Never

Finish

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Abstract

This thesis proposes a new Art Institution that tackles Athens' urban decay by merging art with public works maintenance. This institution will emphasize hands-on training in urban art maintenance and civil craftsmanship, prioritizing practical interventions over theoretical research. It aims to provide skills to implement small-scale, impactful art-based improvements and cooperate with different groups of communities and municipalities to mitigate city deterioration. Grounded in Practice Theory, the building acts as a living tool designed to manage the physical production, distribution, and storage of this civil-craft knowledge. Through temporary, art-driven interventions on its own plug-and-play architectural structure, the institution reconnects inhabitants with the cityscape, embodying the principle of "small steps toward a big impact" to drive a continuous, meaningful urban renewal.

Acknowledgements

I would like to express my deepest gratitude to my graduation committee at the Faculty of Architecture and the Built Environment, TU Delft. Thank you to my primary supervisor, Dr. Angela Rout, and my secondary mentor, ir. Marija Mateljan, for introducing me to alternative design and working methodologies within the Design, Data and Society Group (DDS). Their guidance continually pushed my project forward, opening up new possibilities and enabling me to develop my concept with true spatial depth while allowing me the freedom to fully explore my ideas.

I am equally grateful for the insights gained during our graduation field trip. Immersing myself in the local culture and spatial realities of Athens was vital; it helped me form a deeper understanding of the city's urgent public needs and allowed me to identify the real-world intervention strategies that shape this thesis.

Finally, I want to extend a warm thank you to my peers and my family. The continuous discussions and shared feedback during our studio peer reviews provided immense inspiration and helped me sharpen my design logic. At the same time, the unwavering support, patience, and encouragement from my family gave me the strength and stamina needed to carry this work through from the very first sketch to its final completion.

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Chapter one

Introduction

Figure 1.1 Minor infrastructure deterioration in Athens, demonstrating uneven asphalt patching and a bent sidewalk guardrail.
(Photograph by author, 2025).

Athens' Context

In recent years, Athens has undergone different large-scale government-backed regeneration projects to improve and upgrade the city such as The Ellinikon Project to transform the former airport district into a "Smart, resilient and climate neutral" city (The Ellinikon 2025). However, these mega-scale projects always take years with different construction phases to complete, and they are mainly designed specifically for targeted areas, therefore the ground and minor scale of city realm deterioration around entire Athens are still dependent on the state daily management and public works maintenance. In fact, Athens Municipal Authority is currently facing problems with inadequate oversight of public and private utility companies, which has left the ongoing public amenities construction areas in poor condition with broken roads, potholes and hasty patchwork (Andrianopoulos and Triantafyllou 2024). This neglected condition can be seen in the images (Fig. 1.1) I took during our field trip. The problem of physical decay in the public realm is apparent everywhere including cracked or missing tiles, leaning railings etc. Which affects the city's appearance but also poses safety and accessibility risks for residents, especially with uneven floors and missing protective edges for basement lighting well.

Beyond the physical deterioration, the numerous vacant storefronts and buildings in Athens also reveal the city's ongoing struggle with urban blight. Nikos and Polina (2024), drawing from studies by the Chambers of Commerce and Statistical Authority bulletin, report that the rising number of vacant businesses and the continuous decline in turnover from vacant buildings are creating "black holes" in central urban areas after the economic crisis. Although the percentage of closed stores in Athens' center is decreasing from 32.3% in September 2013 to 24.90% in March 2018, it remains at a worrying level for a metropolitan market (Inemy 2018).

Urban decay, along with the city problems mentioned, creates intensive challenges for Athens. However, it also presents an opportunity to foster creativity, artistic development, and community engagement. It opens avenues for collaboration between the municipality and the community, enabling community-led regeneration projects and artistic initiatives that deliver positive social impact and value. For example, Martha Giannakopoulou and her studio if-untitled developed a successful platform called Polis, which connects architects, the community, and the Municipality of Athens to promote citizen-led regeneration. The platform evaluates vacant buildings, mediates with their owners, and assigns these transformed spaces to young innovators and the community for temporary use (Greta 2024). Even street art, often dismissed as graffiti and seen as a cause of public ugliness, has become a form of public art supported by the government that turns Athens' cityscape into an open-air gallery, flourishing in the decaying urban fabric. As an example, the mural on Sarandaporou Street is the result of a collaboration between the Municipality of Athens, local community organizations - Urban Act, and the emerging street artist Fio Silva which is an initiative supporting artists, providing them with a platform to express themselves while respecting public space, and contributing to beautifying the city (Culture is Athens 2023). Street art opens the space of possibility, imagination and creativity for both artists and inhabitants to criticize and question societal norms, values and practices (Glăveanu 2017). The role of public art in connecting citizens to their community and creating a sense of belonging is essential, as well as the ability of artists to express their drawing in public spaces demonstrating the tolerance of the government and flexibility for public comments.

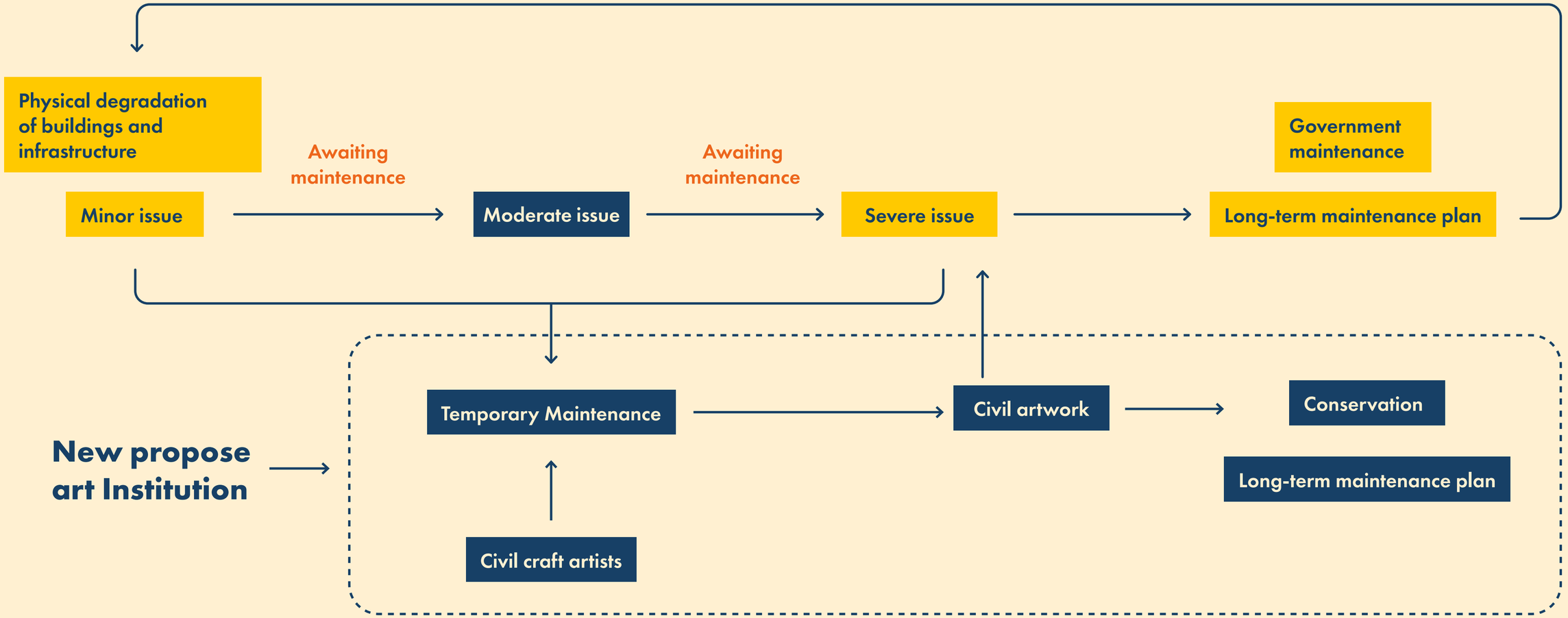


Figure 1.2: Operational flow diagram illustrating the systemic role of the proposed institution within municipal infrastructure deterioration cycles.
(Diagram by author, 2025).

The role of the institution

Urban decay presents an opportunity for the development of mural public art, which not only reconnects the community and enhances the city's appearance but also acts as a subculture to confront urban decay. Building on this, I propose advancing public art by expanding beyond 2D street art and integrating it with public works for city maintenance. This approach would extend urban repair through art to include civil infrastructure projects, creating a more comprehensive and impactful urban renewal strategy.

This new art school is not intended to address all the challenges of urban decay, as creating a well-designed public realm requires extensive long-term urban planning and substantial resources which take a lot of time to proceed. Instead, it focuses on the transient essences of street art—its materiality place-taking, ephemerality, oscillation and withdrawal (Bengtsen and Arvidsson 2024) to provide immediate, small-scale interventions that contribute to urban renewal.

The school operates on a timeline that addresses the transitional phase of facilities deterioration, intervening before they reach a critical state requiring government maintenance. This period offers an opportunity for temporary interventions, enabling the school to explore the integration of civil works with art. It also allows the students of using art to experiment with various intervention possibilities to slow the deterioration of the public realm. Bringing aesthetic improvements to the cityscape that allow artists to express themselves and create a bridge between the cityscape and its inhabitants. This approach embodies the principle of "small steps toward a big impact."

This art school would prioritize hands-on training, enabling students to engage in practical work on urban art maintenance. It would emphasize collaboration between art, design, and civil craftsmanship, working closely with the Municipality of Athens and property owners to implement practical solutions.

Program

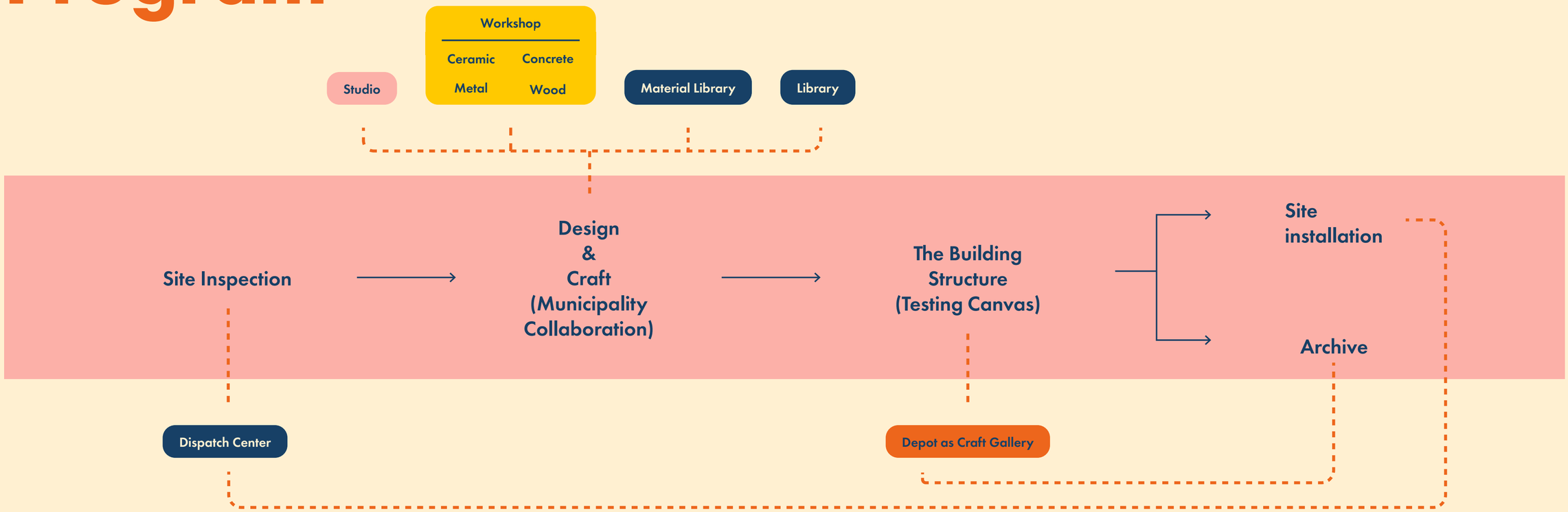


Figure 1.3: The Integrated Program and Operational Workflow.
(Diagram by author, 2026).

Workshop base education

In the Bauhaus school model, according to research (Johnson and Oates 2025), the key elements for integrating practice-based knowledge with general knowledge are purposeful activity, which may open creative design possibilities and alternatives. We are reminded of the importance of learning and creating new knowledge as it is tightly related to solving real-world problems and learning by doing. It emphasizes the importance of providing a workshop space in art schools to allow students to learn through hands-on experience.

Public maintenance works
The maintenance of the urban landscape can be divided into two main categories: public works and building maintenance. In accordance with the London Public Realm Toolkit recommended to architects (City of London Corporation 2024), public civil works maintenance can be divided into three main areas: surface materials (footway paths, kerbs, etc.), street furniture (bollards, steps, handrails, seating, etc.), trees and plantings (tree grilles, mobile planters, etc.). There is also minor maintenance of buildings that relates to appearance, including brickwork, carpentry, joinery, fencing, gates, painting, decorating,

Correlation between maintenance work and art school subject
From the Bauhaus school of art, design, and architecture, we can already see that the education model facilitates students to develop designs that combine functionality with creativity and are relevant to society's needs. Considering this, the proposed art school will be more radical to push functionality more towards practicality, including not just design, but also manufacturing to foster craftsmanship, allowing students to produce their own work for public maintenance. In this regard, the school's workshop space will need to be created or combined with traditional art schools' workshops. This will enable it to contain hands-on craftsmanship related to civil works such as joinery, steel working, and welding.

Exhibition space & archive & outdoor experimental space
In art schools, exhibition spaces are an important place for students to display their artwork, providing them with an effective means of motivating themselves and promoting their work to a larger audience (Hudson and White 2020). This art school not only provides exhibition space for current students but also features an archive space with an exhibition function that displays graduate projects for public exhibition as well as a learning space for current students to interact with and reference.

Partnerships

Art schools, as a higher education provider, are important for balancing the various needs and expectations of students, the government, and the wider community. As a result of rapid global change, expectations from these parties have also changed radically, so art schools need to adapt to the world's changes to gain adequate funding and resources.

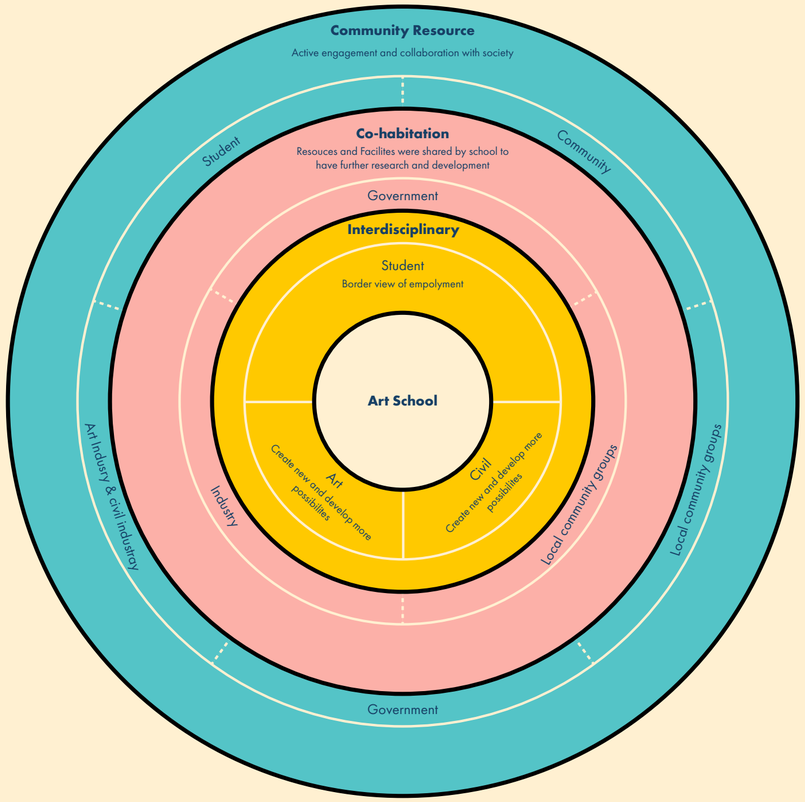


Figure 1.4: Concentric stakeholder map illustrating the collaborative institutional network and partnership layers of the art school.
(Diagram by author, 2025).

Cohabitation
New technology, facilities, and physical space would not only facilitate sharing across school subjects but also encourage collaboration with design companies and self-funded educational workshops (Ellen 2005). For example, an open lecture hall could be offered to local community groups, companies, and municipalities, creating a space for diverse parties to engage in open discussions. This approach promotes opportunities for knowledge sharing and collaboration among groups that might not typically interact.

Community resources
The art school would serve as a community resource, open to the public, with events organized and promoted to engage the public in participatory activities and foster collaboration between society and a well-rounded community.

Mural art in Athens

In this site analysis, the mural art is the main focus. Mural art is also being encouraged and accepted by the municipality as part of urban renewal. It mainly cooperates with urban acts and other organizations, and some of those projects are specifically for educational buildings. According to the mapping, the municipal support project was not primarily concentrated in the downtown area, but also intended to expand to other parts of the city. The surrounding site of Plato's academy does not have any mural art form, which makes it a also great opportunity for the Institution to establish the first project involving the community and starting from the surrounding Akadimia Platonos neighborhood.

Legend

- Mural art (Municipality, Urban act Organization)
- Mural art (Unknown)
- Plato's Academy(Site)
- Archaeological site
- Education building
- Building
- Greenery

0 — 1 — 2km

Figure 1.5: Analytical spatial mapping of municipal and unsanctioned mural art distribution across the metropolitan context of Athens (3.1, 3.2). (Map compiled by author based on OpenStreetMap geodata base, 2025).

1. ΑΛΕΞΑΚΗΣ ΓΕΩΡΓΙΟΣ
Silkscreen shop

2. ΚΑΡΑΙΣΚΟΣ Ε. & Ν. Ο.Ε.
Pump & Motors construction shop

3. Stafylopatis S.A. Warehouse
Lifting, Handling & Access equipment

4. HYDRO TITAN E.E.
Hydraulic systems construction shop

5. Akylas Machineshop Stratigakos Bros Ltd
Structural and miscellaneous steel construction business

6. ΚΟΛΛΙΟΠΟΥΛΟΣ
Hydraulic Cylinders-Rods-Tubes construction shop

7. ΤΣΙΑΔΗΣ, ΠΑΝΤΕΛΗΣ, & ΣΙΑ Ο.Ε.
Car Repair shop

8. ΞΗΡΟΣ ΒΑΣΙΛΕΙΟΣ
Car Repair shop

9. DIMX
High-pressure fittings, pipes shops, industrial consumables, machinery and welding equipment shop

10. ΑΦΟΙ Χ.ΖΑΦΕΙΡΟΠΟΥΛΟΙ ΟΕ
Car Repair shop

11. ΜΑΤΘΑΙΟΣ ΣΚΟΠΕΛΙΤΗΣ ΚΑΙ ΥΙΟΣ ΟΕ
Car Repair shop

12. Σιδηρεμπορική ΜΟΝ ΕΠΕ
Steel Manufacture shop

13. JCB
Construction machinery shop

14. ΧΕΡΟΥΒΕΙΜ Κ.ΕΛΑΙΟΥΡΓΙΚΑ ΜΟΝ. Ε.Π.Ε.
Grinding machinery for oliver oil shop

15. ΚΑΤΣΟΜΥΤΗΣ, ΑΛ., & ΣΙΑ Ο.Ε.
Construction supplies shop

16. ΡΗΓΑΣ, ΜΙΧΑΛΗΣ Κ.
Car Repair shop

17. Obrela
Cybersecurity espertise

18. ΓΑΛΕΤΑΚΗΣ ΓΙΩΡΓΟΣ
Car repair shop

19. MACHAIRIDIS, PAVLOS, E.E.
Mini buses design and repair shop

20. Δ ΚΑΙ Ε ΜΟΥΣΤΑΚΑΣ ΟΕ
Car repair shop

21. Δ ΚΑΙ Ε ΜΟΥΣΤΑΚΑΣ ΟΕ
Buses & Coach repair shop

21. Δ ΚΑΙ Ε ΜΟΥΣΤΑΚΑΣ ΟΕ
Buses & Coach repair shop

22. ΒΑΣΙΛΑΚΟΣ ΓΙΩΡΓΟΣ - ΕΥΘΥΓΡΑΜΜΙΣΕΙΣ ΖΥΓΟΣΤΑΘΜΙΣΕΙΣ
Car repair shop

23. ΒΑΣΙΛΑΚΟΣ ΓΙΩΡΓΟΣ - ΕΥΘΥΓΡΑΜΜΙΣΕΙΣ ΖΥΓΟΣΤΑΘΜΙΣΕΙΣ
Car repair shop

24. Tsantilasglass L.t.d.
Glass manufacture shop

25. ΚΑΡΕΛΙΑ ΚΑΠΝΟΒΙΟΜΗΧΑΝΙΑ Α.Ε.
Cigarette manufacturer and exporter

26. ΟΠΑΠ Κεντρικά Γραφεία
Gaming company

27. Όμιλος Χρηματιστηρίου Αθηνών
Financial exchange company

28. BoxNow
Delivery shop

29. SYSTEM CONTROL A.E.
IT knowledge company

30 Tropical Coffee Roasters
Manufacture of machinery, roasting machines, electrostatic filters and Horeca equipment

31. Tsirikos Transmission Systems
Drivetrain products campny

32. Ανταλλακτικά MAN Συνεργείο
Truck repair shop

33. ΜΑΡΚΟΥΛΑΚΗΣ Μ & ΣΙΑ Ε.Ε.
Truck repair shop

34. Ταλιουράκης Χρήστος - Συνεργείο Αυτοκινήτων
Car repair shop

Figure 1.6: Local urban context map and commercial inventory of the Akadimia Platonos neighborhood, demonstrating the industrial and residential boundaries surrounding the site.
(Map compiled by author after Lampropoulos et al. 2020)

Legend

- Plato's academy
- Archaeological site
- Residential building
- Industrial building
- Commercial building
- Abandoned building
- Church
- Education building
- Leisure area
- Aleppo Pine
- Stone Pine
- Cypress
- Olive

Plato's academy is located in an interesting location that is situated between a residential area and an industrial area, providing an important breathing area within this neighborhood. Due to the lack of greenery and leisure areas within this district, Plato's academy also serves as an important leisure area for local residents which provides a playground for children and a place for jogging. A study (Lampropoulos et al. 2019) indicates that the majority of people who use this area are those from the neighborhood and some workers who work near the industry. Therefore, the public use of the proposed art Institution for the local neighborhood should take into account that it does not eliminate greenery and their leisure area, which should be enhanced and improved to provide a social and cultural space.

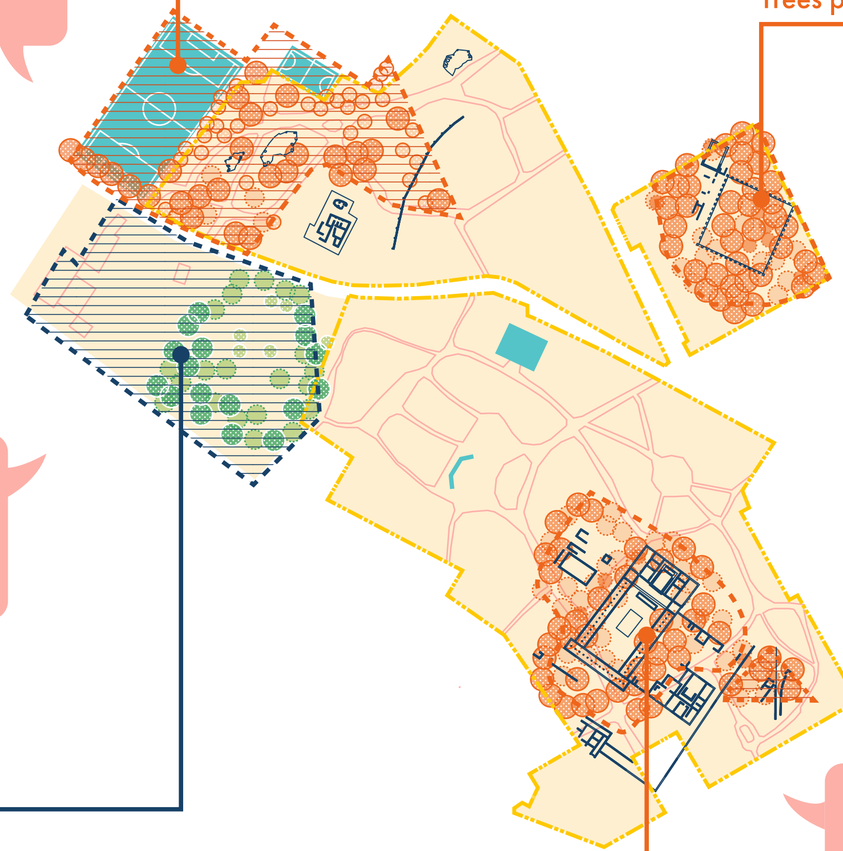
According to the mapping, most of the industries in this area are related to the repair of automobiles. Nonetheless, some industries like steel welding equipment shops, steel manufacturing shop, construction machinery shops, construction supply shops, and silkscreen shops might be connected to civil workshops or might even collaborate with the art Institution in holding workshops. This may be an advantage if the proposed art Institution is located in Plato's Academy the industrial district.

Proposed museum location by Municipality

We say “yes” to the new construction, but why does it have to be inside the grove? They should build it outside so we don’t lose the football and basketball fields or sacrifice this vital green space and free use.

Did you see the competition proposal? If they implement it, we’ll lose 30% of the park’s free space and they’ll cut down 580 large trees!

Trees proposed for removal in the area



This place is such an important green lung for western Athens and one of the most significant archaeological sites we have.

And it’s not like there aren’t other spaces around the park they could use. But no, they want to place it inside the park, taking away over 14,000 sq m of common and green space.

And let’s not forget the earthworks and tree felling for those archaeological pits—it’s going to strip away valuable vegetation. That’s not just bad for us, but for the animals and birds too. It’ll only make the thermal island effect worse.

New proposed art Institution

The area contains some abandoned buildings owned by the municipality which could be demolished, and by selecting this location, the municipality would avoid the need to cut down too many trees, as the neighborhood is very concerned about tree cutting. Since the site is not entirely within Plato’s Academy but only partially occupies the area, local residents could continue to use the leisure facilities during the long construction period. This location has also been suggested by the local community. While Plato’s Academy needs updates and improvements to provide better recreational spaces for locals, the new art Institution, with its focus on civil works maintenance and a tree-planting program, could help upgrade and improve the park and its facilities. In the future, the Institution could collaborate with the local neighborhood to work on Plato’s Academy as a project to enhance the recreational area in the neighborhood.

Trees proposed for removal in the area

Figure 1.7: Contextual park mapping overlaying municipal development boundaries against tracked community concerns, tree preservation zones, and localized site alternatives. (Map compiled by author, 2025).

Chapter two

Approach

Numerous studies have explored interdisciplinary approaches to school education and the encouragement of collaboration between school programs and companies, particularly in STEAM education, which integrates multiple fields. In these discussions, there is often less emphasis on physical spatial correlation than on curriculum planning and pedagogy related to academic approaches. Most architectural and educational studies focus primarily on the school curriculum and teaching methods, with less attention to the active role physical space can play in the processes of knowledge creation, creativity, and manual practice.

In practice theory, especially regarding tectonic and material work, knowledge creation is structurally divided into three main operational pillars: producing knowledge, distributing knowledge, and storing knowledge.

Producing Knowledge
In a civil-craft context, makers produce material knowledge through active physical fabrication, material experimentation and manual manufacturing within the workshop environment.

Distributing Knowledge
Knowledge is distributed not merely through essays, but through the physical communication and presentation.

Storing Knowledge
Material findings, civic assets, and physical archives are stored through programmatic documentation, material repositories, and structural integration within a protective, localized site landscape.

By treating these three practices as spatial requirements rather than abstract ideas, the architecture ceases to be a passive shelter. Instead, the building systems are engineered as an active, three-dimensional apparatus designed explicitly to test, showcase, and archive the evolving knowledge of civil maintenance.

Research questions

1. How can the architectural design of a radical civil-craft institution structure the production, distribution, and storage of material knowledge to execute public-realm renewal in Athens?

    - How can a building type integrate heavy, hazardous physical production while remaining open and accessible to the public domain?

    - How can an architectural framework actively support the continuous distribution and temporary display of evolving student work?

Methodology

This thesis adopts a Research-through-Design (RtD) methodology, in which the core investigative tool is the hands-on production of architectural drawings, technical details, and models. Rather than treating design as a post-theoretical application, the architectural layout embodies three core pillars of practice-theory knowledge creation: Production (the workshops), Distribution (the building envelope as an active display), and Storage (the students' work archive).The investigative framework is divided into three phases:

Phase 1
Contextual & Typological Mapping

The first phase established the baseline of the research by documenting and mapping the spatial culture, boundary conditions, and heritage treatments within the Athens fabric. This phase utilizes sections and site mapping to analyze the living cultural patterns, programmatic hierarchy, and historical memory:

The Commercial Storefront Culture:
Field research sectionally mapped how local shops and workshops culturally manipulate their boundaries.

The Treatment of the Archaeological Perimeter:
Site mapping at Plato's Academy documented the defensive municipal treatment of heritage layers.

Phase 2: Physical Modeling and Structural Discovery

The second phase is using three-dimensional modeling as an active design tools for conceptual invention and systemic verification, advancing through two stages:

The Abstract Conceptual Model Stage:
The design process began with highly abstract, open-ended modeling to explore what kinds of architectural concepts could be developed. This stage was completely blind to final building layouts or dimensions; instead, it operated as a three-dimensional sketching medium to test conceptual ideas and possibilities. It was precisely through this abstract physical experimentation that the core concept of "The Skin of the City" was discovered and framed. Once this conceptual framework was established, it provided structural guidance towards the final architectural design principles.

The Scaled Model Stage:
Following the abstract framing of the design principles, the project advanced into scaled modeling as testing tool to discover the relation between the spatial layout and structural system.

Phase 3: Technical Component and Material Synthesis

This phase shifted from broad structural testing to micro-component validation. This phase executed a detailed cross-material investigation to determine the exact technical parameters required for the building envelope.

To satisfy the theoretical framework, material performance matrices were developed across three tectonic planes:

Production Substrates (Floors):
Comparing solid slabs, coatings, and modular flooring configurations to evaluate reconfigurability, installation time, and capacity to handle heavy vehicular logistics.

Distribution Interfaces (Walls):
Evaluating glazed surfaces, solid partitions, cladding panels, and wire meshes to analyze attachment methods and surface reversibility for high-frequency student display interventions.

Structural Anchor Systems (Columns):
Researching concrete, steel, and timber columns to map surface integrity impact against anchor compatibility, verifying how to maximize installation access without causing long-term structural wear to the building frame.

Chapter three

Results

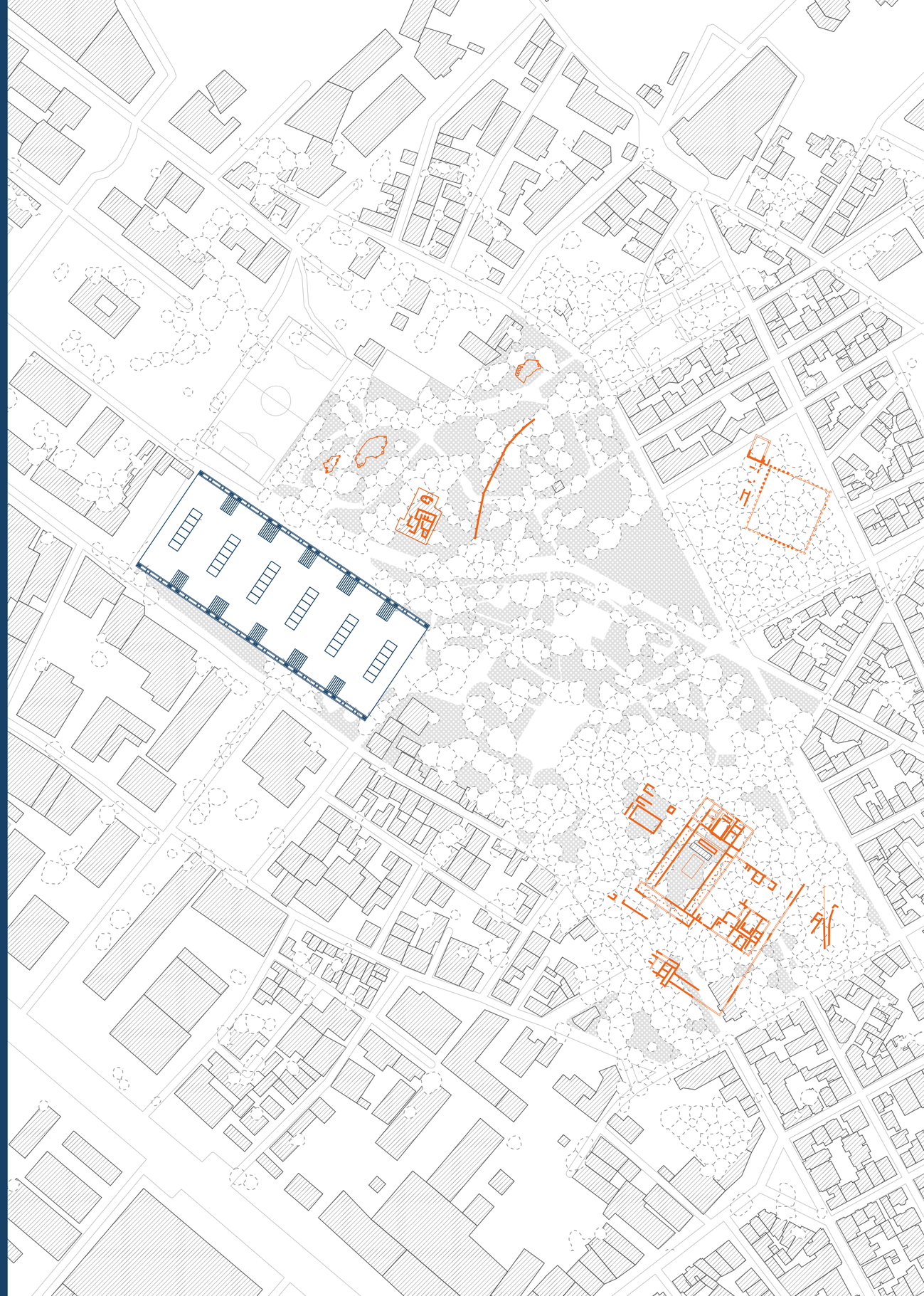
Design concept

The Skin of the city

Since the institution involves producing and installing knowledge related to public-realm facilities in streets and public spaces, it operates fundamentally at the surface layer of the city. This operations-led reality generated the core design concept of the "Skin of the City"—an architectural intent to bring the functional essence, material behaviors, and boundary-blurring characteristics of Athens' streets directly into the fabric of the building, expanding opportunities to display and demonstrate the artistic potential of civil maintenance.

Architectural results

The final architectural proposal for the Never Finish institution at the Plato's Academy Archaeological Park stands as a structural and pedagogical manifest. The results translates the theoretical framework of practice-based knowledge—Production, Distribution, and Storage—into a highly technical, reconfigurable building system. The project redefines the institution as an active exhibition infrastructure, evolved from a core 1200mm modular structural grid.



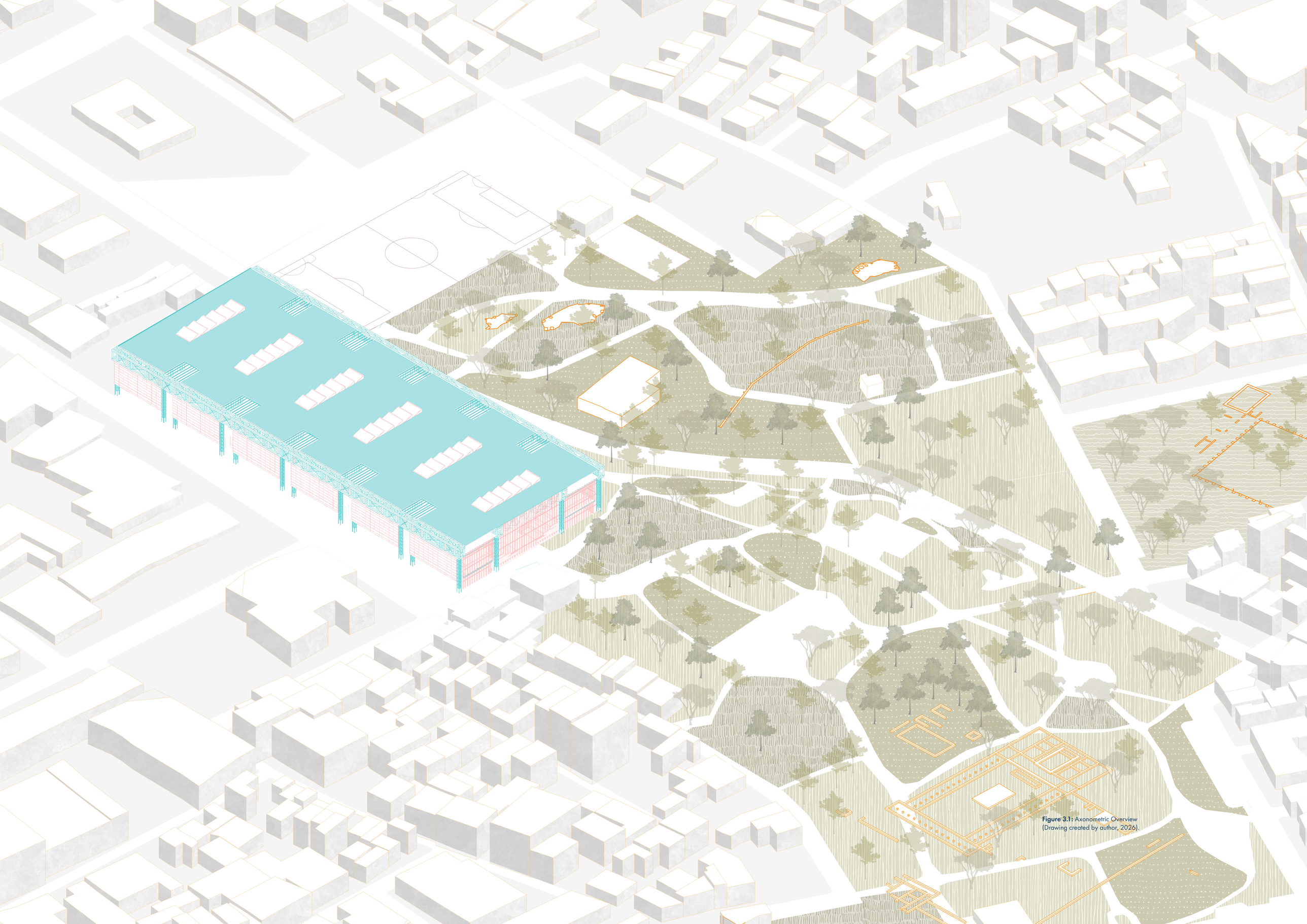


Figure 3.1: Axonometric Overview (Drawing created by author, 2026).

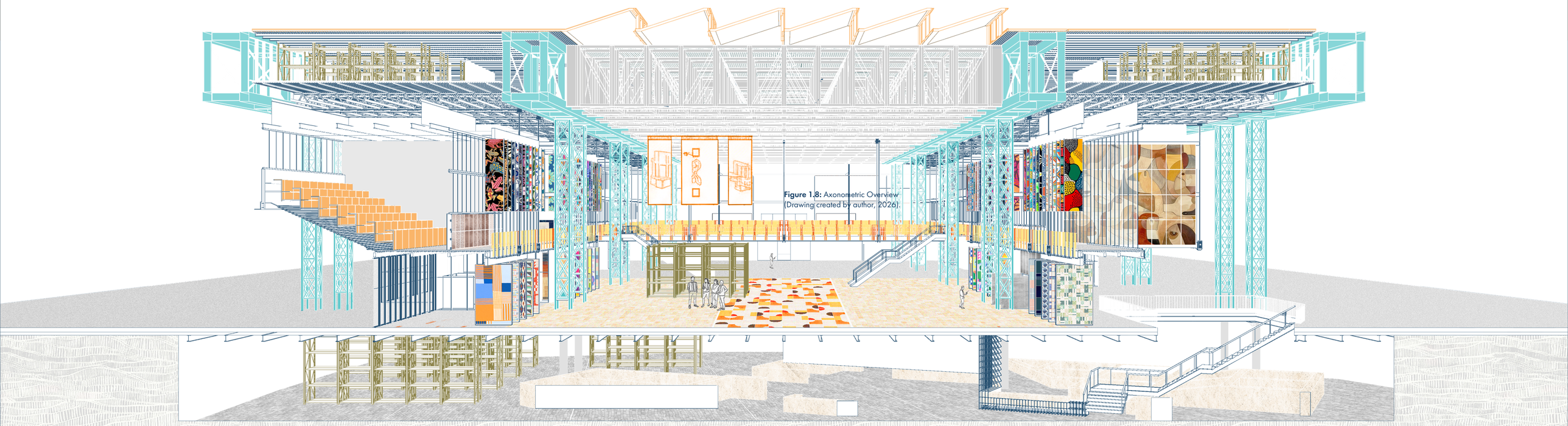


Figure 1.8: Axonometric Overview
(Drawing created by author, 2026).

Figure 3.2: Sectional perspective
(Drawing created by author, 2026).

Design principle one

Public Space and Craft on the Street, Utility in the Core
(Production and distribution of Knowledge)

This design principle adapts the socio-spatial qualities of Athenian street life and residential typologies to challenge the conventional boundary between institutional and public space. It is drawn from field observations in Athens, where storefronts and restaurants extend seating, display, and commercial activity onto public sidewalks while kitchens and service areas remain enclosed inside (Figures 3.2 and 3.3). The principle also draws inspiration from the traditional Athenian Polykatoikia apartment block, where the highly public commercial base transitions into progressively more private and controlled upper levels. The project adopts this vertical gradient as a sectional hierarchy, concentrating complete programmatic openness at the ground level while increasing privacy and academic control with height.

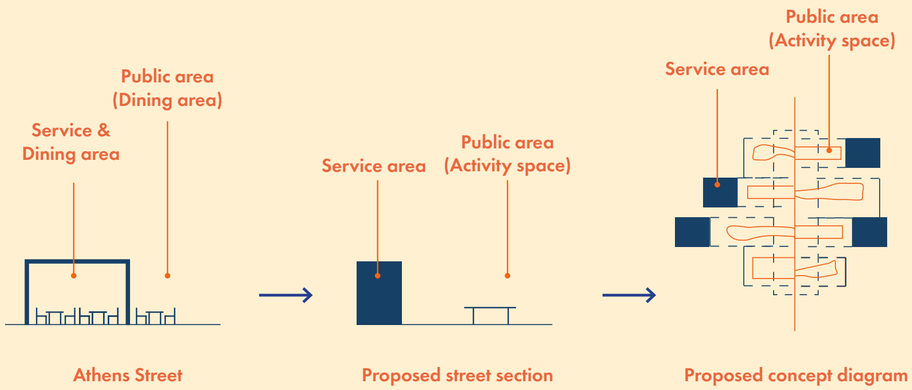


Figure 3.3
Conceptual diagram evolution is tracing the spatial evolution from a traditional Athenian storefront loop into an inverted, open-plan structural street layout.

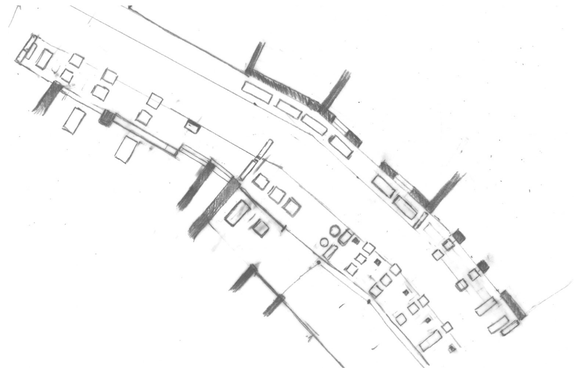


Figure 3.4: Athens storefront restaurant hand plan mapping the organic expansion of private dining tables and seating grids directly onto the public pedestrian sidewalk.
(Drawing by author, 2025)

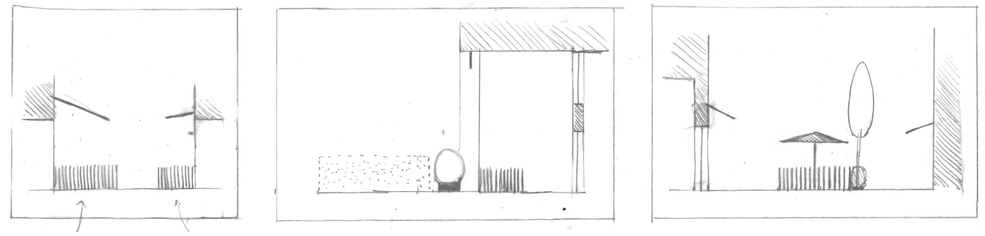


Figure 3.5: Hand-drawn micro-urban field sections mapping the vertical heights of awnings, seating boundaries, and outdoor street furniture expanding from local Athenian storefronts into the public sidewalk domain.
(Drawing by author, 2025).

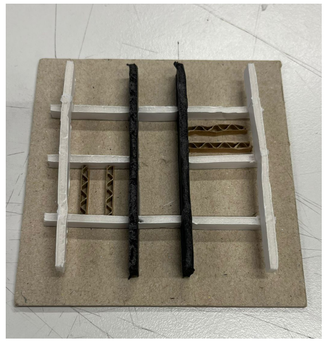


Figure 3.6: The Urban Road Hierarchy Model. An abstract structural grid mapping out the ground floor circulation hierarchy, where black vectors isolate the main heavy-traffic logistics artery and overlapping white components establish porous pedestrian domains.
(Photograph by author, 2025).

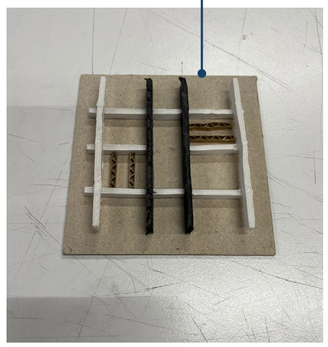


Figure 3.7: The Layered Facade Skin Model. A volumetric module exploring variable envelope depths and boundary behaviors, utilizing a temporary yellow skin interface to prove that the building perimeter could function as a reconfigurable, multi-layered envelope rather than a static solid wall.
(Photograph by author, 2025).

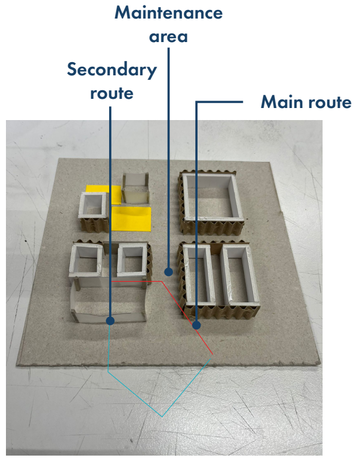


Figure 3.8: The Multi-Temporal Circulation Model. A layout simulator mapping how pathways manage the friction between public flow and active construction, defining the public promenade with a yellow frame while tracking alternative routes to safely divert pedestrians during heavy logistics phases.
(Photograph by author, 2025).

Result

In plan, the institution directly scales up this urban behavior. Rather than hiding production spaces behind heavy partitions, the layout relocates high-intensity fabrication, repair, display, and social programs into an un-enclosed, publicly accessible ground zone. This active area functions as an interior extension of the street, maximizing the visibility of knowledge exchange and allowing visitors to engage directly with the making process. To liberate this open floor plan, private and technical functions—specifically toilets, mechanical shafts, and essential building utilities—are consolidated into a solid service core. The resulting circulation strategy mirrors the movement pattern of entering a storefront from the sidewalk, moving through the interior, and returning to the public realm. Visitors enter from the main street axis, follow a linear primary route, and branch into secondary paths that connect directly to the active workshops, creating a continuous public loop that animates the fabrication processes (Figure 3.1).

In section, the design applies the vertical hierarchy of the Polykatoikia. The ground plan becomes a fully unenclosed public fabrication street, while the upper levels transition into more controlled academic, storage, service, and faculty zones. Through this spatial inversion, the building operates both as an institution and as an extension of the city, turning repair, fabrication, and learning into public acts.

Ground floor plan (public participation)

The ground floor plan organizes this inverted program along a clear linear 6-part gradient, changing from high-intensity fabrication at the industrial edge to public civic programs more open to outdoor space at the park edge(Figure 3.7):

Zone 1 (Industrial Interface)
Houses the dispatch center and heavy logistics parking lot to manage raw materials, which act as a large service zone behind the whole institution. .

Zones 2 & 3 (The Fabrication Core)
Integrates the high-intensity ceramic, wood, concrete, and metal workshops. Heavy machinery (such as jaw and roller blenders) is isolated in glass-enclosed rooms for acoustic and particle control, keeping heavy machinery entirely visible from both the interior and the exterior street, ensuring the main student fabrication zones remain open and porous for all visitors..

Zone 4 (The Depot & Staging Street)
Functions as a student work repository integrated as display and a high-capacity display zone both outdoor and indoor capable of staging heavy 1:1 scale construction machinery and civic prototypes such as crane and dump truck.

Zone 5 (The Archaeological Threshold)
The main public entrance, connecting the southwest industrial road to the northeast park. It includes a grand staircase and a large floor opening that reveals the ancient ruins below, underscoring a shift between the building's grid and the historic fabric.

Zone 6 (The Civic Park Interface)
A secondary entrance from the southeast, situated at the park's busiest axis. It contains an open-air theater and a prominent auditorium staircase, with small civil-maintenance exhibitions embedded along its length. The cafeteria kitchens align with the overarching design principles, subtly informed by the stair's geometry.

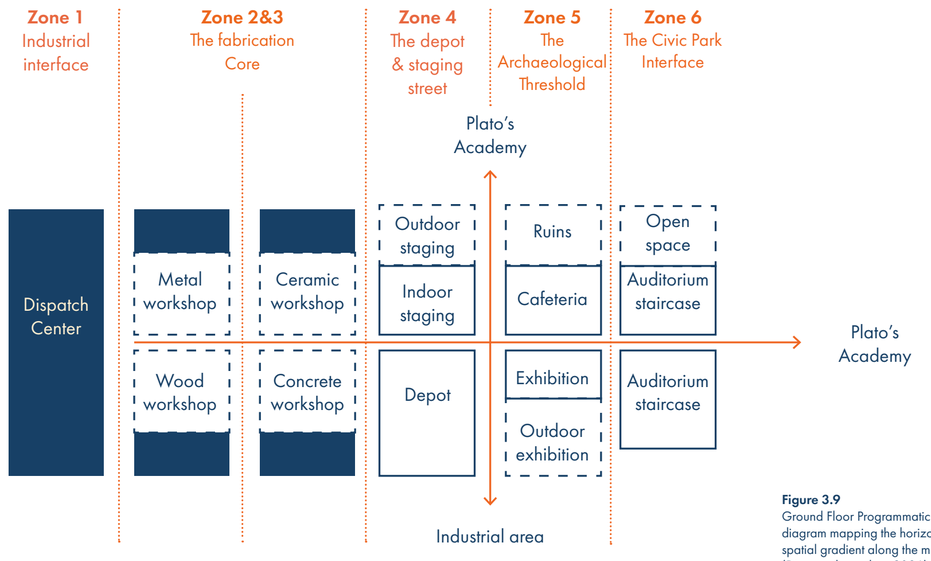


Figure 3.9
Ground Floor Programmatic Matrix diagram mapping the horizontal 6-part spatial gradient along the main axis. (Diagram by author, 2026).

First Floor Plan (The Suspended Studio Level)

Positioned inside the tension-suspended volumes, the floor shifts from the more public ground floor functions into a semi-private student and faculty spaces(Figure 3.8).

Zone 2 & 3 (Student studio spine and council hub)
Mainly for student use, these zones place the studios directly above the ground-floor workshops to maintain visual and spatial continuity between design and fabrication. The student council hub sits at the end of the main axis, anchoring student life on the upper level. The central corridor remains visually open to the workshop and studio activity below, underscoring the integration of learning, production, and collaboration.

Zone 4 & 5(Flexible Exhibition Edge)
Zone 4 serves as a depot for lighter student work and accommodates staff offices. Zone 5 features a corridor oriented to the main entrance, with a lecture hall opposite that provides vistas of the park and ruins. These zones located adjacent to the studios, this zone sustains a tight link between teaching, design, and fabrication spaces. Rotating panels along the corridor facing the atrium allow the space to be reconfigured for exhibitions, events, or temporary closures, forming a flexible mid-section that supports multiple ground-floor uses.

Zone 6 (Learning Commons and Social Extension)
Classroom and library functions with an extended open area for informal activities and gatherings. This space connects to the ground-floor stair auditorium, enhancing social interaction and encouraging movement between levels.

Second Floor Plan (The Municipal-Academic Co-Habitation Core)

Houses advanced studio spaces alongside the Official Office of Civil Maintenance for the Municipality of Athens. This pairing ensures that student work directly addresses the live public infrastructure needs of the city rather than theoretical exercises.

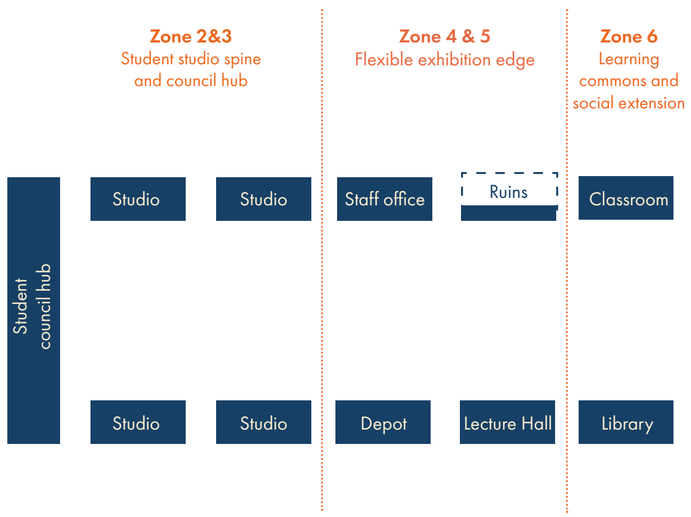


Figure 3.10: First Floor Programmatic Matrix diagram illustrating the upper-level spatial distribution
(Diagram by author, 2026).

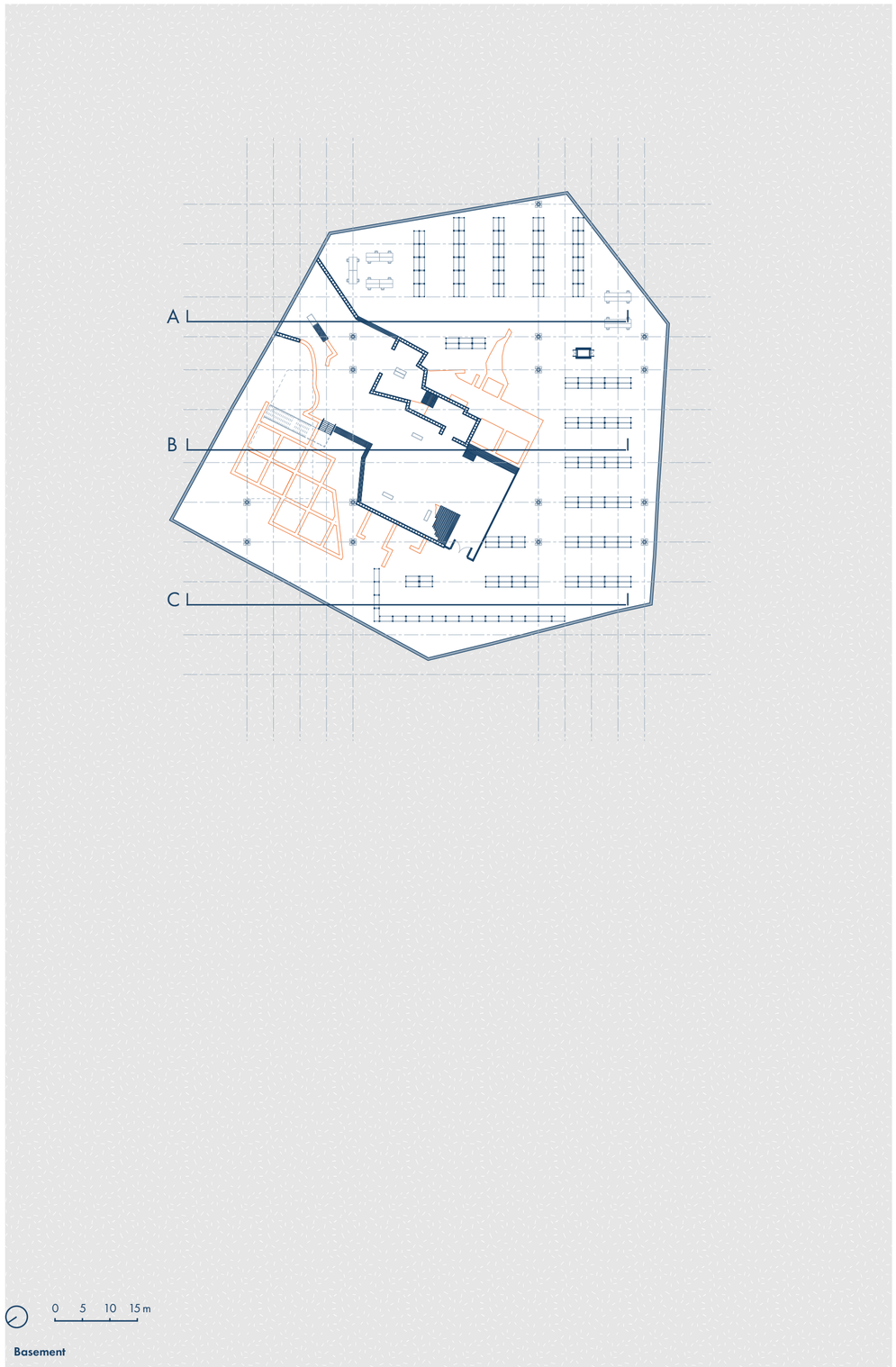


Figure 3.11: Finalized institutional Basement floor plan.
(Drawing by author, 2026).

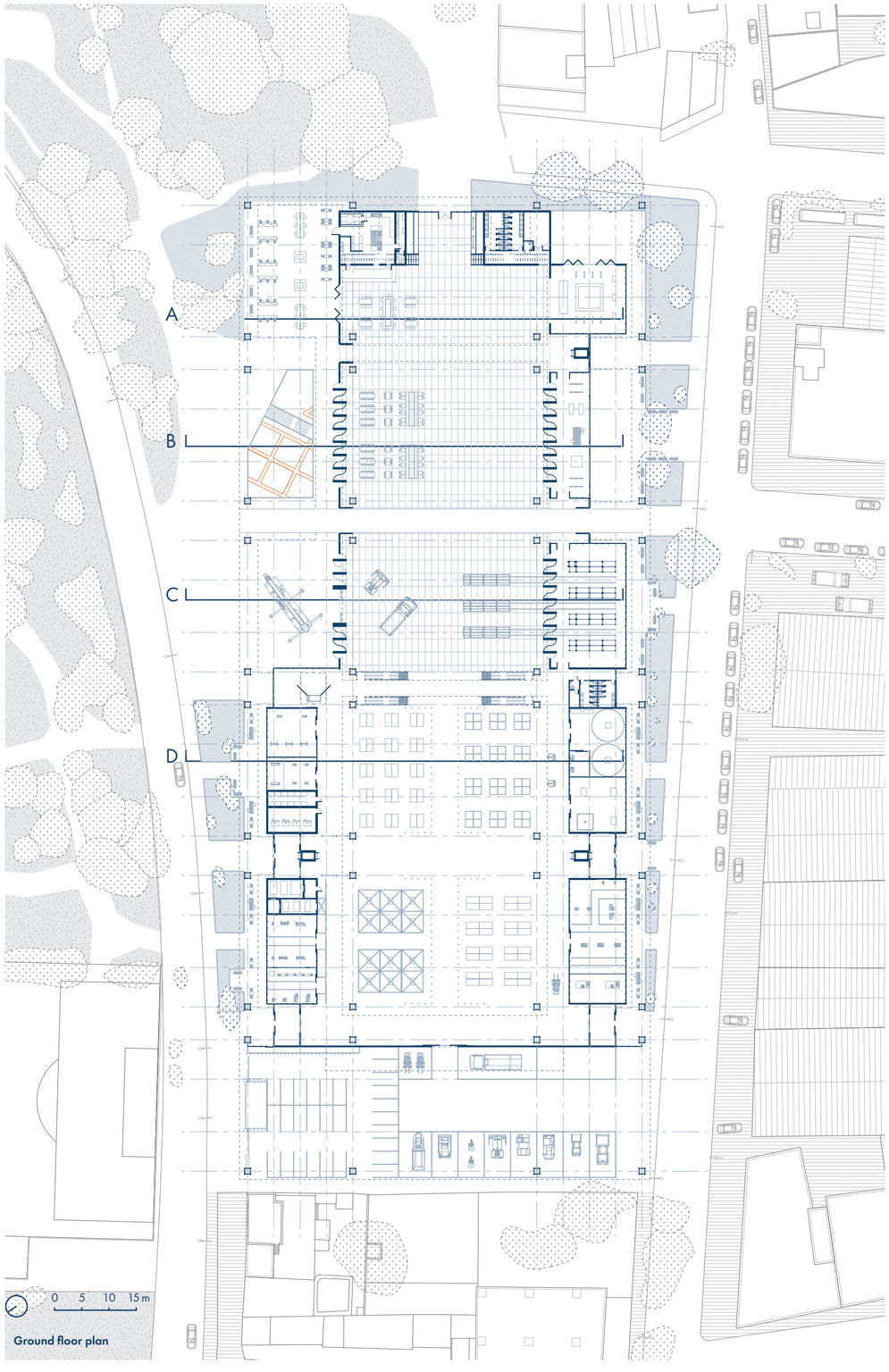


Figure 3.12: Finalized institutional Ground floor plan.
(Drawing by author, 2026).

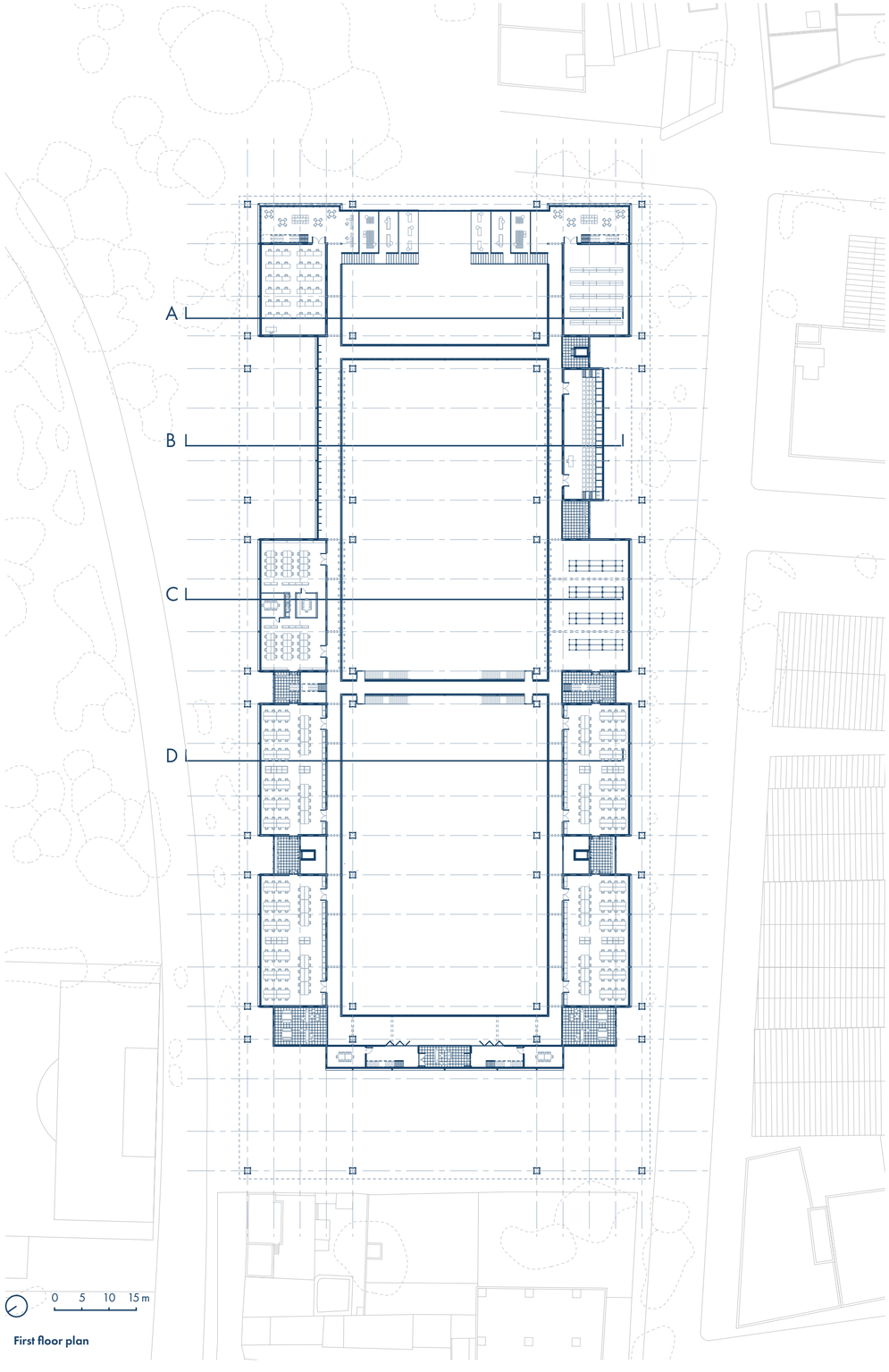
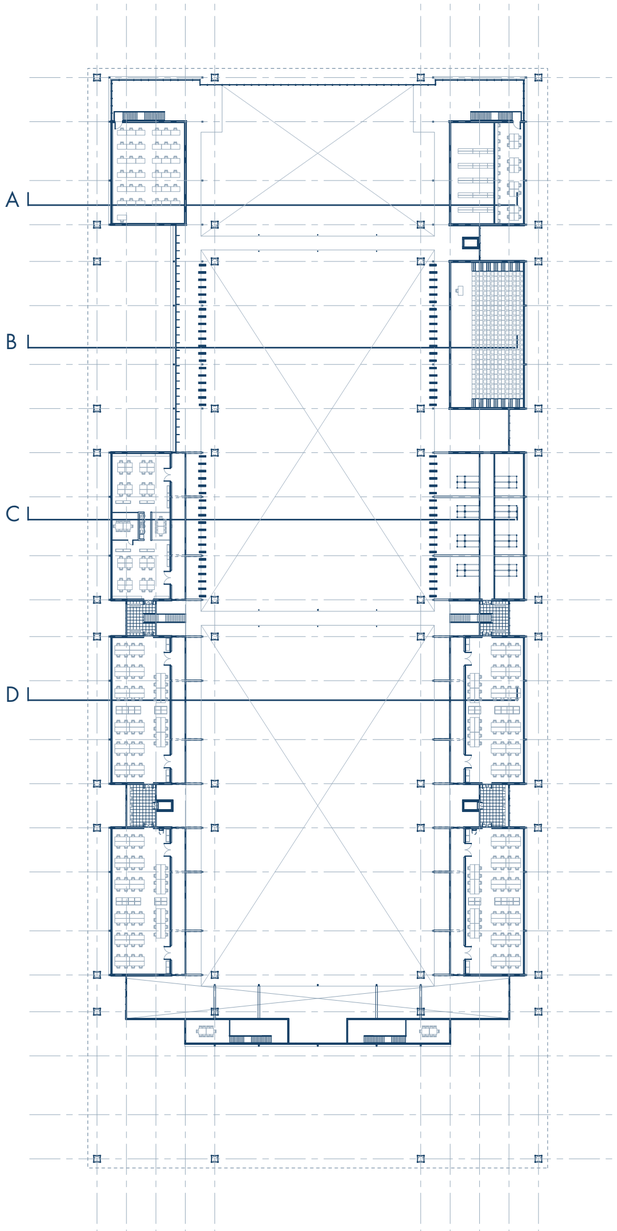


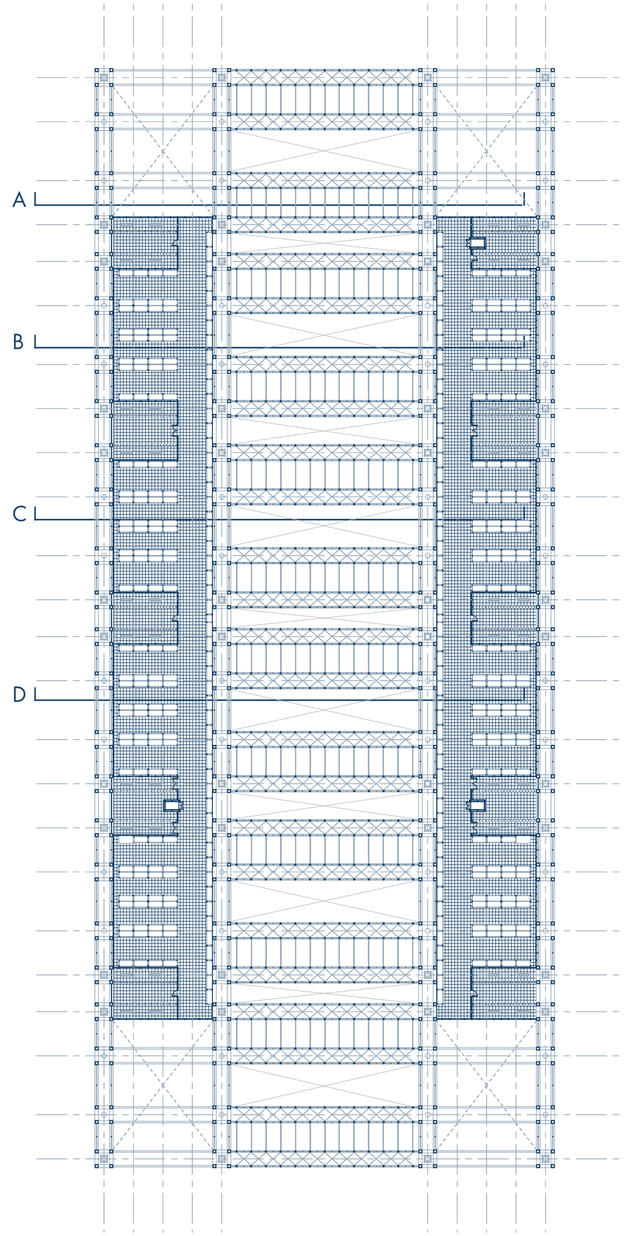
Figure 3.13: Finalized institutional First floor plan.
(Drawing by author, 2026).



0 5 10 15 m

Second floor plan

Figure 3.14: Finalized institutional Second floor plan.
(Drawing by author, 2026).



0 5 10 15 m

Roof floor plan

Figure 3.15: Finalized institutional Roof floor plan.
(Drawing by author, 2026).

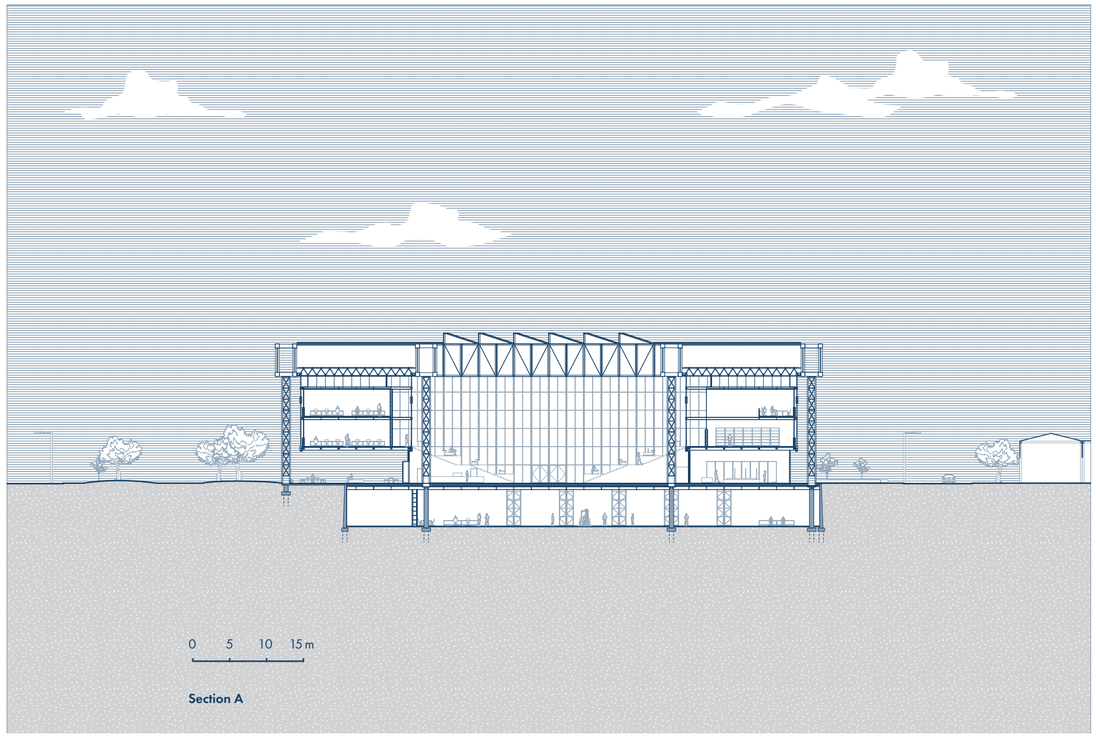


Figure 3.16: Finalized institutional Section A.
(Drawing by author, 2026).

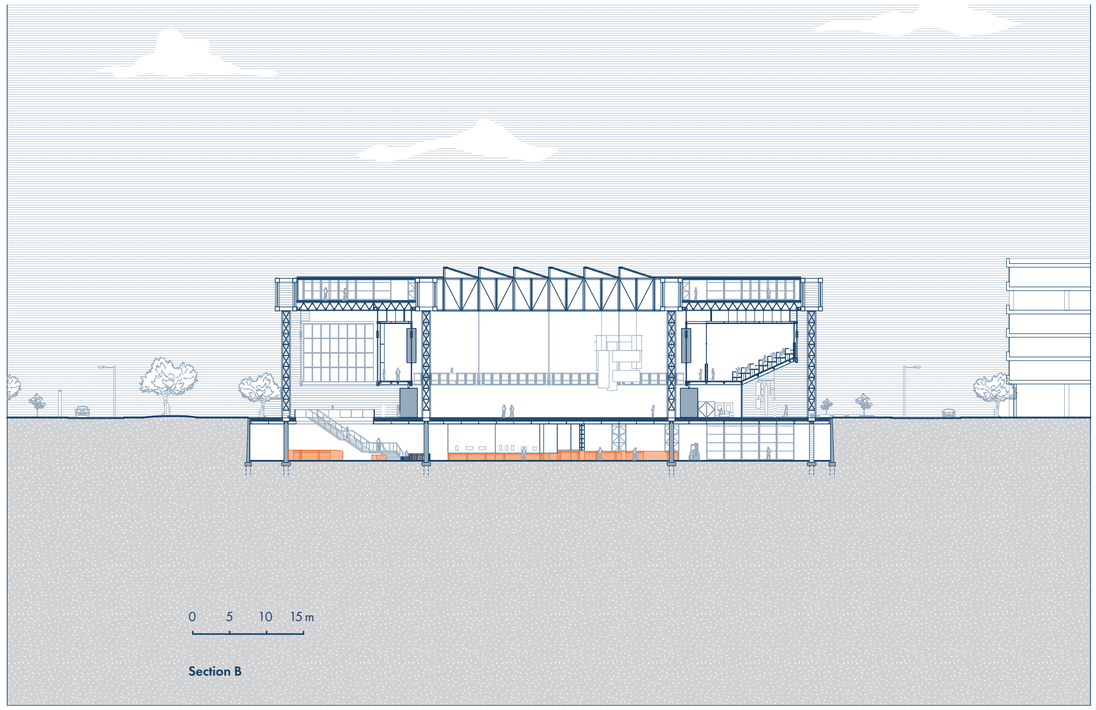


Figure 3.17: Finalized institutional Section B.
(Drawing by author, 2026).

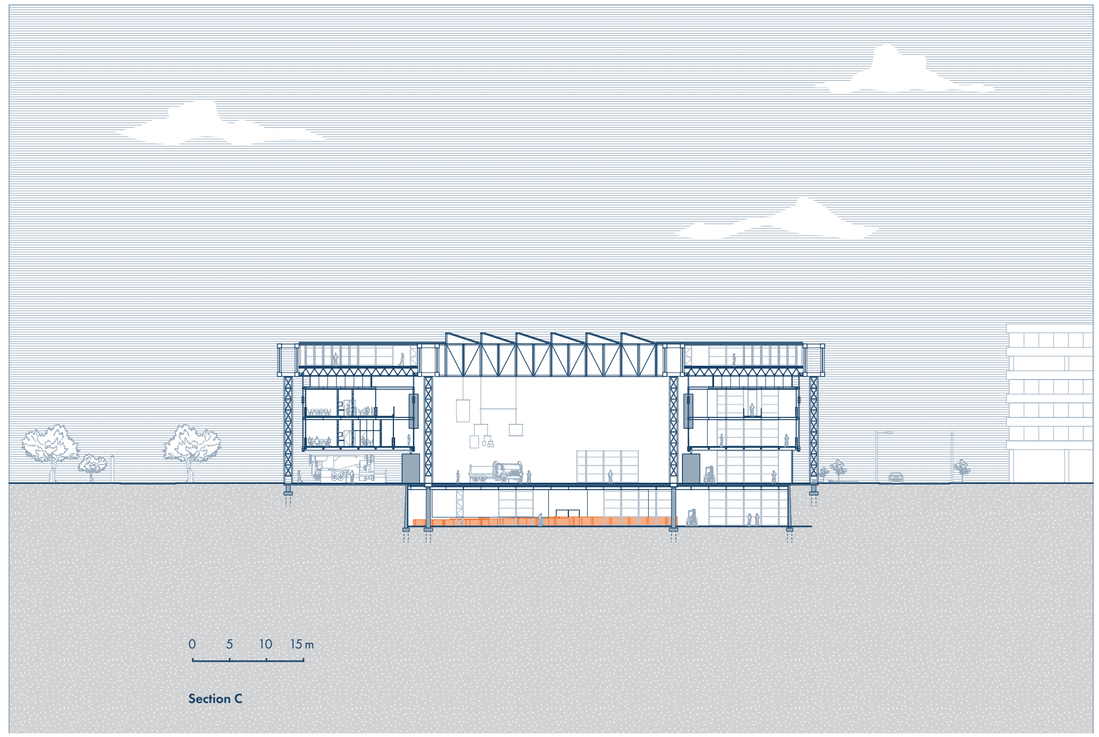


Figure 3.18: Finalized institutional Section C.
(Drawing by author, 2026).

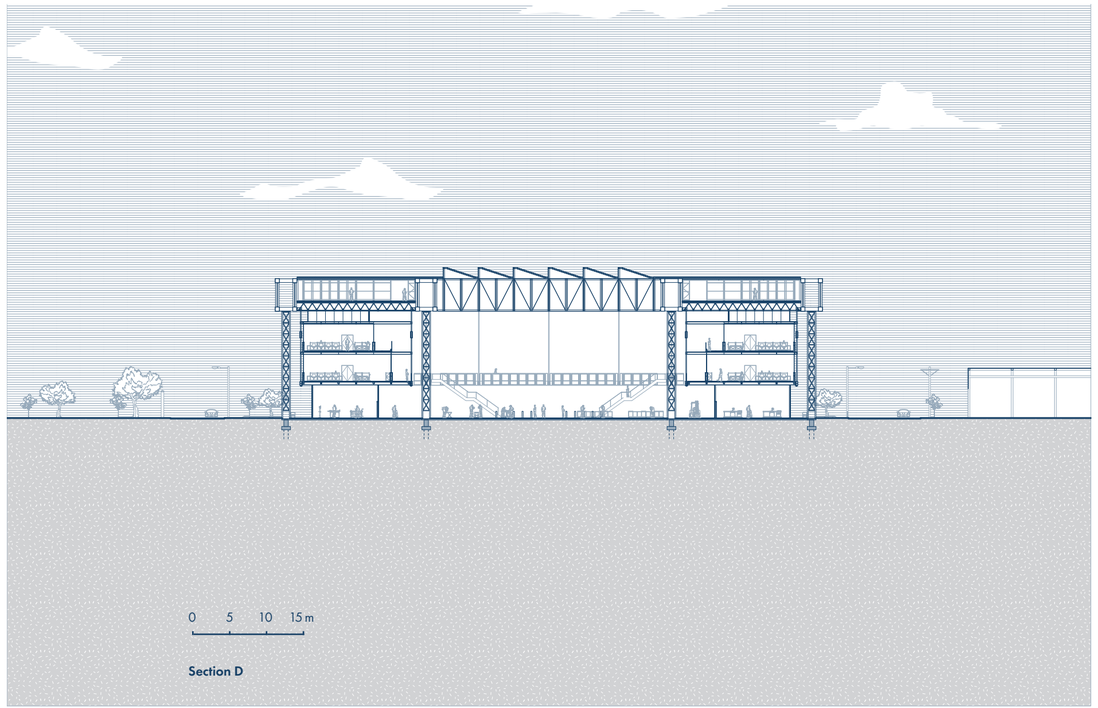


Figure 3.19: Finalized institutional Section D.
(Drawing by author, 2026).

Design principle two

Micro-Urban Elements as Transparent Safety Interfaces

This design principle re-imagines safety infrastructure by re-purposing familiar street elements as architectural interfaces within the building. Rather than opaque segregation walls, it introduces visible, civic-scale safety interfaces that preserve openness while protecting users. The concept enacts a radical inversion in which high-intensity student workbenches and fabrication activities are positioned in open, unenclosed public zones. Consequently, safety cannot be hidden or closed off. Instead, transparent safety interfaces reinforce the project's core aim: a democratic, visible, and public-facing environment for repair, making, and learning.

To develop this strategy, eight urban elements were compared: bollards, road markings, curbs, railings, concrete benches, planters, fences, and movable planters. Each element was evaluated using an analytical framework that measures its potential as a civic interface between public circulation and active fabrication zones (Figure 3.17).

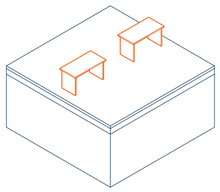
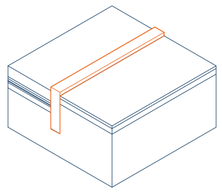
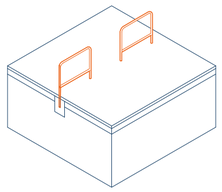
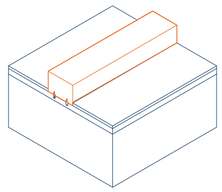
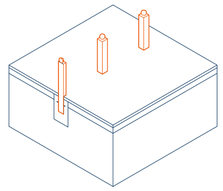
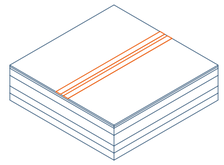
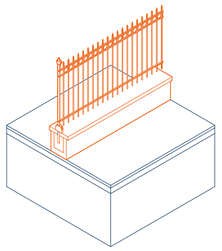
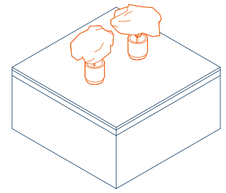
								
	Public furniture	**Curb**	**Railing**	**Concrete benches**	**Bollards**	**Road marking**	**Fence**	**Movable Planter**
Safety function	Perimeter block	Low impact block	Fall protection	Perimeter block	Impact block	Visual alert	Forced exclusion	Soft isolution
Tangible	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Visibility/ Notability	Medium	Medium	High	Medium	Medium	High	High	Medium
Access control and flow	Restrictive border	Step boundary	Absolute stop	Restrictive border	Permeable filter	Passive directional	Absolute stop	Shiftable border
Flexibility	None	Low	Low	None	Low	High	Low	High
Durability	High	High	High	High	High	Low	High	Medium

Figure 3.20: Comparative research matrix and analytical axonometric diagrams of micro-urban boundary elements.
(Diagram by author, 2025).

Result

The research matrix is translated directly into the spatial organization of the building through three critical urban-architectural applications (Figure 3.18):

Soft Boundary Interface: Chromatic Road Markings
It is a High-visibility, passive access control that creates a psychological boundary between active fabrication zones and public circulation, without physical barriers.

The Semi-Permeable Buffer Interface: Structural Civil Bollards
It is Durable, medium-hard barriers surrounding the workshop perimeter. They establish a legible boundary that remains visually open and permeable for movement between the workshop cores and the public avenue, preserving a link between production, circulation, and observation.

The Absolute Protection Interface: Face-Mounted Sleeve Balustrades
Maximum-level barriers on the first and second floor, oriented toward fall prevention. They provide safety while maintaining the transparency of the suspended volumes.

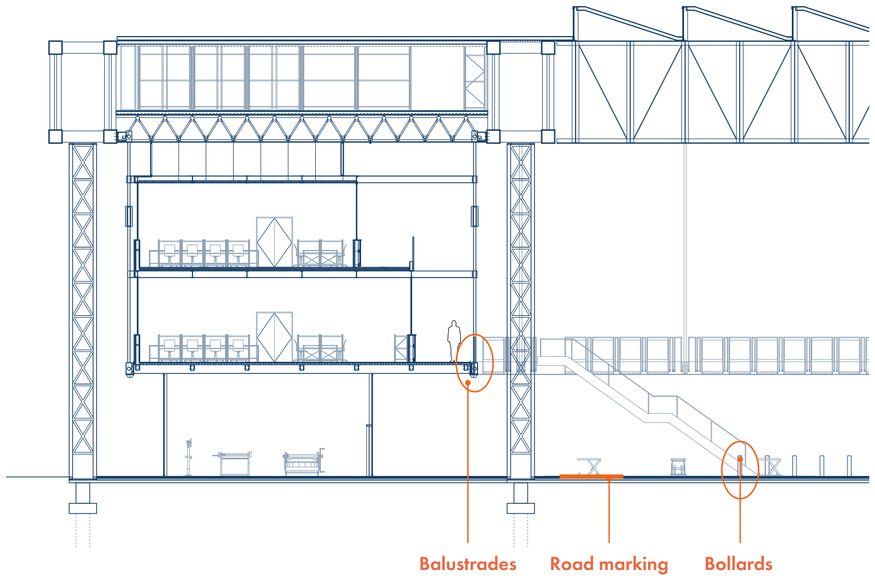


Figure 3.21: Detailed architectural section illustrating the spatial integration of native micro-urban elements—specifically balustrades, floor road markings, and safety bollards.
(Drawing by author, 2025).

Design principle three

The Building as a Living Tectonic Archive (Distribution and storage of Knowledge)

This concept aligns with the academic pillar of the Distribution of Knowledge. Rather than treating the building's structural systems as passive enclosures, the architecture renders them into a visible, tactile infrastructure for public education. Guided by a 1200 mm modular grid, every horizontal and vertical plane acts as a permanent receiving framework to display and distribute student prototypes, civic interventions, and material experiments to the public.

The institution treats its architectural fabric as an active civil laboratory. Because full-scale components must be mounted, tested, and removed by students, the building systems must tolerate constant intervention without degrading. To enable this, three architectural planes—Columns, Floors, and Walls—were analyzed across metrics: Surface Integrity Impact, Modularity and Reconfigurability, Reversibility of Installation, Typical Attachment Methods, Life Cycle, and Installation Time. The result is an adaptable shell with reversible, non-destructive assembly logic (Figure 3.19 to 3.21).

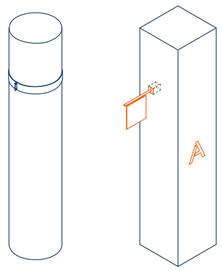
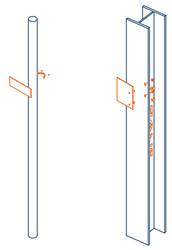
			
Forms	**Prefabricated reinforced concrete columns** Standard precast circular/ rectangular	**Prefabricated Steel columns** Steell-Beams, Angles, Channels, HSS Tubes	**Engineered timber columns** Glulam Columns
Attachment method compatibility	Friction clamps & cast in channels	Bolt-on Plates & Magnetic Clamps	Concealed Steel T-Plates & Dowels
Surface integrity impact	Zero impact (No drilling)	Low Impact (Utilizes pre-drilled holes)	Medium Impact (Minor surface scoring)
Reversibility and repair	Maximum (Zero damage to structural skin)	High (Components unbolt cleanly)	Medium (Requires localized timber plugging)
Flexibility	Low (Limited strictly to factory-cast coordinates)	High (Allows continuous clamping along flanges)	Maximum (Softest skin; allows custom positioning)

Figure 3.22: Column Attachment and Tectonic Performance Matrix

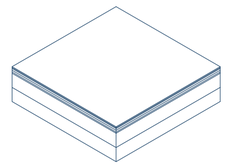
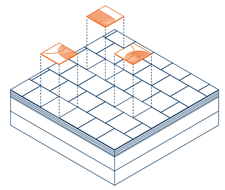
		
Surface installability	**Solid concrete floor** Permanent cast	**Paver-like modular floors** Dry-laid grid
Modularity and reconfigurability	None (Fixed)	Maximum (Individual tile swapping)
Reversibility of installation	Low/ Destructive (Requires cutting/ jackhammers)	Absolute (Zero-damage lifted component)
Types of Art intervention	Heavy structural installations, fixed anchors	1:1 scale urban staging, layout testing
Life cycle	Maximum (Decased long industrial wear)	High (Individual panels easily replaced)

Figure 3.23: Flooring Substrate and Reversibility Evaluation Matrix

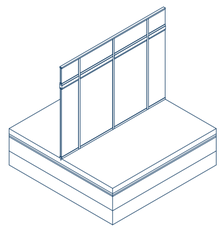
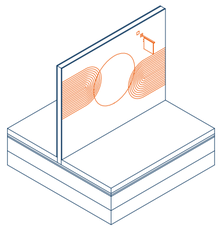
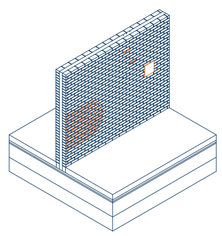
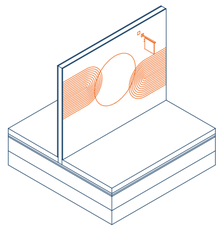
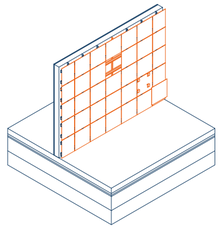
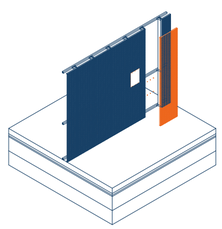
						
	Glazed surfaces	Plaster wall	Masonry	Concrete / cementitious surfaces	Cladding panels	Mesh
Structural accessibility	Surface-only	High (Soft surface)	Moderate	Restrictive (Solid)	System defined	Absolute (Open grid)
Reversibility / permanence	Temporary	Temporary (Easily patched)	Semi-permanent	Permanent (High impact)	100% reversible	100% reversible
Intervention feasibility	Adhesive vinyl/Digital	High-frequency pin-ups	Zoned brickwork displays	Low-volume heavy objects	Maximum component change	Hanging & clamped artwork
Typical attachment methods	Suction mounts, static film	Screws, staples, adhesives	Mortar joints, wall plugs	Anchor bolts, cast-in tracks	Secret-fix back hooks	Mechanical S-Hooks, ties
Life cycle	High	Low (High wear)	High	Maximum	High	High

Figure 3.24: Wall Substrate and Envelope Surface Reversibility Matrix

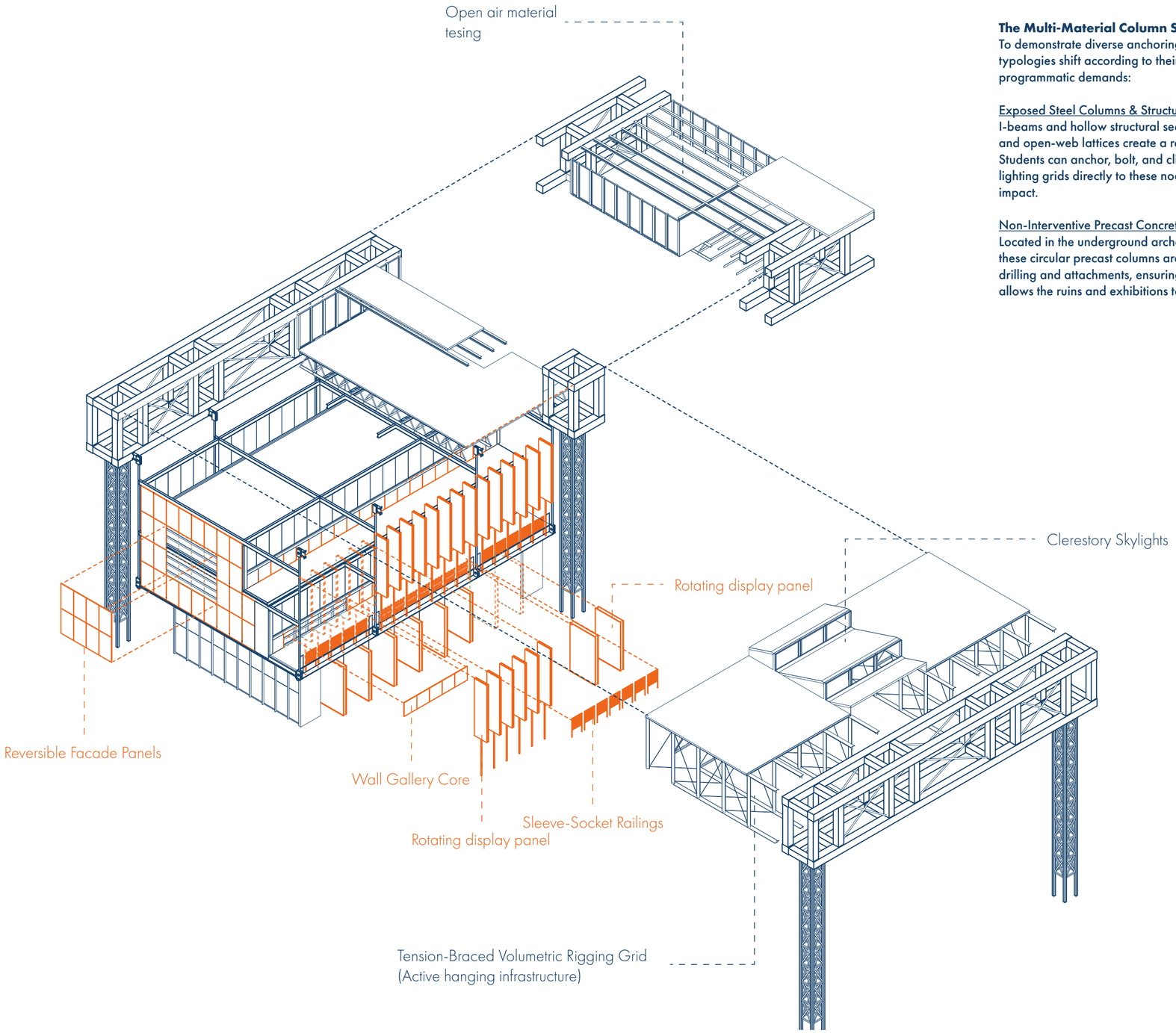


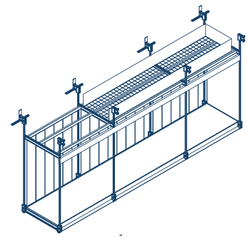
Figure 3.25: Exploded Tectonic Axonometric of Structural Systems and Component Assemblies

Result

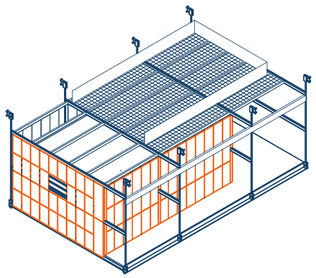
The Multi-Material Column System (Vertical Anchoring)
To demonstrate diverse anchoring behaviors, the primary column typologies shift according to their localized structural and programmatic demands:

Exposed Steel Columns & Structural Masts:
I-beams and hollow structural sections (HSS) with bolt-on plates and open-web lattices create a ready-to-use vertical backbone. Students can anchor, bolt, and clip temporary 3D installations and lighting grids directly to these nodes without drilling or surface impact.

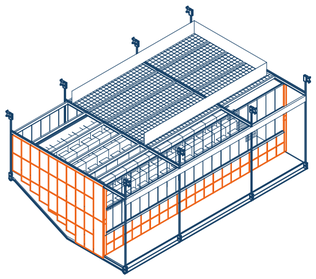
Non-Interventive Precast Concrete Columns:
Located in the underground archaeological ruins repository, these circular precast columns are non-reversible. Concrete resists drilling and attachments, ensuring the structure remains neutral and allows the ruins and exhibitions to be the focus.



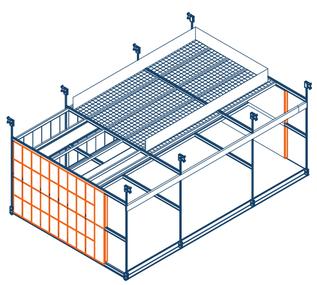
Ruins Overlook



Classroom



Lecture hall



Student Archive

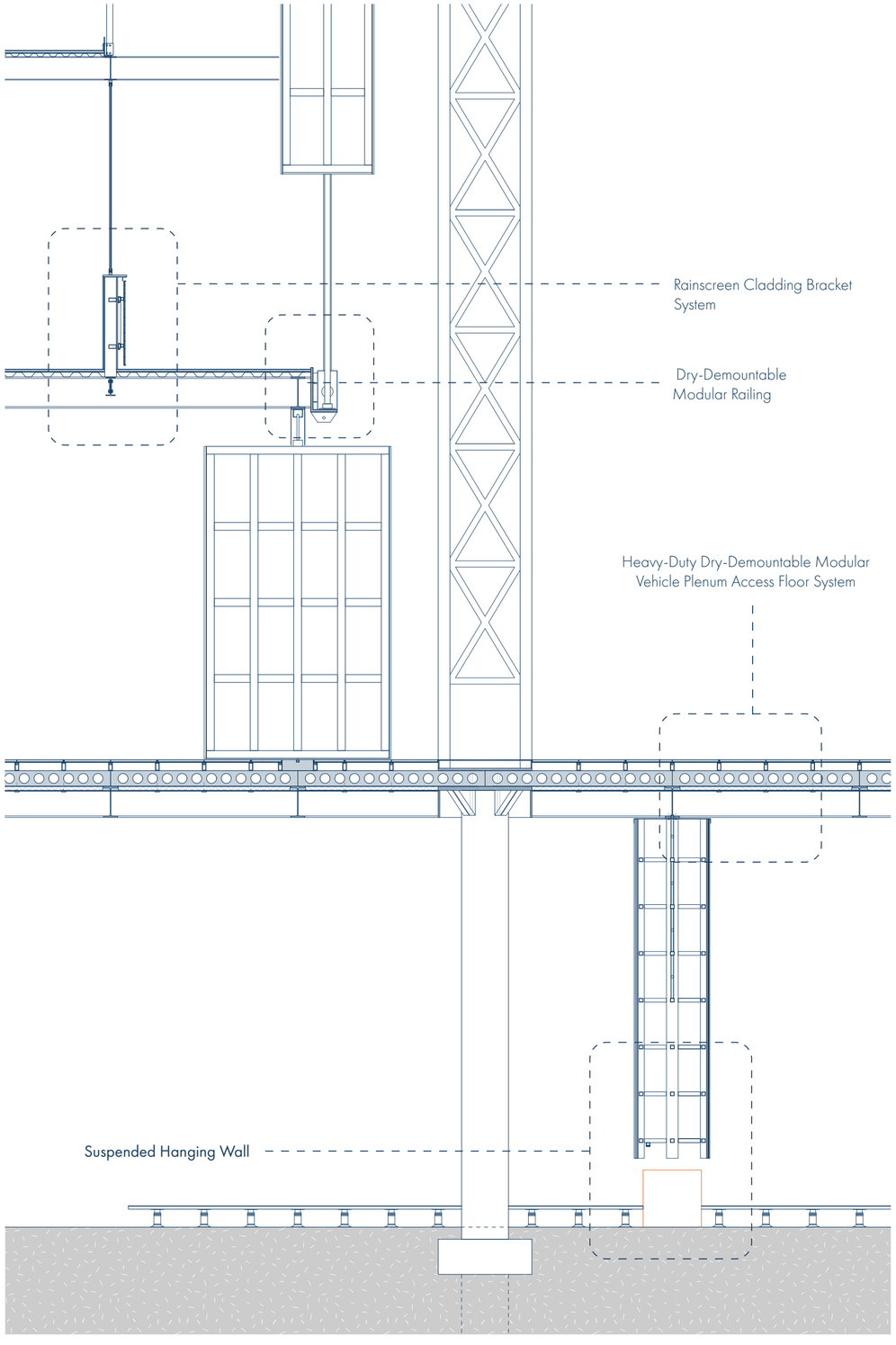


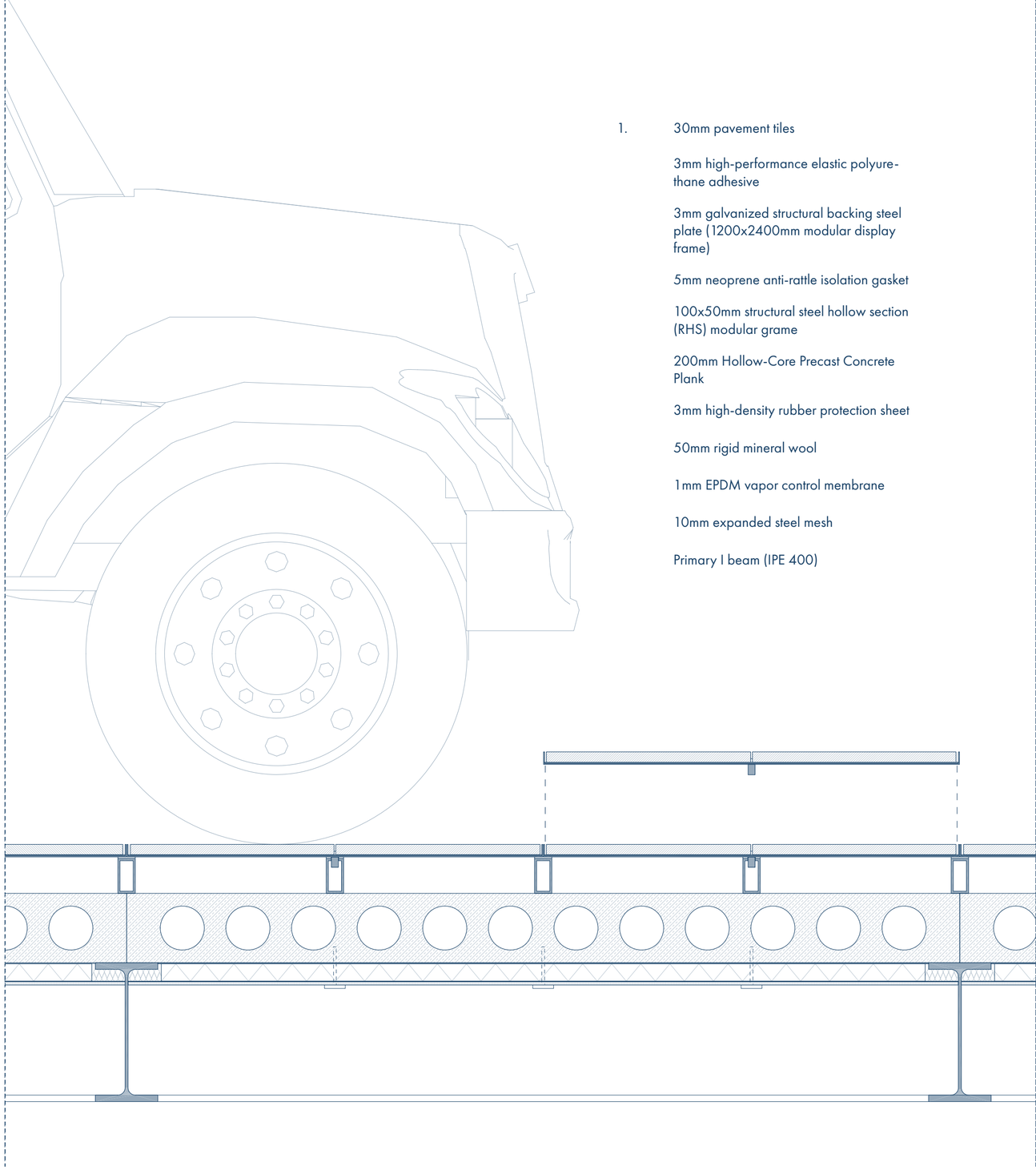
Figure 3.26: Detail Section

Figure 3.27: Detail Model

The Hybrid Ground Substrate (Horizontal Floor Matrix)
The floor plate adapts to zone function by pairing a permanent concrete core in Zones 2–3 with a modular, demountable system in Zones 4–6 along the linear ground axis.

Solid Concrete Flooring
Used only in Zones 2 and 3 (The Fabrication Core). A continuous concrete slab provides exceptional load-bearing capacity and cushions vibrations from industrial machinery, delivering a durable, long-life industrial foundation in a high-activity area where little change is expected.

The Heavy-Duty Modular Cassette System (2400mm × 1200mm)
The ground floor uses a dry-jointed, demountable modular flooring system. Built on heavy-gauge steel joists, each 2400 mm × 1200 mm cassette can be unlocked, lifted out, and replaced with either a student-tile module or a Pre-Fabricated Bollard Plug Panel (Figure 3.23). This configuration supports rapid testing and display of student-made tiles and civil elements under heavy loads, while preserving the integrity of the primary floor for repeated resets .



1. 30mm pavement tiles
3mm high-performance elastic polyure-thane adhesive
3mm galvanized structural backing steel plate (1200x2400mm modular display frame)
5mm neoprene anti-rattle isolation gasket
100x50mm structural steel hollow section (RHS) modular grame
200mm Hollow-Core Precast Concrete Plank
3mm high-density rubber protection sheet
50mm rigid mineral wool
1mm EPDM vapor control membrane
10mm expanded steel mesh
Primary I beam (IPE 400)

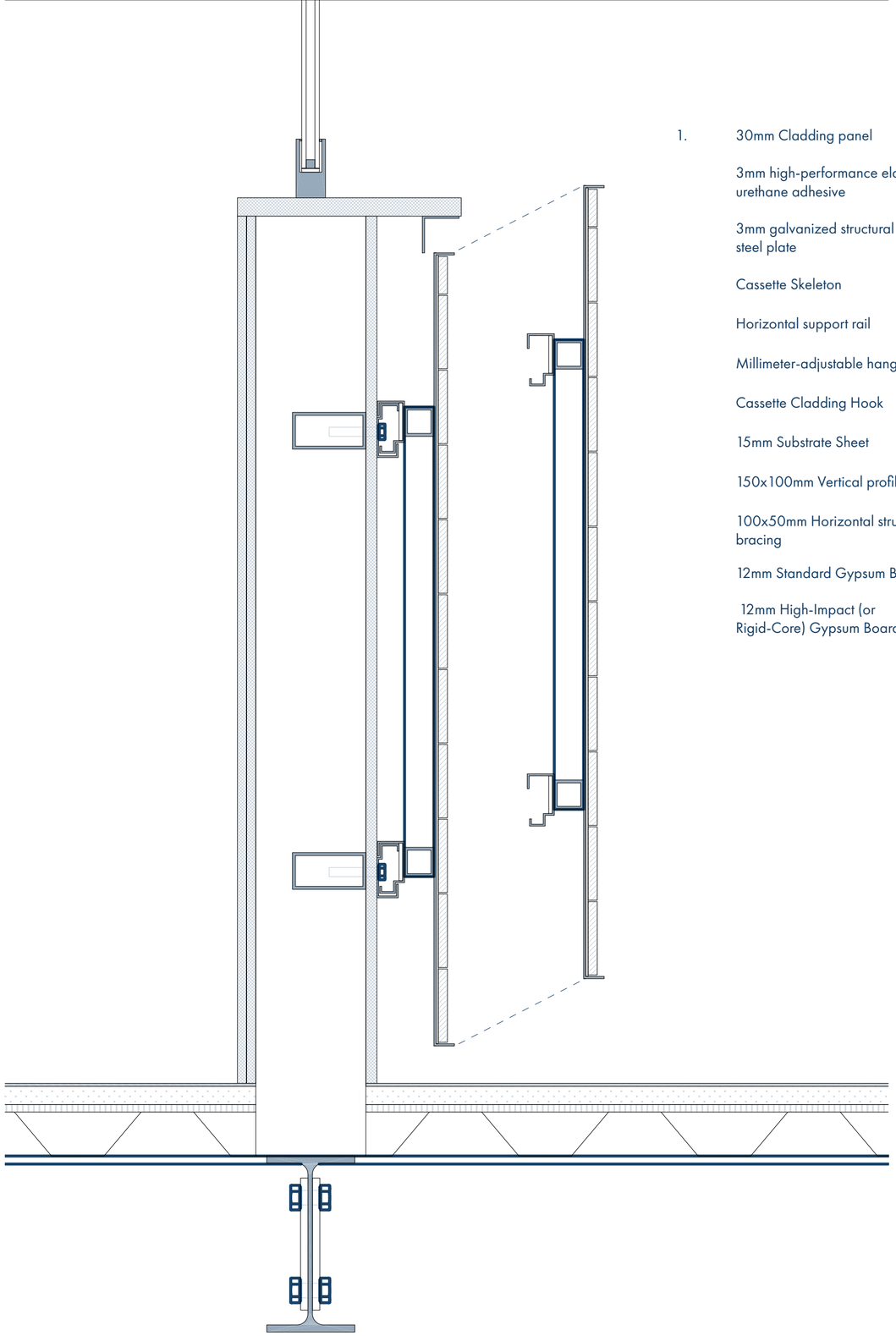
Figure 3.28: Tectonic Floor Cassette Detail Showing Heavy Vehicle Load Integration

The Reconfigurable Wall Envelope (Vertical Display Canvas)
The vertical enclosures abandon permanent drywall and fixed partitions, deploying a multi-material system that accommodates different frequencies of student intervention:

Structural Cladding Walls
Lateral walls of tension-suspended modules use a 1200 mm × 2000 mm steel Secret-Fix Hanging Rail substructure. Students attach custom tiles and facade panels to integrated back-hooks that slide on the rails. The skin can be swapped for full-scale envelope experiments without structural wear(Figure 3.24).

The Sub-Window Perimeter Cladding Walls
Located along internal corridors under exterior glazing, these knee-walls use a 1200 mm × 1000 mm sub-frame module. They share the same Secret-Fix Hanging Rail system to maintain a unified mechanical logic with the structural cladding.

The Kinetic Framework (Rotating Panels)
Large rotating display panels sit within internal corridor boundaries as spatial valves. Using the same steel sub-frame and tile-display logic, panels can hold modular exhibition tiles and lock into place. When rotated on their pivots, they open circulation and reveal deep visual thresholds. The framework can be taken down, reconfigured, or replaced as needed.



1. 30mm Cladding panel
3mm high-performance elastic poly-urethane adhesive
3mm galvanized structural backing steel plate
Cassette Skeleton
Horizontal support rail
Millimeter-adjustable hanging bracket
Cassette Cladding Hook
15mm Substrate Sheet
150x100mm Vertical profile
100x50mm Horizontal structural bracing
12mm Standard Gypsum Board
12mm High-Impact (or Rigid-Core) Gypsum Board

Figure 3.29: Reversible Facade Cladding and Sub-frame Attachment Detail

The Face-Mounted Safety Infrastructure (Interchangeable Railings)
The modular safety barriers along the elevated corridors transition directly into an active mechanism for Knowledge Distribution, operating as an interchangeable, high-capacity frame that showcases full-scale student production:

The Sleeve-Socket Mechanical Under-Structure
Heavy-duty steel sleeves are permanently face-mounted to the floor sub-frame's perimeter channels. Student-made railings use matching steel base-stubs that drop into these receiving sockets, forming a rigid, code-compliant connection without on-site drilling or welding (Figure 3.25).

The face-mounted sockets keep safety elements removable and non-destructive to the structure. When needed, the railing assembly can be vertically lifted out in seconds for transfer to another site, leaving the underlying structure intact. This creates a plug-and-play edge that supports living safety demonstrations and rapid distribution into the urban fabric.

The Overhead Truss System (Active Hanging Infrastructure)
The building's overhead structure transitions the roof from a passive shield into an active framework for vertical project distribution across the central long bays:

The Tension-Braced Rigging Grid
Over the central atrium, the exposed bottom chords and nodes of the open parallel-chord trusses form a unified rigging matrix. Rather than viewing the ceiling as a fixed surface, this system acts as a Volumetric Exhibition Suspension, enabling students to hook, clamp, and suspend large-scale prototypes, multi-scalar installations, and demountable exhibitions directly from the ceiling framework.

1. Rectangular steel railing post (or round tube profile)
   1mm internal clear tolerance air gap
   Custom or standardized steel sleeve socket box
   Horizontal locking pin
   12mm thick structural steel baseplate
   5mm neoprene anti-rattle gasket
   3mm steel finish frame (perimeter floor border)
   High-tensile structural through-bolts (standardized matrix)

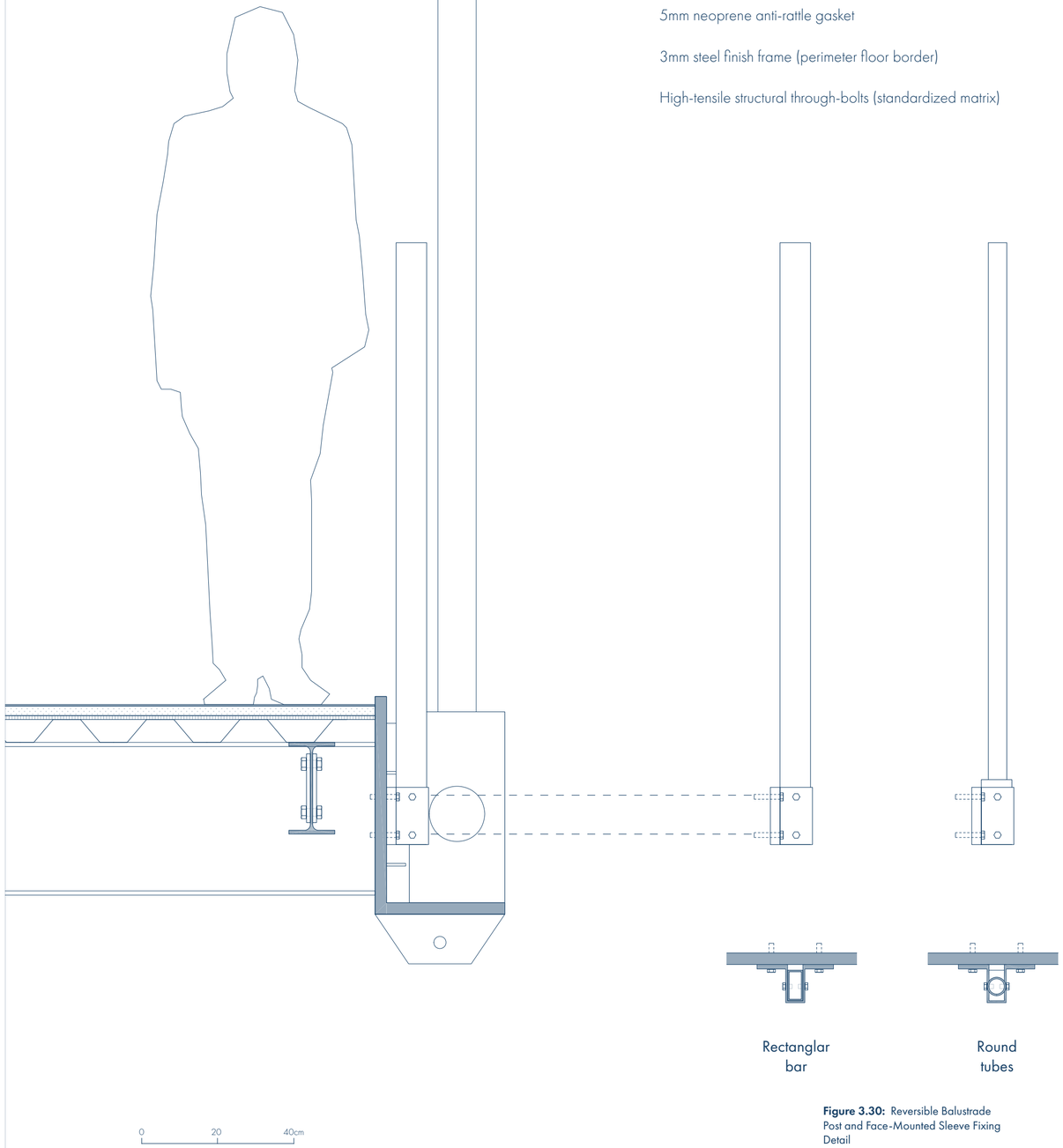
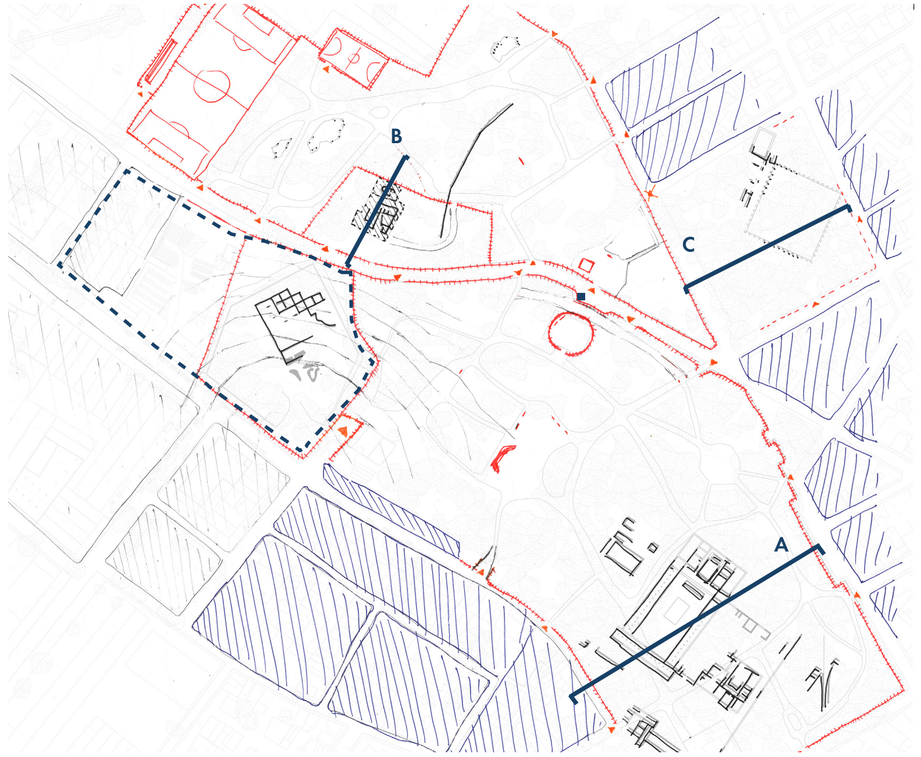


Figure 3.30: Reversible Balustrade Post and Face-Mounted Sleeve Fixing Detail

Design principle four

Reversible Heritage Activation

This institutional principle rethinks the Plato's Academy Archaeological Park in response to site context. The park's current defensive fencing and "hands-off" boundaries isolate the ancient ruins behind chain-link barriers and artificial mounding, separating them from the adjacent industrial neighborhood and green space (Figure 3.26). Instead of a closed, protected perimeter, the project emphasizes open, tactile accessibility: keeping the ruins visually prominent and physically accessible to the public while avoiding destructive structural loads or interventions on the delicate ruins. The aim is to invite active participation and interpretation without compromising the site's integrity.



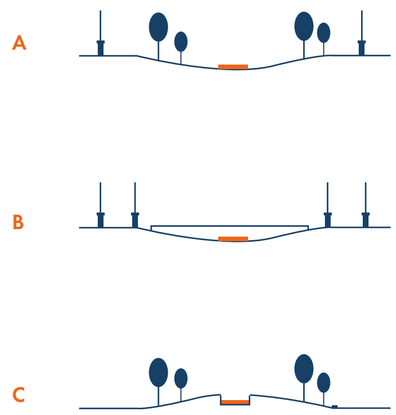


Figure 3.31: Archaeological Site Context and Perimeter Threshold Sections

Result

The Suspended Archaeological Cradle
Introduce Tension-Suspended Exhibition Walls that hang from the overhead structure, creating a precise air gap above the ruins to prevent any load transfer. The lightweight partitions extend from the ancient footpaths, visually echoing the original layout without contacting the archaeology.

The Plaster Hanging Wall
A solid, floating enclosure that mirrors the mass and rhythm of the ancient walls, while serving as a high-contrast display surface. A continuous LED strip along the bottom edge bathes the ruins in soft light, highlighting textures and inscriptions without glare.

The Steel-Frame Hanging Wall
A highly permeable wire-frame that traces the historic wall profiles using open mesh channels. This transparent boundary preserves sight lines across the footprint while offering a lightweight, protective boundary for ongoing demonstrations.

Both walls act as active vertical surfaces for mounting, displaying, and distributing student prototypes and exhibitions in dialogue with the ruins, fostering a collaborative public experience rather than a barrier.

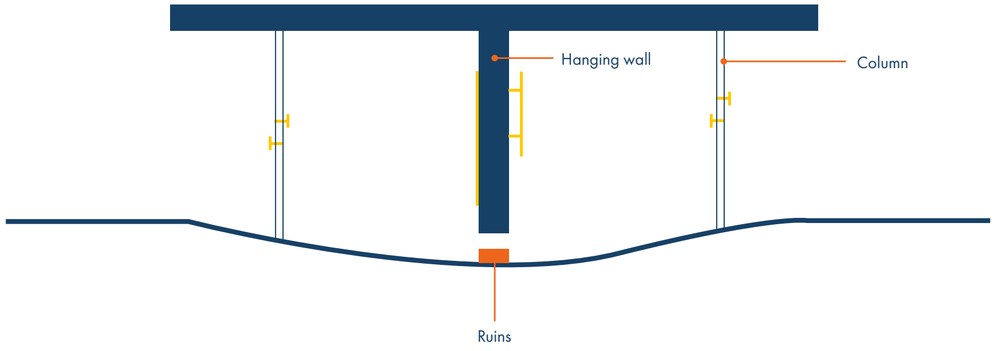


Figure 3.32: Suspended Hanging Wall and Non-Interventive Heritage Interface Diagram

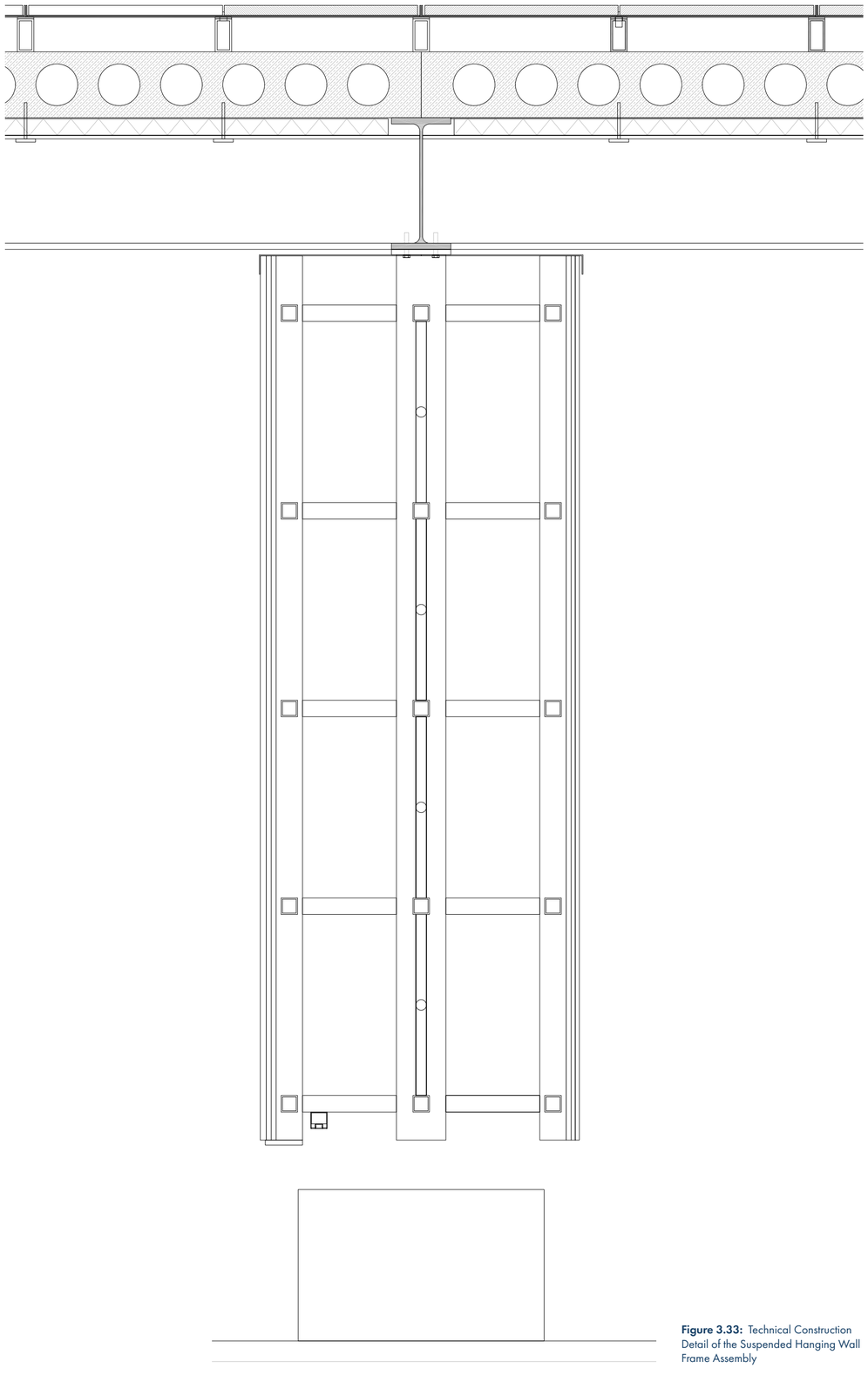


Figure 3.33: Technical Construction Detail of the Suspended Hanging Wall Frame Assembly

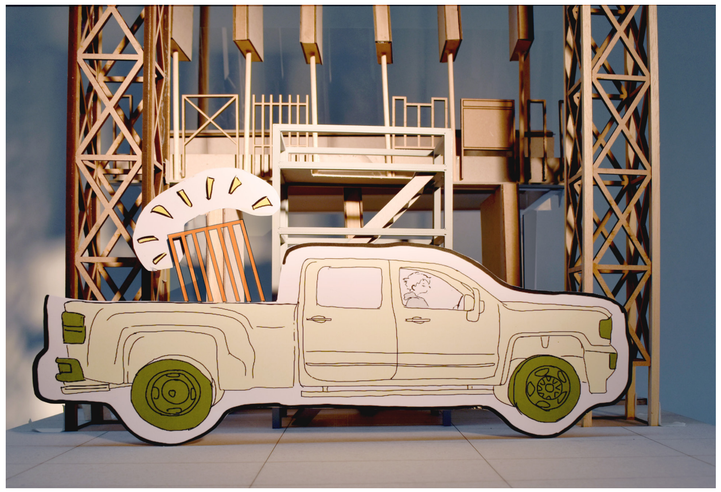


Figure 3.34: Stop-motion narrative sequence utilizing a 1:20 scale physical component model to simulate the operational timeline of the reversible material pipeline. The chronological sequence demonstrates the rapid, non-destructive deconstruction of the face-mounted safety rail from the institutional chassis for site-dispatch and installation within the Athenian public realm. (Photographs and model by author, 2026).

Chapter four

Conclusion & reflection

Conclusion

Realizing the Technical and Pedagogical Ambitions
The project argues that urban public decay is an ongoing material reality that requires a dynamic, operable building type. Its core innovation is a new model for an Art Institution that partners with the city to address physical decay through an integrated approach that ties practice theory directly to the building's technical architecture. By specializing Production, Distribution, and Storage, the structure becomes a three dimensional apparatus in which making, repairing, and learning are inseparable, and where civil maintenance is the primary architectural language. The project demonstrates how a functioning public facility can balance daily operations with the ethical and educational imperatives of active civic engagement. Rather than enclosing production, the design opens the ground floor into an "Athens Street" promenade, enabling safe access to fabrication activities while preserving a porous public realm. Safety barriers are conceived as transparent interfaces that preserve sight lines and legibility while meeting life-safety codes, allowing high public interaction without compromising protection. A 1200 mm structural grid evolved and unifies main columns, hanging rods, and cross beams, enabling plug and play displays and modular reconfigurations with minimal structural impact; this modularity supports continuous experimentation, rapid demonstrations, and the capacity to reallocate space as programs evolve. The suspended cradle above the ruins transfers no dead load onto the archaeological substrate, allowing visitors to experience the ruins in their original spatial context rather than as a burdened artifact. In this sense, the building functions as an active educational platform rather than a static container for art, where making, exhibiting, and maintaining public spaces become collaborative acts of urban care.

Implications and Recommendations

The implications for the architectural profession are equally consequential. This project reframes public works as a collaborative civic platform that can sustain ongoing care, material exchange, and community participation. By aligning engineering with social intent, the 1200 mm grid coordinates structural and exhibition sub-frames, demonstrating how a resilient, adaptable framework can support long-term urban renewal and inclusive public engagement. The institution's core strategy—treating the city as a living laboratory—points toward a future in which durable, demountable systems enable communities to participate more directly in the design, maintenance, and evolution of their streets and spaces. This approach invites rethinking the role of architects from designers of finished spaces to coordinators of ongoing care, repair, and renewal, capable of orchestrating multidisciplinary collaboration between municipal authorities, academics, students, and the public. It also foregrounds the ethical and practical dimensions of cross-cultural design, highlighting how real-world constraints—legal, administrative, and logistical—shape architectural decisions and, conversely, how architecture can help surface and navigate these constraints to achieve shared civic aims.

Reflection

This project is honest about its gaps: the leap from a concept-tested framework to everyday urban practice is larger than the design surface suggests. My cross-cultural position and limited access to on-the-ground installation protocols, municipal approvals, and local street codes mean the current scheme rests on assumptions about how city systems operate in Athens. Field observations captured visible storefronts and patterns, but the tacit routines, formal approvals, and procurement realities that shape public-work interventions remain under explored. Rather than presenting the design as a ready-to-implement solution, the work foregrounds these uncertainties as key learning opportunities. The proposed Official Office of Civil Maintenance is not a solved outcome but a needed instrument for aligning design intent with city governance, data-sharing norms, and safety regulations. Its success depends on defining clear governance, responsibilities, and timelines, which are not yet resolved. Going forward, the project should articulate concrete collaboration protocols, risk management strategies, and phased implementation steps that connect classroom experimentation to actual site work in Athens. It must also address the city's diverse neighborhoods, ensuring adaptable modules and performance envelopes that respect seismic, climate, and aging considerations. In short, the study doesn't claim to have completed the city's care loop; it maps a rigorous, actionable path for turning a compelling architectural concept into an enduring, participatory urban practice.

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Appendix A
Workshop

		Materials used in Athens	Size		Workshop
Floor	Footpaths	Concrete			Concrete workshop
		Paving stones			
		Manufactured Concrete pavers	10 - 30 x 10 - 30 mm		
		Cobblestones	60 x 80 mm		
	Roadways	Asphalt concrete			
		Concrete pavements			
	Kerbs	Concrete	H:100 / 125 / 150 mm W: 150 / 200 mm		
		Granite			
		Concrete block			
	Inspection covers	Cast iron	600 / 750 / 900 / 450-500		
	Road marking	Thermoplastic paint (hot-applied)			
Wall	Building skin	Cement plaster			Metal workshop
		Travertine claddings			
		Concrete panel facades			
		Tiles			
		Metal cladding			
Public furniture	Bollards	Steel and stainless steel bollards	H: 700 - 900 mm D: 168 - 219 mm		
		Cast iron bollards			
		Concrete bollards			
	Cycle stands	Steel			
		Concrete or granite stands			
	Litterbins and recycling bins	Stainless steel	Cap: 70 -100 L H: 700 - 850 mm D: 400 - 500 mm		Ceramic workshop
		Aluninium bins			
		Concrete and composite bins			
	Cigarette butt bin	Stainless steel	Cap: 5-15L H: 250 - 400 mm D: 100 - 200 mm		
		Aluminium			
	Handrails	Stainless steel	H: 1000 - 1100 mm D: 30 - 40 mm W: 600 - 900 m		
		Aluminium			
		Stone			
		Concrete			
	Wayfinding signs	Aluminum panels with vinyl decals			
		Acrylic or polycarbonate panels			

Appendix B
Ceramic Workshop

Ceramic workshop					
Equipment		PPE	Material		
Material preparation	Tile mixer	/	Raw material	Clay	Kaolin
Forming	Manual tile press				Ball clay
	hydraulic press				Bentonite
	Rolling mill		Glaze	Ceramic fluxes	Feldspar
	Throwing wheels				Silica
Slab and shaping tools	ceramic saw with wet blade			Glazes	frits
	carbon steel hand saws				color oxides
	wire cutters				stains powder
Drying	Drying racks		Recycle	Recycle ceramic tiles scrap	
Kilns	Electric kilns				
Glazing	Glaze preparation containers				

Equipment	Image	Name	Approx. Size (L x W x H)	Compo
Mixing, material preparation and conditioning		Tiles mixer	830 x 320 x 200	
		mortar pail	D: 350 , H: 300	
Forming, shaping and pressing		Hydraulic press	1676 x 870 x 2200	
		Rolling mill	1220 x 820 x 1090	
		Throwing wheels	702 x 600 x 580	
Cutting, shaping and finishing of components		Ceramic saw with wet blade	1530 x 440 x 1060	
Drying, curing and ware handling		Drying racks		
Firing and heat treatment		Small electric kilns	internal: 460 x 510 x 910 external: 965 x 1016 x 1600 215L	
		Medium electric kilns	internal: 610 x 760 x 1220 external: 965 x 1346 x 1910 420L	

Appendix B
Metal Workshop

Metal workshop					
Equipment		PPE	Material		
Welding Setup	MIG welder	flame-resistant jacket helmet with appropriate shade gloves ear protection welding curtains steel-toed boots eye protection Repirator or dust mask	Metals and basic stocks	Steel	Solid bar stock
	TIG welder				Hollow sections
Cutting and shaping	Band saw or cold saw				Flat bar stock
	Belt sander or vibration sander			Aluminium	Aluminum tubes/boxes
	Angle grinder with cut-off and flap discs			Stainless steel	Stainless round tubes
	Metal brake or simple manual bending tools				flat bar
	Tube/pipe bender				fasteners compatible with SS
	Metal forming tools (Chisels, hammers, anvils)			others	caps
Drilling and tapping	Drill press				flanges
	Right-angle drill attachment or magnetic drill				brackets
	Tap and die set				fasteners
Assemble and fixtures	Welding positioners or clamps			Fastners and hardware	bolts
Finishing and protection	Angle grinder with flap discs or sanding discs for smoothing welds				nuts
	Wire wheel attachments for rust/solder removal				washers
Coating and corrosion protection	Industrial-grade primer				screws
	Powder coating booth		Finishing	Primers	ZINC or zinc-rich primer
	Powder coating oven				Epoxy or acrylic metal primer
	Electrostatic spray gun for powder coating			Paints and coating	Exterior-grade enamel, epoxy, or powder coating
Others	Clamp			Powder coating	Powder coating gun
					cure oven

Equipment	Image	Name	Approx. Size (L x W x H)	Cc
Welding and metallurgy		MIG welder	320 x 140 x 260	
		TIG welder	490 x 240 x 400	
		Welding positioners	1225 x 752 x 855	
		Robotic welding positioner	Machine size : 5008 x 2726 x 1700 room size : 7245 x 5803 x 2005	
		Clamps (welding fixturing)	60 x 450	
		Clamp for Pipe Welding	216 x 216 x 102	
		Angle Clamps	170 x 170 x 66	
		Right angle drill attachment	98 x 150	
		Tap and die set		
		Plasma cutter	367 x 190 x 290	
		Acetylene torch		
Metal fabrication and cutting		Band saw	1470 x 510 x 1060	
		Cold saw	saw : 680 x 540 x 770 Stand : 600 x 600 x 889	
		Angle grinder with cut-off and flap discs	270 x 75 x 90	
		Belt sander	200 x 193 x 151	
		vibration sander	255 x 150 x 110	
		Drill press	350 x 500 x 1710	
		Tube/pipe bender	340 x 170 x 180	
		Metal brake	1000 x 320 x 380	
		Sheet scissors	1400 x 760 x 1150	
		punching machine	565 x 355 x 855	
		Sheet folding machine	2527 x 700 x 1164	
		Sheet roller	1500 x 600 x 900	
				

Equipment	Image	Name	Approx. Size (L x W x H)
Surface preparation and finishing		Anvil	550 x 210 x 220
		English wheel	863 x 227 x 1581
		Small powder coating booth	1820 x 1980 x 1370
		Automatic Powder coating booth	1200 x 2500 x 2580
		small powder coating oven	1045 x 1000 x 2373
		Powder coating oven	2500 x 1800 x 1500
		Wire wheel attachments for rust solder removal	Power drill: 200 x 115 x 214
		Industrial-grade primer	

Appendix B
Concrete Workshop

New concrete workshop					
Equipment		PPE	Material		
Recycled aggregates	Crusher or shredder for recycled aggregates	Hard hats eye protection dust masks/respirators chemical splash goggles gloves steel-toe boots hearing protection.	Core raw material	Portland cement	
Core contrete fabrication equipment	concrete mixers			blended cement	
	Wheelbarrows with shovels			Aggregates	sand
	Aggregate storage and batching system				Gravel/ Crushed rock
	Concrete vibration equipment				rubble
Moulds	3D print formwork			Water	
	CNC milling machine			Supplementary cementitious material	Fly ash
	steel or aluminium forms				Slag
Curing	Water curing tanks				Silica fume
	misting systems				metakaolin
Surface finishing	Flat polishers				natural pozzolans
	trowels		Recycled and green material	Recycled aggregate stockpile bins	
	edgers		Testing	compressive strength testing	
	jointing tools			Moisture meters and simple pH/ control test kits	
	Bush hammers			Fresh/concrete density or air content testers	
Finishing	compression test cubes				

Appendix C
Civil maintenance process

			Installation		Equipment		
Floor	Footpaths	Concrete	Site set up and mobilization	Establish site boundaries, temporary works and access routes	Site setup and delivery	Mobile crane	Heavy blocks
				Set up site office, material storage areas and waste management plan		forklift	
				Deliver and store material		Loader	Moving material
			Excavation and Demolition	Demolition (Dig up base layer)		Concrete mixer	Mixing concrete
		Paving stones		Clean up and smooth surface	Finishing and leveling (Concrete)	Plate compactor (vibratory)	For pavers
			Sub-base preparation	Place sand or crushed aggregrate		Jumping jack	compacting narrow trenches
				Leveling and flat surface		Concrete vibrator (poker vibrator)	Remove air voids
			Bedding layer and screed	install bedding sand or mortar		Screed boards	level surface
			Pavement installation			Bull float, magnesium or aluminum	Concrete surface finishing
		Manufactured Concrete pavers				Trowels	Final finishing
					Curing, protection (Concrete)	Curing blankets or plastic sheeting	Protect concrete
						Sanding or brooming equipment	texture and finish for concrete surface
		Cobblestones			Bedding and sub-base material	Wheelbarrows and material carts	Transport base material
						Shovels	spread and level bedding and base
						Laser level	precise grade
					Bedding and Paving	Spacers, string lines, and level rods	
						plastic hammer	
						Jointing paver tools	
						Broom or mechanical sweeper	Clear surface
	Roadways	Asphalt	Excavation, proof rolling and Demolition	verify subgrade consistency	Site setup	Loader	moving material
				cut seams on the raod surface, break off any of the loose		Small hydraulic excavator	trench work
			Sub-base preparation	place, spread, and compact base course material (often nuclear gauge or CBR correlates)		forklift	Heavy blocks
			Asphalt mix	Pour out Asphalt	Material transport	Dump trucks	
			Paving	tap it down to flat		On-site asphalt storage and heating	
					Paving	Asphalt paver	primary machine for laying hot mix asphalt
					sub-base and bedding preparation	Plate compactor (vibratory)	base material compactio
						Rammer	edge compacting
					Compacting	Tandem roller	consolidates asphalt base
						Pneumatic-tire roller	Final compaction
						Smooth wheel roller or static roller	initial and intermediate compaction
						Jumping jack	small plate compaction
	Curb	Precast concrete	Layout and marking	Make curb alignment	Site setup	laser level for alignment	
			Bedding preparation	Place bedding bed, lightly compact		Chalk line reel for straght layout lines	
			Positioning and alignment	Place precast curb section along marked line	Subbase, bedding	Plate compactor (vibratory)	For bedding and base compaction
			Fixation and stabilization	base on condition, dowel or pin into the bedding to resist movement		Jumping jack	for tight corners and near edges
			Jointing	Place blackfill material in lifts behind the curb		hand tampers	for edge compaction
				Mortar joint		Concrete vibrator (poker vibrator)	release air void if cast in place
		in-situ cast in	Formwork	construct formwork to exact geometry		Wheelbarrows and material carts	Transport bedding material
			Bedding and reinforcement	Place bedding material or mortar bed		Shovels	spreading and leveling bedding
			Pouring	Pour concrete into forms		rubber mallets	nudging precast components
Wall	Building skin	Cement plaster	Cleaning	Remove loose material, dust, paint, oil	Surface prep	angle grinder with diamond cup wheel	Surface profiling
			Cracking and repairs			Abrasives	sanding blocks
			Cement plaster mix	Base coat		trowels	vibration and compantion
				Intermediate coat	Mixing	Mortar mixing	
				Finish coat		scales	for measuring materials by volume
		Tiling process	Layout and planning	make grid line		Grout or mortar pail	transport during application
			Adherence	use a polymer-modified thin-set mortar suitable for exterior use	Plastering	Trowels	plastering and finishing
			Tiles installation	Place tiles		Scratch comb	scratch coat
			Grouting	Apply exterior-grade grout		Hawk	holding mortar
						Plastering hawk	
					Moulding	control joints	
						Mesh	
						joint filler or sealant	
	Public furniture	Bollards	Foundation design	shallow pad footing			
				deeper spread footing			
				piers depending on soil			
			Site perparation	Erect barriers			
			Installation	Place formwork			
				Pour concrete to foundation			
				Anchoring bollards			
			Finishing	Clean excess grout			

Equipment	Image	Name	Approx. Size (L x W x H)	
Heavy lifting and earthmoving equipment		Mobile crane	10608 x 2550 x 3500	Heavy blocks
		Small hydraulic excavator	2210 x 690 x 1585	trench work
		Dump trucks	7040 x 2400 x 3342 (Max: 4200)	
		Loader	4350 x 1600 x 2450	Moving material
Material handling and loading		forklift	3800 x 1230 x 2110 (Max: 4270)	
		Wheelbarrow	900 x 585 x 600	Transport base material
		Shovels	900	spread and level bedding and base transport during application
		mortar pail	D: 350 , H: 300	for measuring materials by volume
		scales	300 x 300 x 600	
Concrete and compaction equipment		Concrete mixer (Drum)	1470 x 1290 x 1470	Mixing concrete
		Plate compactor (vibratory)	562 x 292 x 929	For pavers
		Jumping jack	740 x 465 x 1090	compacting narrow trenches
		Concrete vibrator (poker vibrator	Machine: 400 x 325 x 340	Remove air voids
		Screed boards	1200 x 25	level surface
		Bull float	1500 x 300	Concrete surface finishing
		Trowels	450	Final finishing

		Curing blankets or plastic sheeting	900 - 1800 x 2000	Protect concrete
		broom	300 - 600 x 1500	texture and finish for concrete surface
		Laser level	300 x 300	
		Spacers	/	
		plastic hammer	60 x 300	
Road and asphalt product		asphalt mixer	5290 x 2133 x 3450	
		Asphalt paver	3910 x 1300 (Max :2005-2490) x 1710	primary machine for laying hot mix asphalt
		Tandem roller	2824 x 1353 x 2563	consolidates asphalt base Final compaction
		Pneumatic-tire roller	4970 x 2166 x 2320	
		Smooth wheel roller	5705 x 2250 x 2990	initial and intermediate compaction
		hand tampers	150 x 150 x 900	for edge compaction
Finishing, surface and tools		Mortar mixing	D: 450, H: 700	
		Scratch comb	300 x 150-300 x 1200	scratch coat
		Mortar holder	350 x 300	holding mortar
others		angle grinder with diamond cup wheel	250 x 350	Surface profiling