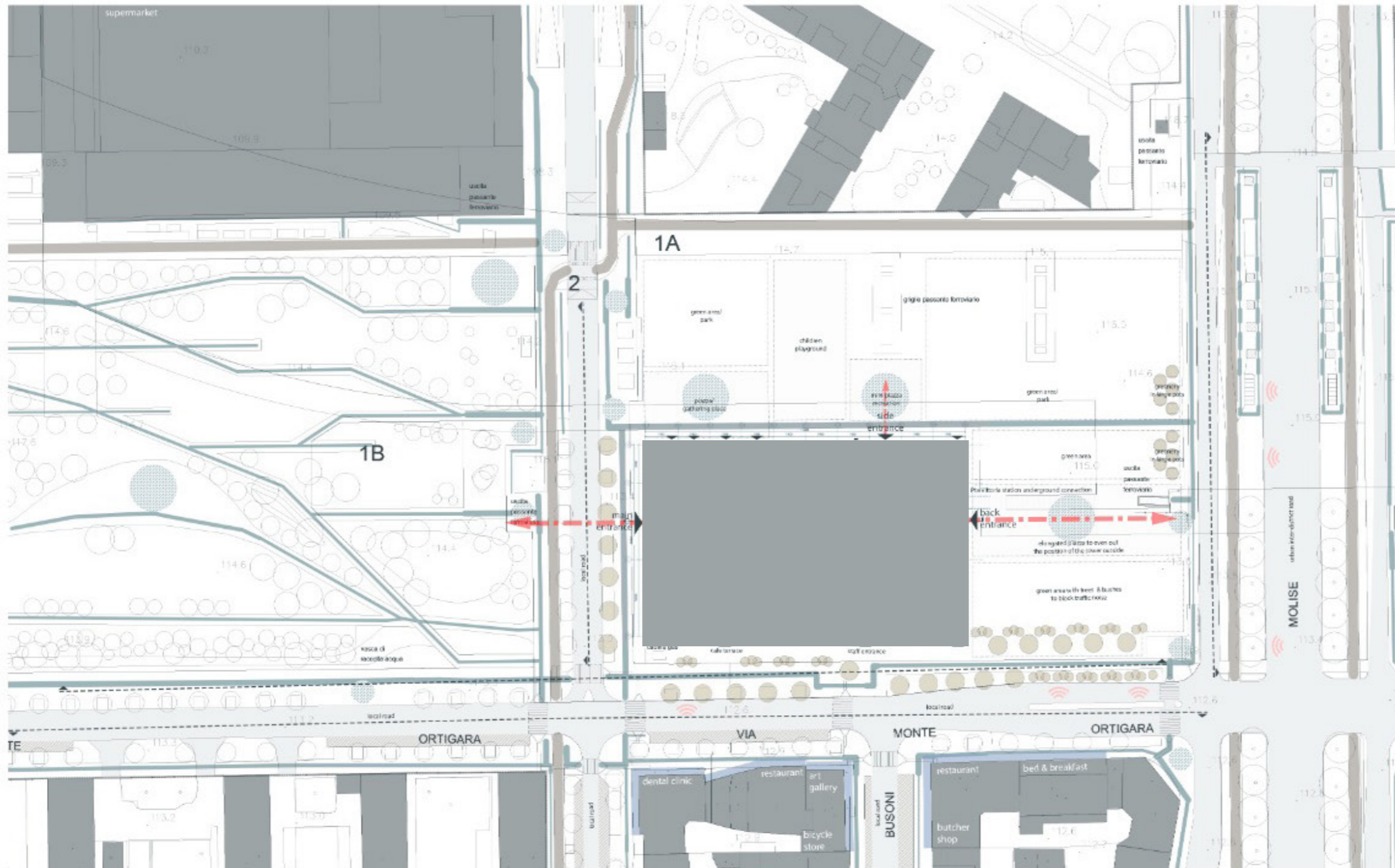


Figure 22: Urban Sections



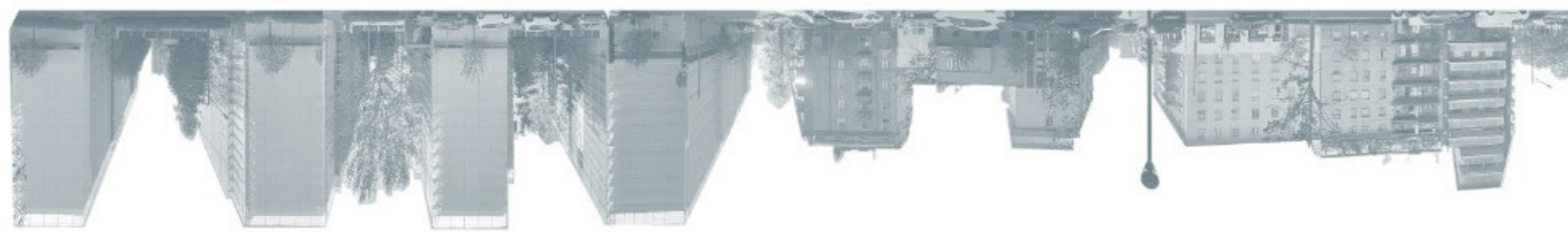
- Legend**
- Areas:**
- Buildings
 - Fenced areas
 - Roads
 - Parking lots
 - Stay places
 - Commercial area
 - Trees & bushes
- Flows:**
- Pedestrian pathways
 - Bicycle lines

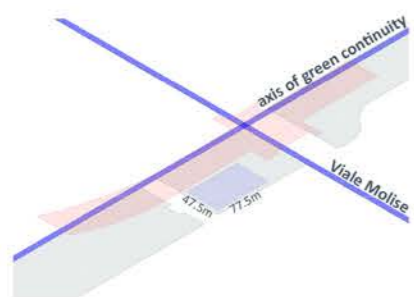
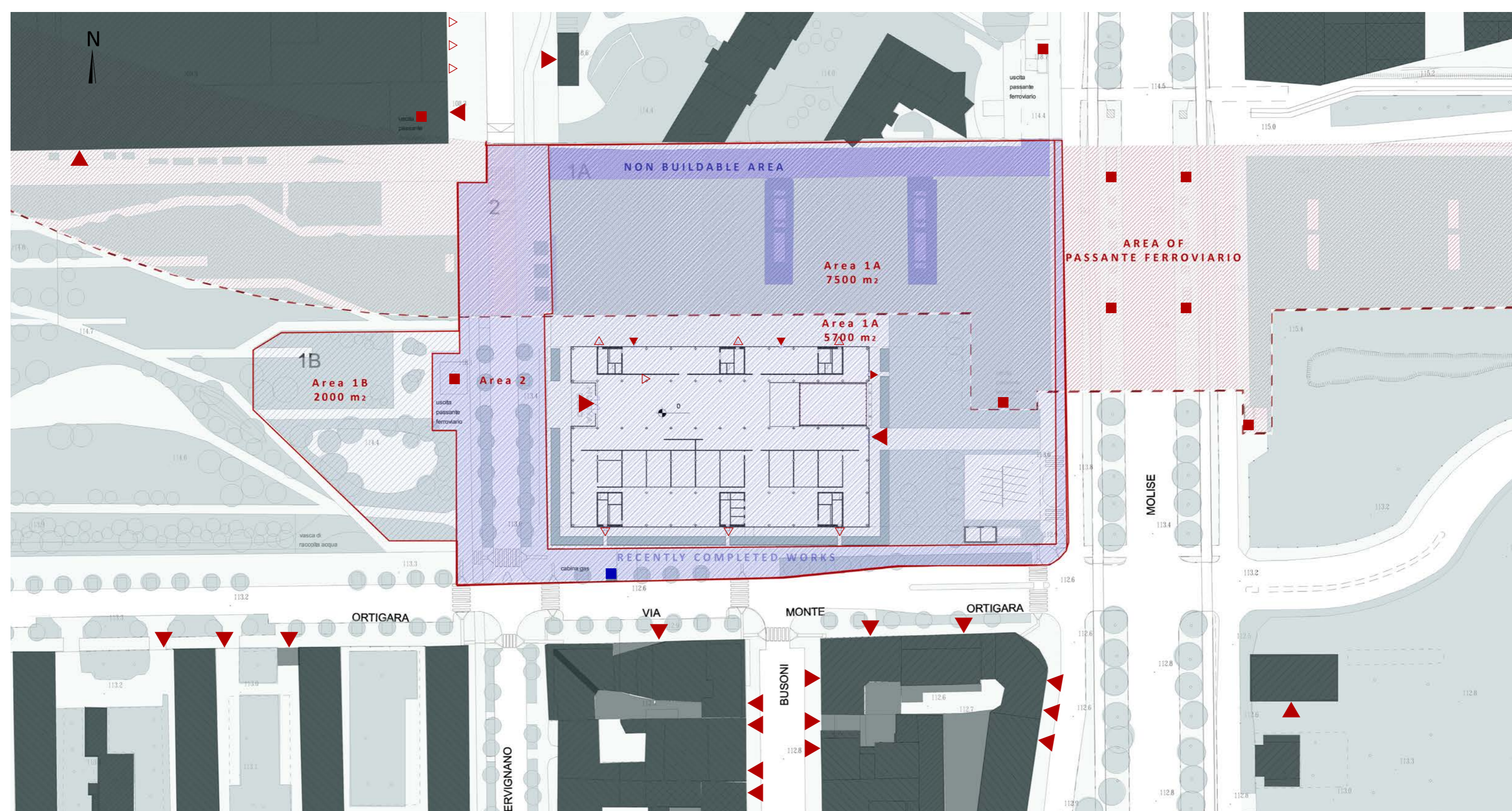
Conclusion

The south and west facades of the building are protected from urban noise and overheating of the building's surfaces due to a row of planted trees along the roads, which helps support the sustainable design strategy. It also creates some obstacles to recognize the building and to identify the main entrance to the building. The East facade also lies along an urban inter-district road and needs additional protection from noise pollution by planting rows of trees.

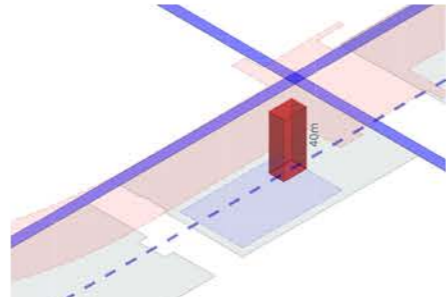
The main entrances to the building are located along the prevailing axis. Additionally, visitors can access the building through commercial, terraces and other doors on the north and south sides.

To conclude our analysis, we identified the North and East facades as the most visually "readable" surfaces. Emphasized vertical elements on North, West and East side help to specify the location of the Tower inside the building and its relationship with the outer shell.

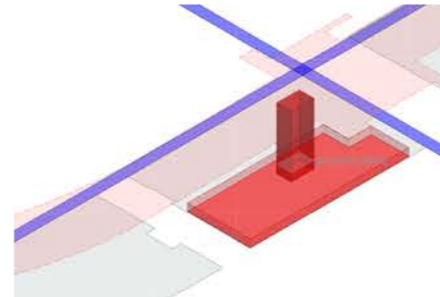




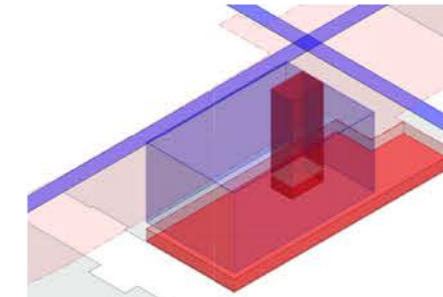
A 'golden' RECTANGLE within the buildable area leaving the north plot open for green continuity



LANDMARK on the E-W axis parallel to Corso XXII Marzo and aligned with the park



EMERGING FROM THE GROUND
New Landmark having roots underground



SENSE OF LIGHTNESS
Contrary to the rooted landmark, facade is suspended

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- MASTERPLAN LEGEND:**
- Border of passante ferroviario
 - Limits of the feasibility of project as shown on Nuova B
 - ▲ Main entrance
 - ▼ Secondary entrance
 - ◀ Service entrance
 - ▶ Exit of passante ferroviario
 - Gas cabin

LIBRARY

Figure 23: Feasibility Limits
Figure 24: Conceptual Design



*passante ferroviario exit
uscita passante ferroviario

*passante ferroviario exit

uscita passante ferroviario

*passante ferroviario exit
uscita passante ferroviario

*Porta Vittoria Station exit

VIA CERVIGNANO

1B
Parco 8 Marzo

VIA MONTE ORTIGARA

VIALE MOLISE

MOLISE

ORTIGARA

VIA

BUSONI

MONTE

ORTIGARA

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N

2

LIBRARY: Architectural Design

riglie

riglie

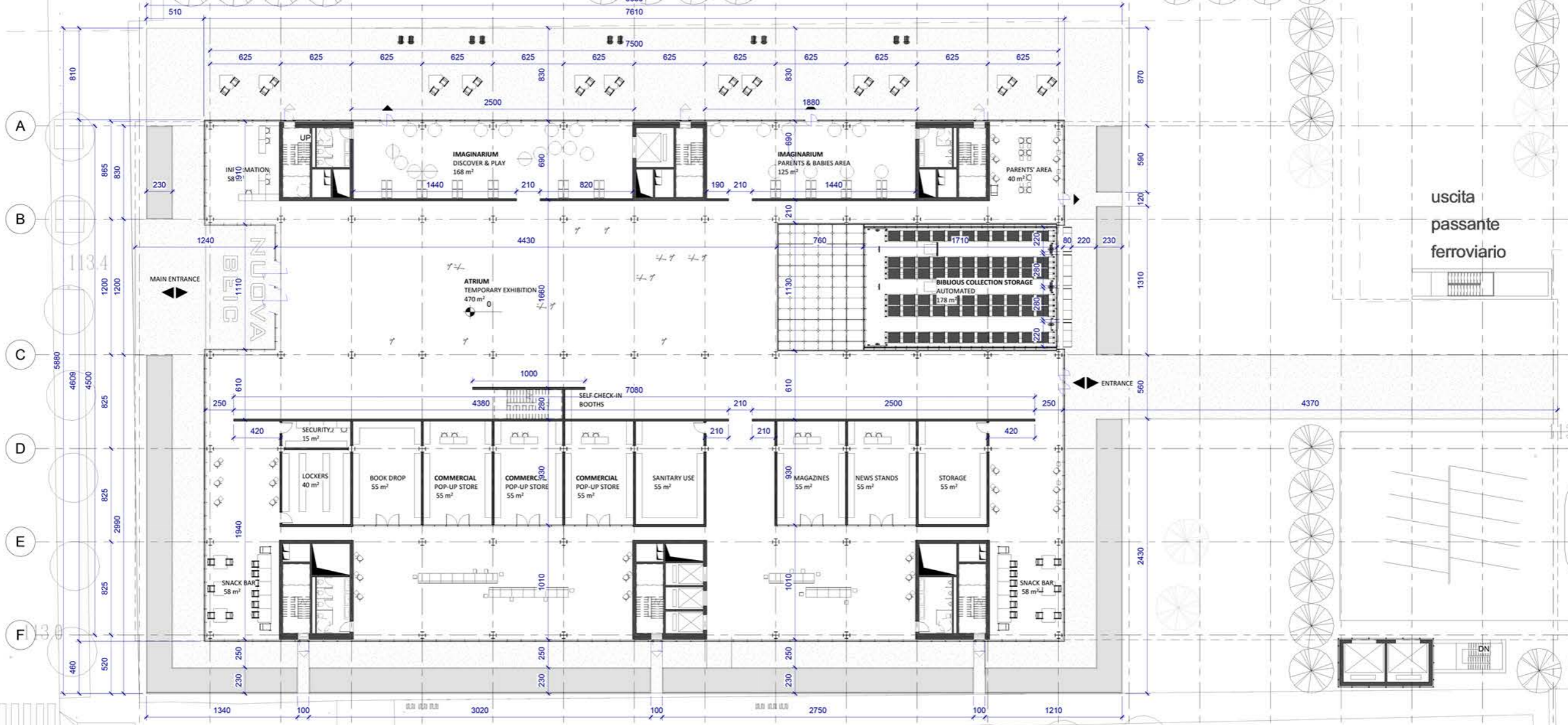
114.2

115.1

115.0

114.6

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21



uscita
passante
ferroviario

uscita
passante
ferroviario

MAIN ENTRANCE

ENTRANCE

cabina gas

112.6

112.6

VIA

MONTE

ORTIGARA

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Figure 26: Ground Floor Plan



Crowds visiting the new Parco 8 Marzo perceive the northern park of the library as an extension of this public space. While the northern side is a vast garden immersed in greenery, a linear water feature runs along the southern side and by the main entrances, that is thought of as a permeable barrier; one which controls the access points to the library, but also brings coolness, lightness and freshness to the south perimeter which faces a denser, taller urban condition.



The main entrance aligns with the path from the park and the entrance/exit points of the planned *passante ferroviario* project, and is perceived by the indent on the façade, the width of which is determined by the main element of the composition.

Upon entry the Tower of Books appears as a monument in the distance. The atrium space is an interior urban square on the ground level, from where the height of the Tower can be appreciated.

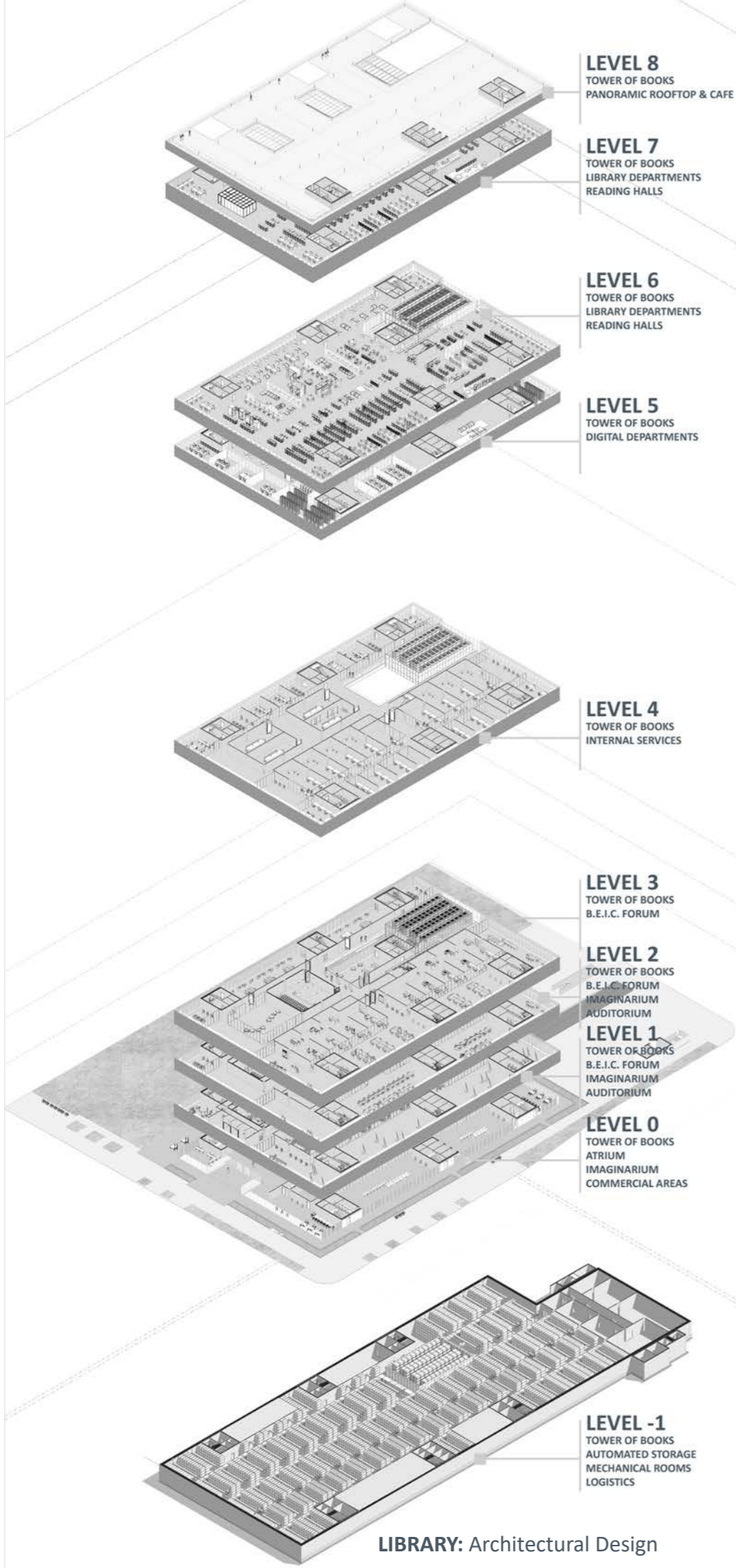
Walking across the atrium, visitors reach the excavated area in front of the Tower where the 'roots' underground can be observed, the movement of automated machinery inside can be noticed, and how technology can enhance the book-holding capacity of a library can be understood by experience.

While the atrium is closely about the Tower, defined by its measures and enclosed by long walls, the sides offer uninterrupted views to the west, connecting once again to the wider public space that is the park.



Figure 27: Building Perimeter

Figure 28: The Atrium from ground level



The program is based on the Nuova B.E.I.C. competition brief. The strength of the brief is the ability to target and quantify areas that will bridge the gap between digital and analog, between cultures and promote lifelong learning.

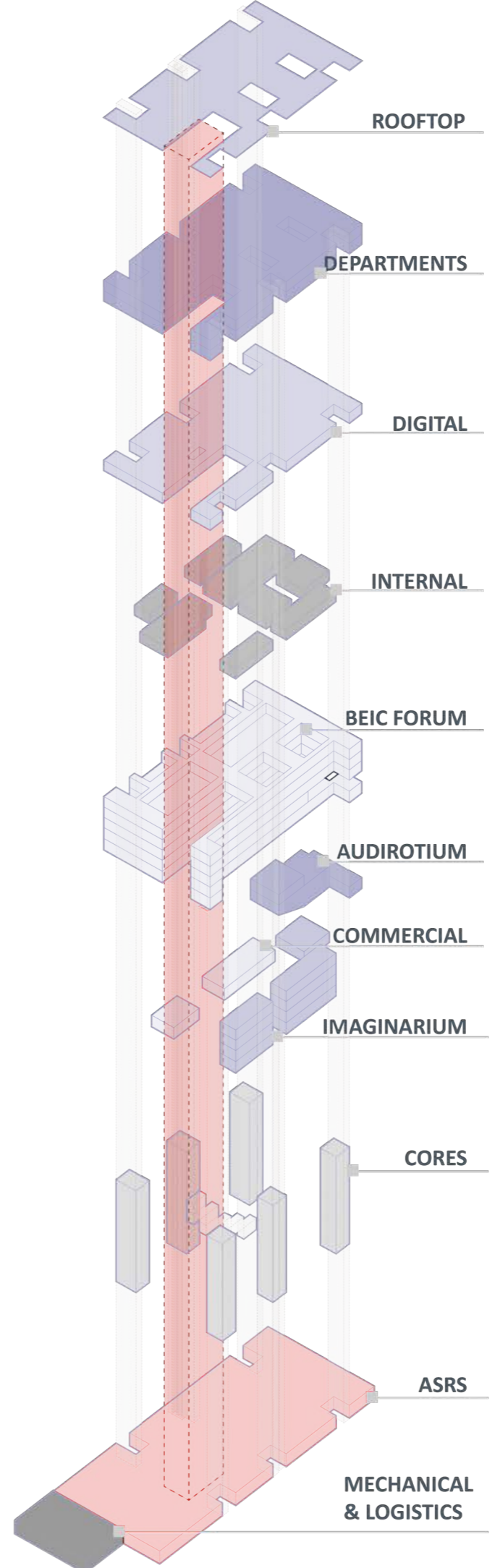
Deviations from the original program of the competition are introduced. The spine of the program is the automated central storage system running through every floor, that is the Tower of Books. At times it reminds one of a sculpture, at times it is a place marker to read around.

Places like the Imaginarium (area dedicated to children) need access to the outdoors, such as the northern park, and commercial areas that rely on street interaction to generate income are placed on the ground level; so that they have maximum visibility.

The auditorium is not so much an independent body but a pole of the building opposite the Tower, with a distinct view of the atrium space from the foyer.

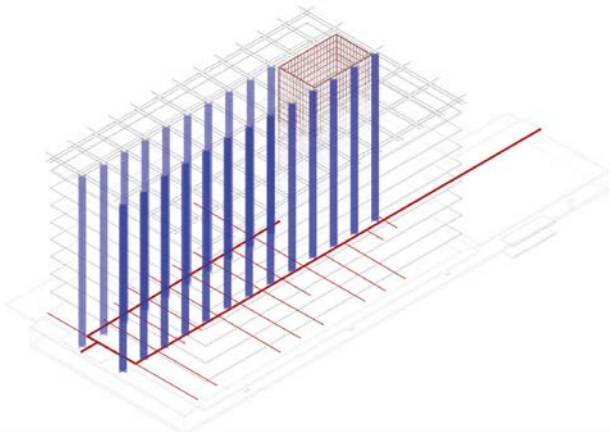
The spine is fixed and dense, while the perimeter is dynamic and fluid. This approach is applied to both production spaces of the B.E.I.C. Forum--where a 'flexible space' accompanies a specific use laboratory--and the reading spaces that benefit from the free-standing position of the library.

Another reinterpretation of the program is the addition of a panoramic terrace on the rooftop that gives visitors a different perspective of their surroundings and a chance to dialog with the city.



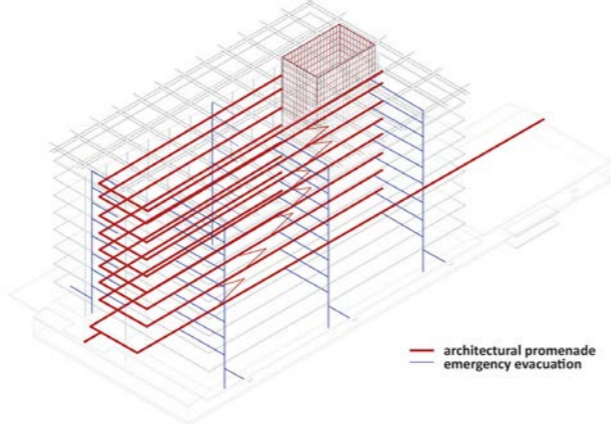
PROGRAM	
B.E.I.C. REQUIREMENTS	PROJECT PARAMETERS
FUNCTION: PANORAMIC ROOFTOP	
AS PART OF DEPARTMENTS: Panoramic Room/Terrace	LEVELS: 8 AUXILIARY SPACES: Rooftop Bar Roof Garden TOTAL AREA: 2693 m ²
FUNCTION: LIBRARY DEPARTMENTS	
TOTAL AREA: 7700 m ²	LEVELS: 6,7 SEATS: 600 TOTAL AREA: 4986 m ²
FUNCTION: DIGITAL DEPARTMENTS	
TOTAL AREA: 1350 m ²	LEVELS: 5 SEATS: 185 TOTAL AREA: 2540 m ²
FUNCTION: INTERNAL SERVICES	
TOTAL AREA: 4600 m ²	LEVELS: 4 SEATS: 225 TOTAL AREA: 1449 m ²
FUNCTION: AUDITORIUM	
SEATS: 300 AUXILIARY SPACES: Backstage Control Room Dressing Rooms Rehearsal Rooms Storage Foyer Translation Booths Cloakroom	LEVELS: 1,2 SEATS: 170 AUXILIARY SPACES: Backstage Control Room Dressing Rooms Rehearsal Rooms Storage Foyer Translation Booths Cloakroom
TOTAL AREA: 1300 m ²	TOTAL AREA: 676 m ²
FUNCTION: IMAGINARIUM	
AUXILIARY SPACES: Reception Green Area Laboratories Drama Space	LEVELS: 0,1,2,3 AUXILIARY SPACES: Reception Green Area Laboratories Drama Space (85 seats)
TOTAL AREA: 1800 m ²	SEATS: 185+85 TOTAL AREA: 1317 m ²
FUNCTION: COMMERCIAL AREA	
TOTAL AREA: 1350 m ²	LEVELS: 0 STORES: 6 TOTAL AREA: 336 m ²
FUNCTION: B.E.I.C. FORUM	
AUXILIARY SPACES: Entrance (1600 m ²) Commercial (1350 m ²) Seating (2385 seats) Exhibition (150 l.m.) Pop-up stores Security Book-Drop Cloakroom	LEVELS: 0,1,2,3,4 AUXILIARY SPACES: Atrium/Gallery (469 m ²) Promenade (3570 m ²) Reception, Info and Flexible Areas (2076 m ²) Break Areas (1314 m ²) Laboratories and Multi-Media (2386 m ²) Pop-up stores Security Book-Drop Cloakroom
TOTAL AREA: 4300 m ²	TOTAL AREA: 9346 m ²
FUNCTION: AUTOMATED STORAGE	
CAPACITY: 2,500,000 volumes minimum estimated 30 units per box of 60x40x30cm	LEVELS: All levels BIBLIOS COLLECTION: 3564 boxes CONSUMABLES: 3982 m ² (6710 boxes) CAPACITY: 2,362,020 volumes in boxes + open shelves
FUNCTION: SERVICES	
RESTROOMS SANITARY USE SHAFTS STORAGE VERTICAL CIRCULATION	LEVELS: All RESTROOMS: 498 m ² SANITARY USE: 119 m ² SHAFTS: 365 m ² STORAGE: 200 m ² VERTICAL CIRCULATION: 1596 m ²
FUNCTION: LOGISTICS (INCOMING & OUTGOING VOLUMES)	
	LEVELS: -1 TOTAL AREA: 521 m ²
FUNCTION: MECHANICAL ROOMS	
	LEVELS: Level -1 TOTAL AREA: 568 m ²
SUMMARY	
TOTAL GFA: 30000 m ²	TOTAL GFA: 33406 m ² TOTAL SERVICE SPACES: 6916 m ² TOTAL SERVED SPACES: 26490 m ² RATIO: 26%

Figure 29: Program



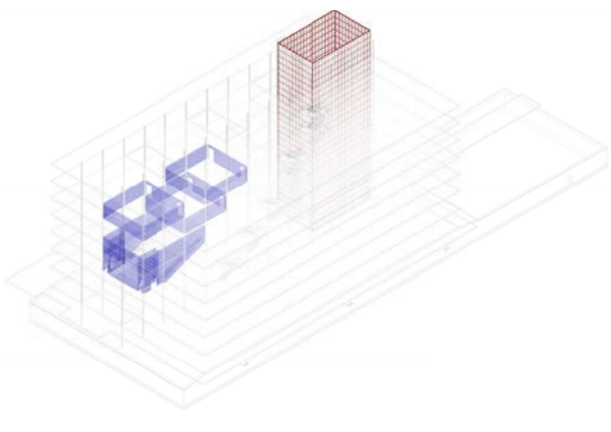
SPATIAL ORGANIZATION

King Cross columns define the atrium space as well as the orthogonal spatial organization, while their rhythmic repetition and shape aid with wayfinding.



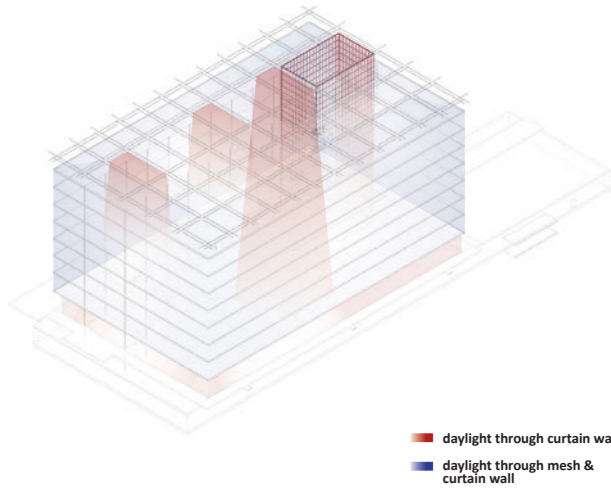
CIRCULATION

The flow of people is concentrated to the edges along the atrium void so that the inner public square on the ground level is carried to the upper levels. There is movement and vibrancy.



HIERARCHY

Large gathering spaces are placed opposite the Tower of Books to counterbalance its presence.



DAYLIGHT

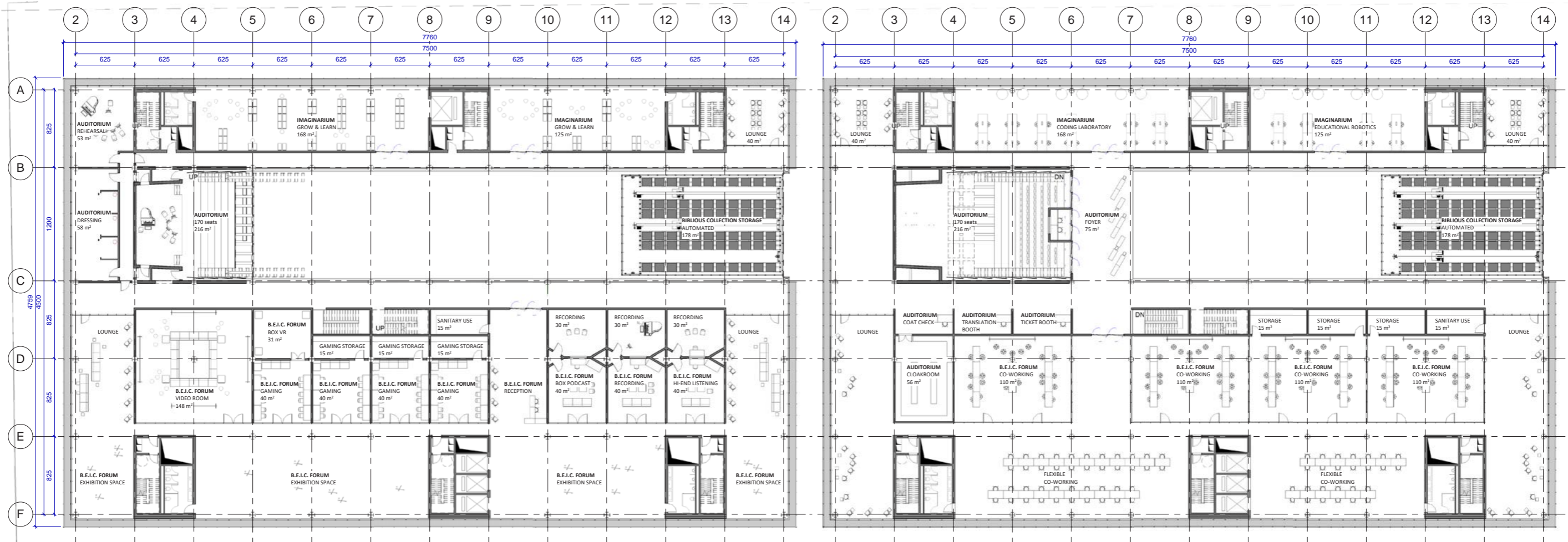
Most of the reading spaces are concentrated on the north side. Skylights are found above the reading rooms as well as the atrium, giving these spaces specific lighting conditions.

Figure 30: Spatial Organization





LIBRARY: Architectural Design



LEVEL 1 FLOOR PLAN

LEVEL 2 FLOOR PLAN

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RENDERING - Auditorium
view from Level 2



RENDERING - Auditorium
view from Level 2

The void of the atrium changes with respect to height. This creates the sensation of being 'compressed' in the first bay, and then gradually released into the atrium. The inclined floor of the auditorium draws visitors in.

Figure 32: Level 1 Floor Plan
Figure 33: Auditorium Renderings

Figure 34: Level 2 Floor Plan



LIBRARY: Architectural Design

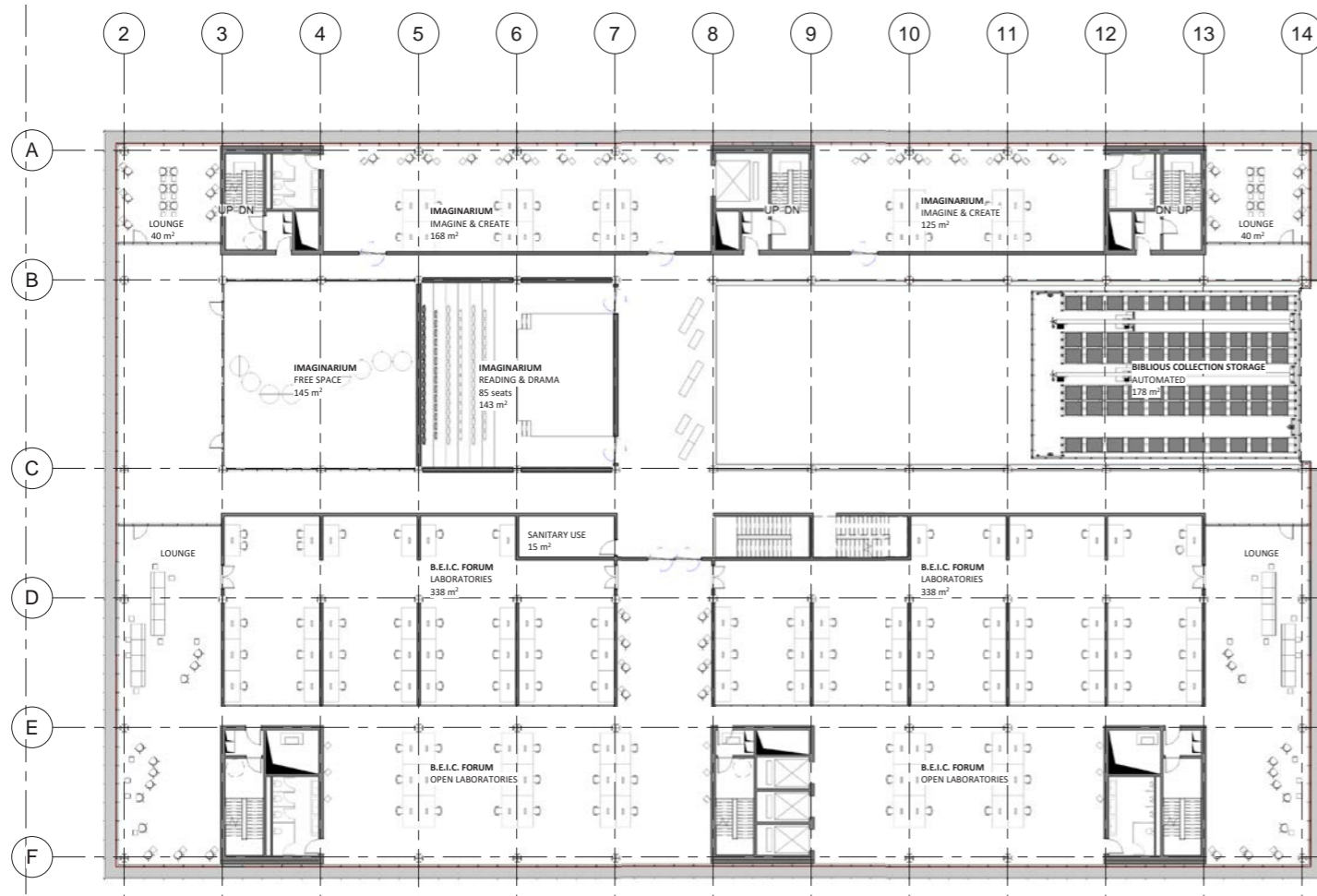


Figure 35: Level 3 Floor Plan



Figure 36: Level 4 Floor Plan

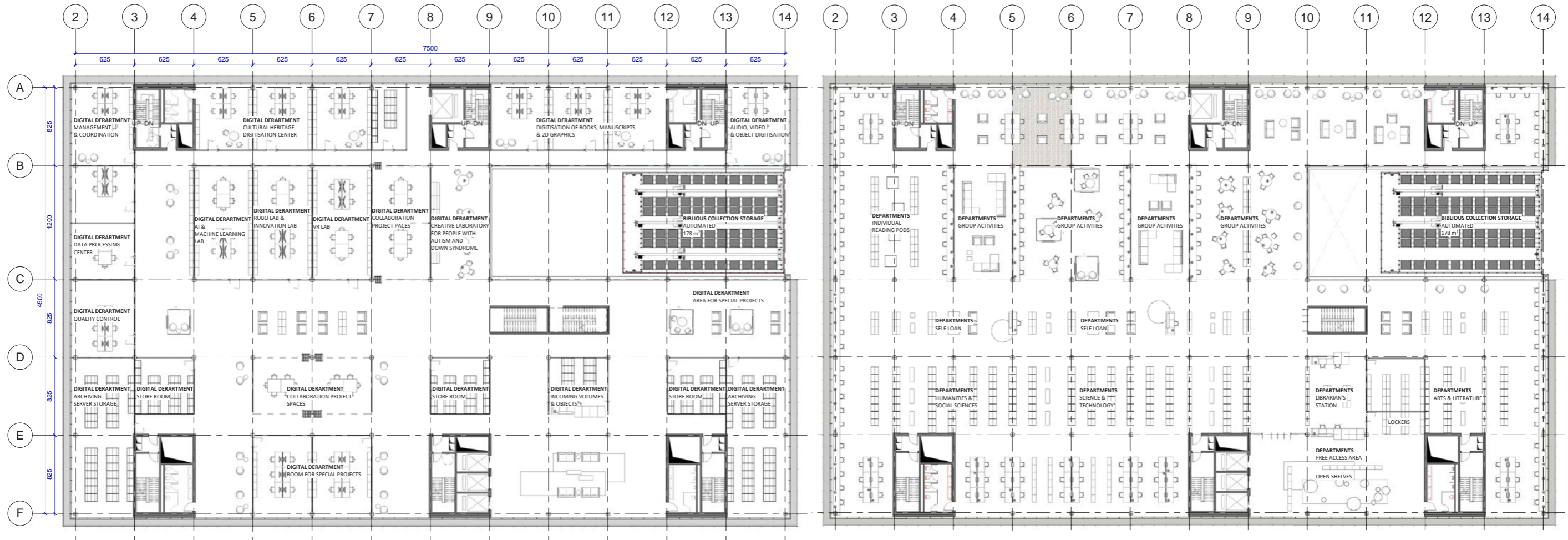
original drawing scale of plans 1:200
scale percentage on page: 45%

The grid layout offers advantages in tailoring the spaces based on expected occupancy. While larger common spaces are found on the lower floors, Levels 3 and 4 are dedicated to laboratories and offices where users can work on their stations but also turn around to group. It also allows for climatic control over different programs.

Louder gathering, multimedia and gaming areas are on lower levels. Quieter, more lit levels are reserved for extended working or reading.



LIBRARY: Architectural Design



LEVEL 5 FLOOR PLAN

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scale percentage on page: 45%



RENDERING - Library group activities area
view from Level 6



RENDERING - Library group activities area under skylights
view from Level 6

Compared to the lower floors,
the upper library spaces are more
open. This is one of the ways
in which integration between
departments is encouraged.

Figure 37: Level 5 Floor Plan
Figure 38: Renderings of Library Spaces

Figure 39: Level 6 Floor Plan



LIBRARY: Architectural Design



LEVEL 7 FLOOR PLAN

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scale percentage on page: 45%

Reading spaces are scattered along the perimeter while the storage and shelving areas are on the south side where there is not much daylight. Although the floor plan is open, different conditions characterize the sub-areas of the reading halls. Reading while facing the park, reading under skylights, reading in a group, reading by the voids, reading by the Tower, consulting books are examples of such conditions.

Access to the Tower of Books for calling/returning books is granted to the librarians. The machinery delivers the box with a particular book, the librarian picks up by opening the operable panels of the Tower's facade, and scans the book.

The crown of the building is the rooftop space, where one can capture a different view of the city. The Tower of Books passes through this space as well, being the tallest element in the composition and the tallest element on a flat open lot that is clearly identified from the within and outside the building. Its effect is seen most clearly on the east façade.



RENDERING - Library reading stations
view from Level 7

Figure 40: Level 7 Floor Plan
Figure 41: Rendering of reading stations

Figure 42: Rendering of Panoramic Terrace
Figure 43: Library in Context



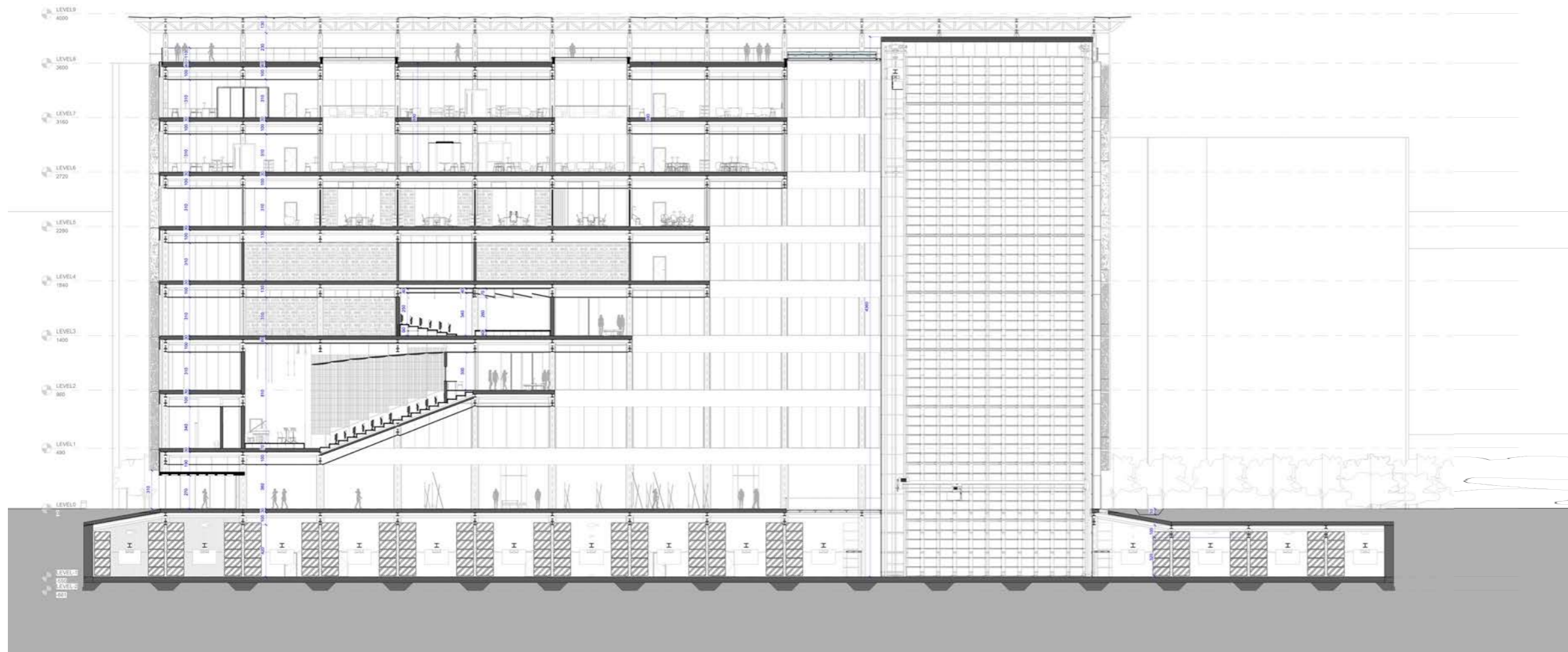
LIBRARY: Architectural Design

The changing void of the atrium with respect to height ensures that the ground floor is a continuation of the public realm, and most floor space is given to the programs like offices, laboratories and reading halls.

The atrium is an occasion for temporary exhibitions as well, which will allow the library join the link of cultural institutions in the area and participate in the *Artepassante* project.

Figure 58: Transverse Section

LIBRARY: Architectural Design



LONGITUDINAL SECTION - through the atrium

Much like the libraries reinventing themselves, the façade is a reinterpretation of the *tripartite* organization seen throughout Milan. To convey that it is a public building, and to ensure flow between the streets and the atrium, the ground floor is glazed with curtain walls.

Starting from Level 1, a second layer of perforated aluminium panels filter the light coming in.

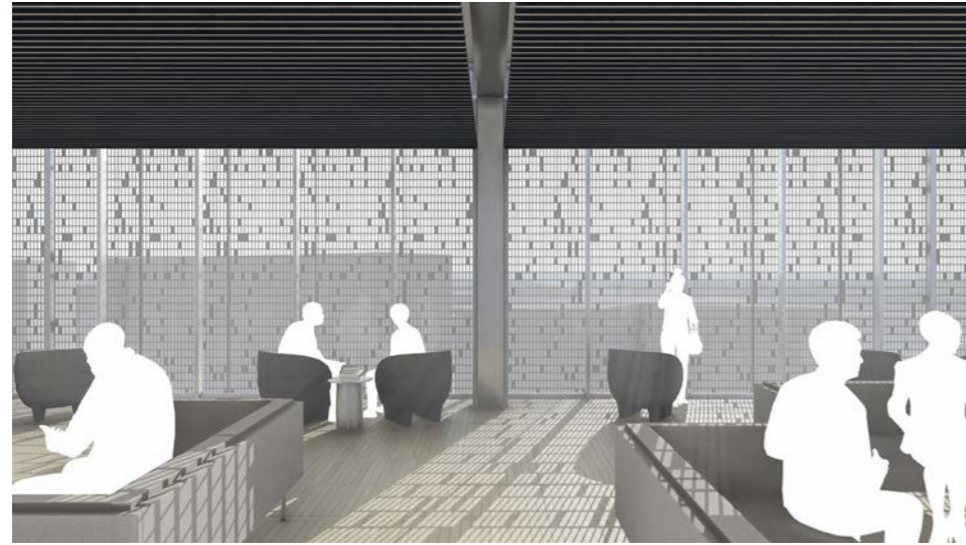
The building is complete with a canopy that seems to float, covering the panoramic terrace. The thin canopy, exposed steel and aluminium panels give a sense of 'lightness' which is different than the feeling of strong presence and density given by the stone cladding of the Tower.



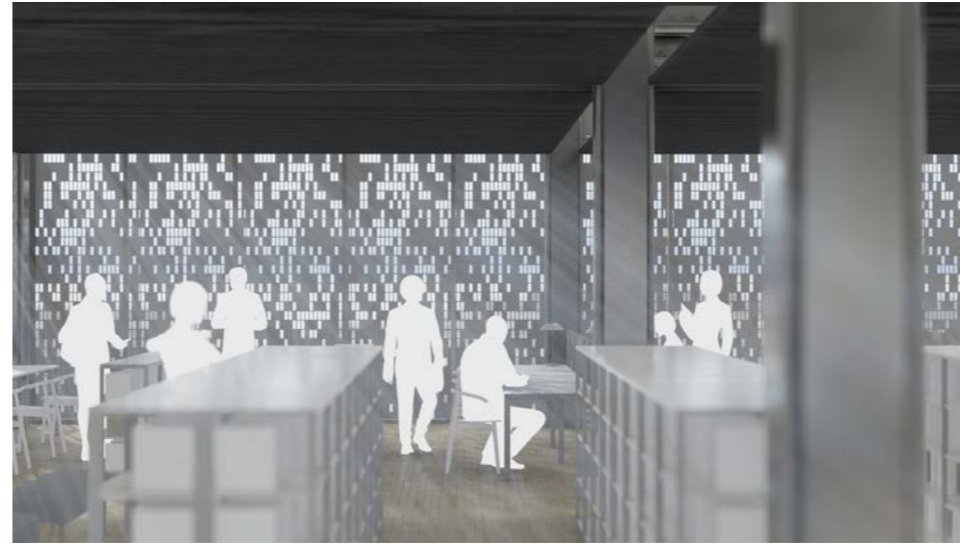
SOUTH ELEVATION

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Figure 45: Longitudinal Section
Figure 46: South Elevation



RENDERING - Library along north facade



RENDERING - Library along south facade

Varying degrees of opacity of the façade provide shade from solar radiation.



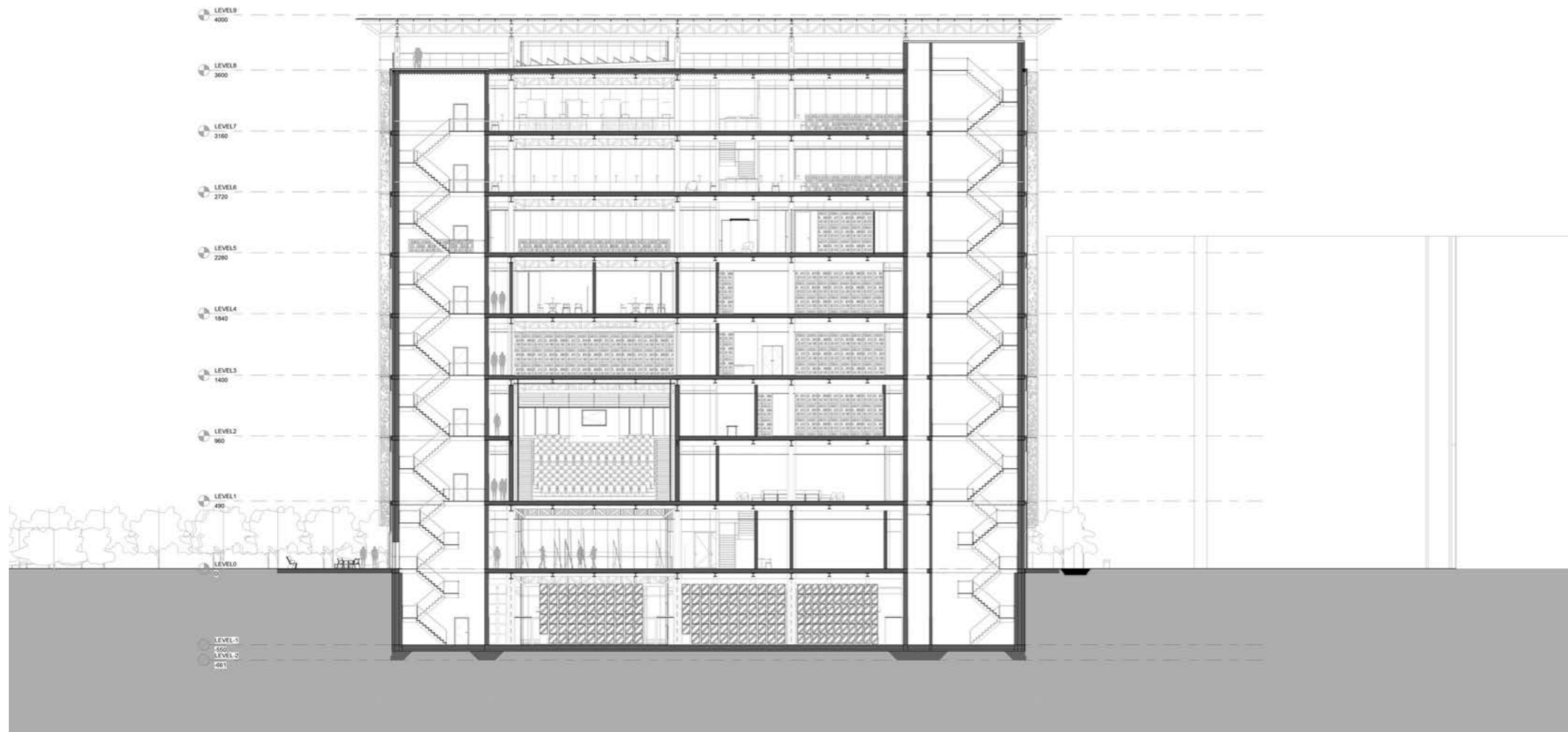
NORTH ELEVATION

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Figure 47: Renderings of varying conditions
Figure 48: North Elevation

The façade is perceived as a whole but subtle variations such as in the parametric perforation of the panels chosen, make it work with both the outer world and the inner world.

LIBRARY: Architectural Design



TRANSVERSE SECTION - through the auditorium

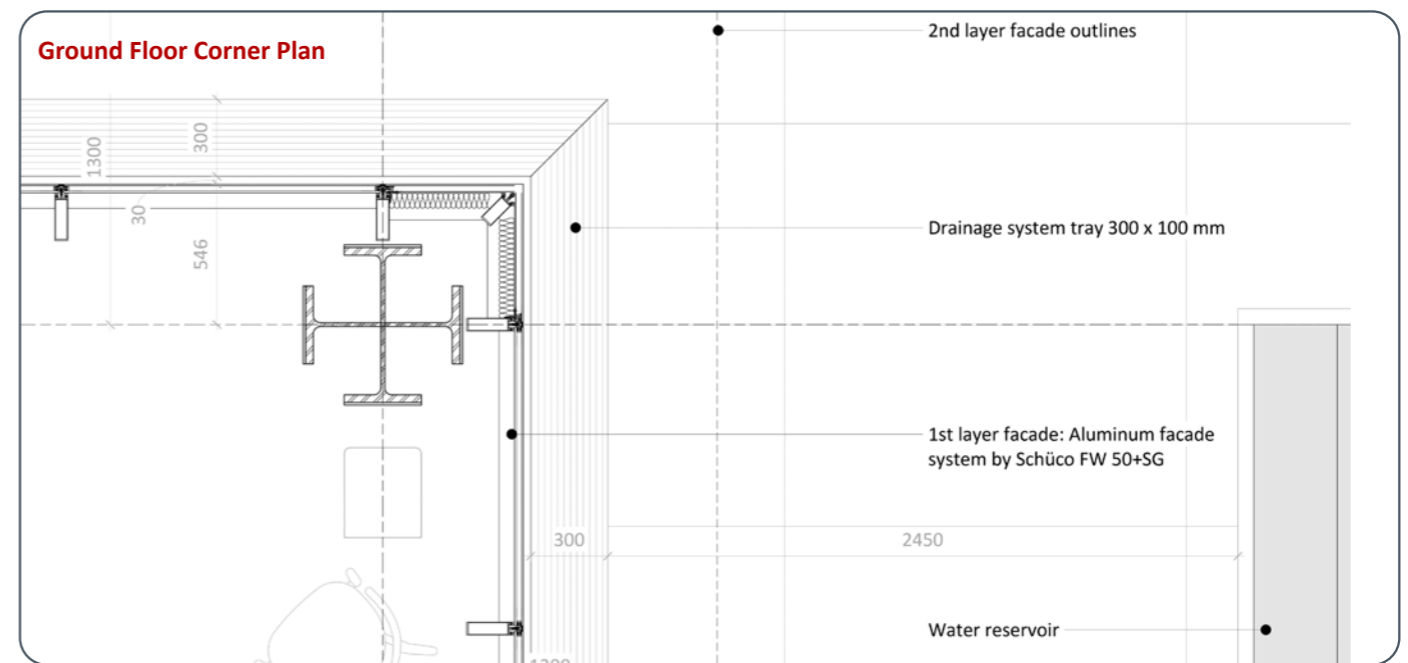
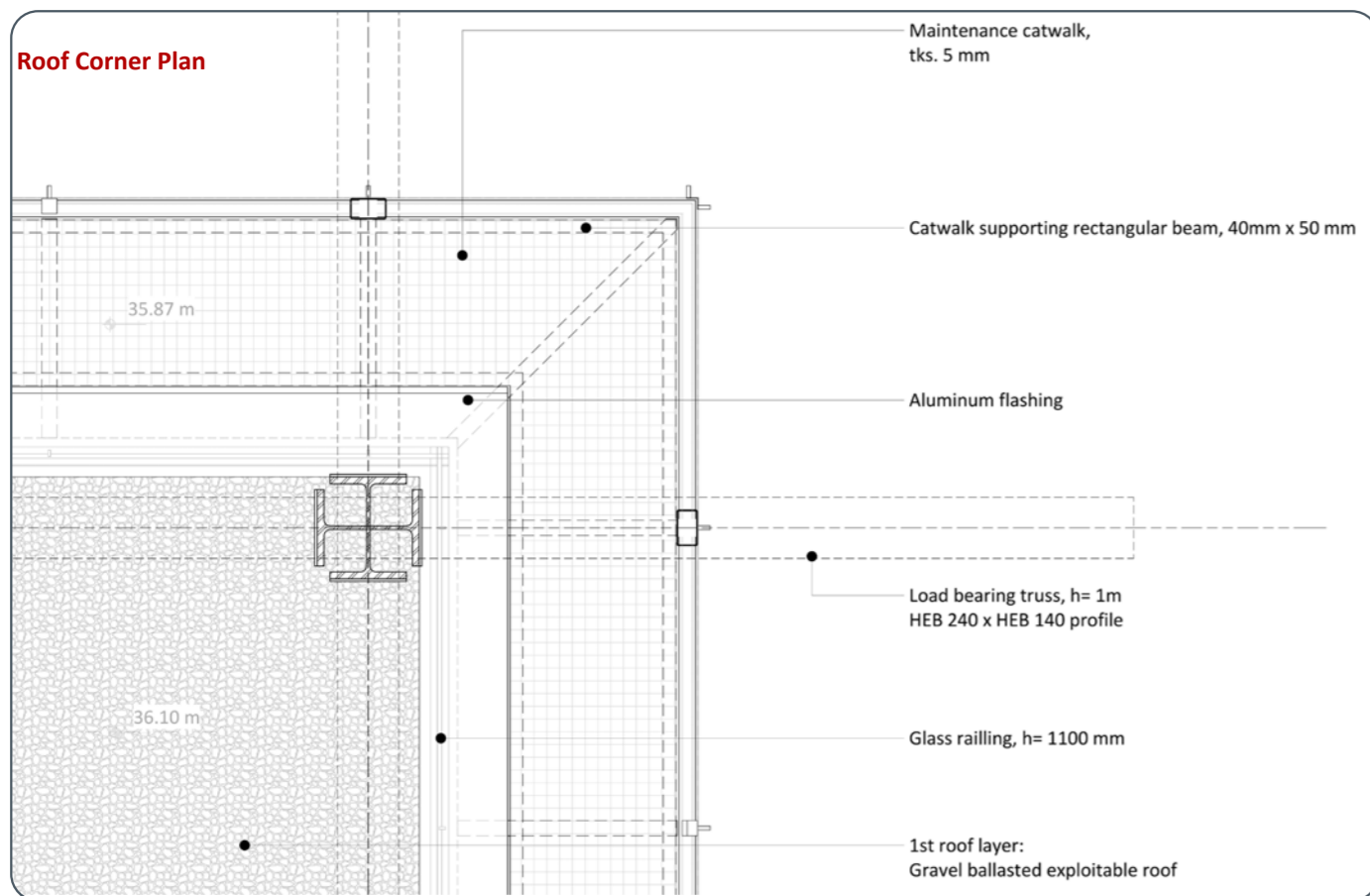
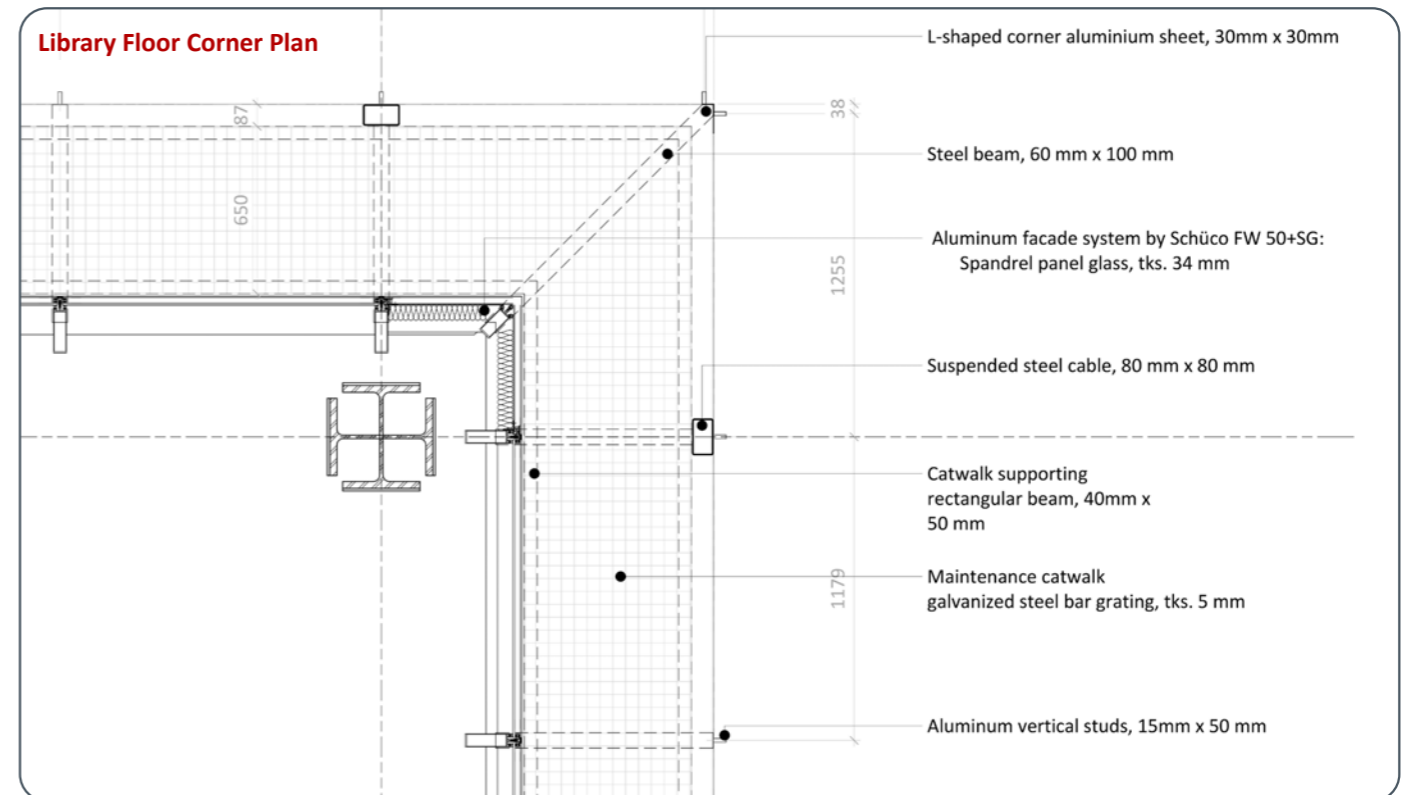
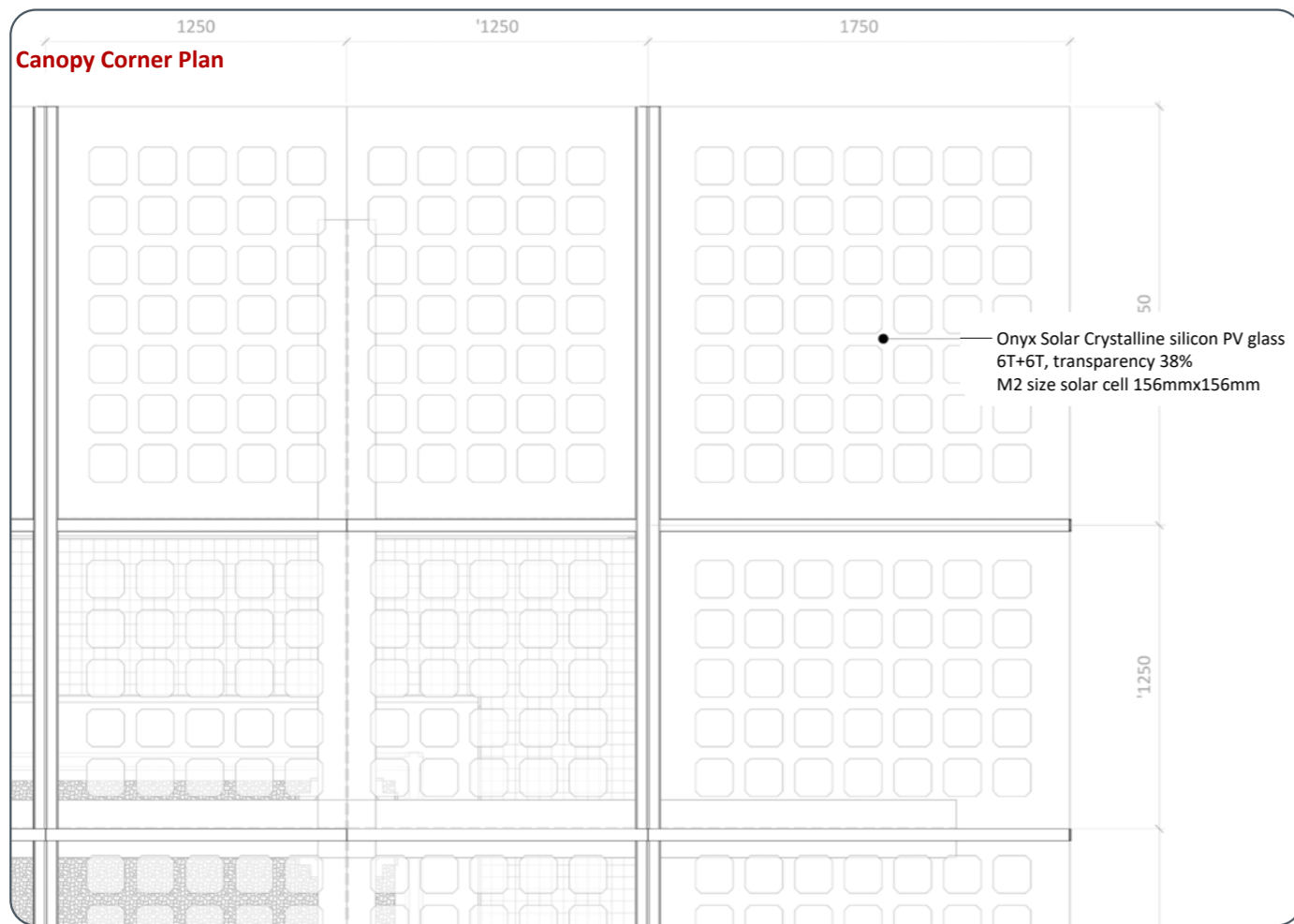


WEST ELEVATION

original drawing scale 1:200
scale percentage on page: 50%

The terrace is accessed by the stairwell or elevators of the southern cores. It is thought of as a new meeting place in the city and a new environment to read in Milan.

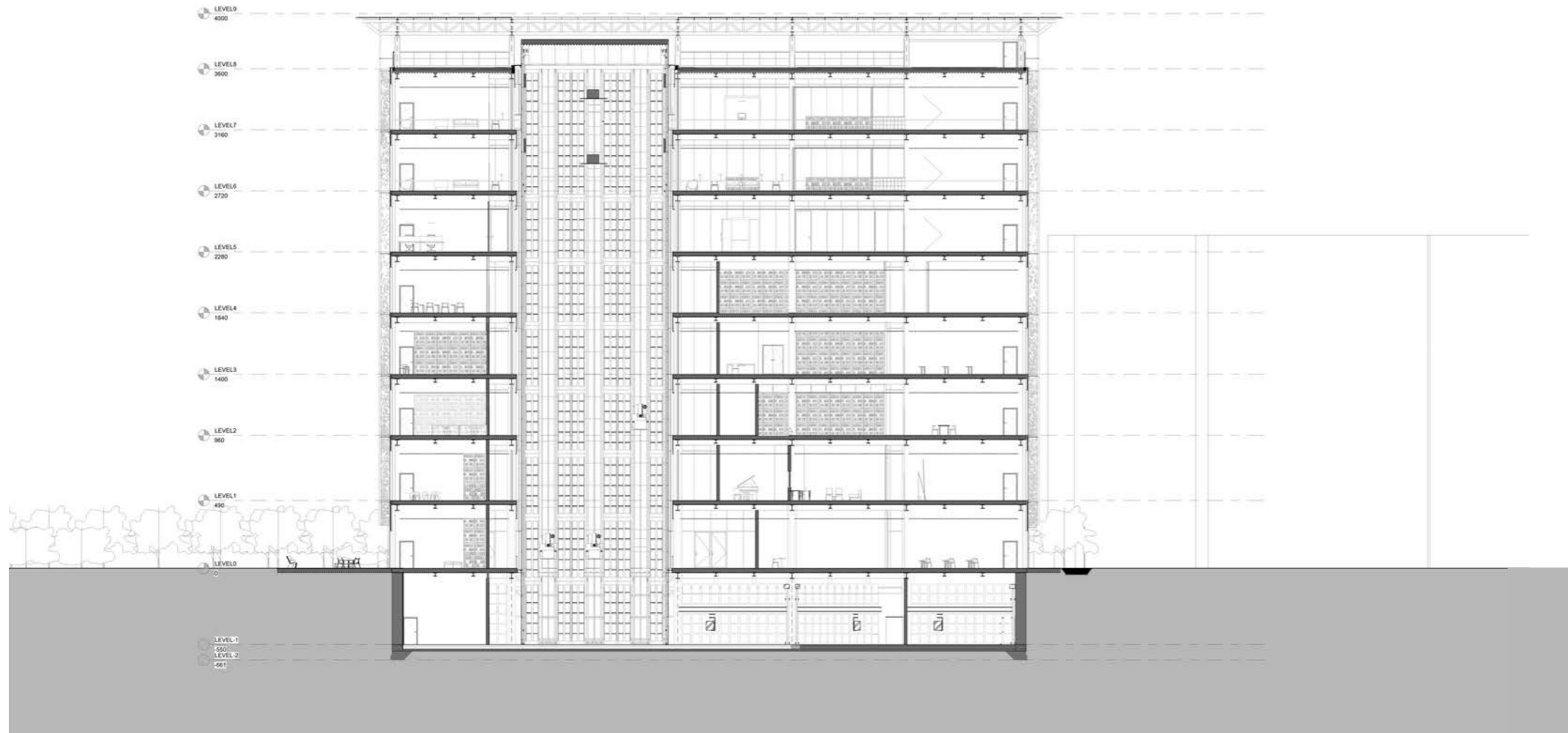
Figure 49: Transverse Section through cores
Figure 50: West Elevation



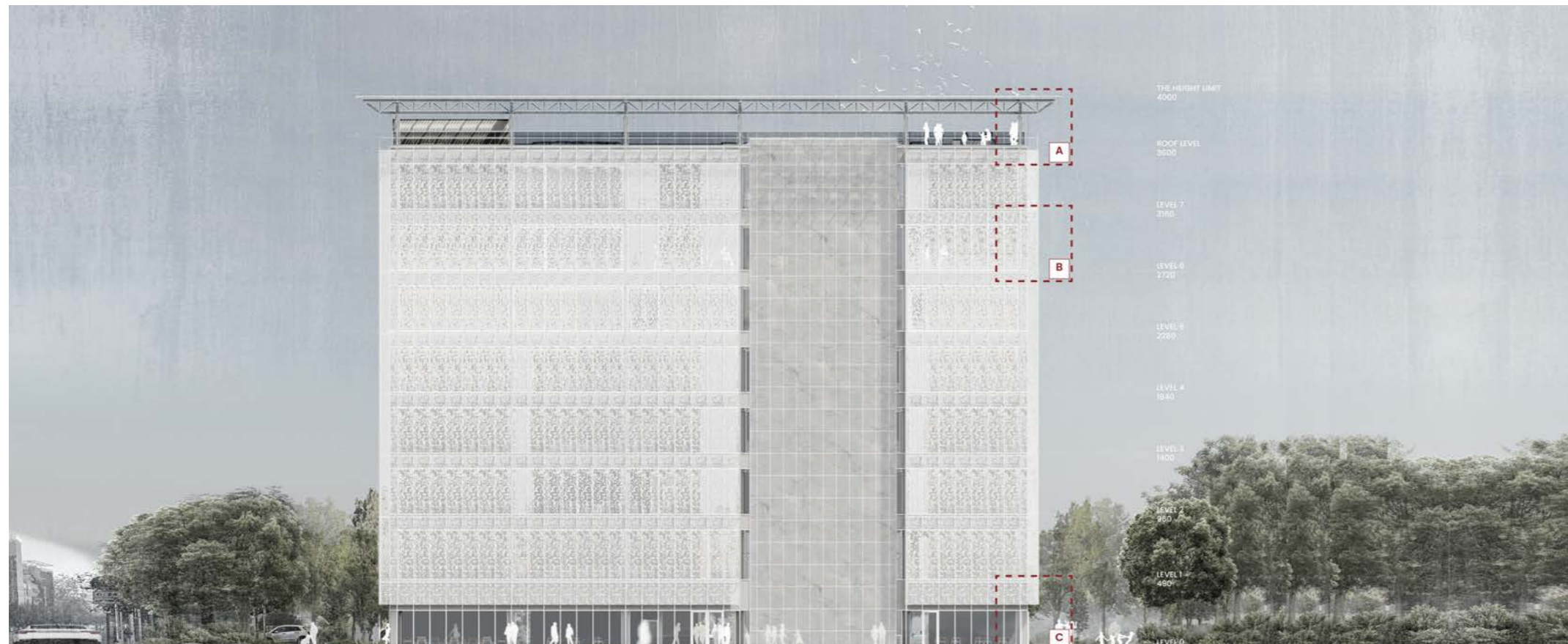
original drawing scale 1:25
scale percentage on page: 85%

Figure 51: Corner Details

LIBRARY: Architectural Design



TRANSVERSE SECTION - through the Tower of Books

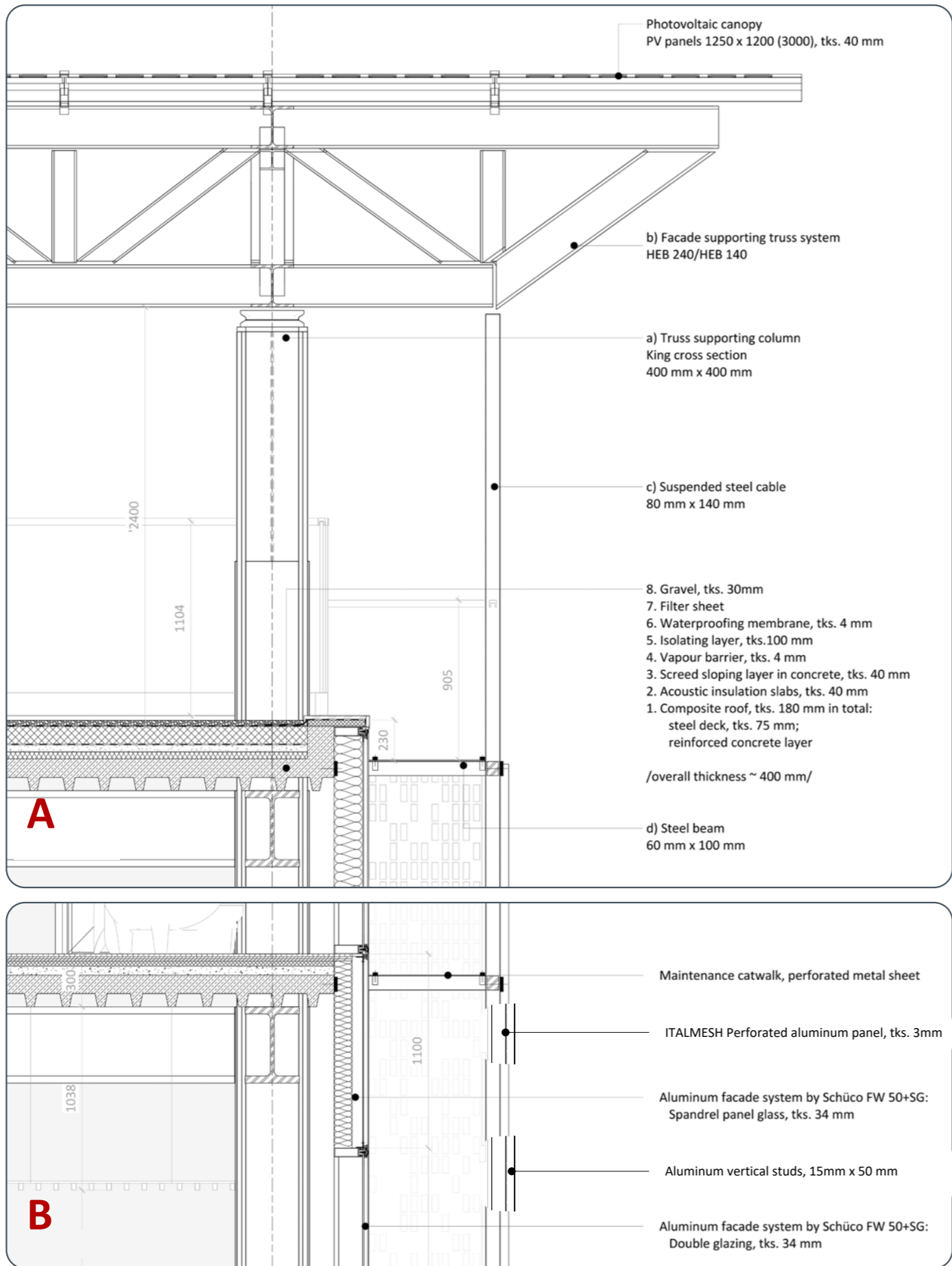


EAST ELEVATION

original drawing scale 1:200
scale percentage on page: 50%

The exception is on the east facade where the perforated panels are discontinued to show the Tower of Books, with its own stone cladding.

Figure 52: Transverse Section through the Tower
Figure 53: East Elevation



original drawing scale 1:25
scale percentage on page: 85%

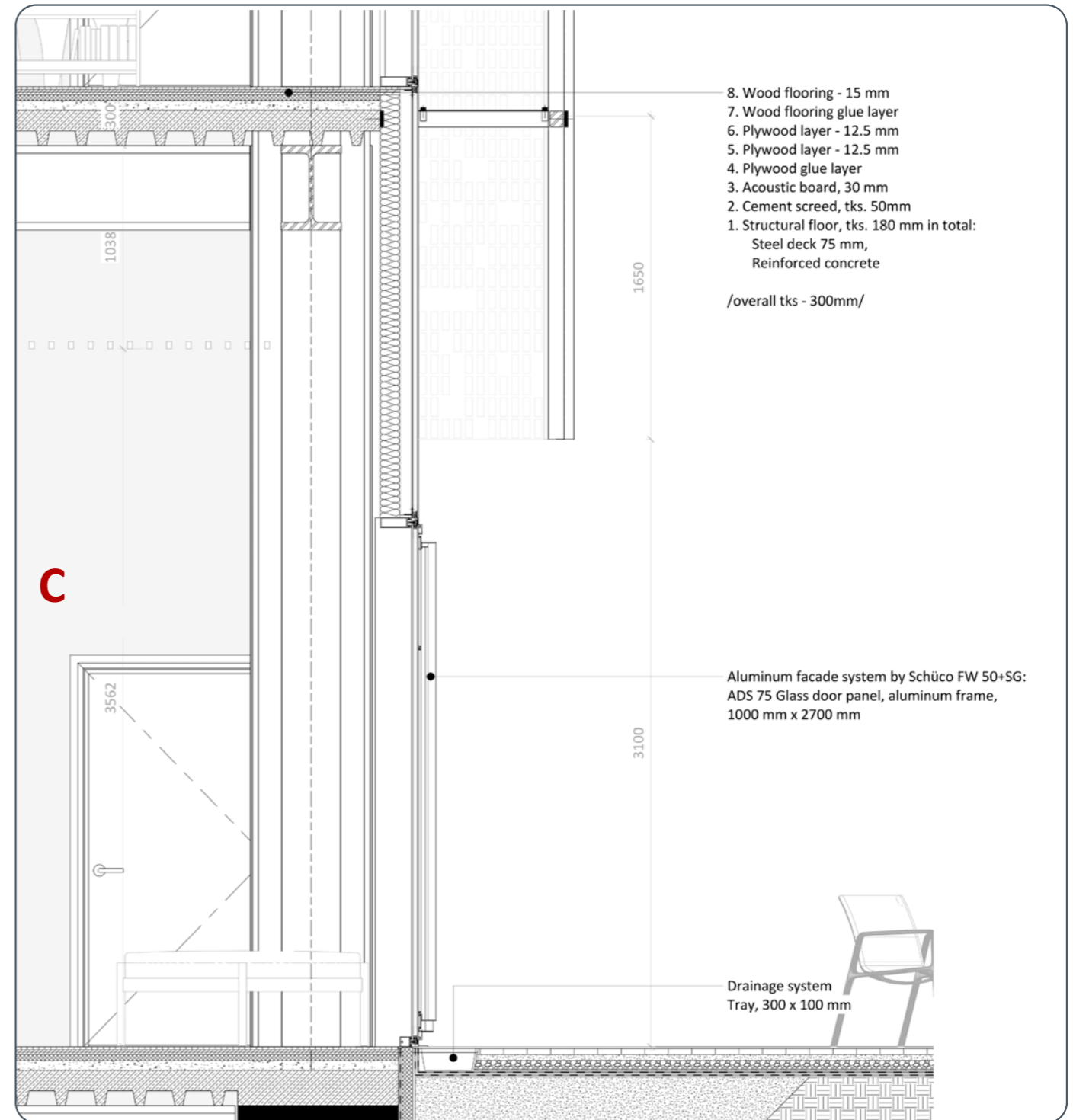
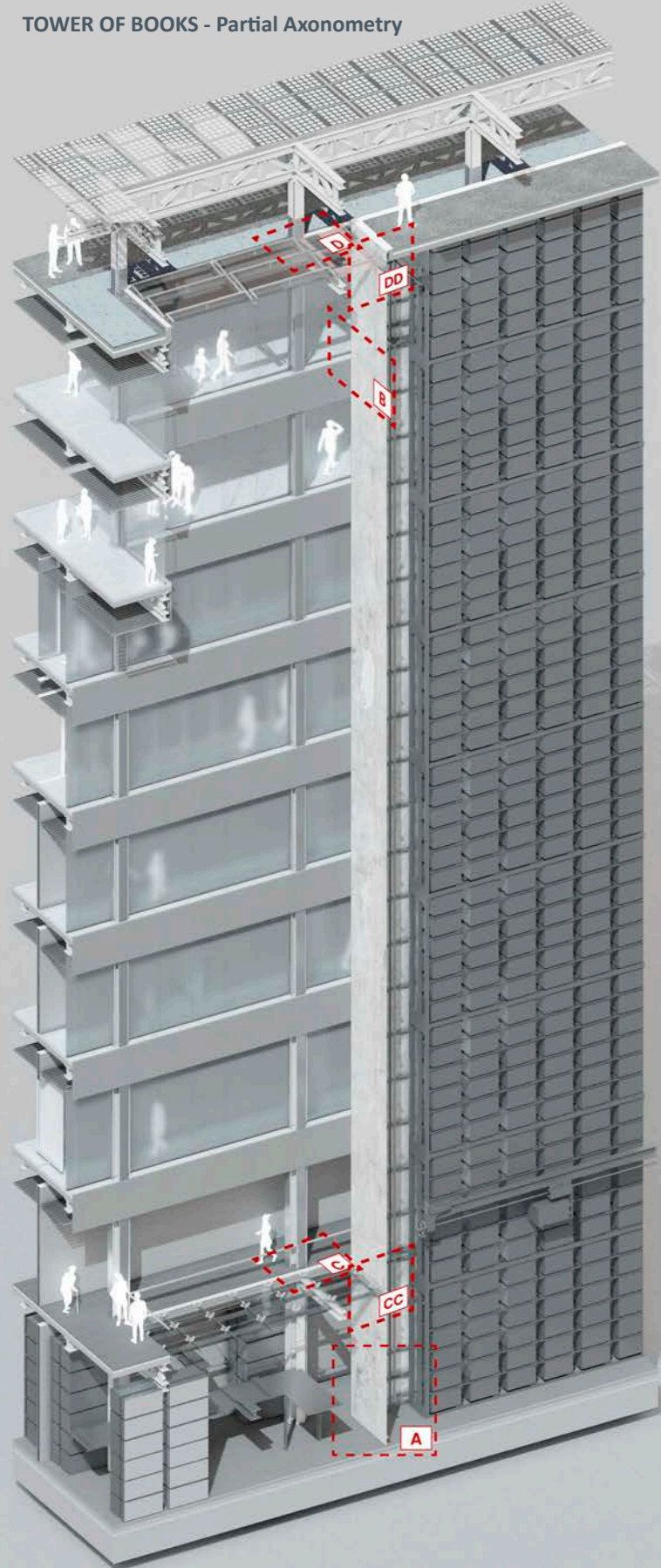


Figure 54: Façade Section Details



Figure 55: East façade view of underground from outside, and entrances

TOWER OF BOOKS - Partial Axonometry



original drawing scale 1:25
scale percentage on page: 85%

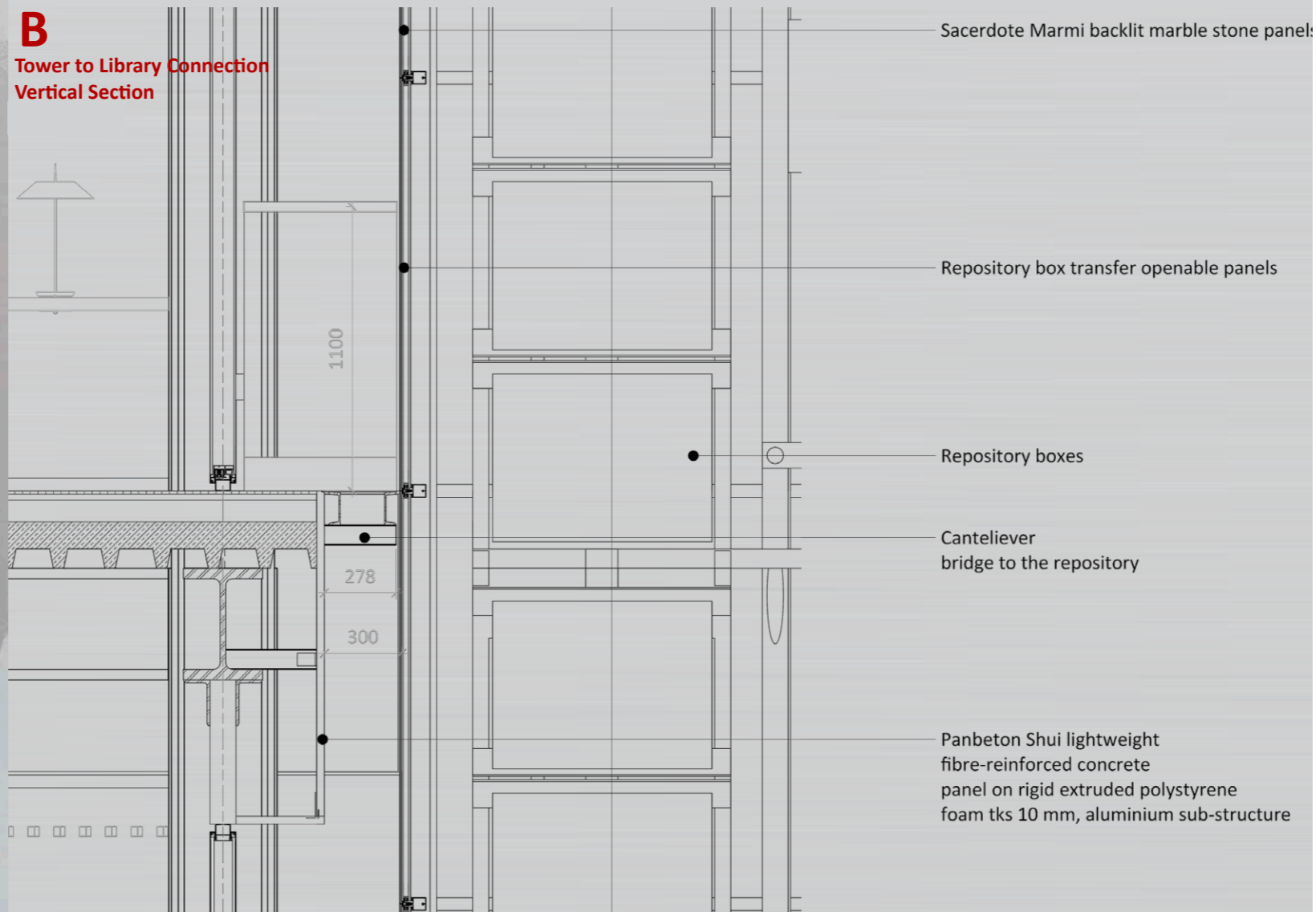
A
Tower Panel



Stone Panel Stratigraphy
4mm clear glass panel
5mm carrara marble stone panel
8mm clear glass panel
20mm air gap
6mm clear glass panel
/overall thickness 43mm/



B
Tower to Library Connection
Vertical Section



Sacerdote Marmi backlit marble stone panels

Repository box transfer openable panels

Repository boxes

Cantilever bridge to the repository

Panbeton Shui lightweight fibre-reinforced concrete panel on rigid extruded polystyrene foam tks 10 mm, aluminium sub-structure

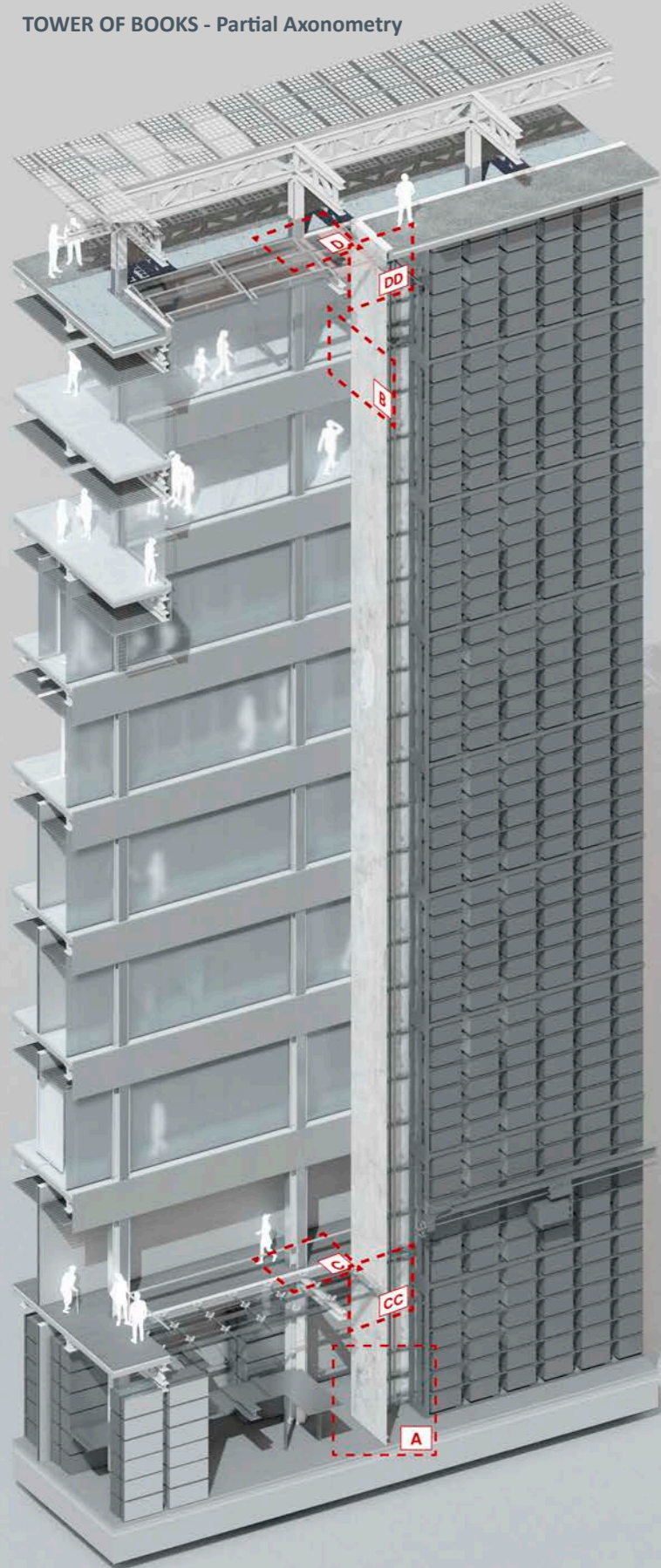
To collect the books from the boxes, the librarian stands on the 'cantilevered bridge to repository'.

The slab edges are covered with fibre-reinforced concrete panels.

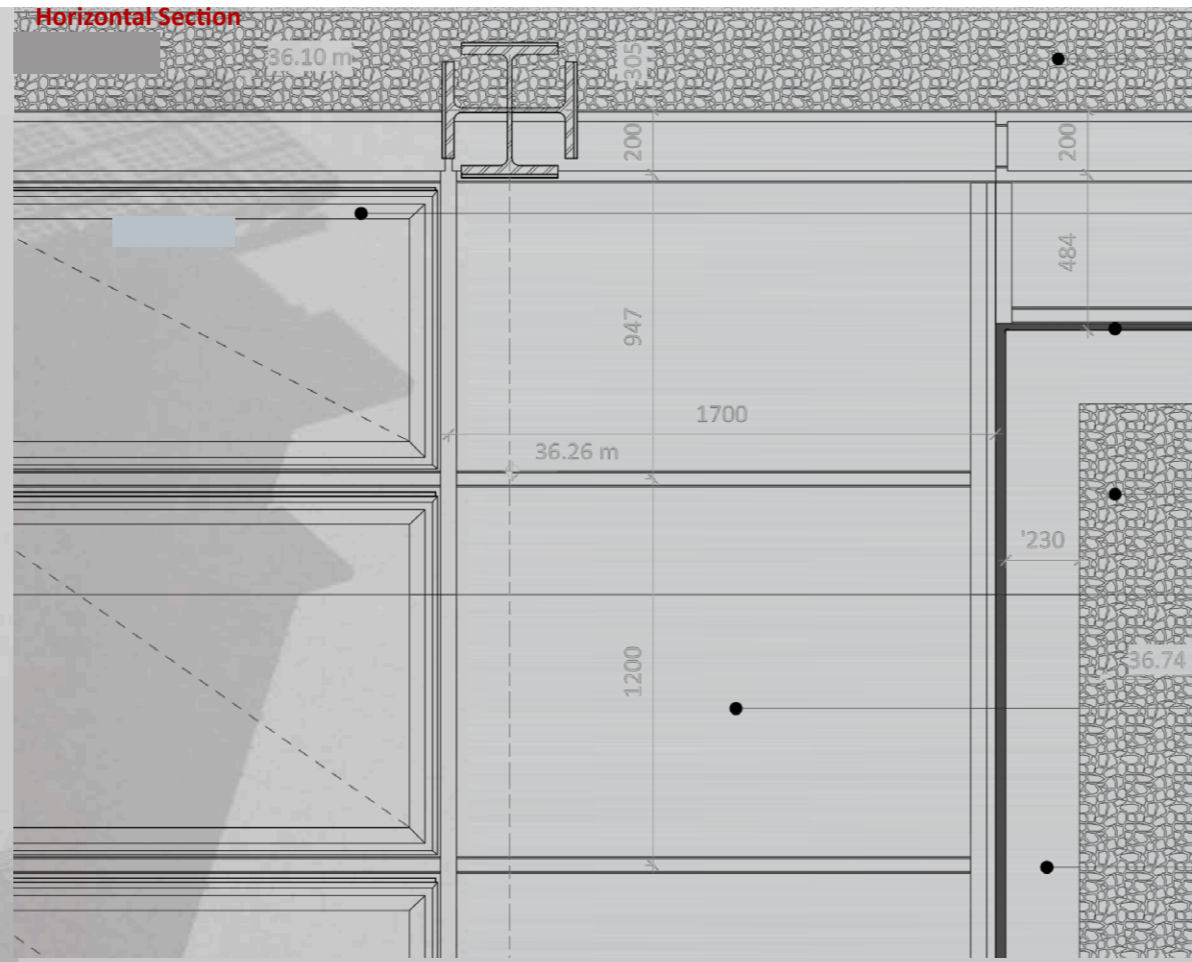
original drawing scale of panel stratigraphy (A) 1:25; scale percentage on page: 80%
original drawing scale of detail (B) 1:25; scale percentage on page: 85%

Figure 56: Façade of the Tower of Books

TOWER OF BOOKS - Partial Axonometry

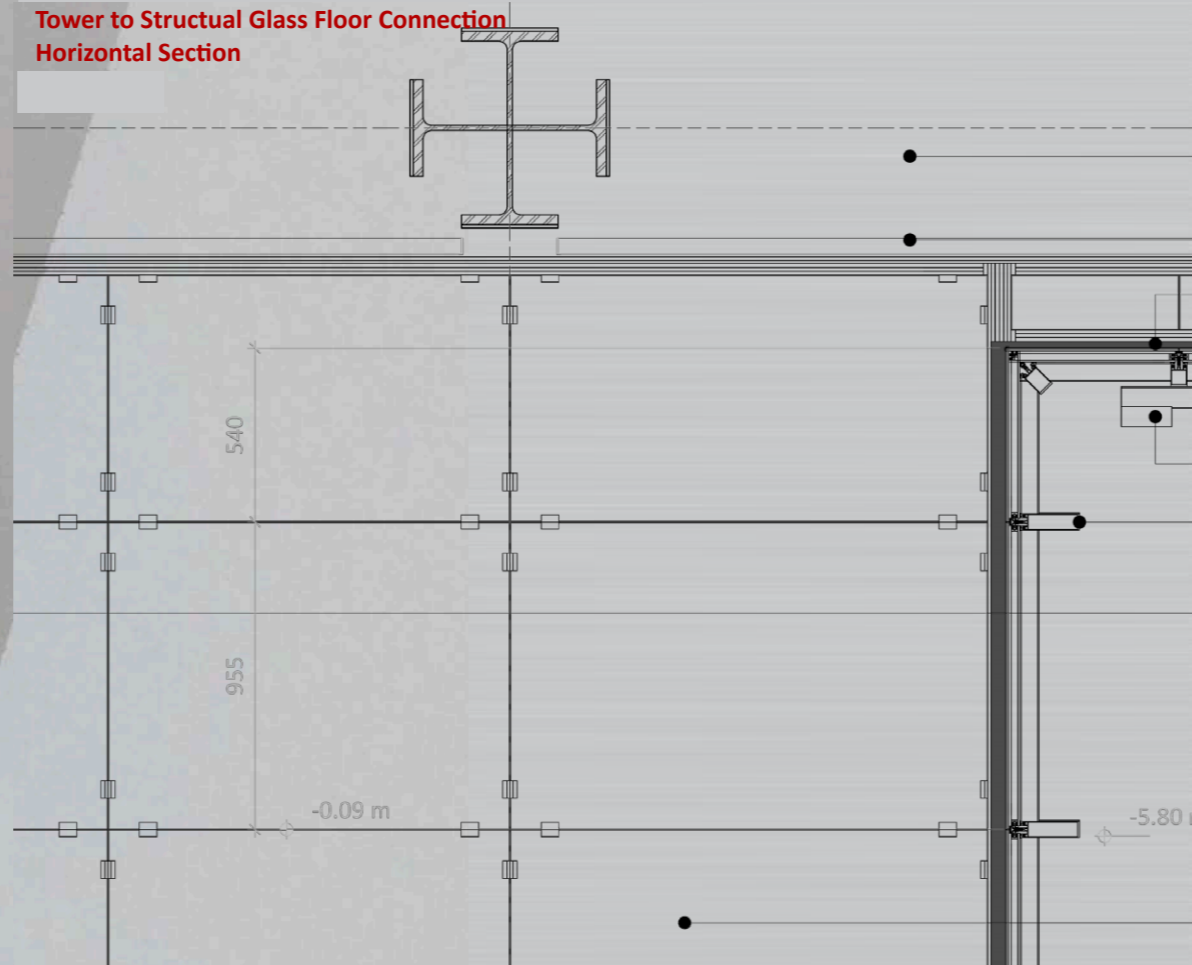


Horizontal Section



- Gravel ballasted exploitable roof
- Schüco Skylight FW 50+.SI openable module
- Sealing layer between glass roof and the facade of the tower, tks. 30 mm
- Gravel ballasted roof
- Schüco Skylight System FW 50+.SI
- Aluminum roof flasing

Tower to Structural Glass Floor Connection Horizontal Section



- Stone pavement
- Railling, h=900 mm
- Airtight sealing joint
- Repository machine
- Schüco FW 50+SG curtain wall system
- Nuova Oxidal TENSYON EVO Spider glass floor

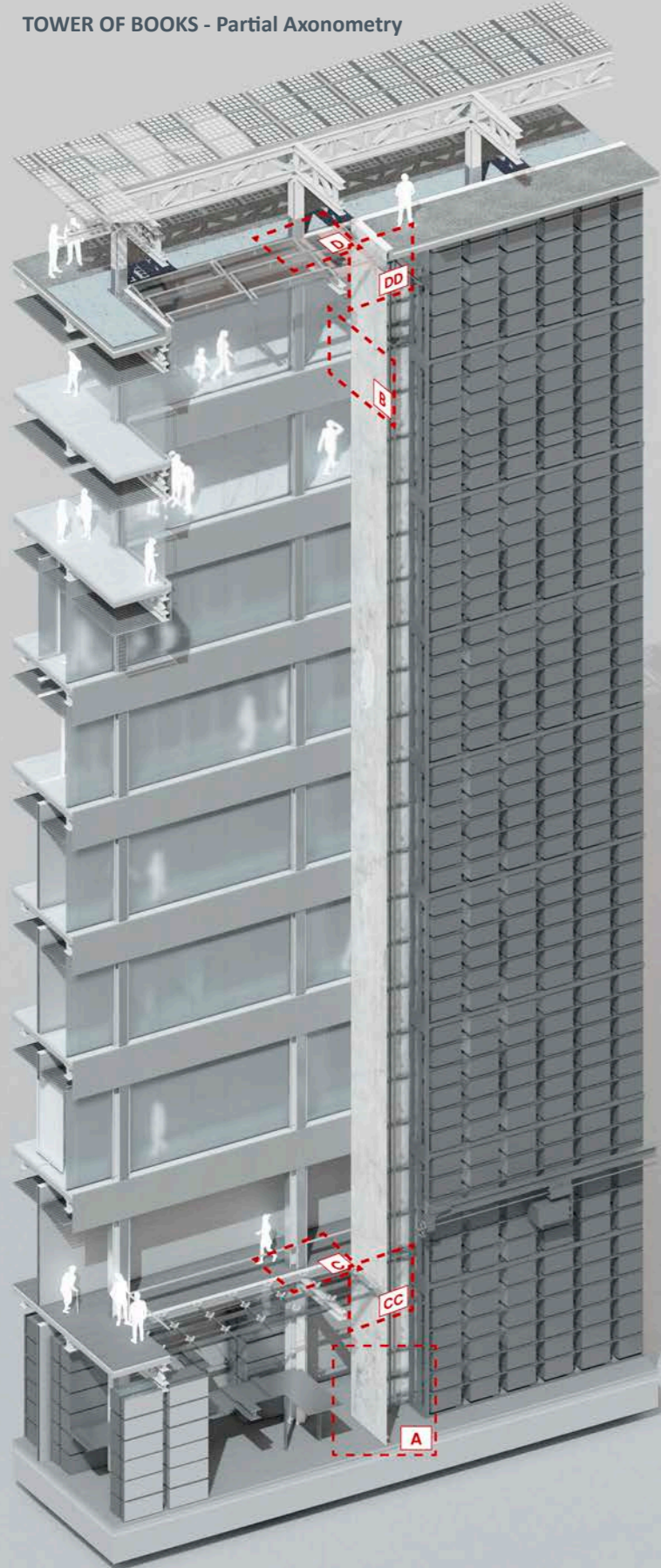
The machinery inside is covered with a curtain wall and thin backlit stone panels clad the Tower of Books. This ensures that the humidity and lighting can be controlled for proper keeping of the biblicious collection.

For safety measures against fire and for climate control, the excavated area of the ground floor slab is covered with structural glass.

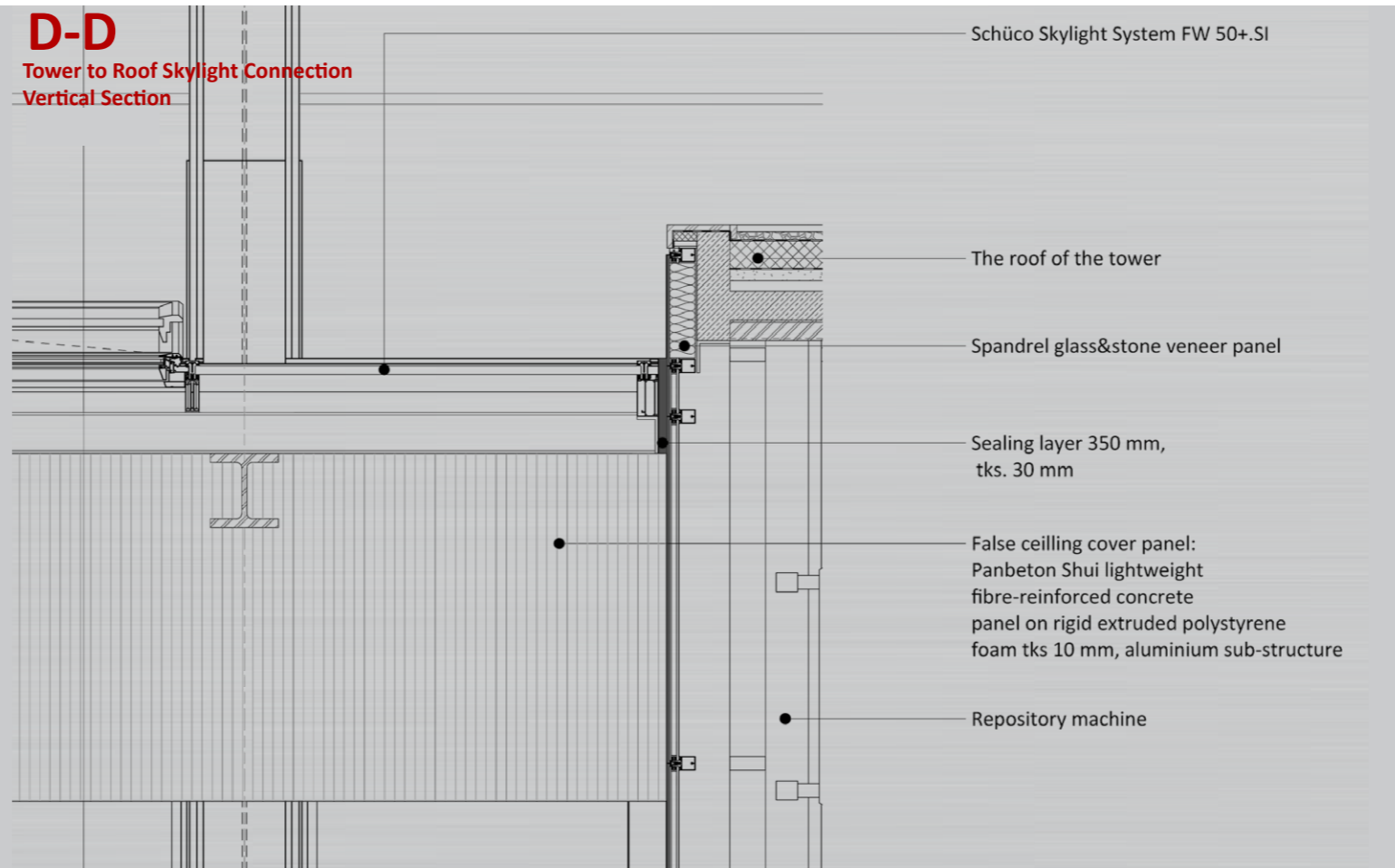
On the level of the roof (Level 8), the Tower pierces through the skylight and goes up to bottom of the trusses. Junction points with these two horizontal glass surfaces are shown on plan view.

Figure 57: Details of the Tower of Books

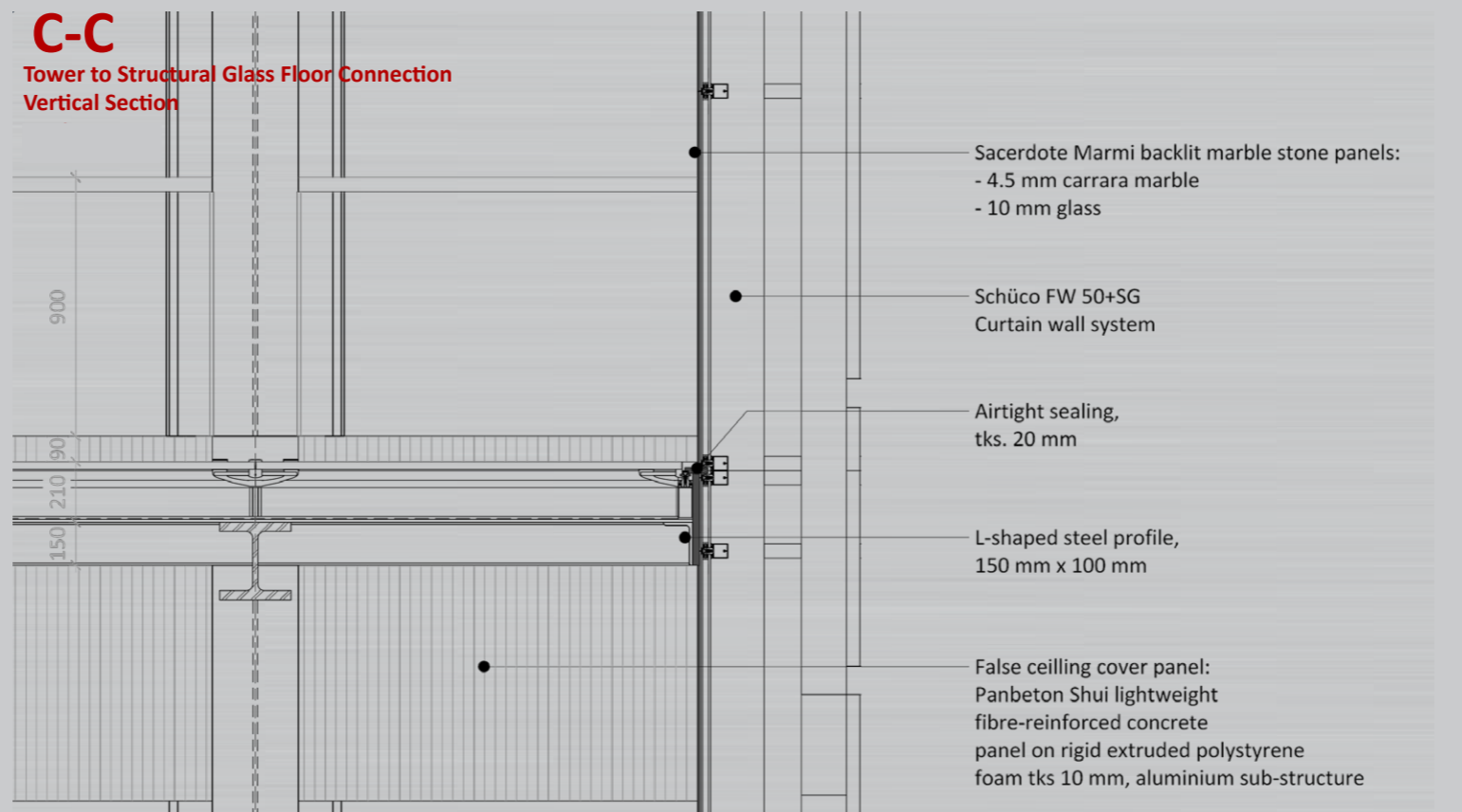
TOWER OF BOOKS - Partial Axonometry



D-D
Tower to Roof Skylight Connection
Vertical Section



C-C
Tower to Structural Glass Floor Connection
Vertical Section

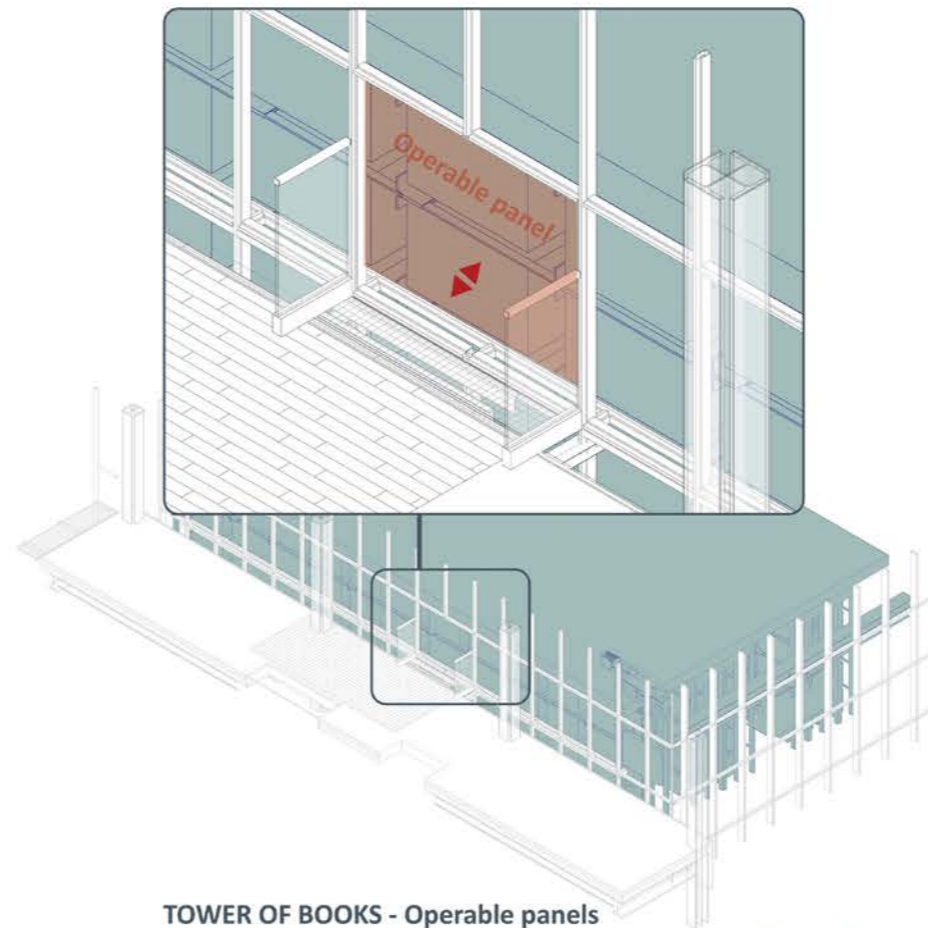
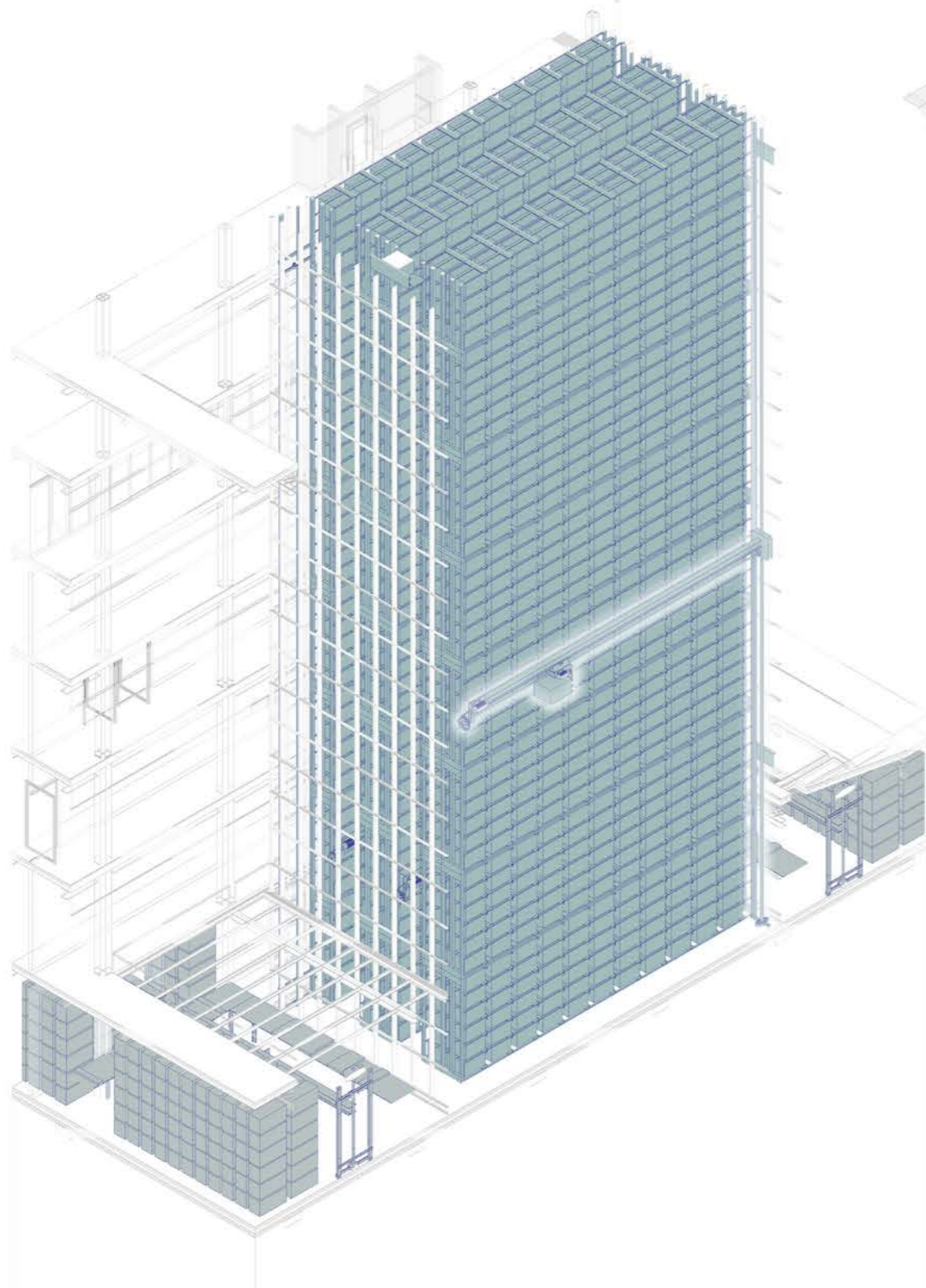


The structural glass floor is set down from the finish floor level so that the gap can be perceived from the middle of the atrium as well. The level of the glass floor is set so that the panels of the stone cladding are all the same height (not cut).

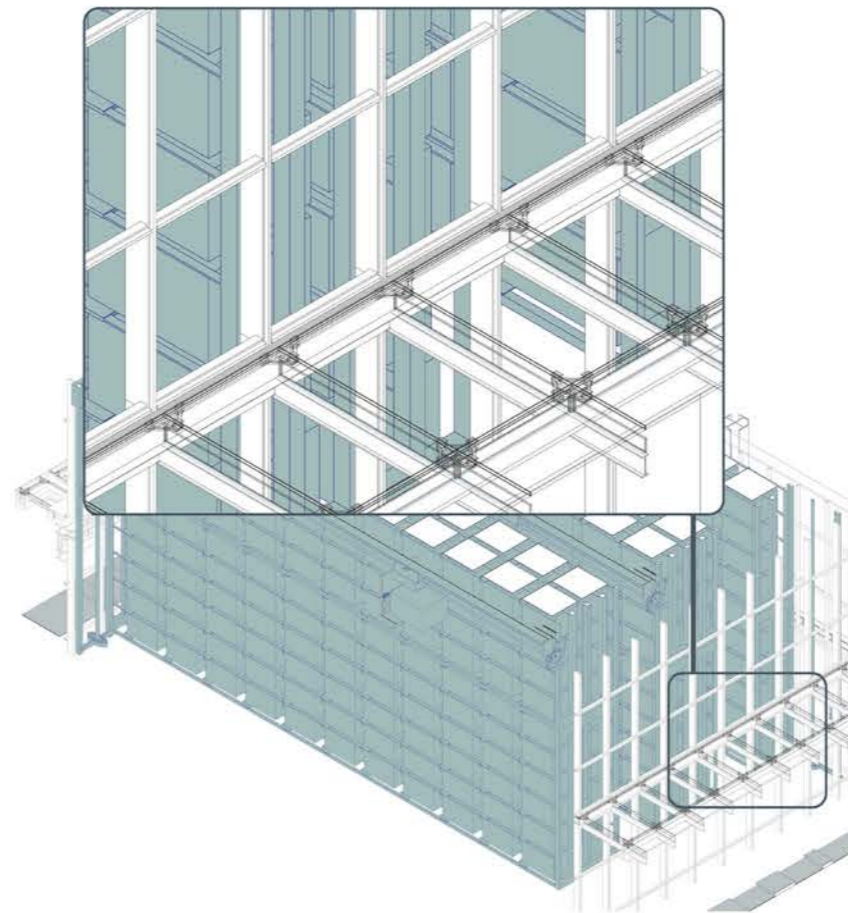
original drawing scale of details (D-D and C-C) 1:25
scale percentage on page: 80%

Figure 58: Façade of the Tower of Books

TOWER OF BOOKS - Partial Axonometry
of automated storage and retrieval mechanism

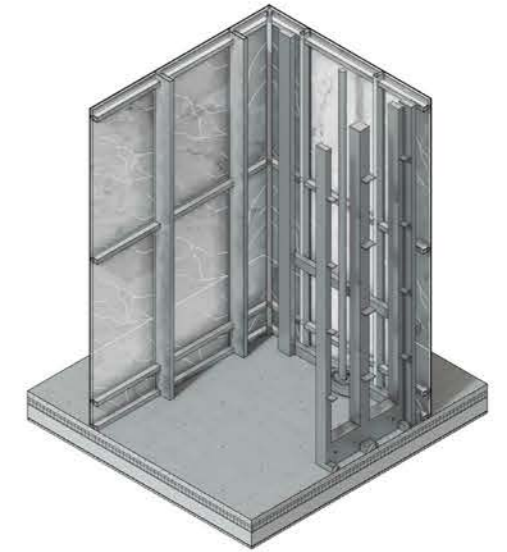


TOWER OF BOOKS - Operable panels
for book retrieval by librarian (Level 7)

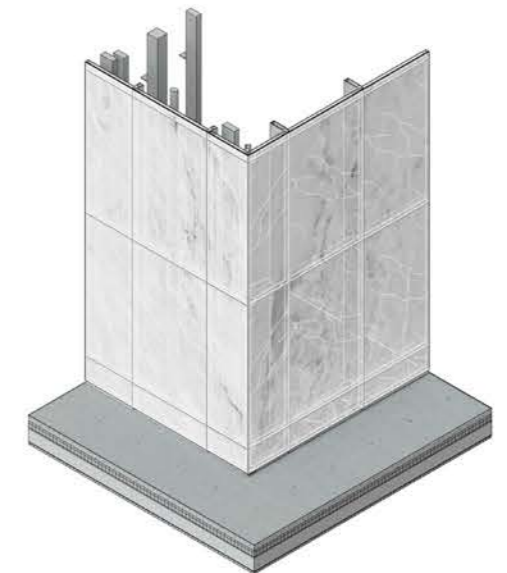


TOWER OF BOOKS - Seal between underground storage
and the atrium (Level 0)

FACADE DESIGN FOR TOWER OF BOOKS



TOWER OF BOOKS - Facade panels fixed to
mullion and transoms
around the tower



TOWER OF BOOKS - Curtain wall mullions
fixed to steel structure
of shelving system

Figure 59: Sealing the Tower