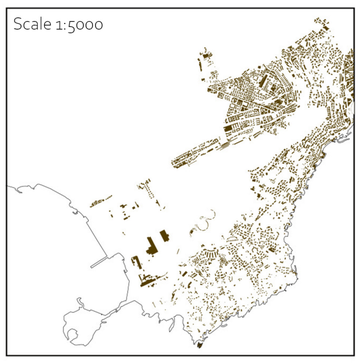
Roman Trace

TIMELINE OF NAPLES

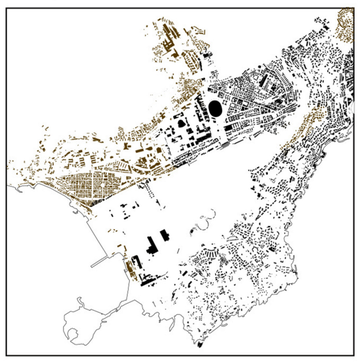
EVOLUTION

Before 1919



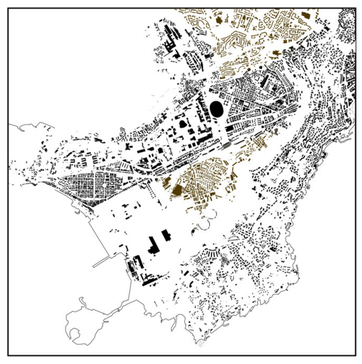
A dense, compact urban fabric defines the historic core of Naples.

"Start of Modernization" 1919 - 1945



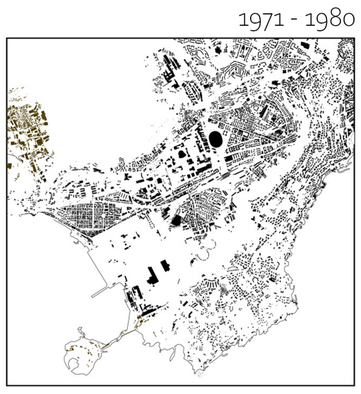
Early expansion beyond the old city walls appears, introducing larger open spaces and new planned blocks.

1946 - 1960



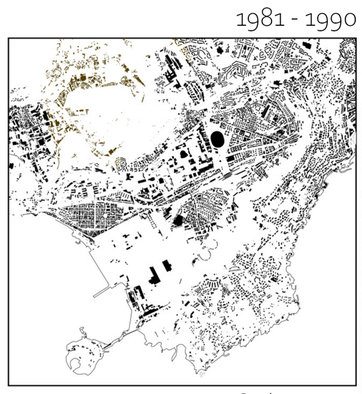
Post-war reconstruction produces more fragmented urban patterns.

1971 - 1980



Rapid, unregulated growth leads to discontinuous peripheries.

1981 - 1990

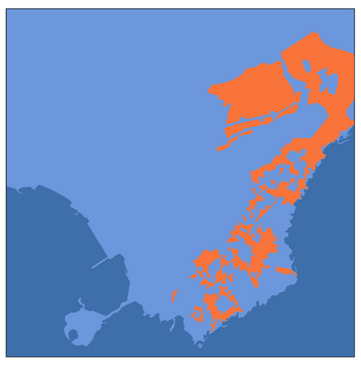


Naples evolves into a metropolitan territory with sprawling, fragmented edges.

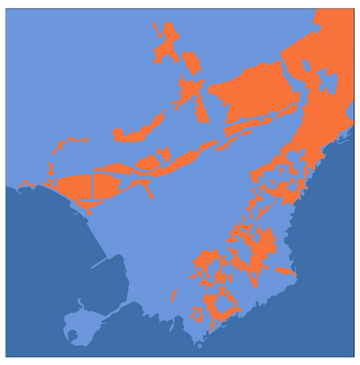
Scale 1:50 000

SPATIAL ENCLOSURE

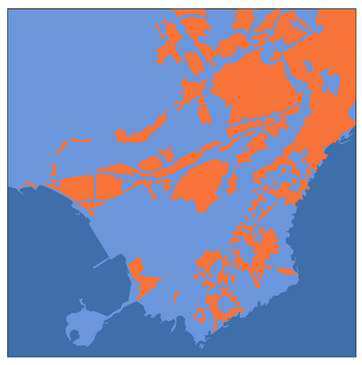
Before 1919



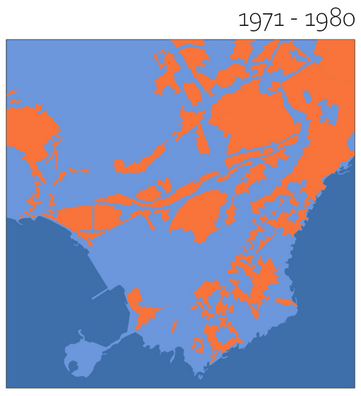
1919 - 1945



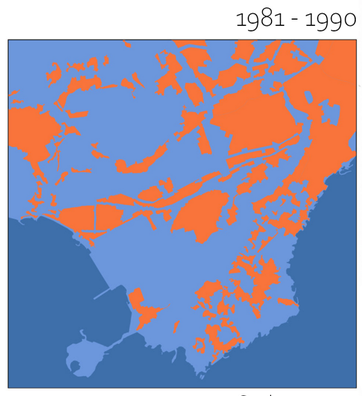
1946 - 1960



1971 - 1980



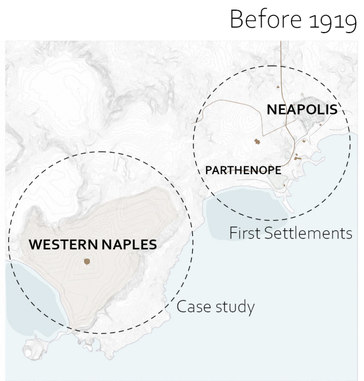
1981 - 1990



Scale 1:50 000

WESTERN NAPLES

Before 1919



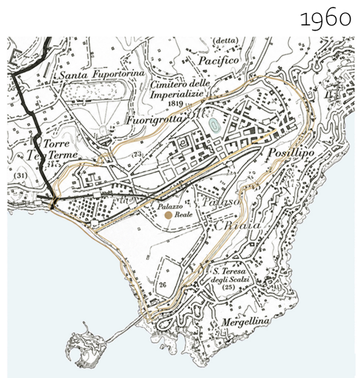
1775



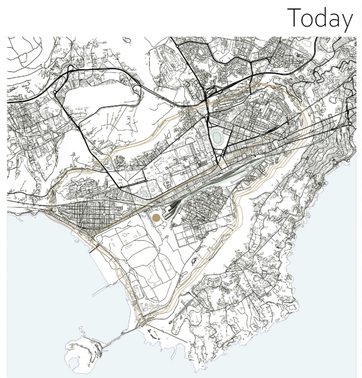
1840



1960



Today

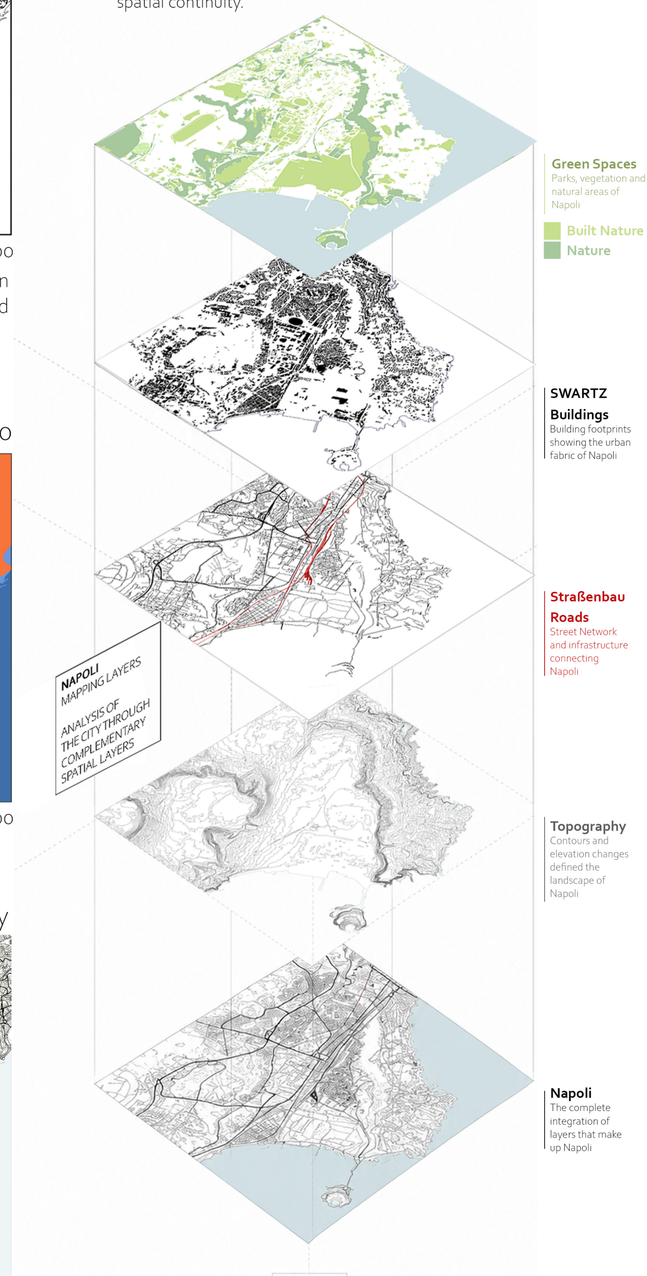


Scale 1:50 000

LAYERS OF NAPLES

MAPPING

This layered mapping diagram analyzes Naples through a series of interconnected spatial systems that together define the identity of the city. By separating green spaces, built fabric, road infrastructure, and topography into individual layers, the study reveals how natural and urban elements overlap and interact to shape movement, density, and spatial continuity.



PROJECT SITE ANALYSIS

"MOSTRA D'OLTREMARE"

Transition

The project is a spatial transition between the monumental landscape of Mostra D'Oltremare and the Fuorigrotta. Today, Via Terracina acts as a physical and psychological barrier, separating the cultural identity of the exhibition grounds from the everyday life of the exhibition. The intervention transforms this condition into a gradual sequence of movement, where the visitor experiences a shift from the urban scale of the city into the open and green atmosphere of the Mostra.

Bridging

The concept of bridging is both physical and symbolic. Rather than treating the site as an isolated corridor, the project establishes a connective spine that links Via Terracina, Fuorigrotta, and the Mostra D'Oltremare into one continuous system. This new axis reconnects fragmented urban elements, abandoned areas, and disconnected public spaces, transforming them into active and accessible environments. The intervention acts as an urban bridge that integrates cultural, social, and ecological layers, allowing the Mostra to extend beyond its borders and become part of the daily life of the surrounding community.

Trace

The project is rooted in the idea of trace, inspired by the archaeological Roman path that once crossed the territory. This historical trajectory becomes the main organizing element of the intervention, guiding circulation, spatial hierarchy, and landscape articulation. By tracing and reinterpreting this forgotten path, the project reconnects the site to its historical memory while projecting it into a contemporary urban condition. The linear elements of the design follow the logic of the ancient route, transforming it into a visible and experiential spine that links past and present. Through this gesture, the project reveals hidden layers of history and uses them as a foundation for a new urban identity.

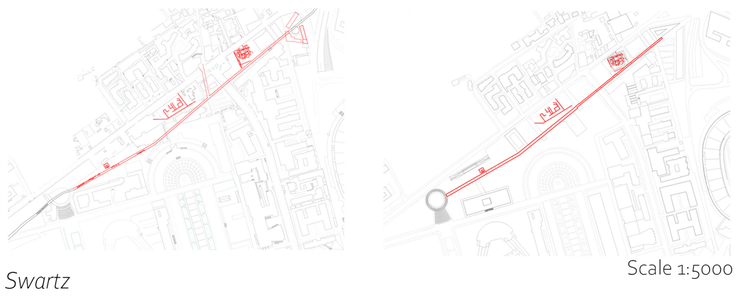
Before After

Straßenbau



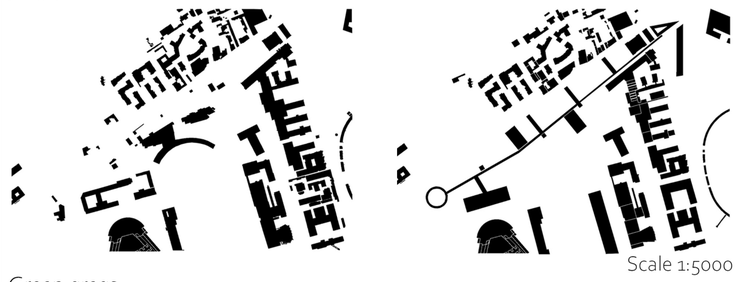
Scale 1:5000

Roman path



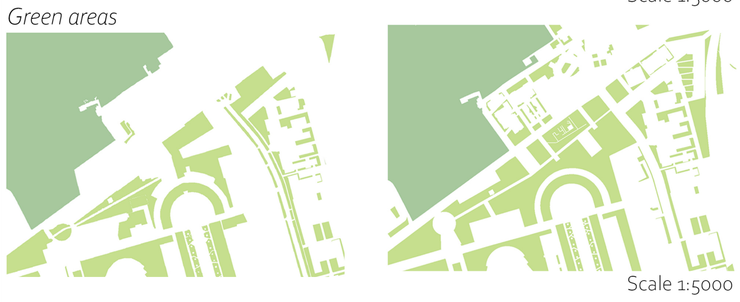
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Swartz



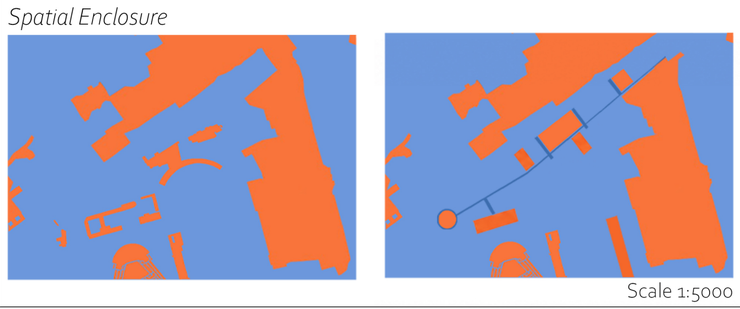
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Green areas

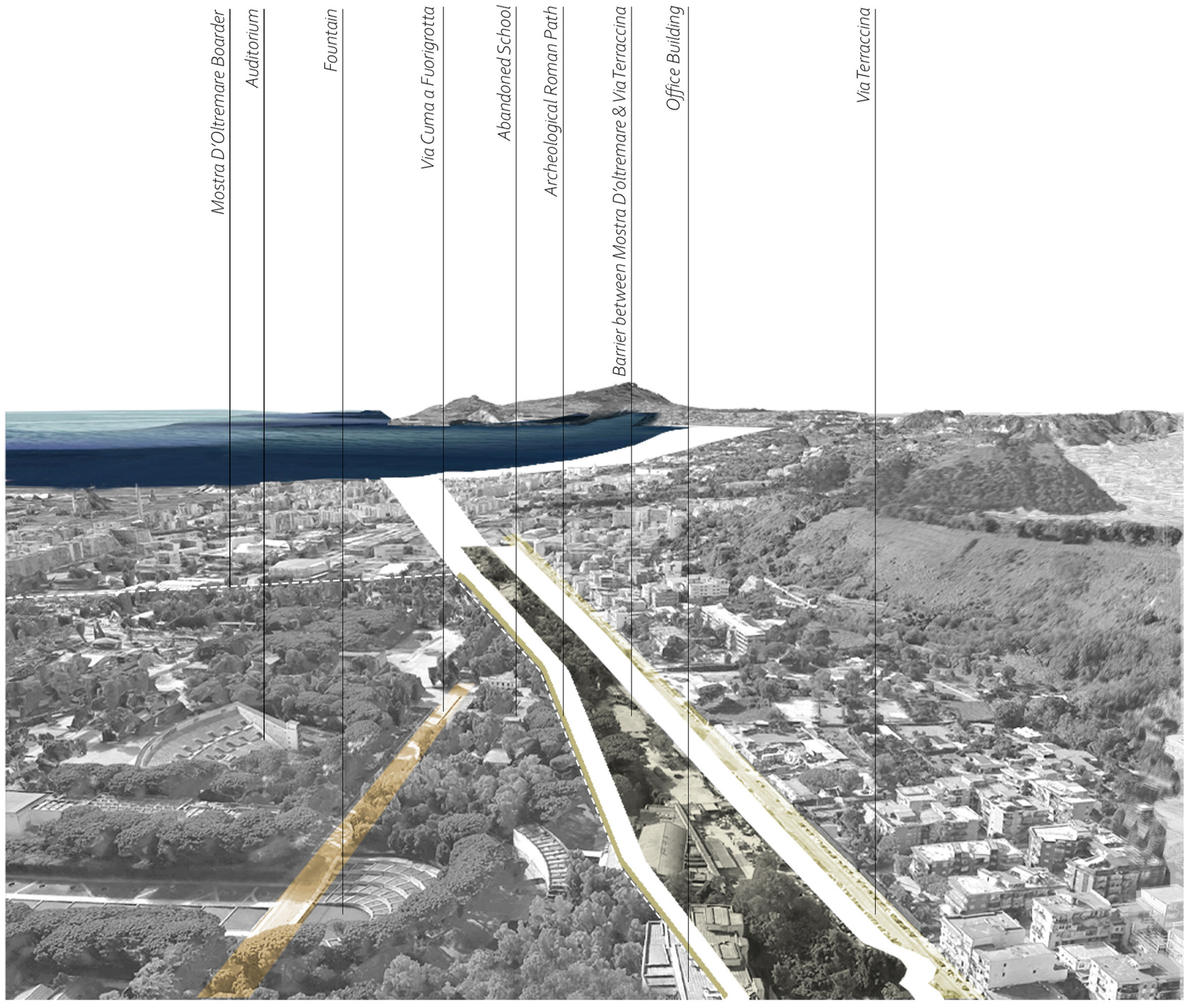


Scale 1:5000

Spatial Enclosure



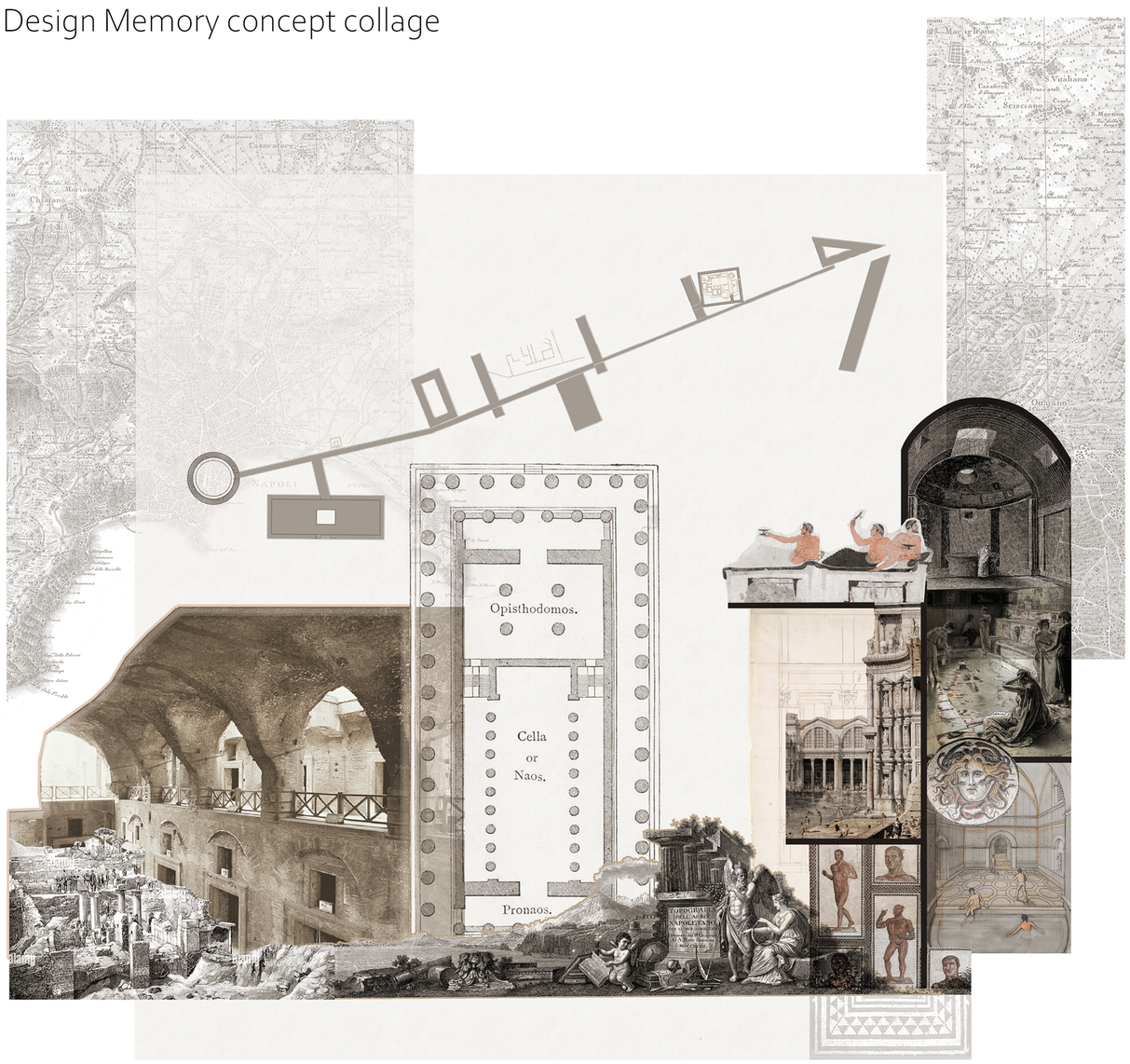
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POLITECNICO MILANO 1863

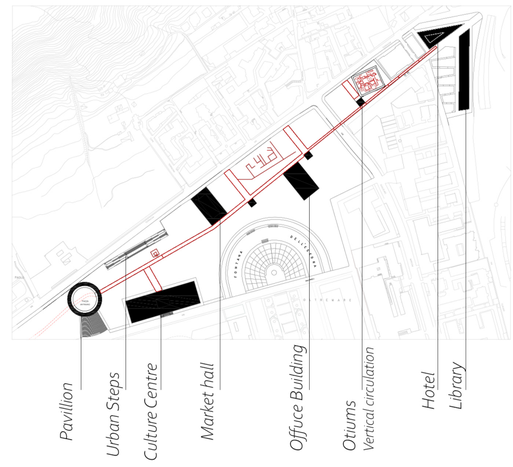
SARA SELIN FREGO LUJAINA ABDELMOHSEN ERIKA GALARRAGA

Design Memory concept collage

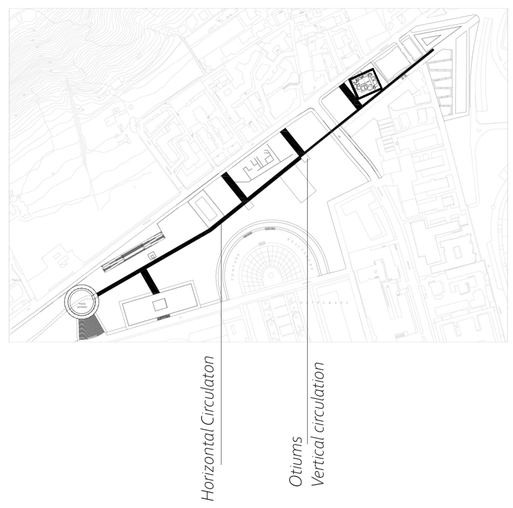


Design Process



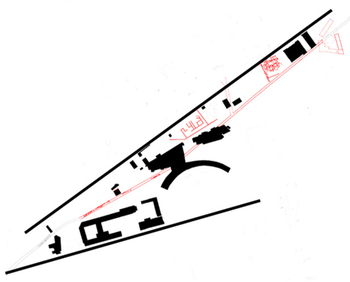






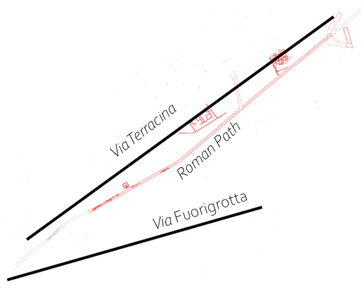
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Design Process



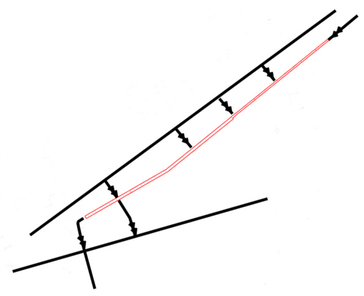
1. Existing Fragmentation

The first step analyzes the existing condition of the site, where Via Terracina acts as a strong urban barrier separating Fuorigrotta from the Mostra D'Oltremare. The fragmented circulation, isolated buildings, and disconnected green areas reveal the lack of continuity between the cultural complex and the surrounding neighborhood.



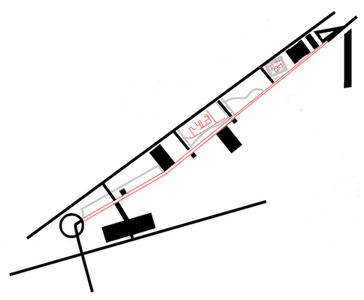
2. Tracing the Historical Path

The second step identifies the forgotten Roman path as the main spatial generator of the project. By tracing this historical axis across the site, the intervention establishes a continuous line that reconnects the territory through movement, memory, and orientation.



3. Reconnecting the Urban Fabric

The third step introduces new transversal connections that bridge the gap created by infrastructure and topography. These connections transform the site from a linear barrier into an accessible urban corridor that links public spaces, pedestrian flows, and landscape systems.



4. Integrated Urban Spine

The final step consolidates the project into a continuous urban spine that integrates cultural, residential, and ecological layers. The intervention becomes both a physical and symbolic bridge between Fuorigrotta and Via Terracina, extending the identity of the Mostra D'Oltremare into the surrounding context.

Morphological Plan



Scale 1:5000

POLITECNICO MILANO 1863

SARA SELIN FREGO LUJAINA ABDELMOHSEN ERIKA GALARRAGA

Masterplan Scale 1:1000

Topographic Continuity

Before



After



This sectional diagram illustrates the transformation of the connection between Via Terracina and the historical Roman path through a before-and-after spatial intervention. The upper section represents the existing condition, where infrastructure creates a fragmented and disconnected landscape, while the lower section demonstrates the proposed integration of terrain, circulation, and green continuity. By reshaping the topography and reinforcing the historical trace, the project creates a smoother transition between the urban level of Via Terracina and the archaeological landscape, turning the section into a continuous experiential corridor rather than a physical barrier.





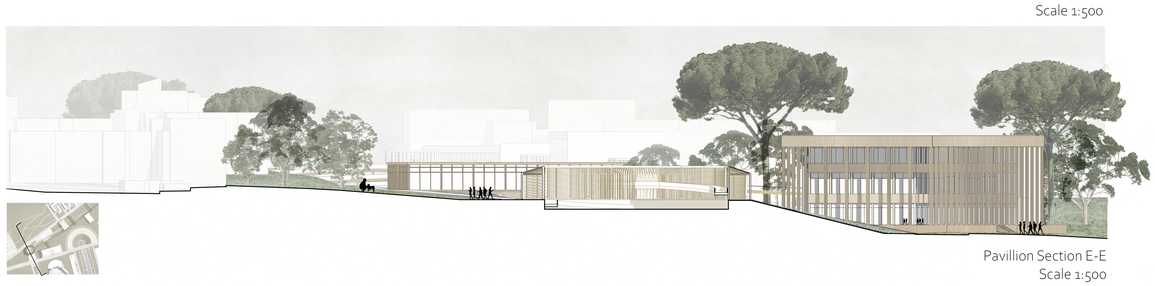




Via Terracina Elevation C-C
Scale 1:500



Culture Centre Section D-D
Scale 1:500

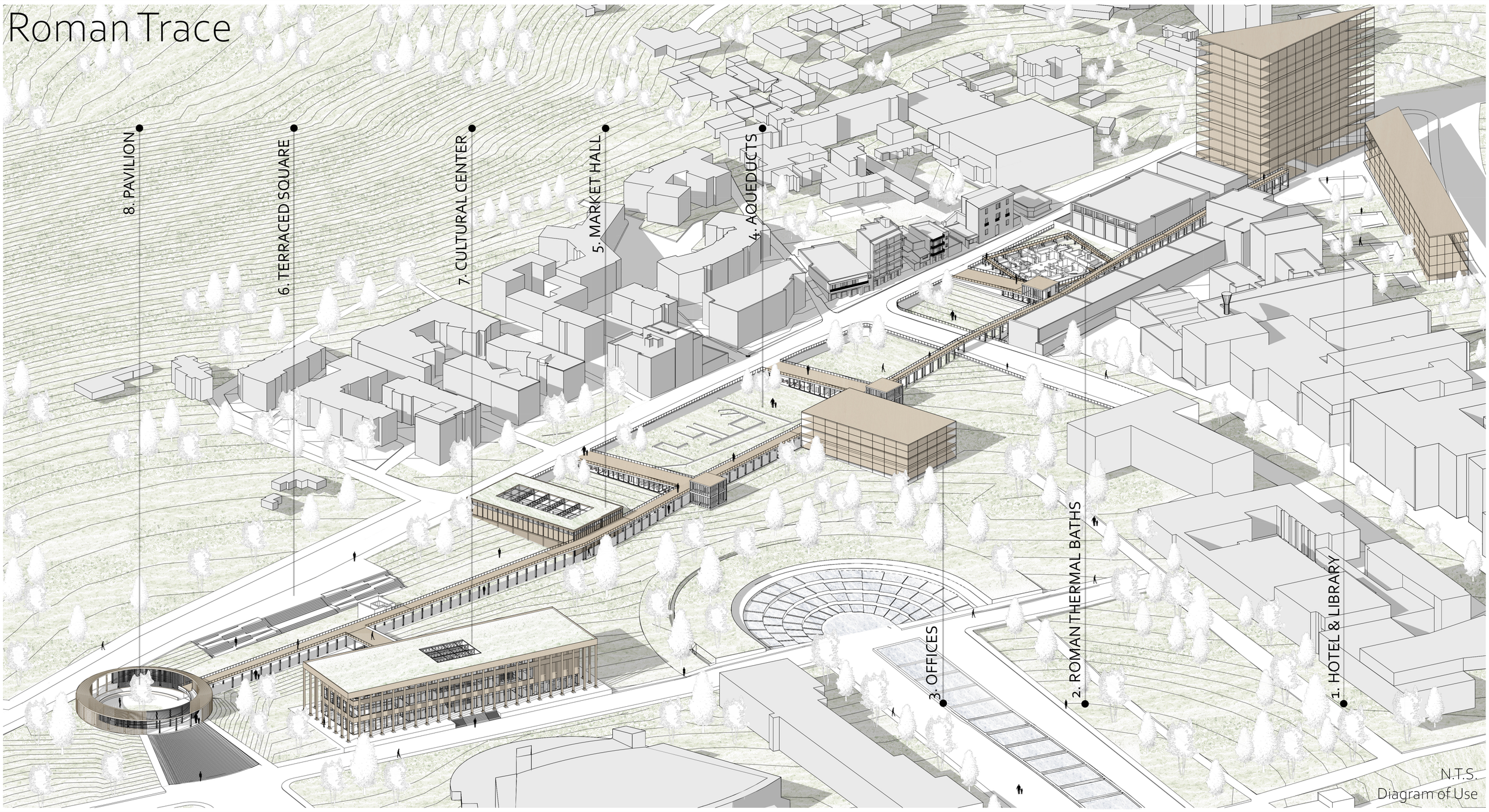


Pavillion Section E-E
Scale 1:500

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Roman Trace



8. Pavilion:

A circular pavilion marking the end of the Roman Trace and the entrance to Mostra d'Oltremare, designed for contemplation and views.

7. Cultural Center:

A space celebrating art, history, and the heritage of Via Terracina and the Roman traces.

6. Terraced Square:

A stepped public space connecting Via Terracina to the Roman Trace while offering places to gather and enjoy the landscape.

5. Market Hall:

A social hub that brings together students, workers, hospital users, etc. through food and community activities.

3 & 4. Aqueducts & offices:

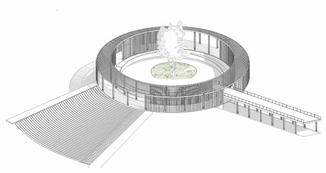
Remains of the Roman aqueduct integrated into an open public route for learning and exploration.

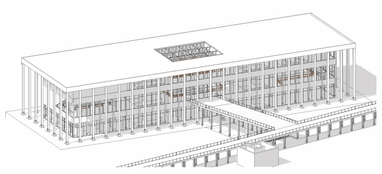
2. Roman Thermal Baths:

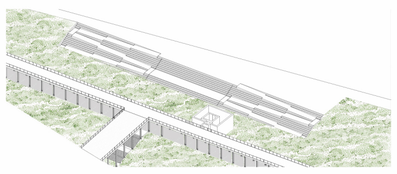
Ancient Roman baths visible from both the historic and contemporary Roman strips.

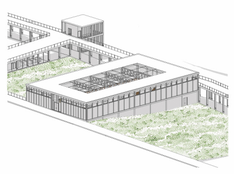
1. Hotel & Library:

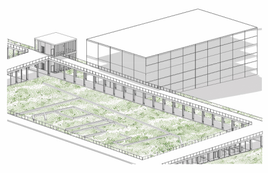
Gateway buildings marking the entrance to the masterplan and the beginning of the Roman Trace.

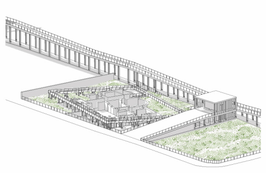


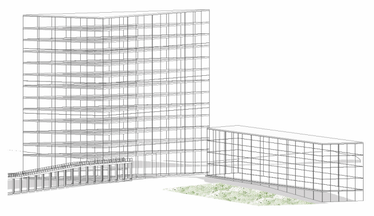




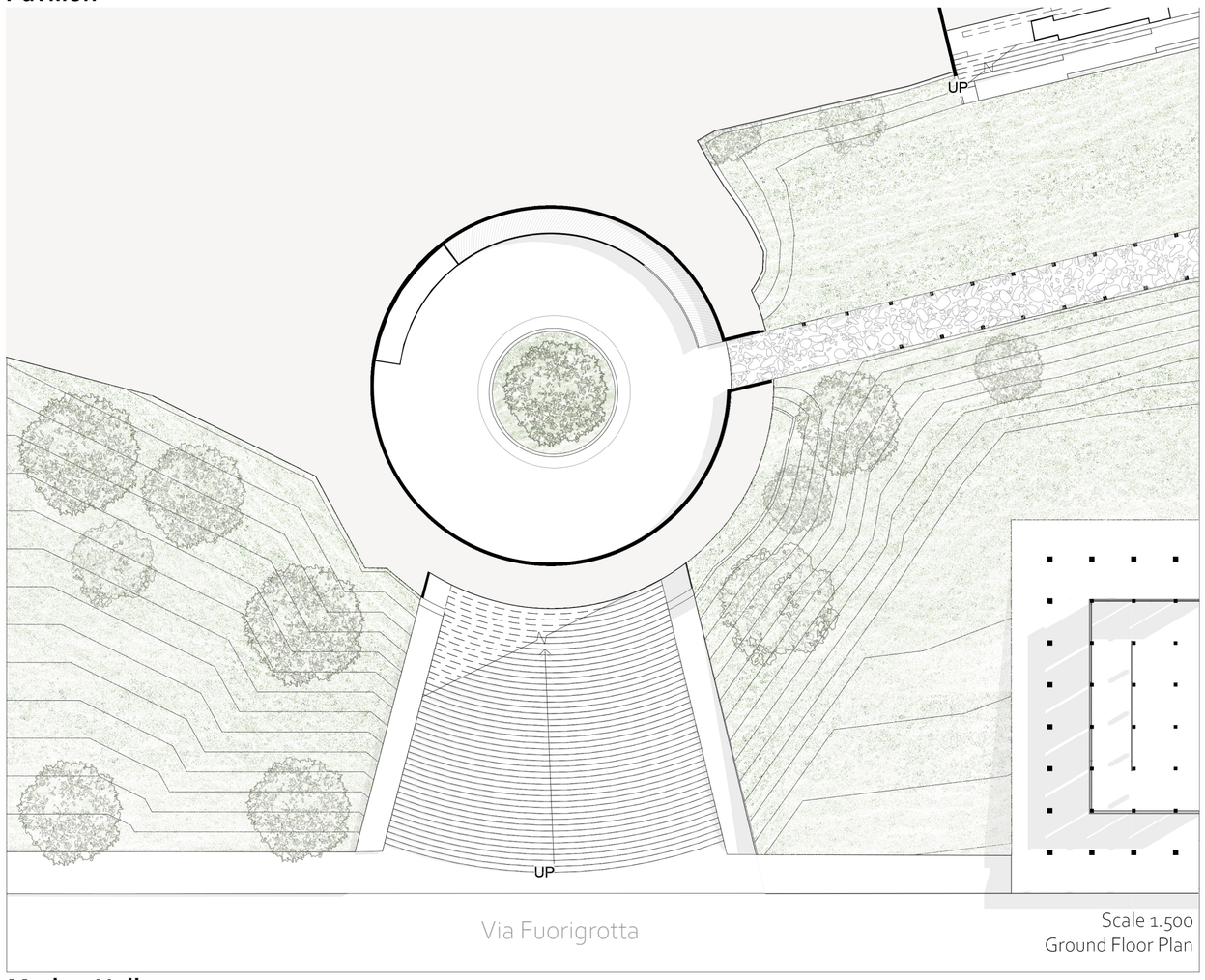


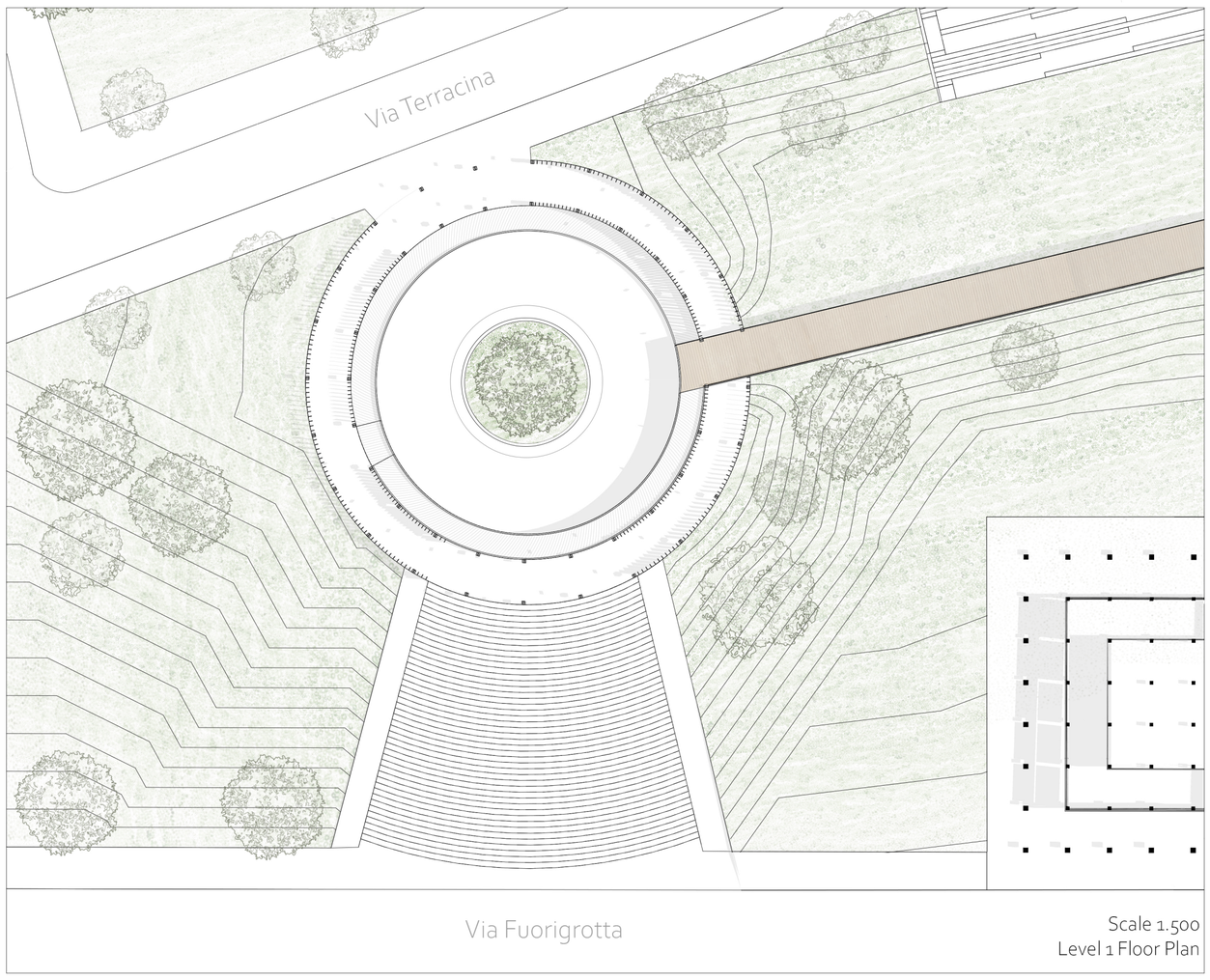




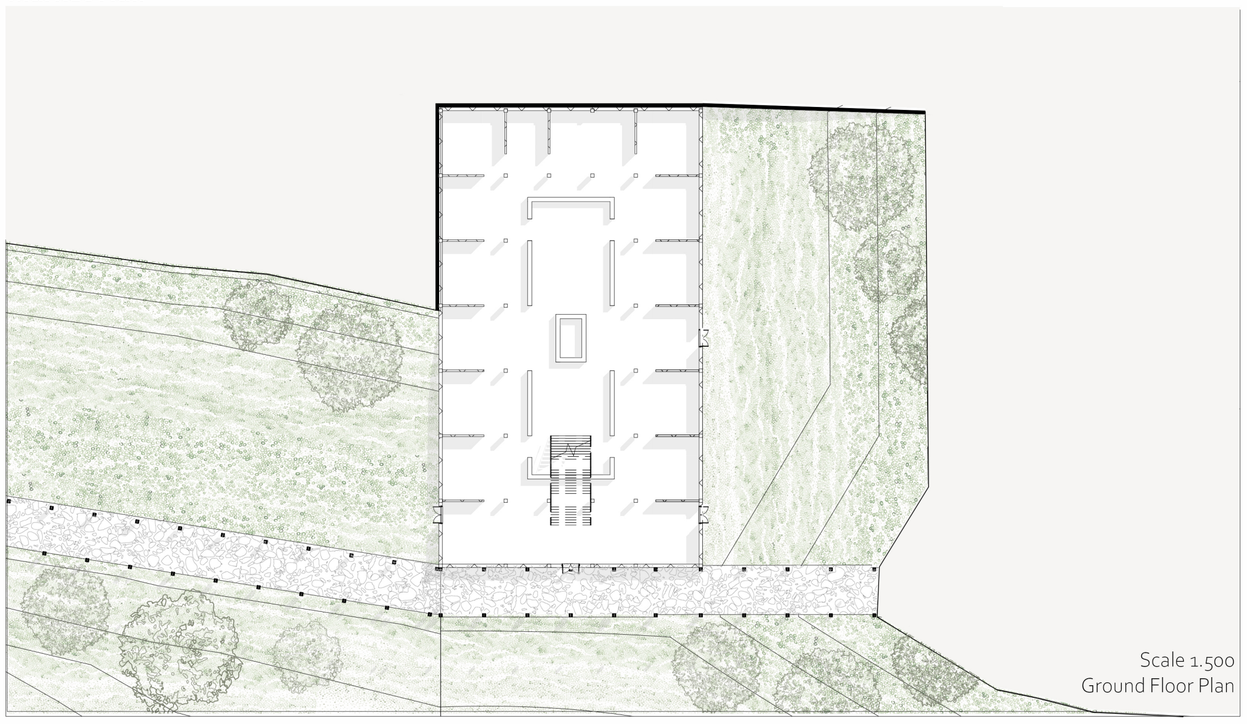


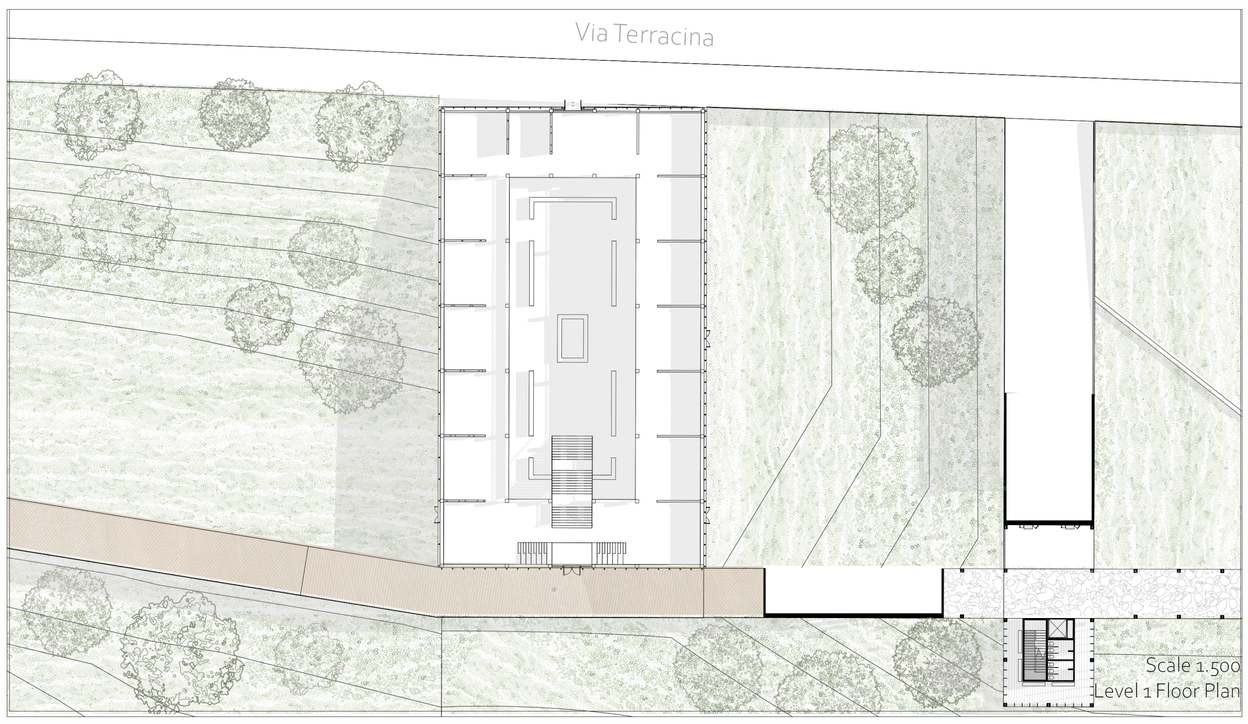
Pavilion





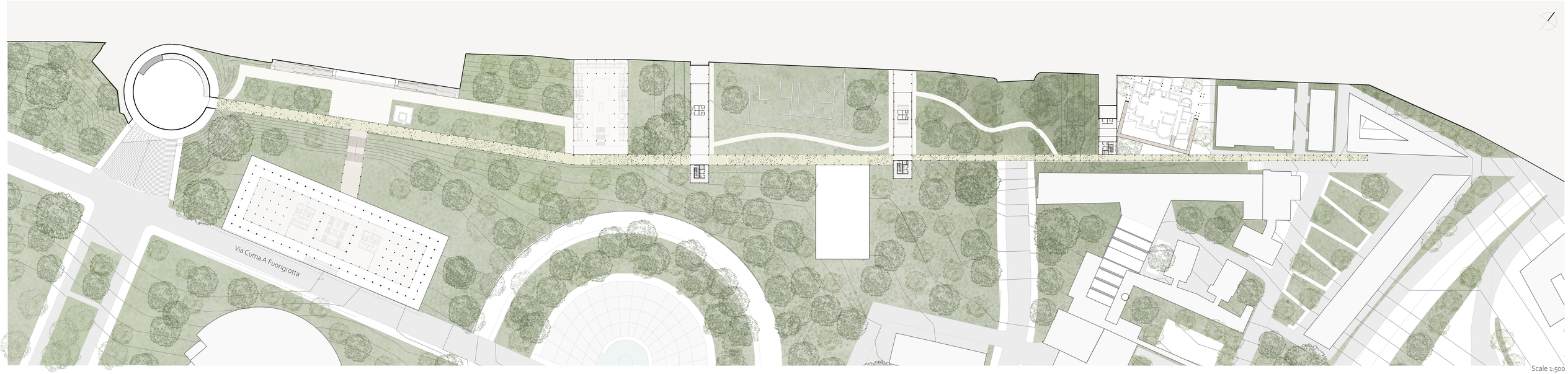
Market Hall





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MILANO 1863

SARA SELIN FREGO LUJAINA ABDELMOHSEN ERIKA GALARRAGA



Scale 1:500
Ground Floor Plan



Scale 1:500
Via Terraccina Section A-A

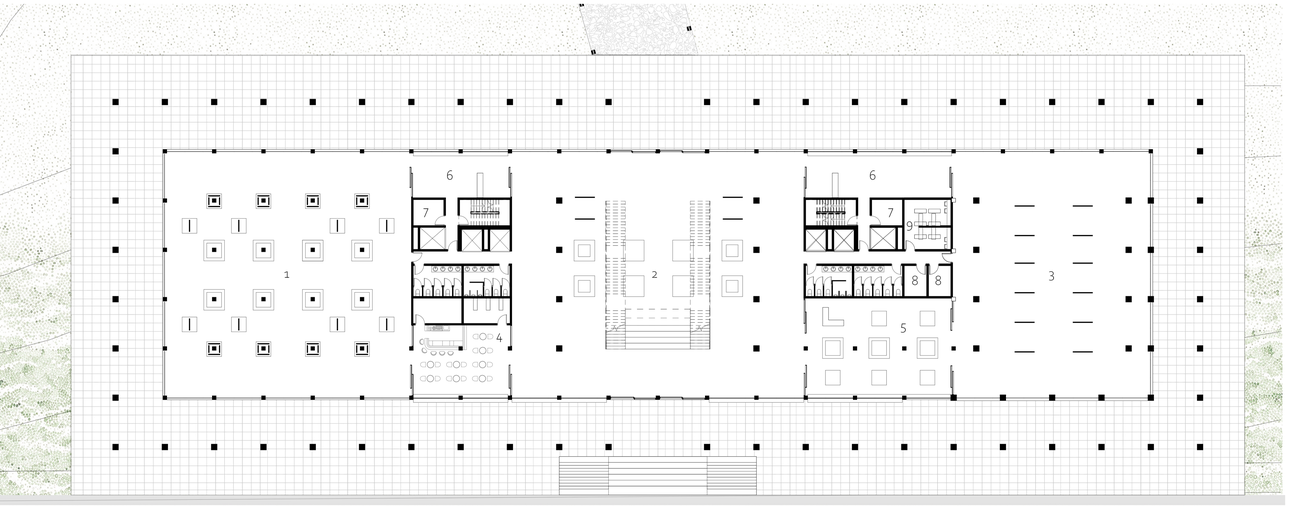


Scale 1:500
Via Terraccina Section B-B

POLITECNICO
MILANO 1863

SARA SELIN FREGO LUJAINA ABDELMOHSEN ERIKA GALARRAGA

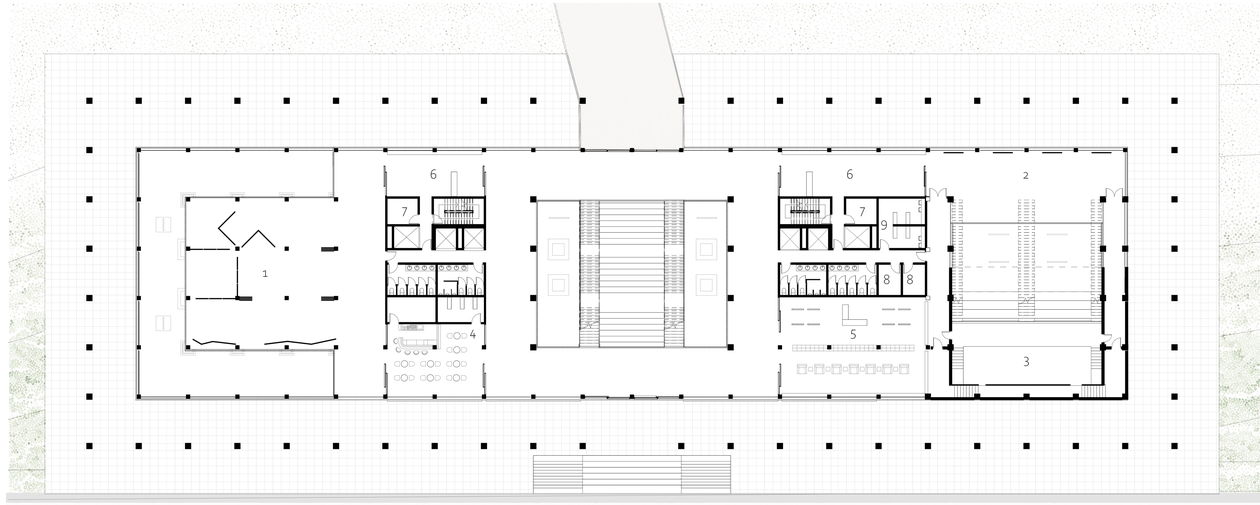
Culture Centre



Via Cuma a Fuorigrotta

Ground floor Plan
Scale 1 :200

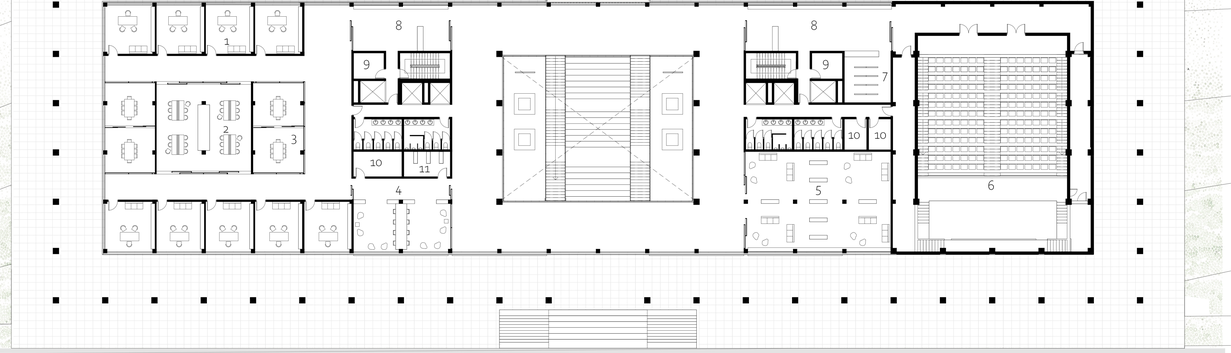
1- Sculpture and handmade artwork exhibition hall
2- Cultural arts exhibition hall
3- Painting exhibition hall
4- Caffeteria
5- Gift shop
6- Info point and ticketing
7- Technical Shaft
8- Storage
9- Dressing room



Via Cuma a Fuorigrotta

First floor Plan
Scale 1 :200

1- Flexible Partitioned exhibition hall
2- Social and visual arts space
3- Auditorium stage
4- Cafeteria
5- Book shop
6- Info point and ticketing
7- Technical Shaft
8- Storage
9- Dressing room

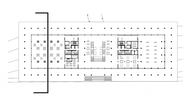


Via Cuma a Fuorigrotta

Second floor Plan
Scale 1 :200

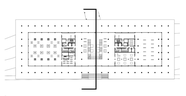
1- Administration offices
2- CO-Working space
3- Meeting room
4- Social co-working space type 1
5- Social co-working space type 2
6- Auditorium
7- Cloak room
8-Info point and ticketing
9- Technical Shaft
10- Storage
11- Cafe Storage Room



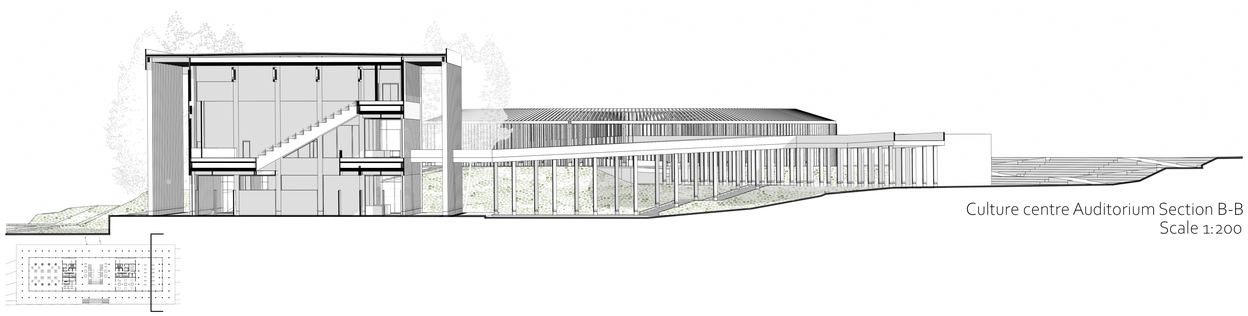


Culture centre Section C-C
Scale 1:200

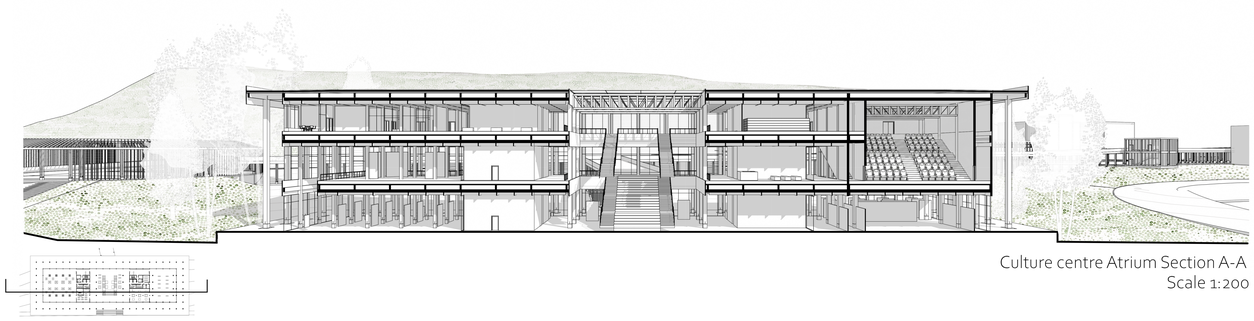




Culture centre Atrium Section D-D
Scale 1:200



Culture centre Auditorium Section B-B
Scale 1:200



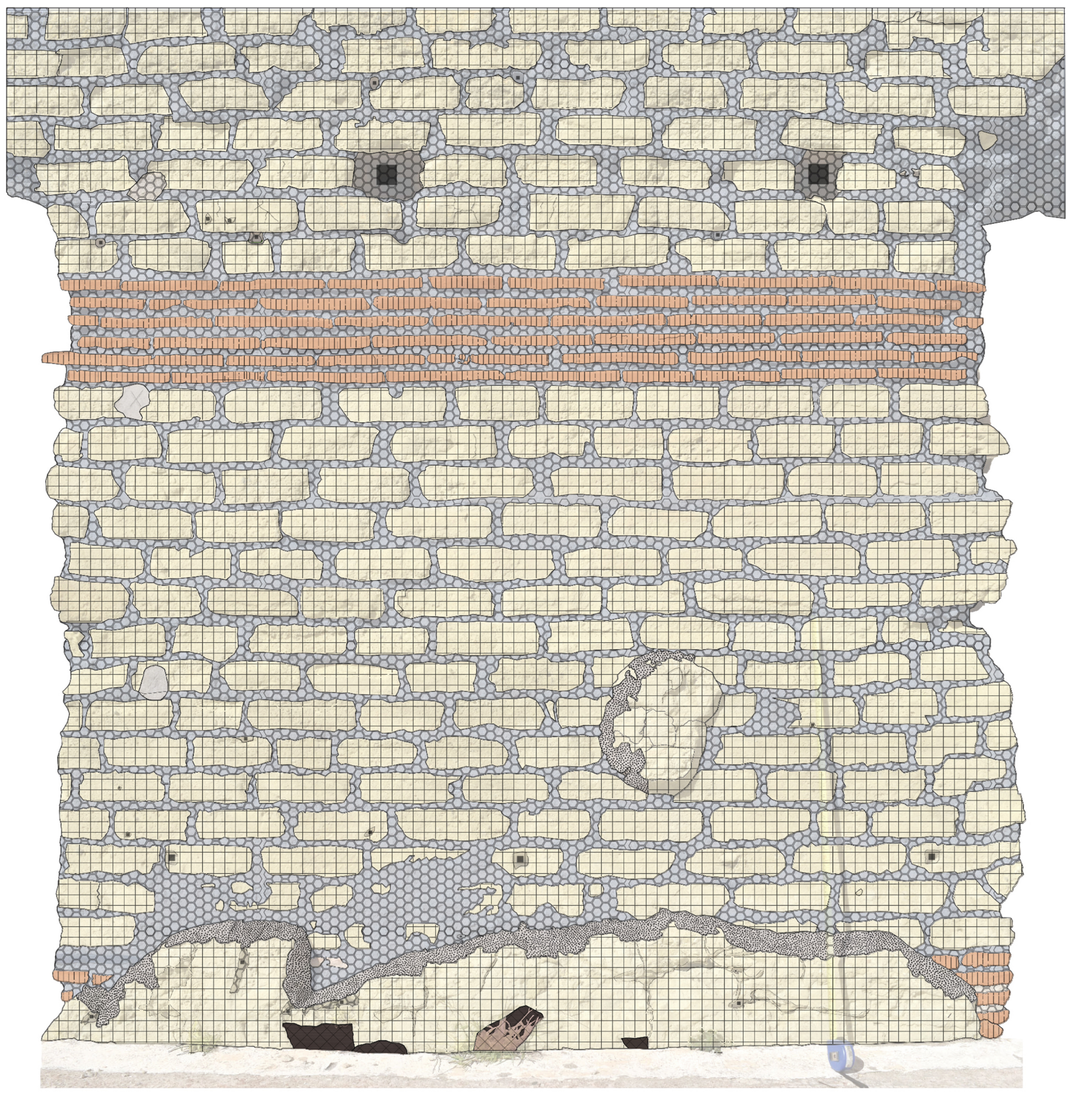
Culture centre Atrium Section A-A
Scale 1:200

POLITECNICO MILANO 1863

SARA SELIN FREGO LUJAINA ABDELMOHSEN ERIKA GALARRAGA

Roman Bath Preservation

Material Mapping



Scale 1: 10

Tuff Masonry · Cement Mortar · Terracotta Brick · Lime Based Mortar · Marble

Degradation Mapping

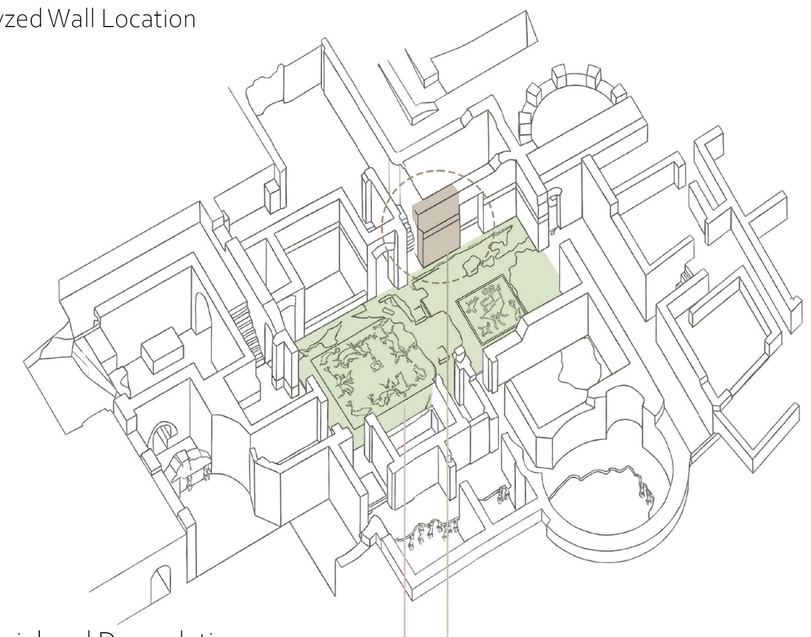


Scale 1: 10

Abrasion · Missing Parts · Sugaring · Cracks · Scaling · Biological colonization · Erosion of Lime mortar & Bricks · Mechanical Damage (Scaling) · Granular Disintegration

Axonometric of the Roman Baths of Via Terracina

Analyzed Wall Location



Material and Degradation Mapping

The main subject of the material and degradation mapping is Wall N°3. This wall's structural system is Opus Vittatum. This technique consists of alternating horizontal courses of rectangular tuff bricks and terracotta bricks. The bricks were bonded together using lime-based mortar, a mixture of slaked lime (calcium hydroxide), water, and local volcanic sand (pozzolana). There is another layer of irregular tuff stones but the only remains are present at the base and one in the middle of the wall. Then the top layer of the wall is marble veneer. The thin layer was placed on top of the tuff and was held in place by a layer of lime-based mortar. There is also a later addition of cement mortar present at the base of the wall.

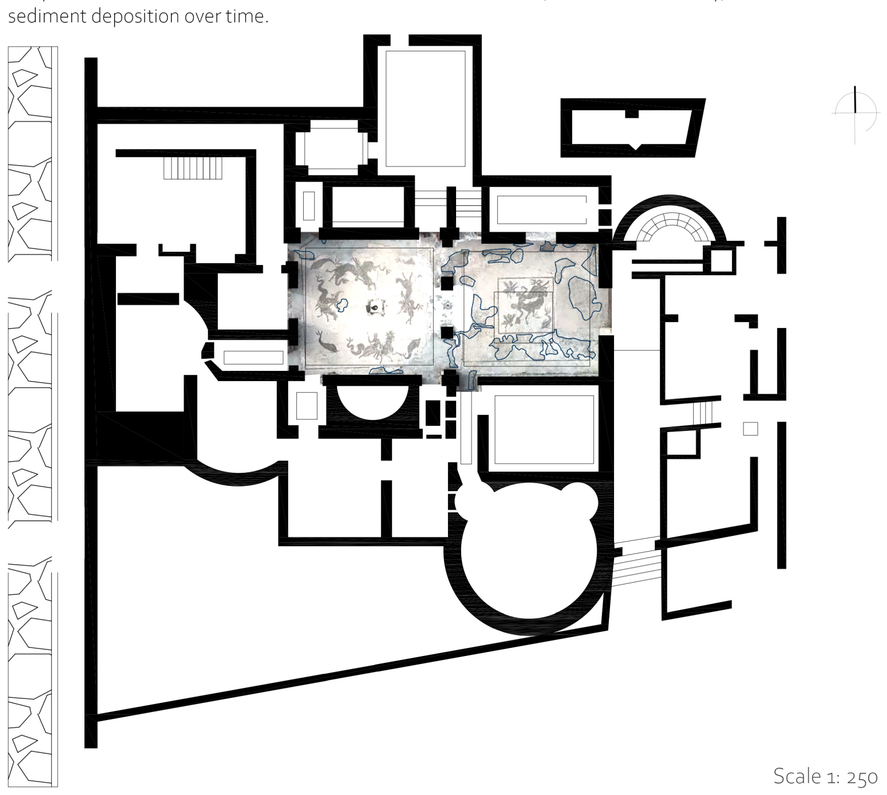
Wall n. 3



A scaled orthophoto was created using a combination of images taken on site and serves as the basis of the material and degradation mapping analyses.

Mosaic Floor

The abrasion mapping of the Roman bath mosaic reveals a concentrated pattern of surface wear distributed mainly along the peripheral zones and transitional circulation areas of the space. The blue-marked regions indicate areas where the tesserae have undergone progressive material loss due to mechanical friction, repeated human movement, environmental exposure, and long-term deterioration processes. The irregular geometry of the abrasion suggests differentiated levels of decay, where certain portions of the mosaic remain relatively preserved while others exhibit severe erosion and fragmentation. The central decorative motifs appear more intact compared to the edges, indicating that the perimeter zones were more vulnerable to water infiltration, structural instability, and accumulated sediment deposition over time.



Scale 1: 250

Abrasion

This mapping is essential in understanding the spatial behavior of deterioration, to identify the vulnerable sectors that require conservation interventions, surface consolidation, and preventive protection measures to preserve the legibility and authenticity of the Roman bath.

Consolidation

Scaling

Phase	Intervention	Material / Chemical
Pre-consolidation	Pre-consolidation	TEOS Diluted
Cleaning	Dry cleaning & Cleaning	Soft brush & Mild detergent+H2O
Consolidation	Surface consolidation	TEOS
Repair	Filling scratches	lime mortar
Protection	Protective layer	Siloxane

See wall degradation mapping

Cracks

Phase	Intervention	Material / Chemical
Pre-consolidation	Pre-consolidation	TEOS Diluted
Cleaning	Dry cleaning & Wet cleaning	Soft brush & Deionized water
Preparation	Opening cracks	Manual tools
Consolidation	Crack filling & Surface consolidation	Lime Mortar & TEOS
Protection	Water-repellent	Siloxane

See wall degradation mapping

Missing Parts

Phase	Intervention	Material / Chemical
Pre-consolidation	Pre-consolidation	TEOS Diluted
Cleaning	Dry cleaning	Soft Brushes
Removal	Remove unstable parts	Manual tools
Consolidation	Fixation	TEOS
Repair	Filling & Internal grouting	Lime mortar
Protection	Protective layer	Siloxane

See wall degradation mapping

Erosion/Rounding of Bricks & Lime mortar

Bricks · Lime mortar

Phase	Intervention	Material / Chemical
Pre-consolidation	Pre-consolidation	TEOS Diluted
Cleaning	Dry cleaning & Wet cleaning	Soft brush & Water spray
Repair	Reconstruction	Lime mortar
Consolidation	Surface consolidation	TEOS
Protection	Protective layer	Siloxane

See wall degradation mapping

Mechanical Damage (Scaling)

Phase	Intervention	Material / Chemical
Pre-consolidation	Pre-consolidation of tesserae	TEOS Diluted
Cleaning	Dry cleaning & Wet cleaning	Soft brushes & Deionized water + cotton swabs
CONSOLIDATION	Re-adhesion of tesserae	Lime mortar
Repair / reintegration	Filling lacunae	Fine lime mortar with marble powder
Protection	Shoe Covers	

See wall degradation mapping

Biological colonization

Phase	Intervention	Material / Chemical
Pre-consolidation	Pre-consolidation	TEOS Diluted
Removal	Vegetation removal	Manual extraction
Cleaning	Biocide application	Quaternary ammonium salts
	Cleaning	Water + brushing
Repair	Joint grouting	Lime mortar
Protection	Protective layer	Biocide Coating

See wall degradation mapping

Abrasion

Phase	Intervention	Material / Chemical
Pre-consolidation	Pre-consolidation of tesserae	TEOS Diluted
Cleaning	Dry cleaning & Wet cleaning	Soft brushes & Deionized water + cotton swabs
CONSOLIDATION	Re-adhesion of tesserae	Lime mortar
Repair / reintegration	Filling lacunae	Fine lime mortar with marble powder
Protection	Shoe Covers	

See Hoor plan

Granular Disintegration

Phase	Intervention	Material / Chemical
Pre-consolidation	Pre-consolidation	TEOS Diluted
Cleaning	Dry cleaning & Cleaning	Soft brush & AGAR GEL
Consolidation	Deep consolidation	TEOS
Repair	Filling voids	Lime mortar
Protection	Protective layer	Siloxane

See wall degradation mapping

Sugaring

Phase	Intervention	Material / Chemical
Pre-consolidation	Surface pre-consolidation	TEOS Diluted
Cleaning	Dry cleaning	Soft brushes
Preparation	Surface cohesion test	Touch / visual mapping
Consolidation	Deep consolidation	TEOS
	Surface strengthening	TEOS Diluted

See wall degradation mapping

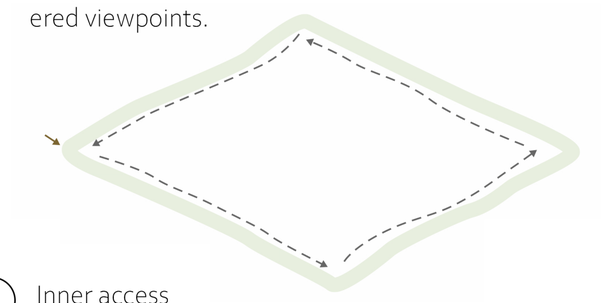
Pre-consolidation → Pre-consolidation · Cleaning → Chemical - Wet - Dry & Wet Cleaning · Removal / Preparation → Removal · Consolidation → Joint Treatment · Repair → Structural Treatment · Finishing / Protection → Protection

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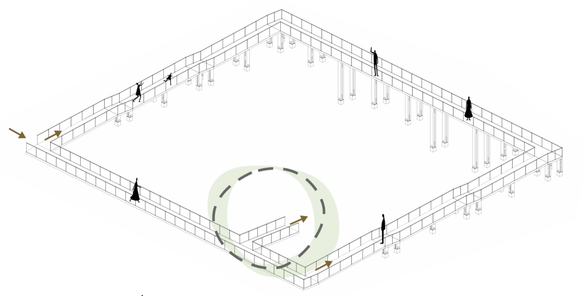
SARA SELIN FREGO LUJAINA ABDELMOHSEN ERIKA GALARRAGA

Roman Baths of Via Terracina

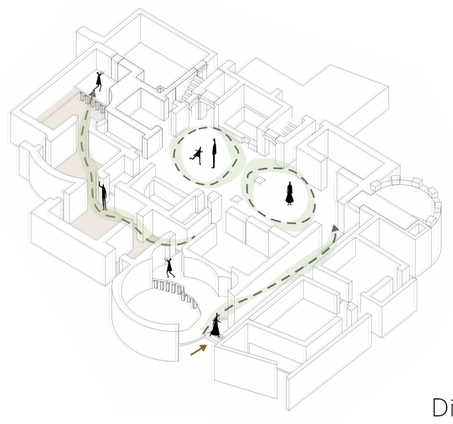
1 Perimetral circulation
Continuous ramped path around the site, framing the preserved Roman baths with elevated and lowered viewpoints.



2 Inner access
Secondary path branching inward, allowing closer engagement with the archaeological remains.



3 Interior exploration
Light circulation system inside the ruins, connecting fragile or deteriorated rooms while highlighting original mosaic paths and their symbolic patterns



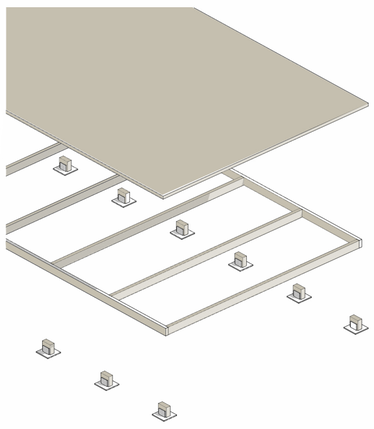
Diagrams
Circulation of the Roman Baths



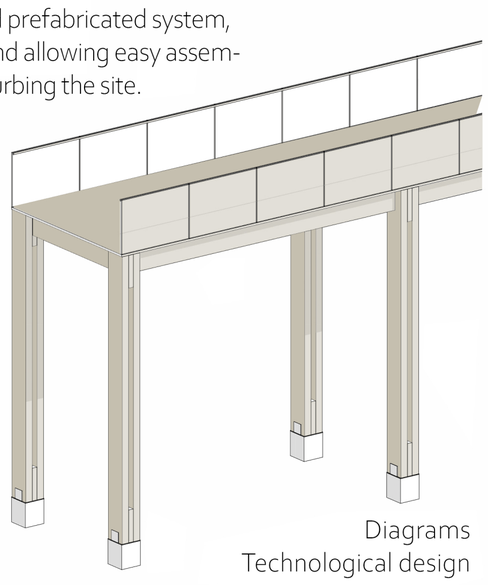
Inner Path

Glass Railing
Transparent boundary that ensures safety while preserving uninterrupted views of the Roman baths.

Metal base plates
Minimal and reversible foundations, limiting ground intervention and protecting the archaeological remains.

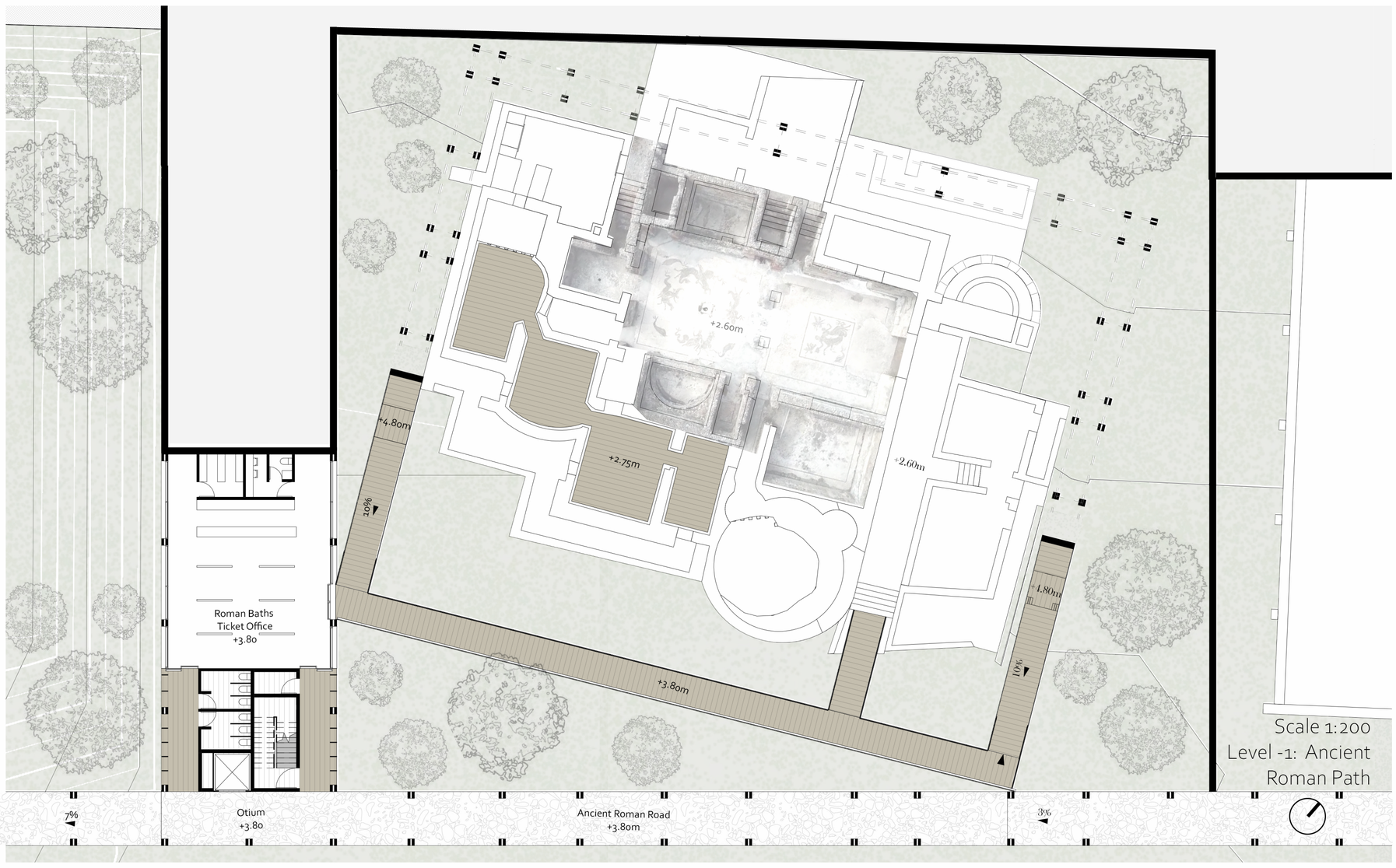


Timber structure
Lightweight and prefabricated system, reducing load and allowing easy assembly without disturbing the site.



1. Glass railing
2. CLT deck
3. Timber beam
4. Timber columns
5. Metal base plate

Diagrams
Technological design





Scale 1:200
Ground Floor: Via Terracina

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MILANO 1863

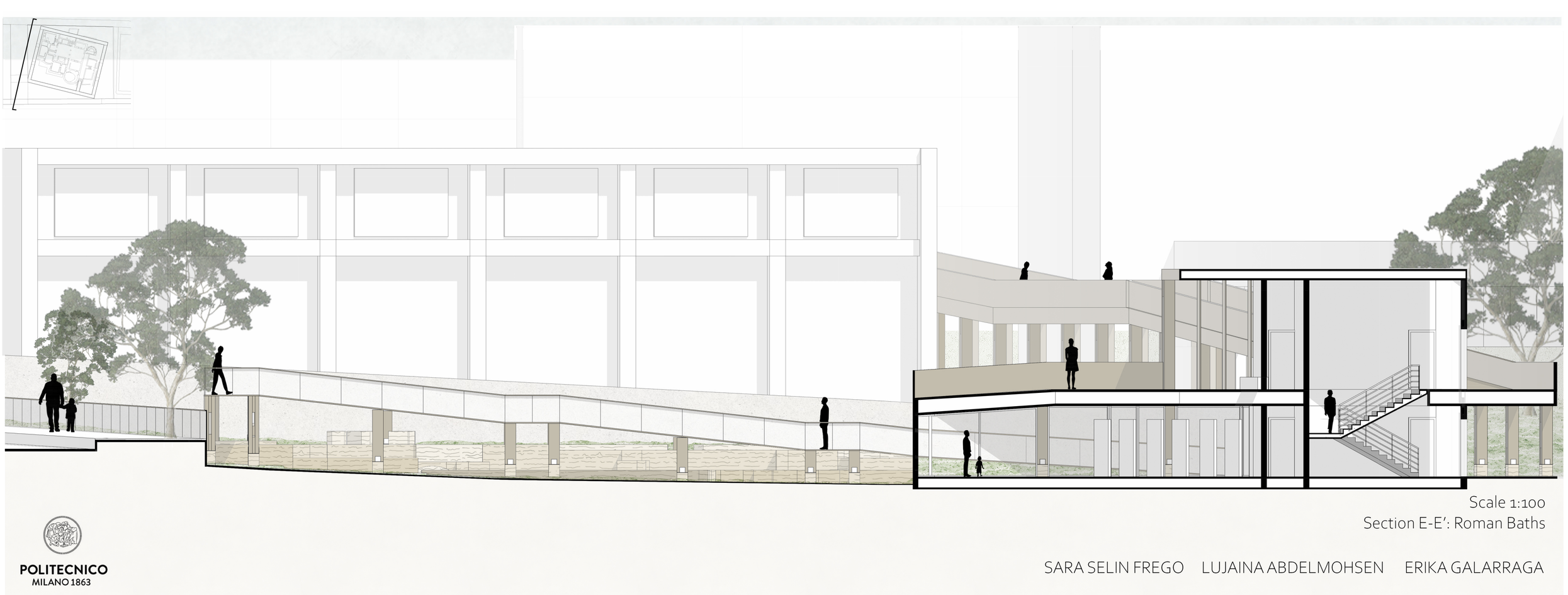
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Roman Baths of Via Terracina

N.T.S
Axonometry: Roman Baths



Scale 1:100
Section D-D': Roman Baths

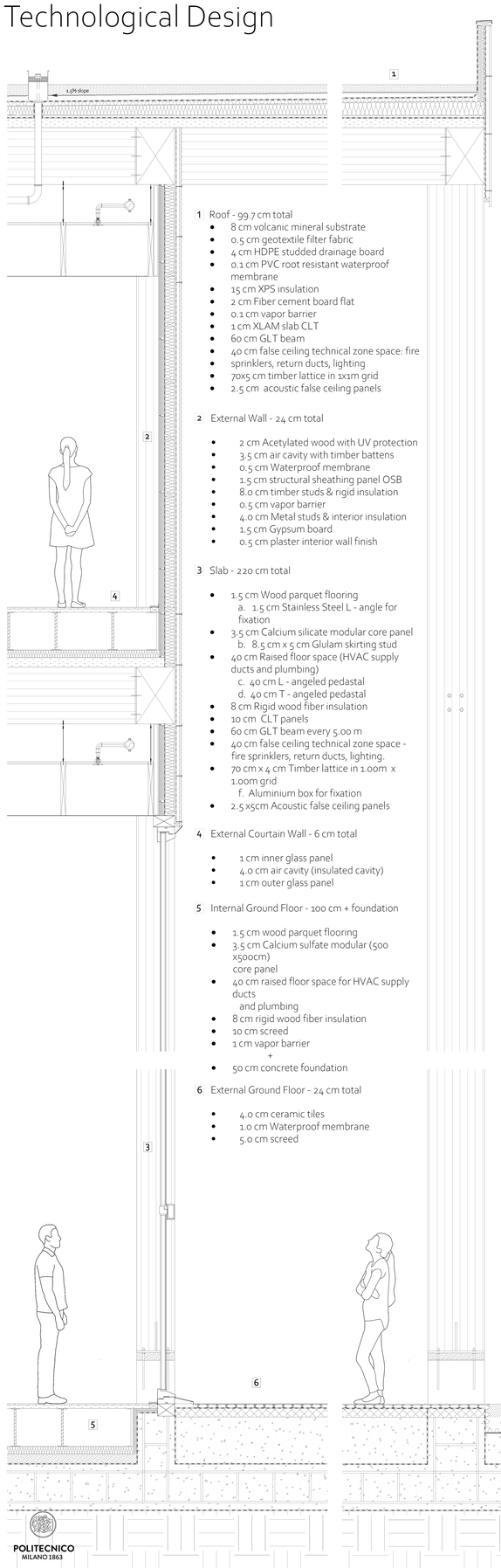


Scale 1:100
Section E-E': Roman Baths

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Technological Design



1 Roof - 99.7 cm total
- 8 cm volcanic mineral substrate
- 0.5 cm geotextile filter fabric
- 4 cm HDPE studded drainage board
- 0.1 cm PVC root resistant waterproof membrane
- 15 cm XPS insulation
- 2 cm Fiber cement board flat
- 0.1 cm vapor barrier
- 1 cm XLAM slab CLT
- 60 cm GLT beam
- 40 cm false ceiling technical zone space: fire sprinklers, return ducts, lighting
- 70x5 cm timber lattice in 1x1m grid
- 2.5 cm acoustic false ceiling panels

2 External Wall - 24 cm total
- 2 cm Acetylated wood with UV protection
- 3.5 cm air cavity with timber battens
- 0.5 cm Waterproof membrane
- 1.5 cm structural sheathing panel OSB
- 8.0 cm timber studs & rigid insulation
- 0.5 cm vapor barrier
- 4.0 cm Metal studs & interior insulation
- 1.5 cm Gypsum board
- 0.5 cm plaster interior wall finish

3 Slab - 220 cm total
- 1.5 cm Wood parquet flooring
  a. 1.5 cm Stainless Steel L - angle for fixation
- 3.5 cm Calcium silicate modular core panel
  b. 8.5 cm x 5 cm Glulam skirting stud
- 40 cm Raised floor space (HVAC supply ducts and plumbing)
  c. 40 cm L - angeled pedastal
  d. 40 cm T - angeled pedastal
- 8 cm Rigid wood fiber insulation
- 10 cm CLT panels
- 60 cm GLT beam every 5.00 m
- 40 cm false ceiling technical zone space - fire sprinklers, return ducts, lighting.
- 70 cm x 4 cm Timber lattice in 1.00m x 1.00m grid
  f. Aluminium box for fixation
- 2.5 x5cm Acoustic false ceiling panels

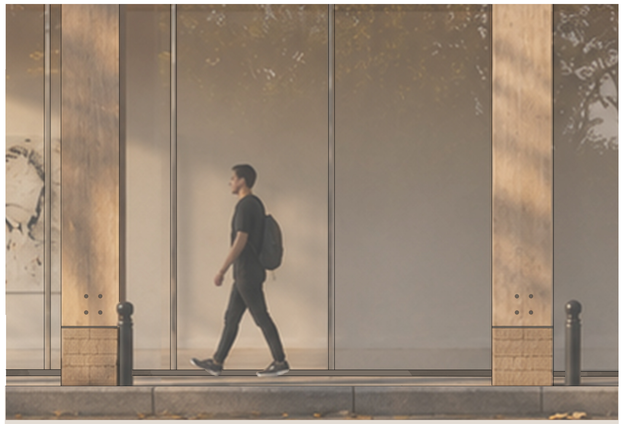
4 External Courtain Wall - 6 cm total
- 1 cm inner glass panel
- 4.0 cm air cavity (insulated cavity)
- 1 cm outer glass panel

5 Internal Ground Floor - 100 cm + foundation
- 1.5 cm wood parquet flooring
- 3.5 cm Calcium sulfate modular (500 x500cm) core panel
- 40 cm raised floor space for HVAC supply ducts and plumbing
- 8 cm rigid wood fiber insulation
- 10 cm screed
- 1 cm vapor barrier

+
- 50 cm concrete foundation

6 External Ground Floor - 24 cm total
- 4.0 cm ceramic tiles
- 1.0 cm Waterproof membrane
- 5.0 cm screed



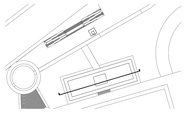


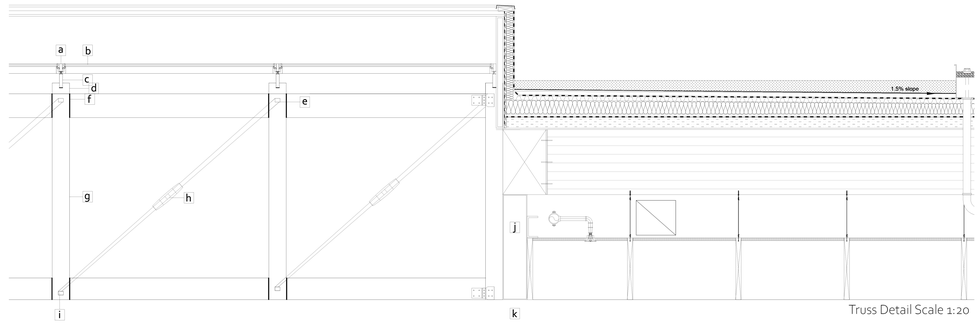
Scale 1:20
Façade section: Cultural center



Truss Section Detail

a. Rubber framing for air gap filling
b. Glass Panel 0.7 cm
c. Steel mullion for skylight framing 3 cm
d. Timber Purlin
e. Concealed connection node
f. Steel plate for truss rod fixation
g. Vertical timber post 200 cm x 24 cm
h. Steel diagonal rod Ø20 mm
i. Timber bottom chord 12 cm
j. Stainless steel C channel 3 cm
k. Steel standoff bracket

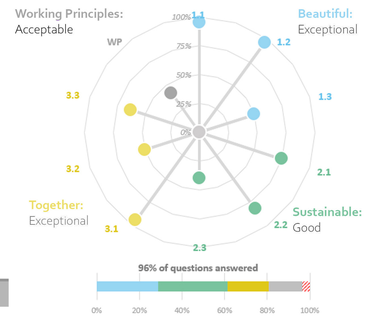




Truss Detail Scale 1:20

NEB Checklist Results

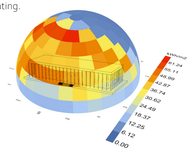
1 Beautiful	*Weight: 25%*	82%	*Exceptional*
1.1 Integration to the built and natural environ		95%	
1.2. Quality of experience		96%	
1.3. Identity and purpose		50%	
2 Sustainable	*Weight: 25%*	68%	*Good*
2.1 Circularity		75%	
2.2 Climate Change mitigation and adaptatio		82%	
2.3 Other environmental aspects		40%	
3 Together	*Weight: 25%*	70%	*Exceptional*
3.1 Physical inclusion		94%	
3.2 Social inclusion		50%	
3.3 Creation of vibrant communities		63%	
Working Principles	*Weight: 25%*	42%	*Acceptable*
Overall		65%	*Very NEB-aligned*

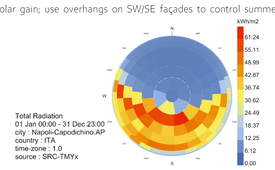


Solar Radiation Analysis

Sky Dome

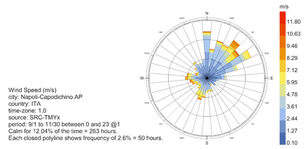
Design implication: Maximize south-facing glazing for passive solar gain; use overhangs on SW/SE façades to control summer overheating.





Wind Rose

Design implication: orient operable openings to capture NE winds.



N.E.B Design Decisions

1 Landscape regeneration

The masterplan transforms a previously enclosed site into a public green landscape. New trees and native vegetation create a forest-like environment that enhances biodiversity, improves environmental quality, and provides spaces for social interaction and recreation.

2 Restoration of the Roman traces

The project re-establishes the historic Roman path, making a previously hidden heritage element accessible to the community. This intervention strengthens local identity, reconnects users with the site's history, and reinforces a sense of belonging.

3 Cross ventilation strategy

Operable openings on the north and south façades promote cross ventilation through the building. The central atrium acts as a thermal chimney, facilitating natural airflow and reducing cooling demand throughout all levels.

4 Daylighting and Stack Ventilation

A glazed atrium skylight maximizes natural daylight penetration while enhancing passive ventilation. Warm air rises and is extracted through the roof opening, improving indoor comfort and reducing reliance on artificial lighting and mechanical cooling.

5 Green Roof

The vegetated roof improves thermal performance by increasing thermal inertia and reducing heat gain. It contributes to the building's microclimate, supports rainwater retention, and enhances ecological integration with the surrounding landscape.

6 Solar control and shading

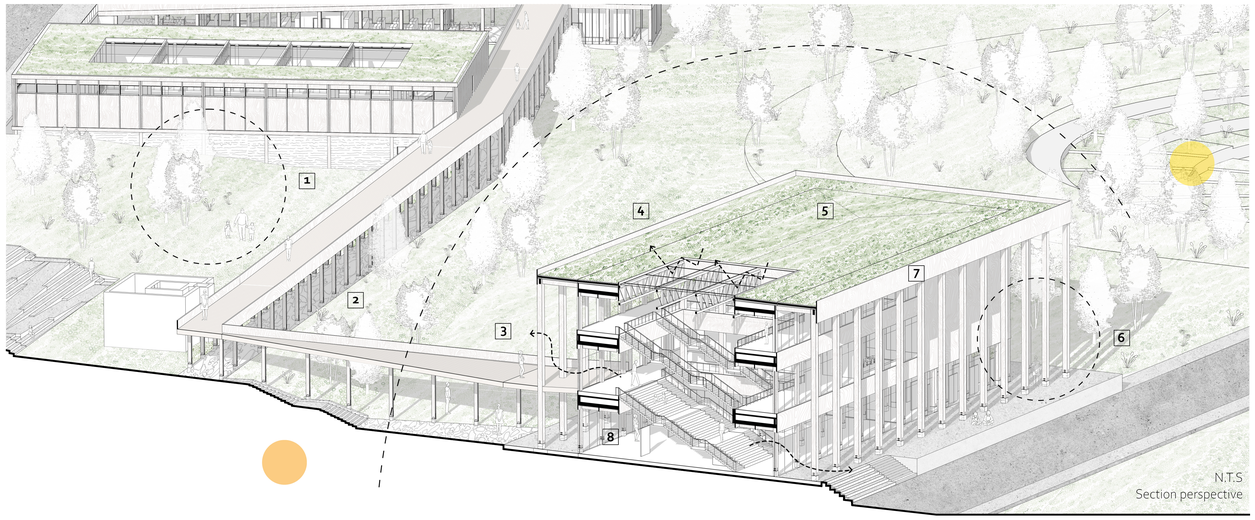
A continuous colonnade surrounds the building, providing passive solar protection for the glazed façades. This shading system reduces direct solar radiation, improves thermal comfort, and lowers cooling loads.

7 Materiality

The structure is primarily constructed in timber, a low embodied carbon footprint. Tuff stone is incorporated at the column bases, referencing the material character of the Roman Baths, establishing a connection with the site's historical context.

8 High efficiency climate control

UFAD supplies conditioned air from a raised floor plenum and returns it at the ceiling. Only the lower occupied zone is cooled, while the warm air carries heat upward to the ceiling returns, reducing the cooling load and removing airborne pollutants from the breathing zone.



N.T.S
Section perspective

N.T.S
Diagrams of climate & solar Performance

Summer Radiation

The colonnade provides effective shading, reducing solar heat gains and preventing overheating.

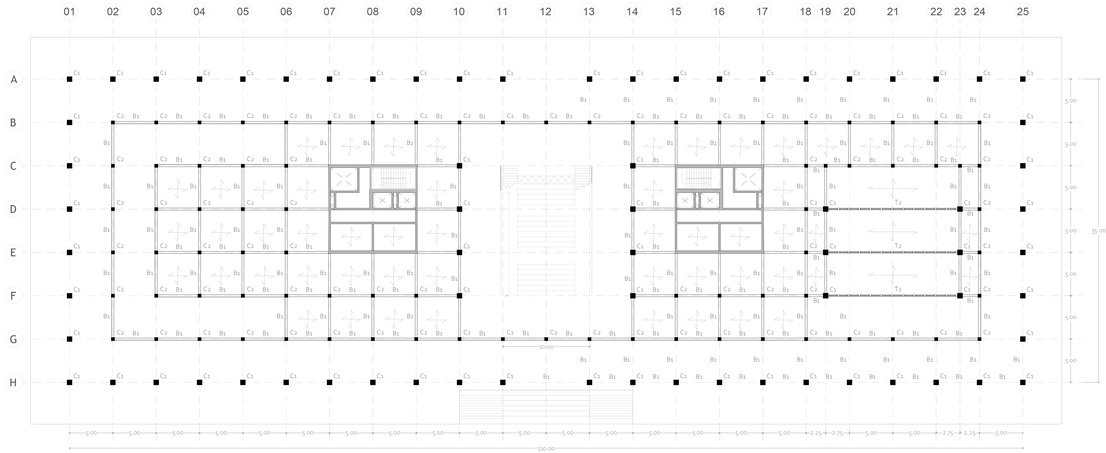
Winter Radiation

Lower sun angles enable passive solar gains, improving thermal performance during colder months.

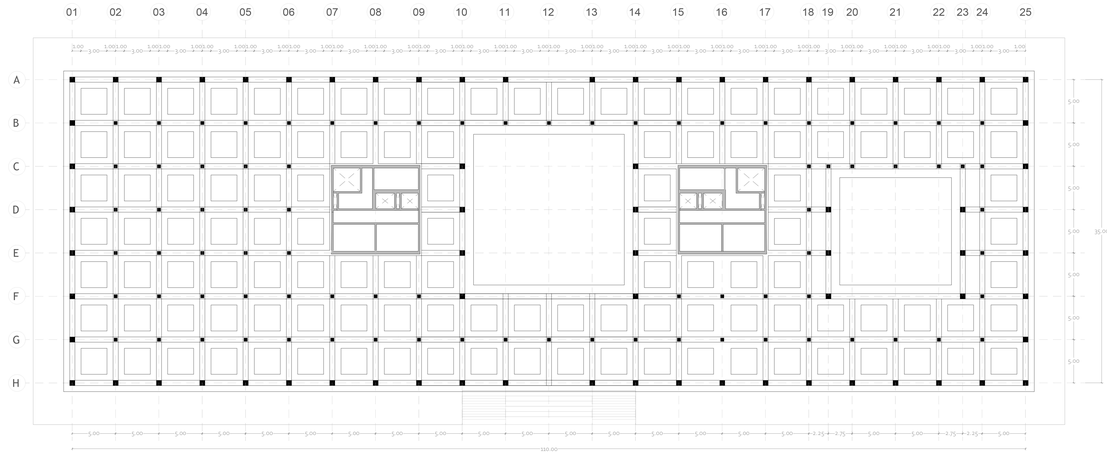
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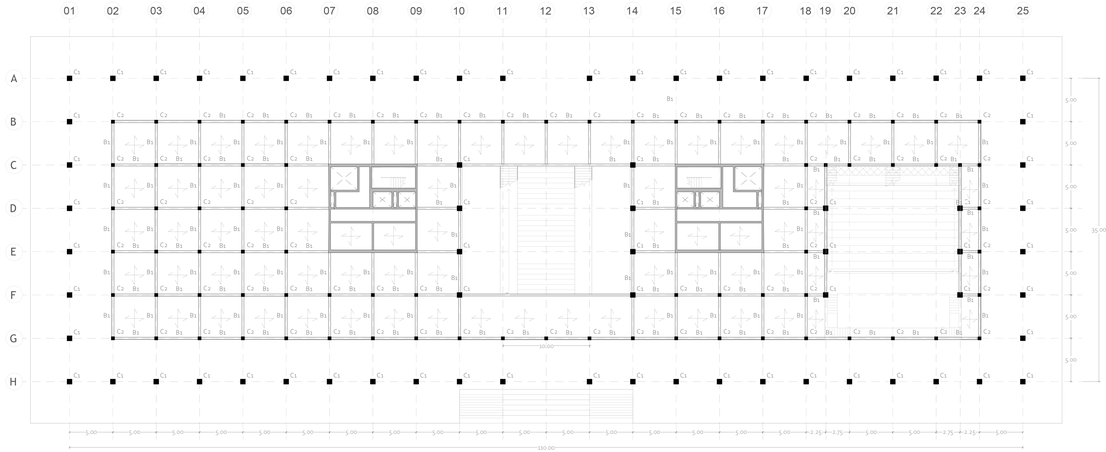
Structural Design | Culture Centre



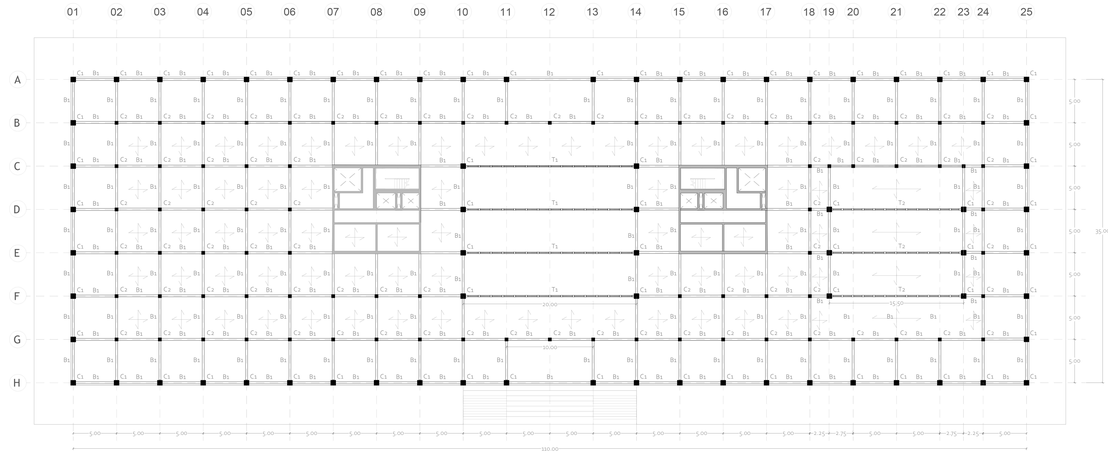
Level 1
Framing Plan
Scale 1:250



Foundation Plan
Scale 1:250



Level 2
Framing Plan
Scale 1:250



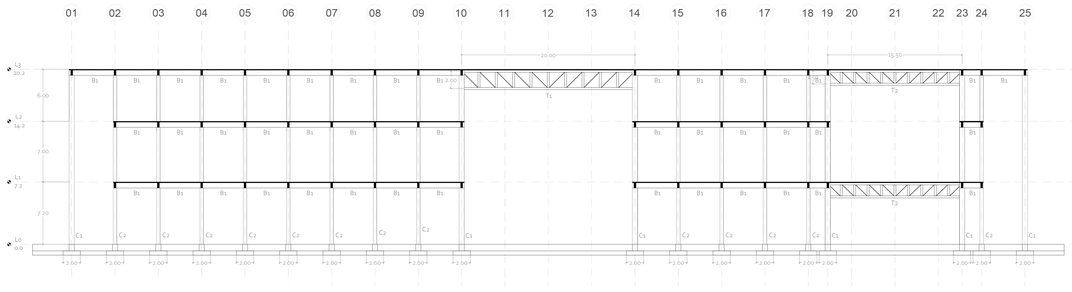
Roof
Framing Plan
Scale 1:250

Structural Design and Materials

The structural design strategy for the three-story cultural center located along Via Terracina in Napoli is designed to balance the architectural vision which includes a exterior perimeter colonnade and an expansive central atrium. The 5m x 5m grid and structural layout are in line with rigorous seismic performance requirements.

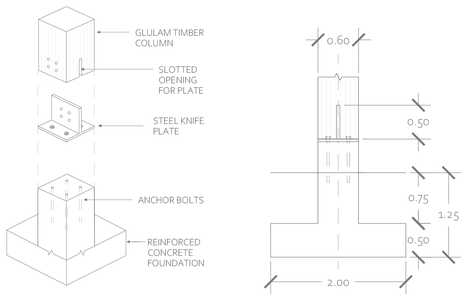
The primary structure utilizes an engineered mass timber system, leveraging the structural efficiency and sustainability of Glulam GL28h for the beams, columns, and trusses and cross-laminated timber (XLAM) for the slab.

Additionally, the foundation and the two cores are made of reinforced concrete and act as the main lateral-force-resisting systems.



Structural Section
Scale 1:250

Timber Column Connection to Concrete Foundation Detail

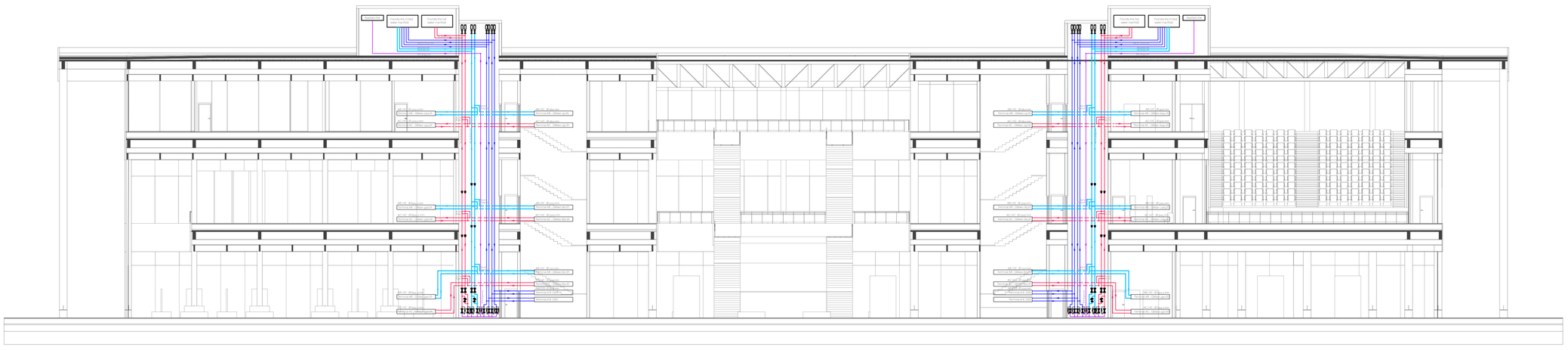


LEGEND	
TAG	TYPE AND DIMENSIONS
C_1	GLULAM COLUMN 600 X 600 mm
C_2	GLULAM COLUMN 400 X 400 mm
SLAB	CLT 200mm (5-ply)
B_1	GLULAM BEAM 600 X 240 mm
T_1	GLULAM TRUSS 2m, 240 X 200 mm
T_2	GLULAM 1.5m, 240 X 400 mm

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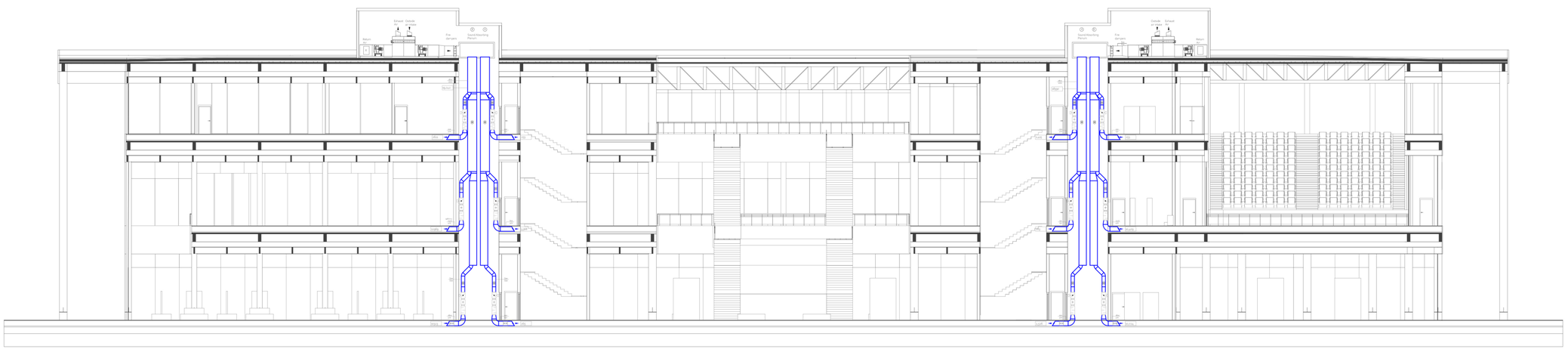
Services Design for Sustainable Buildings



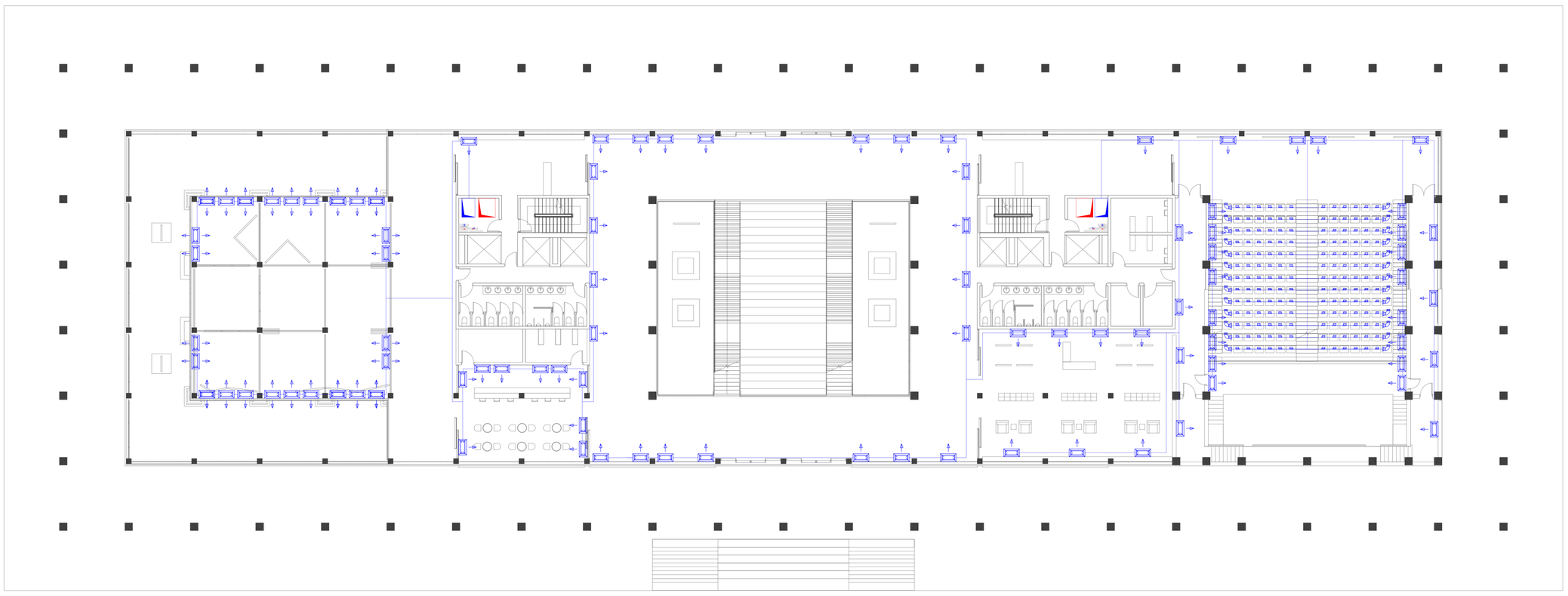
Legend | Heating and Conditioning System

- AC / VC Hot Water Supply
- AR / CED Dedicated Server Cooling Circuit
- AFA Softened Cold Water

Heating and Conditioning Floor plan
Scale 1 :250



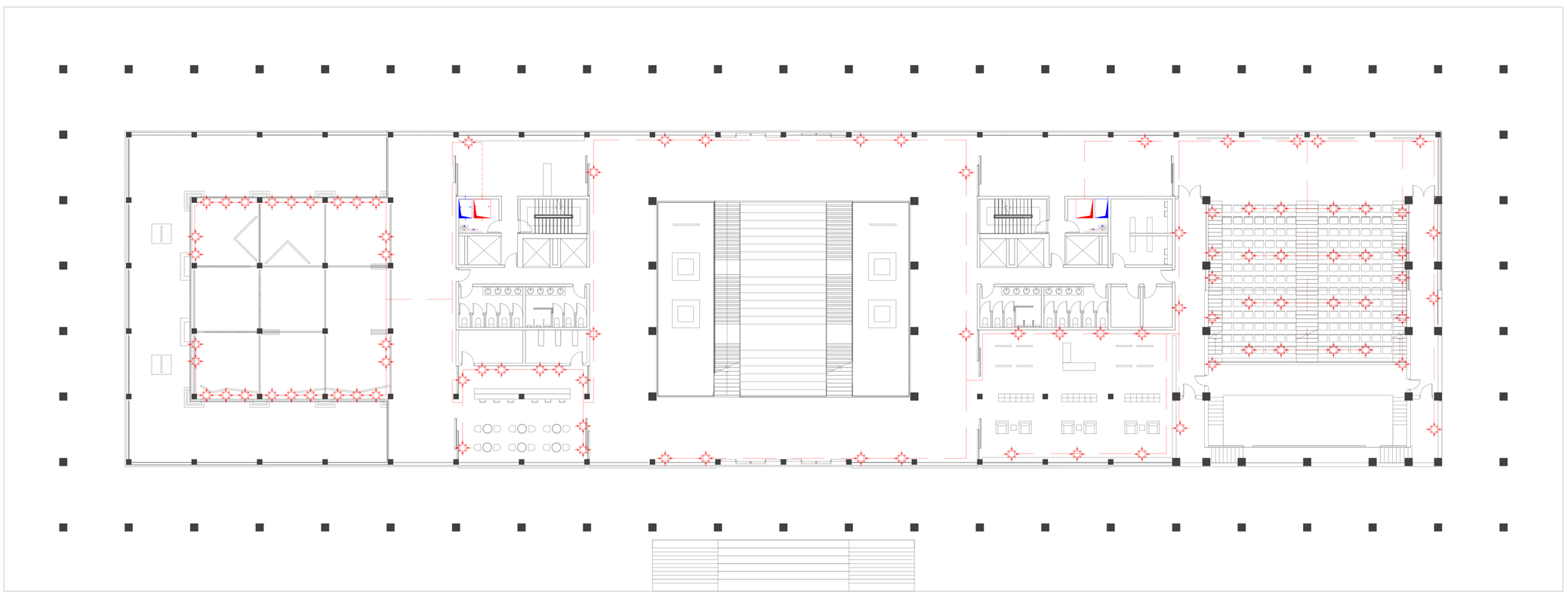
Supply Air Section
Scale 1 :250



Legend | HVAC System

- Supply and fresh air
- Return air
- Supply diffuser
- Return diffuser
- Return Air Riser 1 2000mm x 1250mm
- Supply Air Riser 1 1800mm x 1000mm

Supply Air Floor plan
Scale 1 :250



Return Air Floor Plan
Scale 1 :250

POLITECNICO MILANO 1863

SARA SELIN FREGO LUJAINA ABDELMOHSEN ERIKA GALARRAGA