THESIS

COMPLICATING THE LINE
REIMAGINING URBAN INFRASTRUCTURE

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COMPLICATING THE LINE
REIMAGINING URBAN INFRASTRUCTURE

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[Fig. 1] Group of Shanghainese praying near Nanpu Bridge, Shanghai 1991.
Photo: Robert van der Hilst.

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Many heartfelt thanks to:

My parents
for your unconditional love, countless sacrifices, and the strength you gave me every step of the way. Your unwavering support has been my foundation, and I am forever grateful.

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for your wisdom, thoughtful guidance and endless encouragement. I could not have imagined more generous and insightful mentors.

My thesis helpers, Yuxin and Lisa
for your support that got me through the final push.Your assistance and encouragement during the most challenging moments made all the difference.

I. INTRODUCTION

Infrastructure is not neutral.

It shapes cities, divides communities, and defines how we move, live, and gather. Elevated expressways — those colossal arteries of speed and efficiency — cut through urban fabrics with little regard for the lives unfolding beneath them.

Across the world, transportation networks, both above and below ground, weave dense webs of movement. Yet, beneath these elevated structures, in the forgotten spaces where motion gives way to stillness, lie vast gray zones: vacant voids, parking lots, and wastelands of noise and dust. Although centrally located, these areas are often treated as residual, invisible — mere afterthoughts in the city's choreography.

This thesis challenges the conventional view of elevated expressways as mere transportation routes. It demands a reimagining of elevated expressways not as barriers, but as mediators — dynamic frameworks that stitch the city back together. By layering cultural and recreational functions into these overlooked territories, we can transform them into vibrant spaces of encounter and collective life.



[Fig. 2] Use of the shadow - Guangzhou Ring Road.
Photo: Underneath 5 (Game), 2005. C-Print 120 X 300 cm, MAP Office [Gutierrez + Portefaix].



[Fig. 3] Yangge dancers in Beijing gather regularly under a highway overpass, which provides a flat surface, protection from the sun and good acoustics for the drummers.
Photo: Caroline Chen.

In fact, communities are already informally reclaiming these under-bridge spaces. Initially, elderly men and women gathered in other public areas to play mahjong, cards, or dance to music. However, the noise from their activities led to complaints from the neighborhood. Seeking a more isolated spot, they moved under the bridge, where the space is typically underutilized and the noise from traffic helps mask the sound of their gatherings. Now, elderly men bring portable chairs and tables to play mahjong and cards, while groups of elderly women, dressed in matching outfits, bring radios to perform square dances, making use of the shaded, open-air venue provided by the bridge.

However, I am curious to design spaces that not only accommodate such spontaneous uses but also actively invite people in, transforming these underutilized areas into inclusive, dynamic public spaces.



[Fig. 4] Yuzhong II, Chongqing, CN, 2011
Photo: Gisela Erlacher.



[Fig. 5] Yuzhong IV, Chongqing, CN, 2011.
Photo: Gisela Erlacher.



[Fig. 6] Huangpu VIII, Shanghai, CN, 2013.
Photo: Gisela Erlacher.

I. SITE

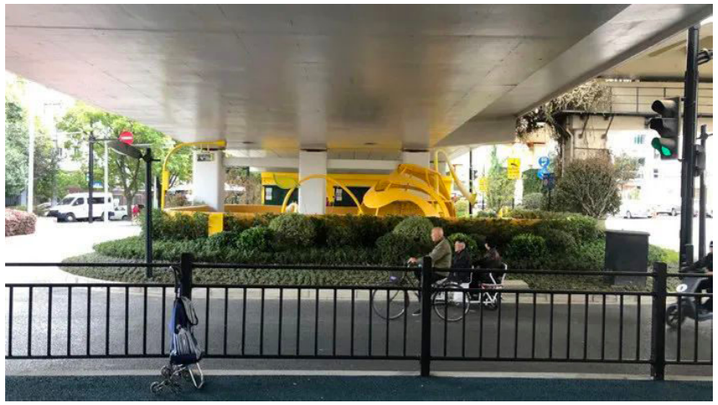


[Fig. 7] Translate: "Awakening dormant spaces, revealing hidden worlds beneath the bridges — when the dark and gloomy corners under the overpasses are transformed into open and bright fitness grounds, a city's appeal to its people can undergo an unexpected transformation.S"
Screenshots from People's City: Shanghai's Practice (《人民城市的上海实践》). China Central Television (CCTV), n.d.

[Fig. 7]



[Fig. 8] Before renovation under Kaixuan Road Bridge.
Photo: Shanghai Urban Space Art Season



[Fig. 9] After renovation under Kaixuan Road Bridge: releasing space for activity venues.
Photo: Shanghai Urban Space Art Season

Although I was born in Zhejiang, I have always considered Shanghai my true hometown. My mother brought me here when I was just two months old, and I have spent over twenty years growing up in this city—absorbing its rhythm, culture, and way of life. From the cuisine and dialects to the vibrant street scenes, Shanghai has shaped my identity in both subtle and profound ways.

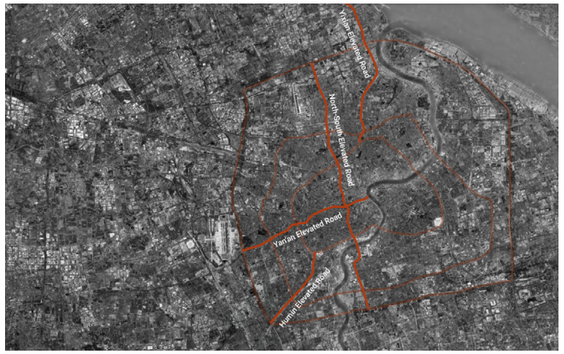
The inspiration for this project began unexpectedly—right outside the gates of my residential community. A small construction site had appeared in what used to be a dim, neglected pocket of land beneath a road overpass [Fig. 8]. The space received little sunlight, had low clearance, and was long overlooked. But over time, it was transformed into a modest yet vibrant playground and basketball court. Local schoolchildren began using it after class, and residents gathered there in the evenings [Fig. 9]. Witnessing this transformation made a strong impression on me. It revealed the incredible potential of spaces we typically ignore—how forgotten voids could be revitalized through intentional design and programming.

This realization led me to examine a broader condition in Shanghai. As of 2020, the city hosts nearly 300 kilometers of elevated highway just within the central districts, creating roughly 32,000 individual "under-bridge" spaces across its landscape (Shanghai Municipal Commission of Transport, 2020). Yet, many of these spaces remain dormant—underutilized and often stigmatized. They are frequently associated with unsanitary conditions, poor lighting, and safety concerns. In some areas, they are informally occupied by homeless individuals seeking shelter, largely because these spaces offer shade and are hidden from surveillance. This complex reality illustrates both the physical and social void that exists beneath our city's infrastructure.

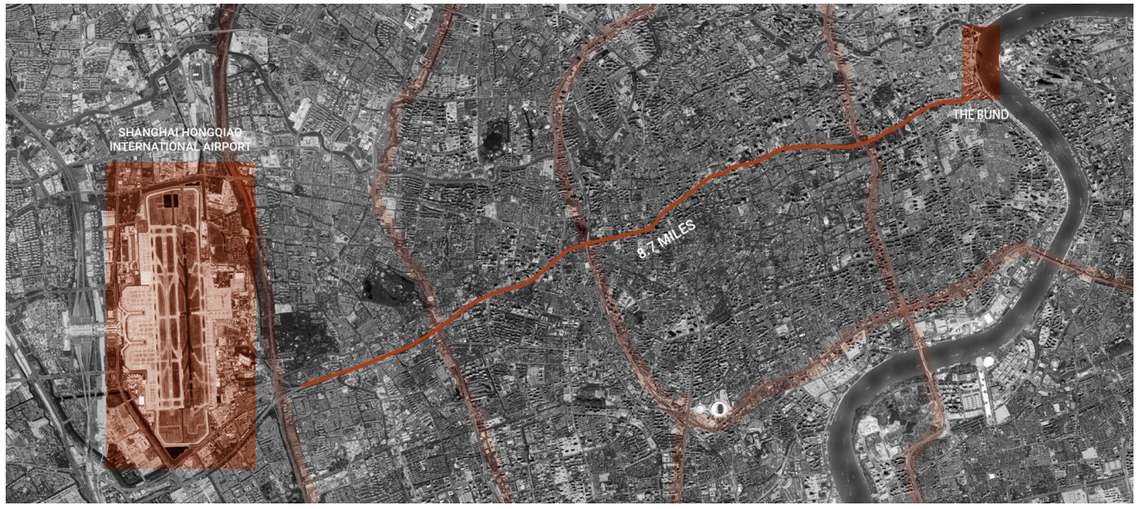
With this context in mind, I chose to focus my thesis on one specific stretch of elevated expressway—using design as a tool to reclaim, redefine, and reprogram the space beneath it. My aim is not just to make aesthetic improvements, but to propose a scalable intervention strategy that asserts architectural agency within infrastructural systems. I seek to demonstrate how design can dominate, or more accurately, complicate the usage of infrastructure—merely as transportation corridors - introducing new layers of civic, ecological, and cultural value to spaces that have long been neglected.



[Fig. 10]



[Fig. 11]

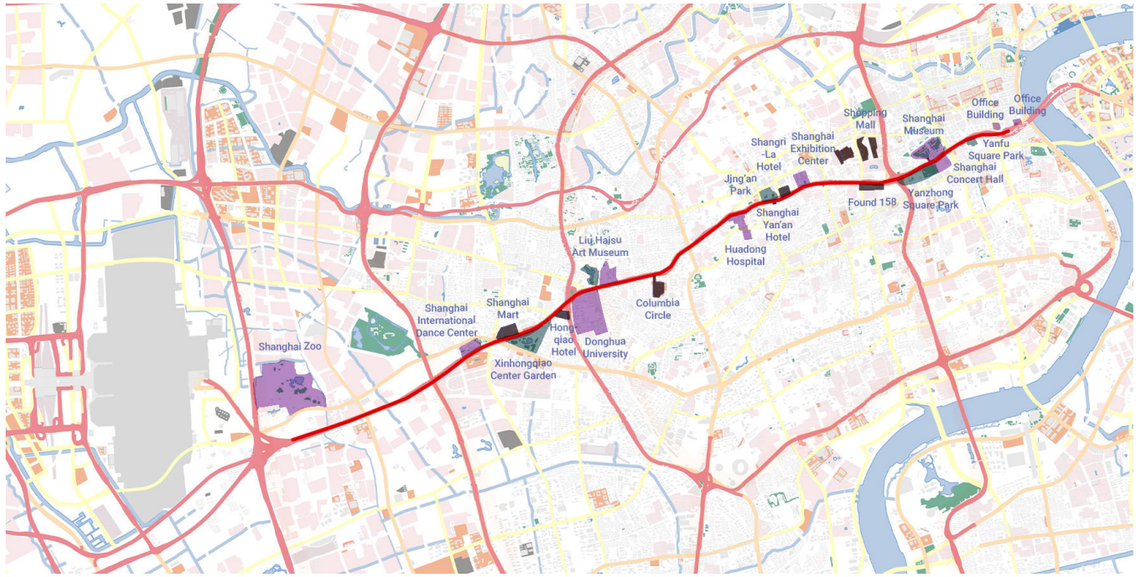


[Fig. 12]

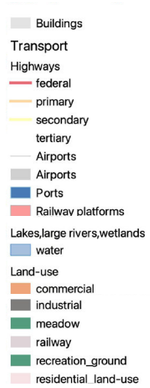
[Fig. 10] Shanghai's expressway network: three ring roads.
[Fig. 11] Shanghai's expressway network: four elevated expressways.
[Fig. 12] Shanghai's expressway network: Yan'an Elevated Road.

In Shanghai, the city's expressway network is defined by its three ring roads [Fig. 10] and four straight elevated expressways [Fig. 11], forming a dense system that facilitates rapid movement but also carves through neighborhoods, leading to the fragmentation of space. Beneath these massive roadways lie vast, underutilized grey spaces—often left as vacant voids, parking lots, or neglected areas plagued by noise and pollution. Despite their scale and central locations, these spaces are frequently overlooked in urban planning, considered as little more than byproducts of transportation networks rather than potential assets to the city.

I focused on a site that is a major elevated expressway that connects Shanghai's Hongqiao International Airport to the historic Bund [Fig. 12]. It cuts through the heart of the city, linking all three of Shanghai's ring roads, and serving as a vital artery of movement. Notably, a full bus route runs underneath it, emphasizing its role as more than just a highway — it is a spine of the city [Fig. 14].



[Fig. 13] Yan'an Elevated Road is surrounded by various types of urban programs.

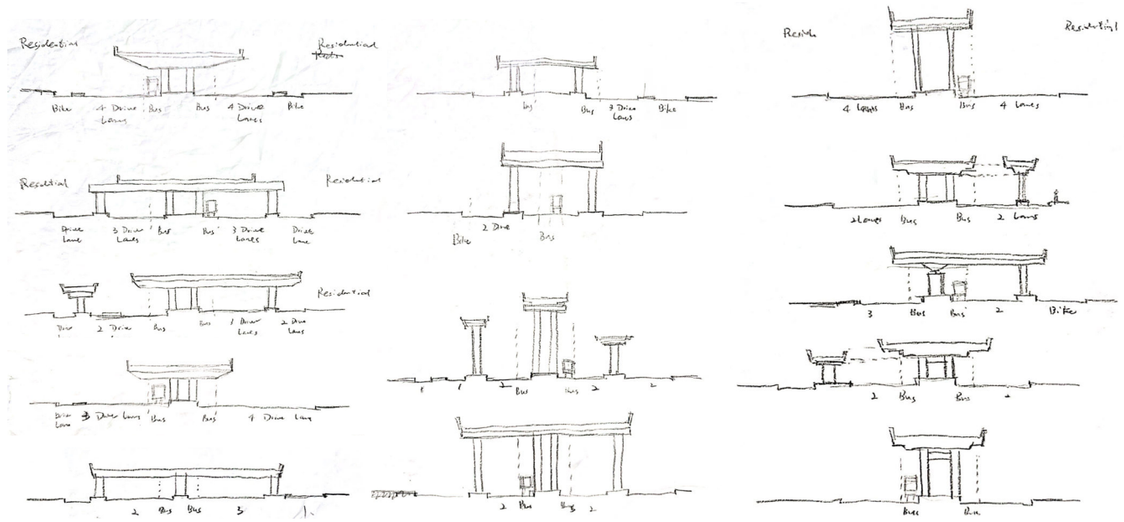


The site features a mix of urban programs: residential clusters near the airport, scattered public institutions, a central hub of office buildings, and limited green space [Fig. 13]. Through mapping these conditions and examining the scale of the voids beneath the elevated expressway, this thesis proposes not the removal of infrastructure, but its transformation—complicating the existing structure by layering new functions and meanings onto it.

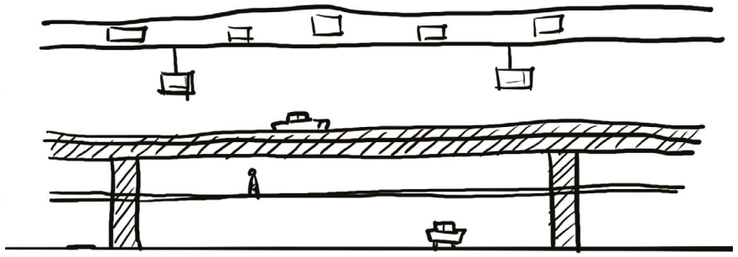
Simultaneously, a wide array of urban amenities—such as the Shanghai Zoo, a dance center, an art museum, Huadong Hospital, an exhibition center, a music hall, and a history museum—are situated in close proximity to the expressway [Fig. 13]. These existing programs offer a starting point for reconnecting the urban fabric across the north–south divide, encouraging movement and engagement between both sides of the site.



[Fig. 14] The bus route under Yan'an Elevated Road, emphasizing its role as a spine of the city.



[Fig. 15] Section Analysis of Yan'an Elevated Road.



II. INITIAL DESIGN

"The contrast of forms and the constantly changing heights between these two elements result in spaces of great architectural force made possible by the modern structural approach to concrete construction, which has given so many beautiful tools into the hands of the architect.[1]"

Platforms and Plateaus by Jørn Utzon

I began the design process through collage-making, allowing me to mentally and visually test the bold ideas I had in mind. These early explorations helped me speculate on both spatial and experiential possibilities. My proposal envisions three new layers of infrastructure woven beneath and around the existing expressway:

— the Green Line
— the Water Line
— the Public Line

Each line introduces a distinct system of activity and meaning, collectively transforming the expressway from a dividing structure into a multifunctional civic spine.

1 Utzon, Jørn, "Platforms and Plateaus. Ideas of A Danish Architect.", in Zodiac, no.10 (1962): 114-117

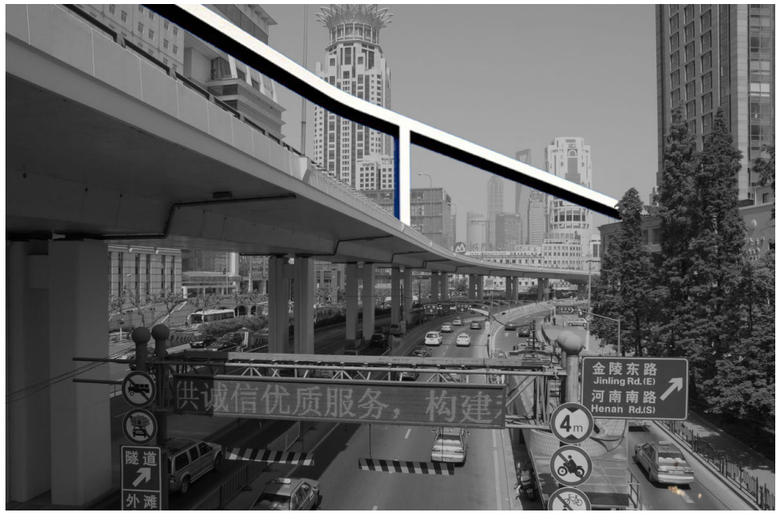
The Green Line

The Green Line addresses the need for clean air and public open space.

Beneath and above the roar of traffic,

I envision a continuous thread of greenery that stitches neighborhoods back together.

Here, infrastructure becomes an urban lung — a place of breath, of healing.



[Fig. 16]



[Fig. 17]



[Fig. 18]

[Fig. 16] The green line positioned above the existing structure.

[Fig. 17] The green line allowing light to penetrate from above.

[Fig. 18] The green line mimicking the weaving pattern of the elevated road.

The Water Line

The Water Line revives memory and history.

In 1853, a creek marked the boundary between the French and English concessions in Shanghai.

That creek was flattened in 1916, and the expressway was built over its memory in 1999.

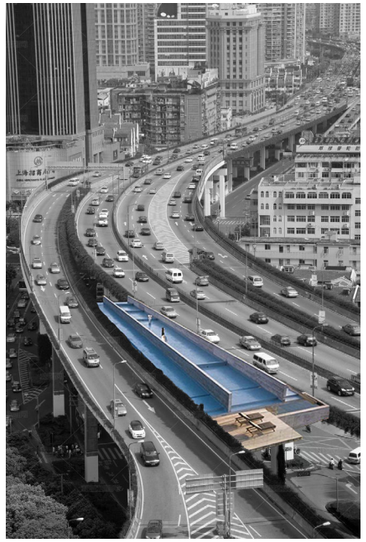
Through the Water Line, I propose reintroducing a symbolic water element:

A playful, fluid space that shifts between formal and informal uses.

Water returns to the site not just as a material, but as a living memory.



[Fig. 19]



[Fig. 20]

[Fig. 19] The water line serves as an aqueduct, transporting water along its path.

[Fig. 20] A swimming pool situated between the elevated roads.

[Fig. 21] A swimming pool adjacent to the driveway.



[Fig. 21]

The Public Line

The Public Line focuses on intimacy and human scale.

The expressway looms overhead, massive and overwhelming.

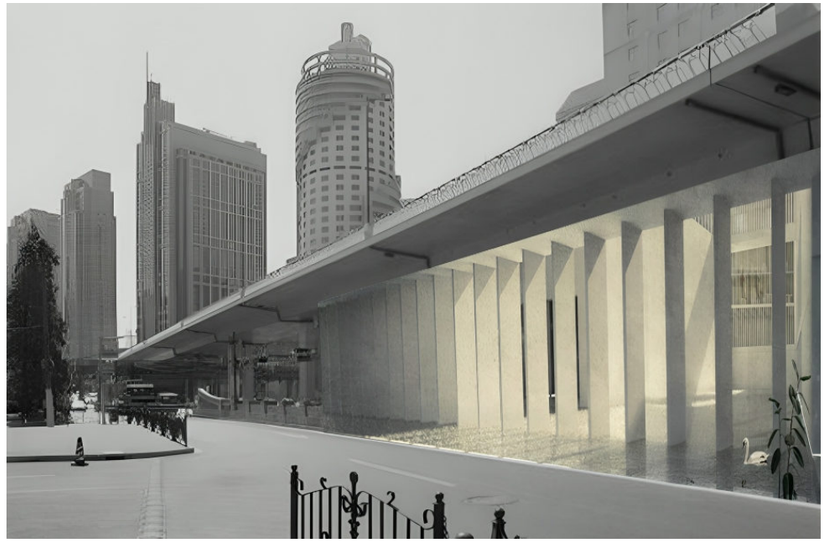
The Public Line breaks this scale down — carving out spaces of encounter, rest, and gathering.

Here, the programs are not strictly defined.

Instead, the scale of the space determines the possibilities.



[Fig. 22]



[Fig. 23]



[Fig. 24]



[Fig. 25]

[Fig. 22] The public line enhances light penetration beneath the elevated road.

[Fig. 23] The repetitive structure transforms the grey space into a more inviting area.

[Fig. 24] A runway weaving through the existing structure of the elevated road.

[Fig. 25] The underside of the elevated road becomes the ceiling of the enclosed space.

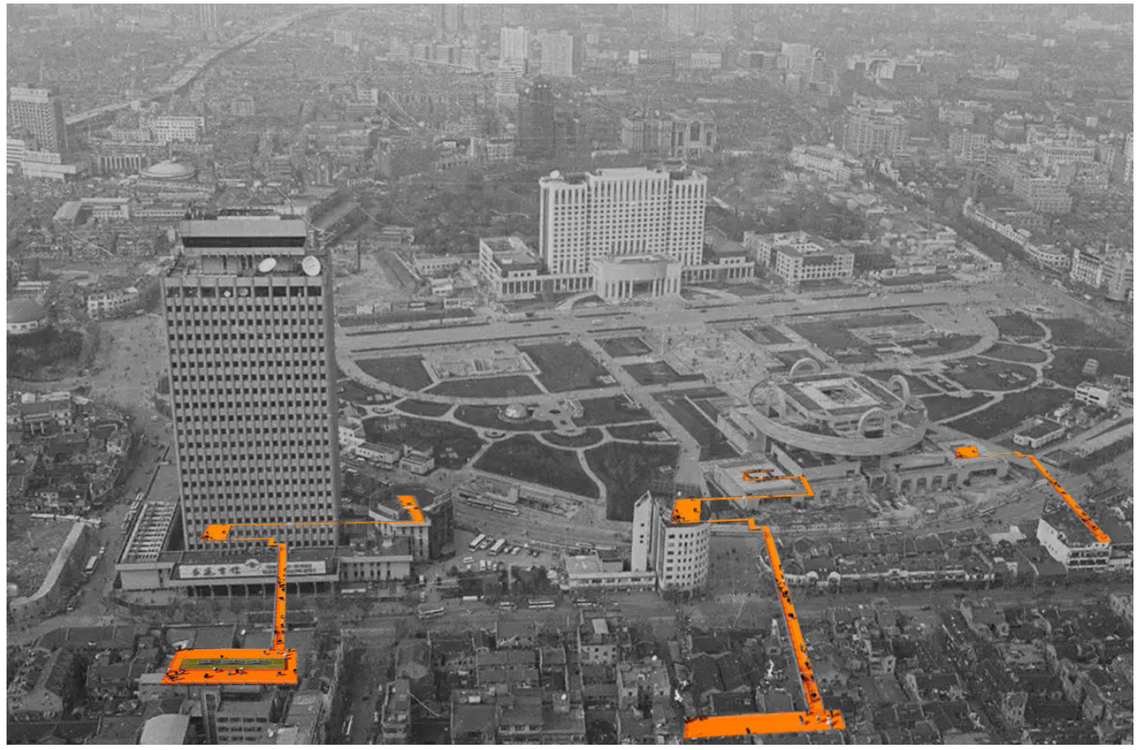
The North-South Relationship

The elevated expressway currently acts as a physical and visual barrier,
severing the connection between the northern and southern parts of the site.
By introducing shared public spaces beneath the structure,
Wthe design aims to restore continuity and encourage interaction between the two sides.

These interventions seek to transform the expressway from a dividing line into a connective threshold.

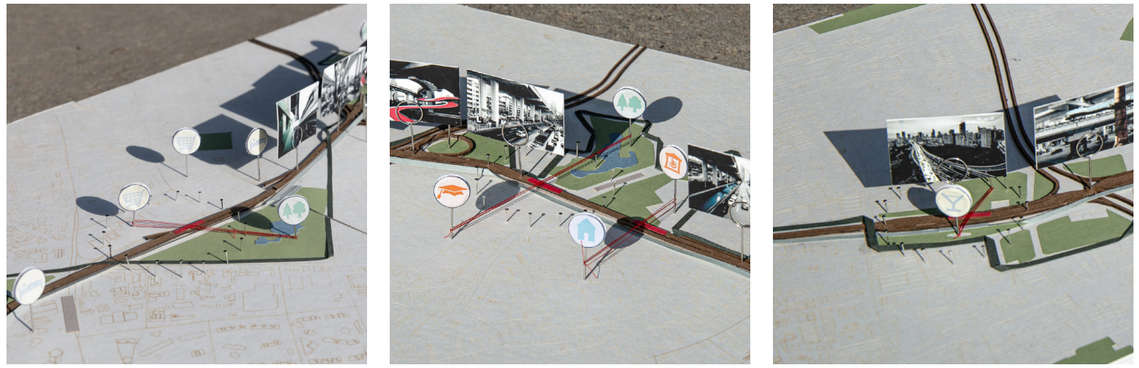


[Fig. 26] A tunnel connecting the surrounding buildings to the opposite end.



[Fig. 27] A series of catwalks linking the north and south sides of the elevated expressway.

III. FINAL DESIGN



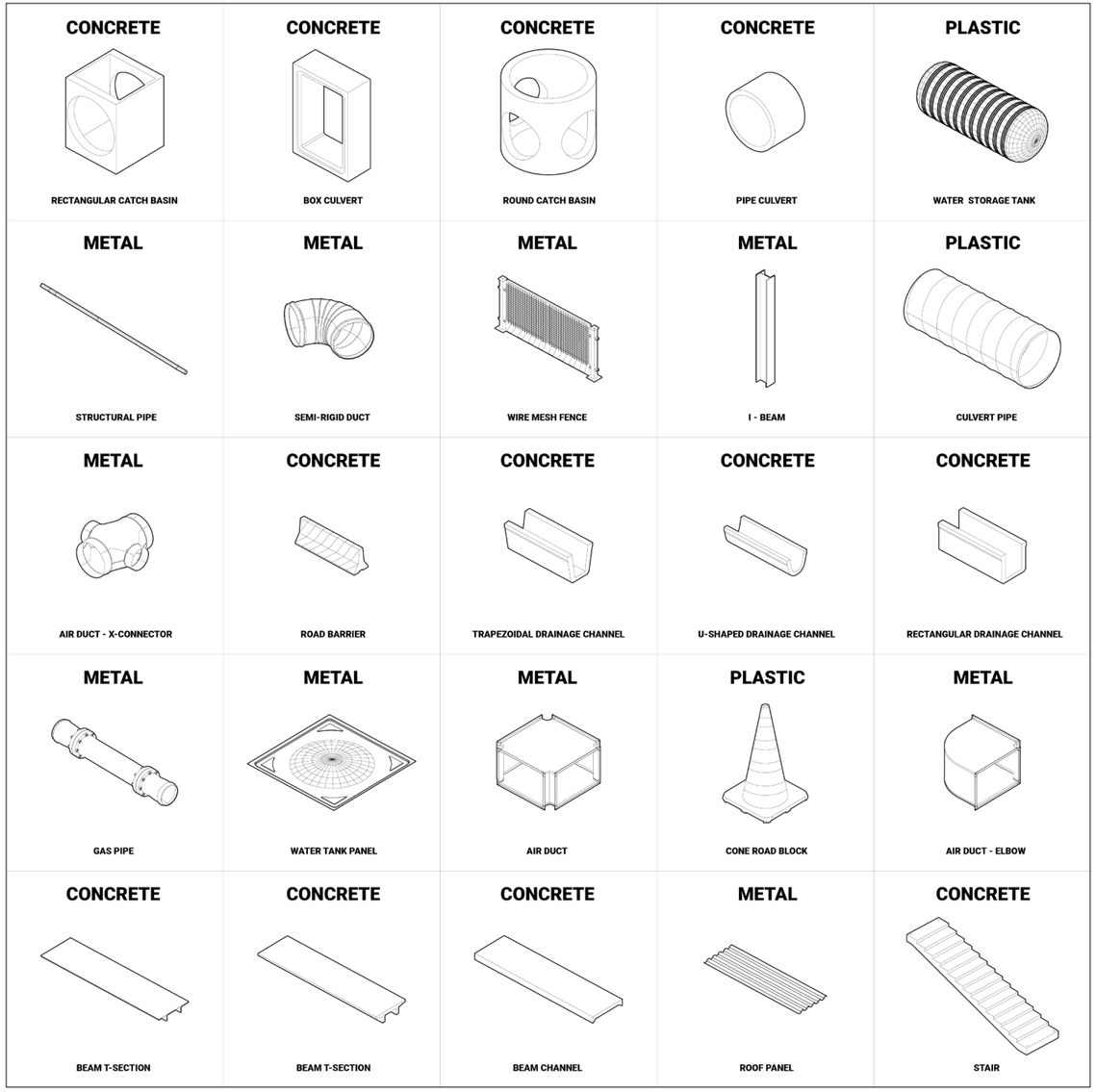
[Fig. 28] The three chosen sites selected for further development.

The Three Sites

When selecting sites to further develop the public line, I aimed to strike a balance between the diverse outcomes that each location could offer. My goal was to choose sites where the combination of programs would be both bold and versatile, fostering dynamic interactions and innovative uses.

The chosen sites include a trade center, a university, and a bar — each representing a distinct urban function. The trade center serves as a hub of commerce and public interaction, the university embodies education and community engagement, while the bar introduces a social and recreational dimension.

Together, these contrasting yet complementary functions have the potential to generate intriguing and vibrant spaces, catering to a wide range of urban activities and user experiences.



Material

Infrastructure materials — concrete, steel, and modular components — traditionally serve as the structural backbone of elevated expressways. However, when reinterpreted, these robust elements hold potential for creating softer, more human-centric architecture. By repurposing pipes, ducts, beams, and drainage units, we can transform the hard, utilitarian shadows of the highway into welcoming public spaces that foster social interaction and community engagement.

This approach challenges the conventional perception of infrastructure, shifting from purely functional constructs to dynamic urban environments that blend durability with human scale. Through thoughtful adaptation, the harsh materiality of elevated roadways evolves into vibrant architectural interventions, seamlessly integrating into the city's fabric.

[Fig. 29] Component Material Assembly.



Site I

The first site is situated between the trade and exhibition complex and the park, offering a unique opportunity to bridge two contrasting urban functions — the bustling commercial energy of the exhibition area and the peaceful ambiance of the park.

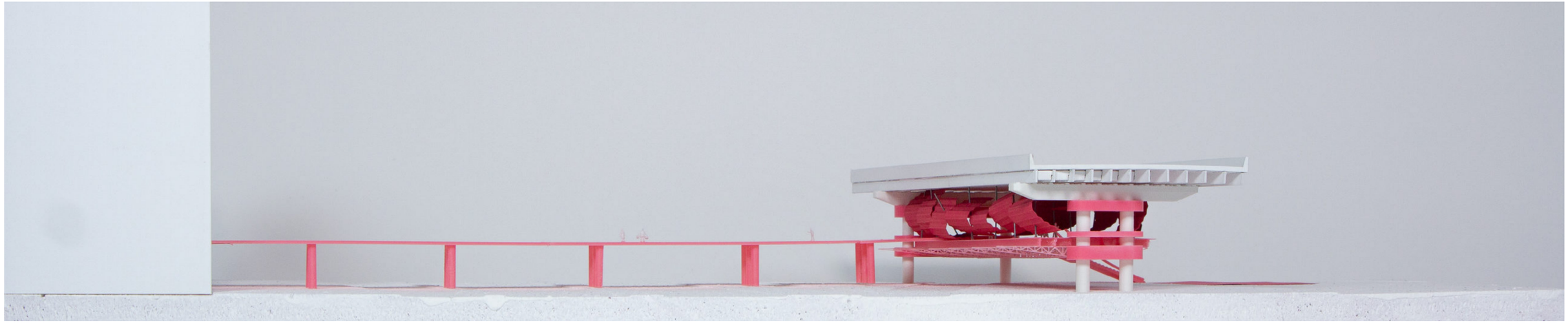
The design envisions this space as a versatile, open-plan gathering area. During the day, it can host sculpture exhibitions, providing a shaded, reflective environment for visitors to appreciate art [Fig. 34].

In the meanwhile, the site offers an opportunity for exhibitors to extend their presence outdoors, allowing them to move their stands from the enclosed complex to the shaded area, promoting their brands and products in a more dynamic setting [Fig. 35].

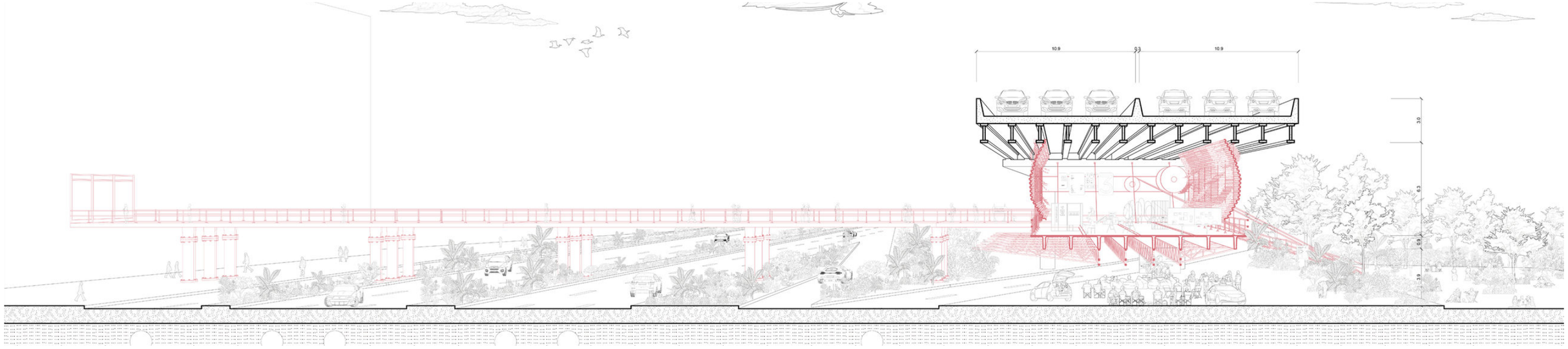
[Fig. 30] Render illustrating the proposed intervention beneath the infrastructure.

[Fig. 31] Model photo contrasting the new intervention with the existing structure.

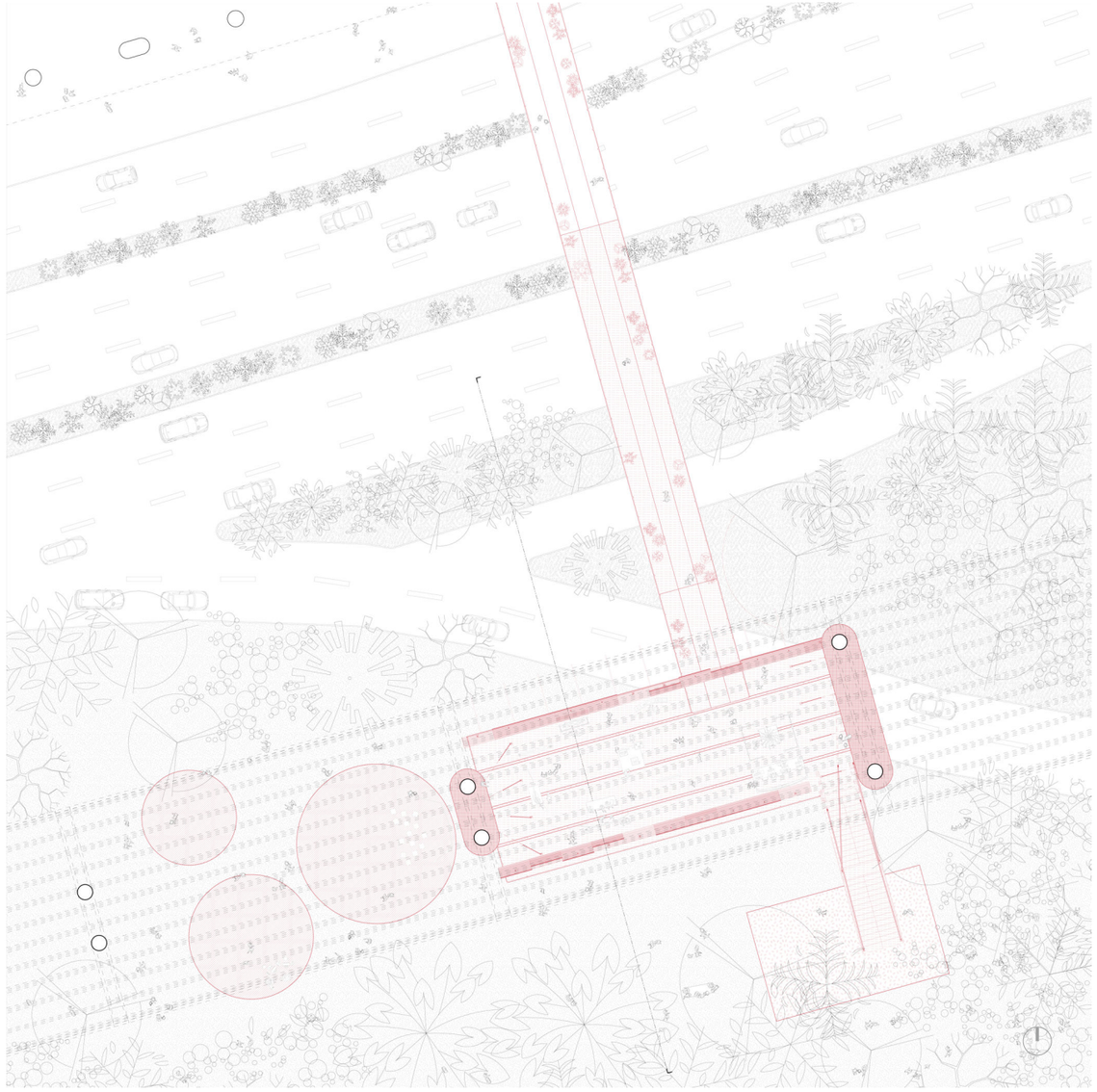
[Fig. 32] Perspective section showcasing the interior and structural elements of the intervention.

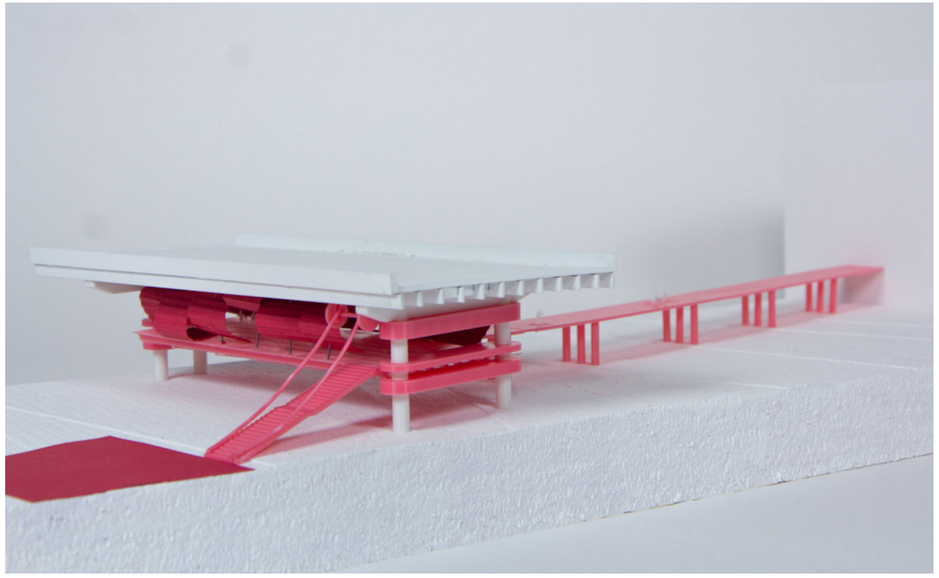


[Fig. 31]



[Fig. 32]





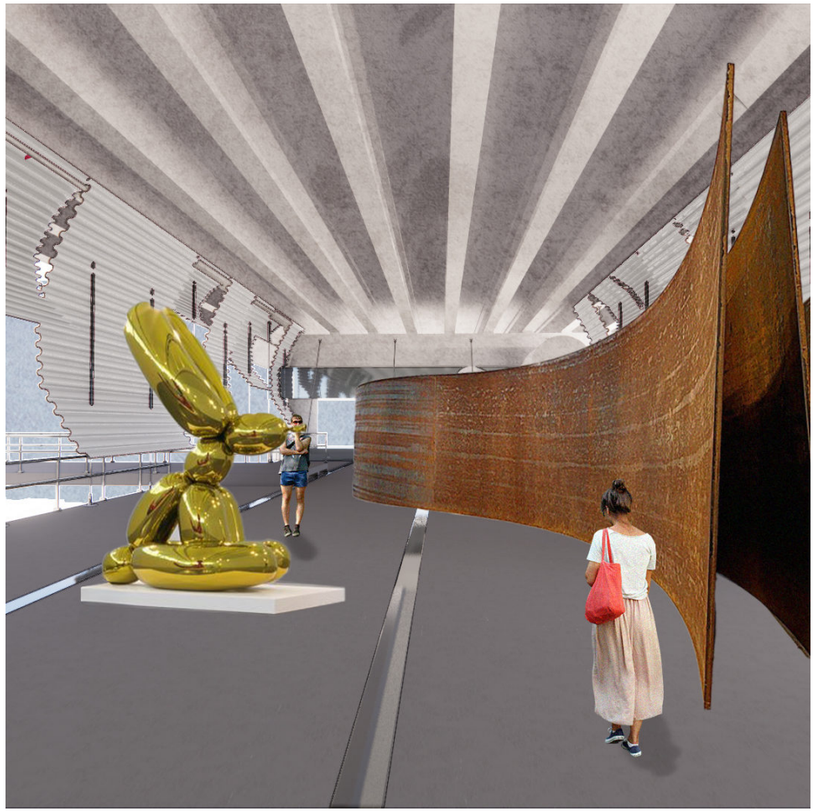
[Fig. 34]

[Fig. 33] Plan illustrating the activities within the intervention.

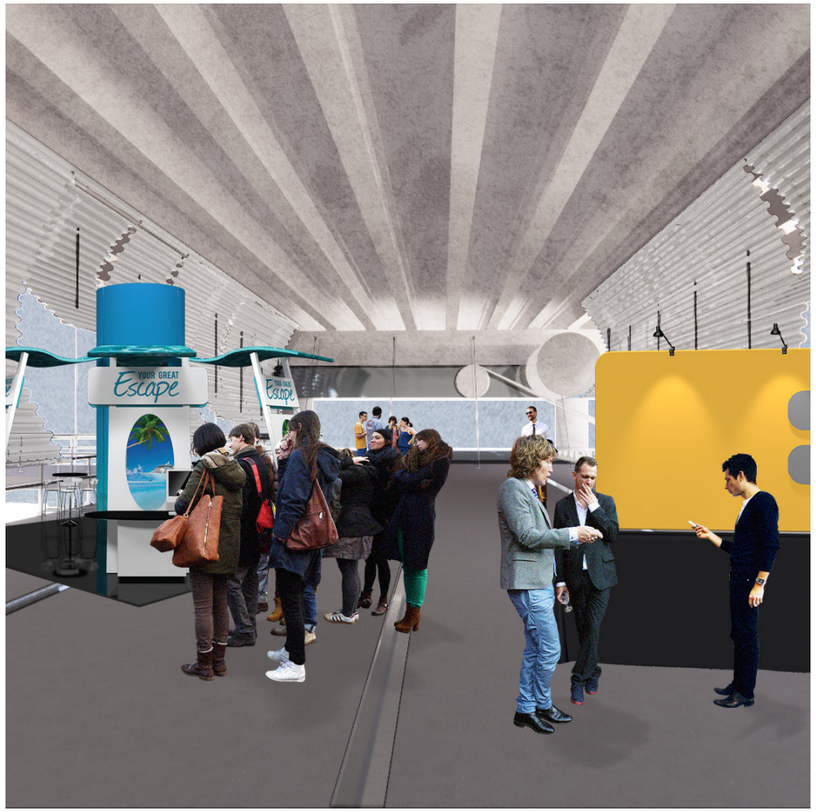
[Fig. 34] Model photo highlighting the kinetic stair positioned on the side.

[Fig. 35] Render depicting the intervention functioning as an art exhibition hall.

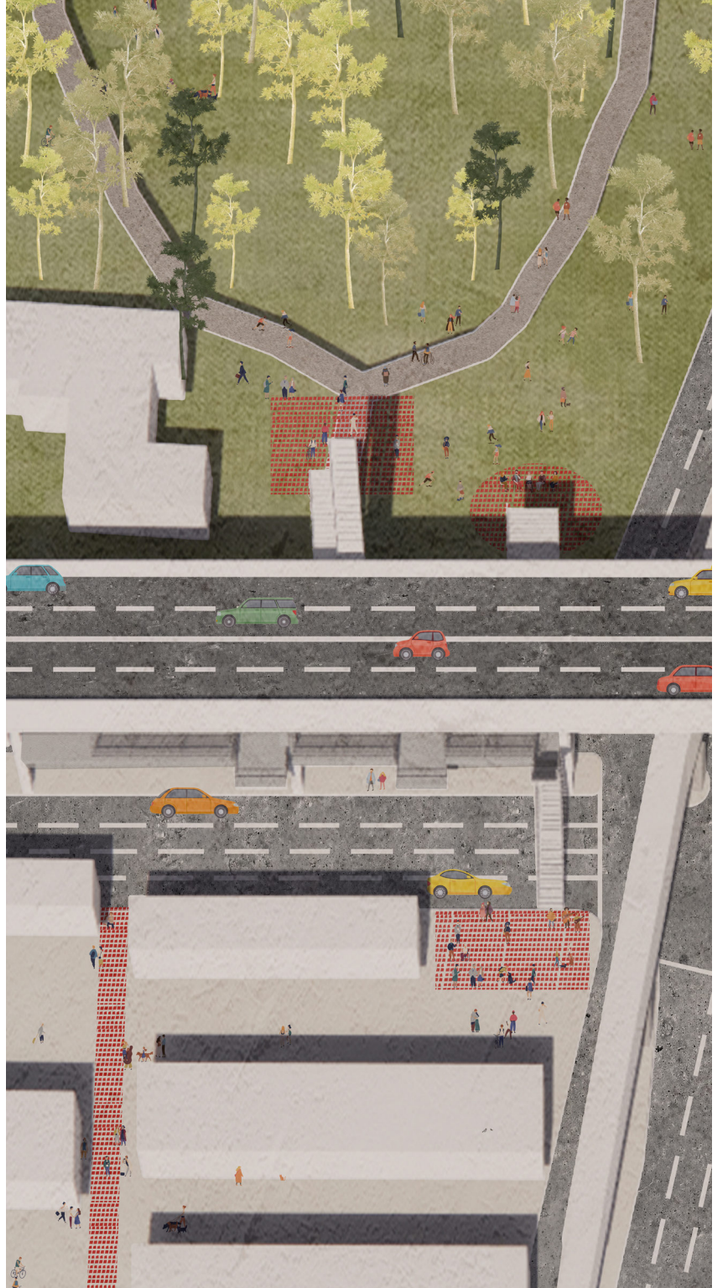
[Fig. 36] Render illustrating the space utilized as an exhibition hall.



[Fig. 35]



[Fig. 36]



Site II

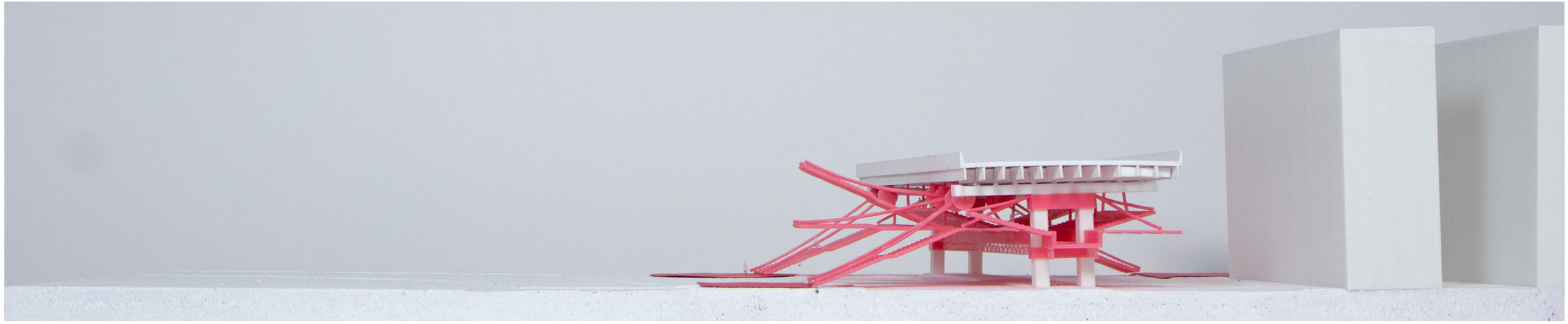
The second site connects a park and a university dormitory, offering the potential to blend student life with public amenities. This unique location allows for the integration of social, recreational, and functional spaces, fostering a vibrant community atmosphere.

The new intervention is a movable kinetic structure, designed to adapt to varying needs and uses. The central feature is a set of movable stairs that can open and close, creating either an enclosed personal space or an inviting public area. When opened, the structure transforms into a social amphitheater, encouraging spontaneous gatherings, performances, or even fitness activities [Fig. 41].

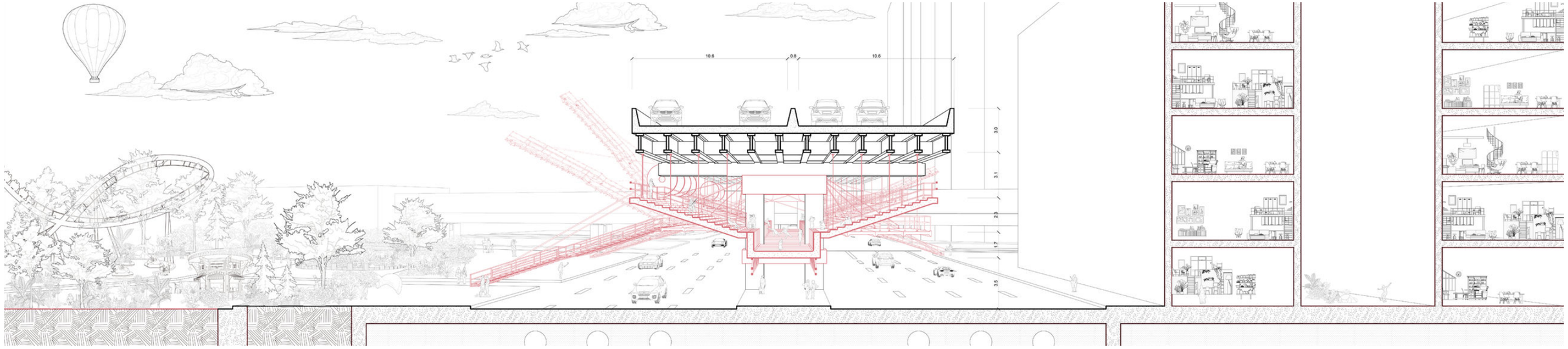
Additionally, during fashion week, the closed structure can be converted into a runway, taking advantage of its proximity to nearby fashion industry buildings. This versatility ensures that the space remains dynamic and responsive to the changing needs of the community [Fig. 42].

[Fig. 37] Render illustrating the proposed intervention within its surrounding context.
[Fig. 38] Model photo highlighting the contrast between the new intervention and the existing structure.

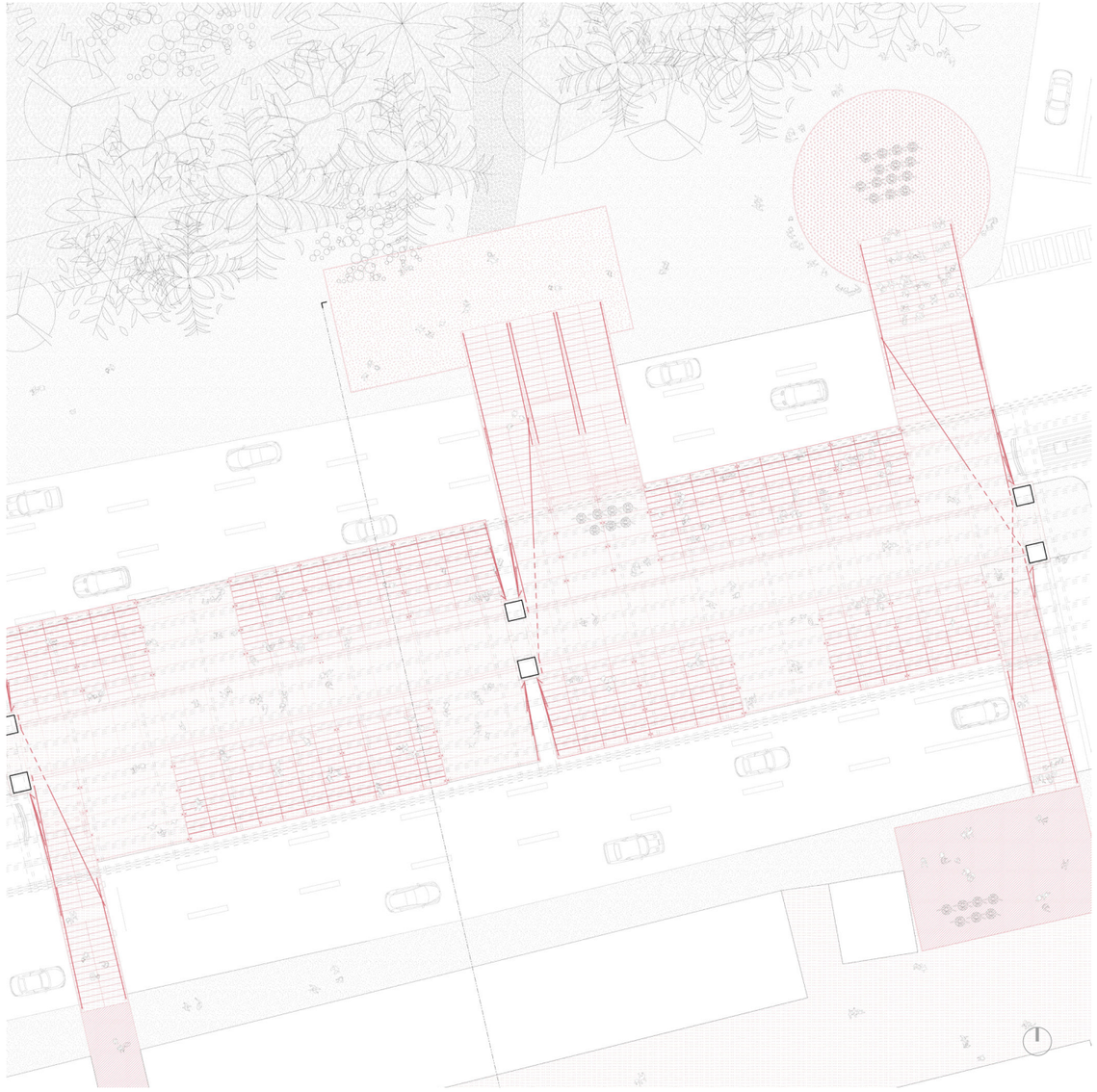
[Fig. 39] Perspective section showcasing the kinetic stairs positioned on both sides of the intervention.

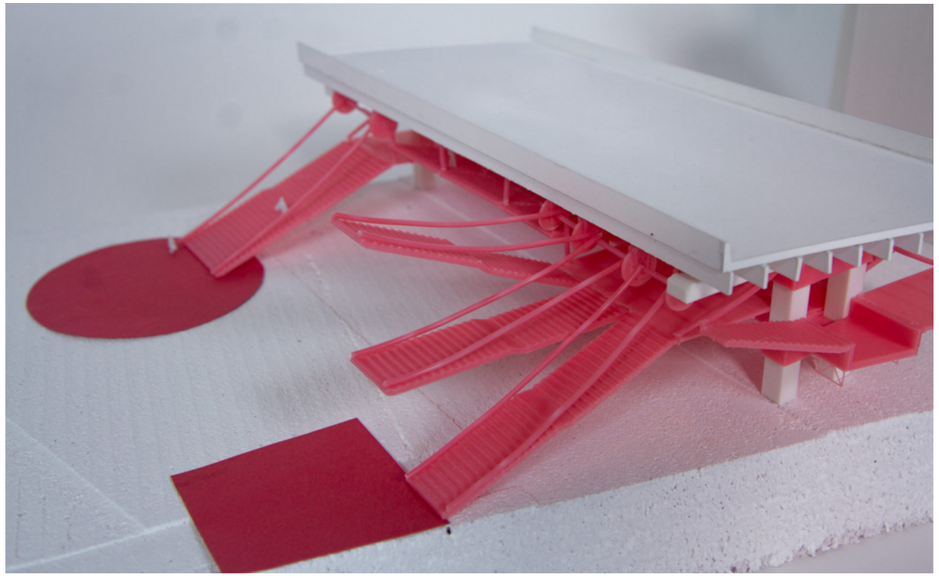


[Fig. 38]



[Fig. 39]





[Fig. 41]

[Fig. 40] Plan showcasing the activities both within the intervention and at ground level.

[Fig. 41] Model photo emphasizing the kinetic stairs located on the park side.

[Fig. 42] Render demonstrating the intervention in use as a swimming pool.

[Fig. 43] Render presenting the space repurposed as a runway for a fashion show.



[Fig. 42]



[Fig. 43]



Site III

The third site bridges the gap between a park and a bar, situated on opposite sides of the expressway. This unique location offers an opportunity to juxtapose the tranquility of the park with the vibrant nightlife of the bar scene. By connecting these contrasting environments, the intervention enhances the dynamic character of the area.

On one side, the intervention features a performance area where passing cars become an unusual yet striking backdrop. This integration of movement and activity creates a visually engaging space, where the juxtaposition of vehicles and performances adds a layer of urban energy.

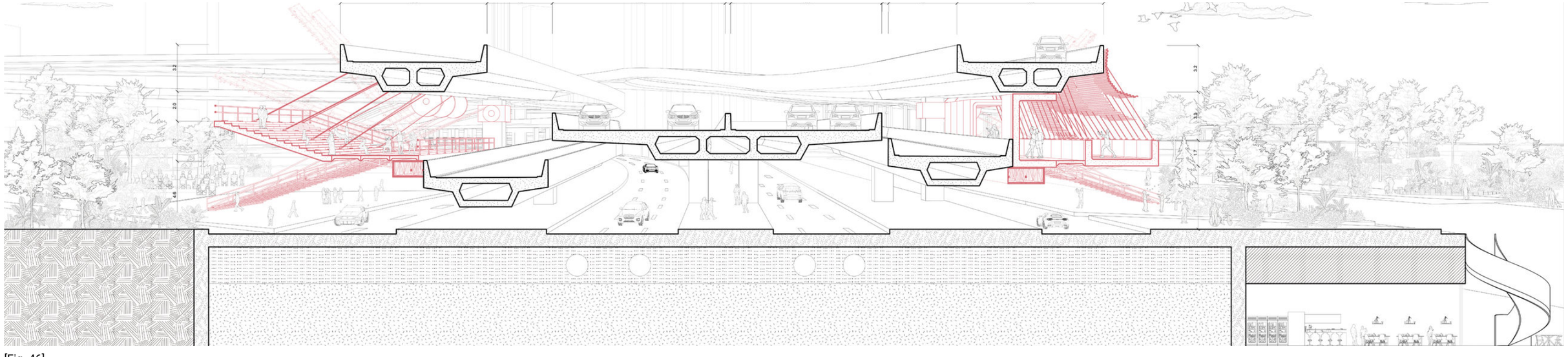
On the opposite side, a swimming pool functions as a recreational area during the day, inviting residents to cool off and socialize [Fig. 49]. As evening falls, the space transforms into a lively pool party venue, enhanced by the presence of nearby bars [Fig. 50]. This dual-purpose design caters to both relaxation and celebration, seamlessly blending leisure activities into the urban landscape.

[Fig. 44] Render depicting the proposed intervention spanning both sides of the infrastructure.
[Fig. 45] Model photo highlighting the contrast between the new intervention and the existing structure.

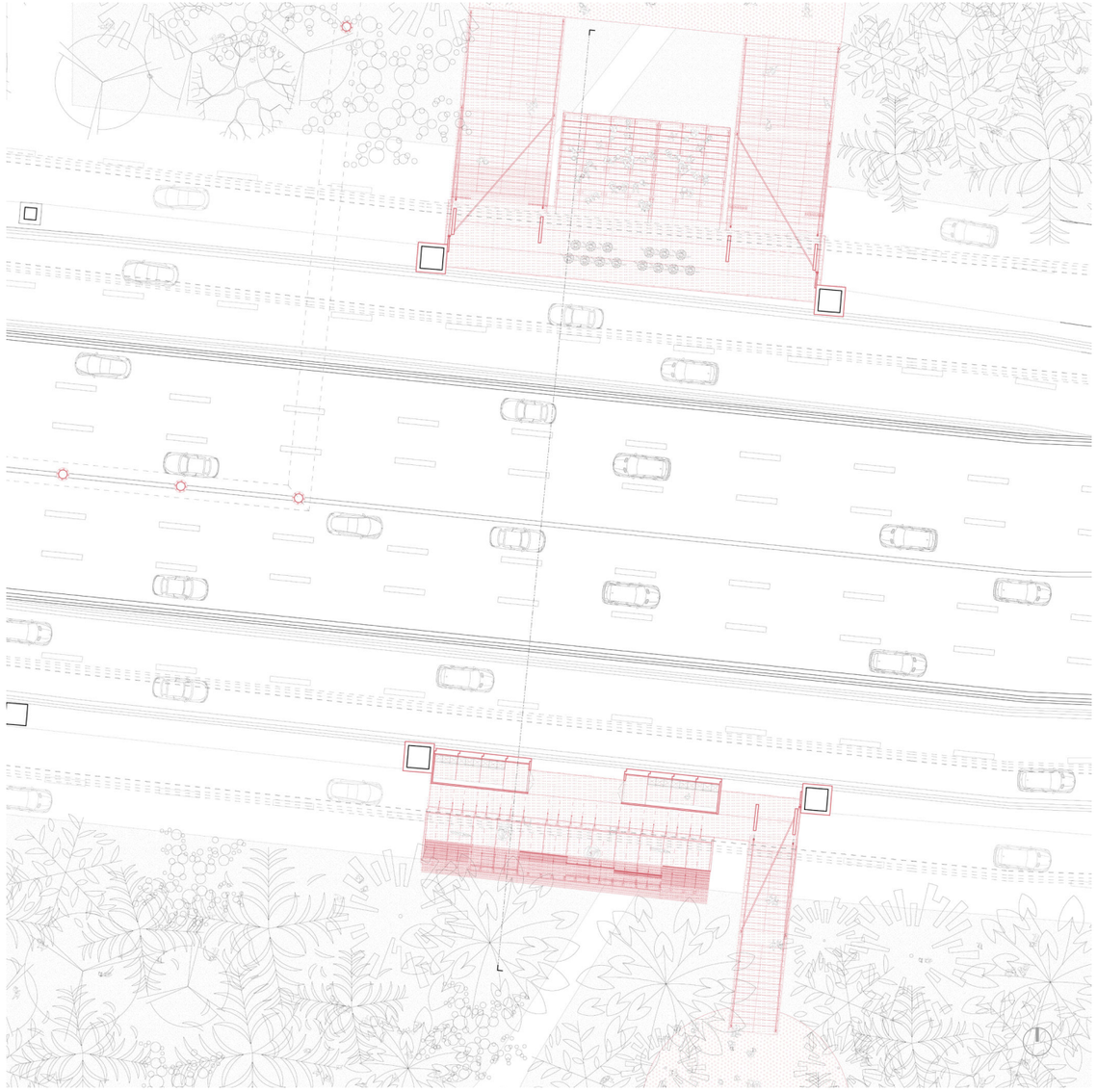
[Fig. 46] Perspective section illustrating the interior and structural components of the intervention.

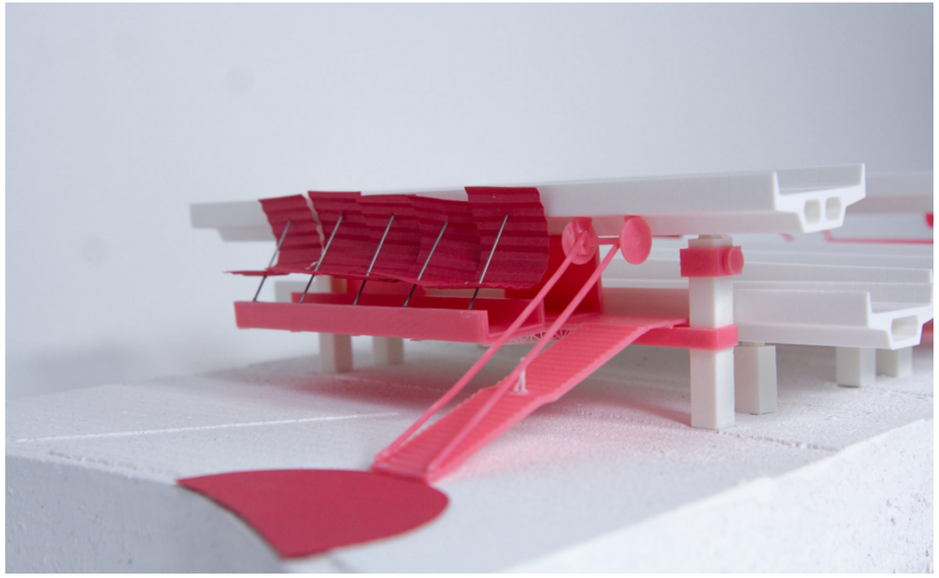


[Fig. 45]



[Fig. 46]





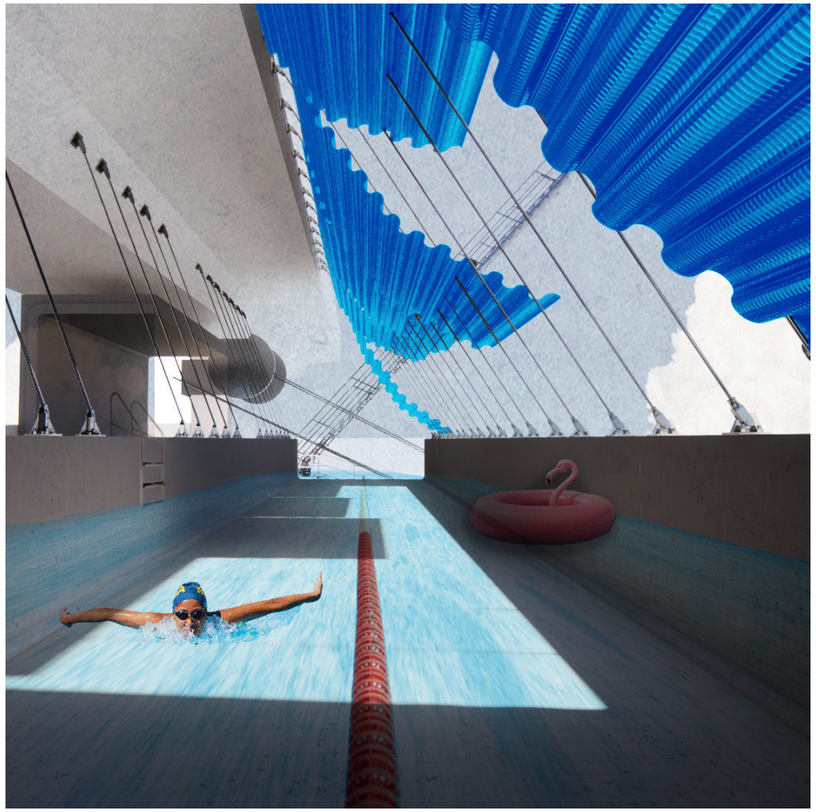
[Fig. 48]

[Fig. 47] Plan showcasing the activities on both sides of the elevated road.

[Fig. 48] Model photo emphasizing the operable corrugated steel used as shading for the swimming pool.

[Fig. 49] Render demonstrating the intervention in use as a swimming pool during the daytime.

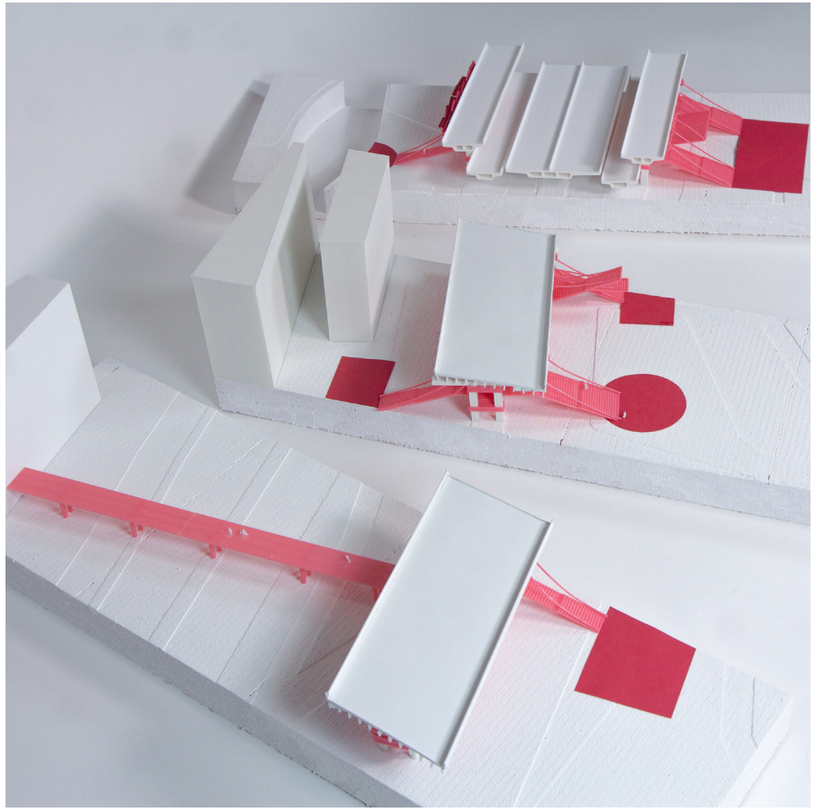
[Fig. 50] Render illustrating the space transformed into a pool party venue at night.



[Fig. 49]



[Fig. 50]



[Fig. 51] All three physical models together.

Conclusion

Urban infrastructure, often perceived as rigid and utilitarian, has the potential to become something more profound. By challenging the single-minded logic of the highway, we introduce layers of experience, meaning, and life. The goal is not to erase infrastructure but to reframe it:

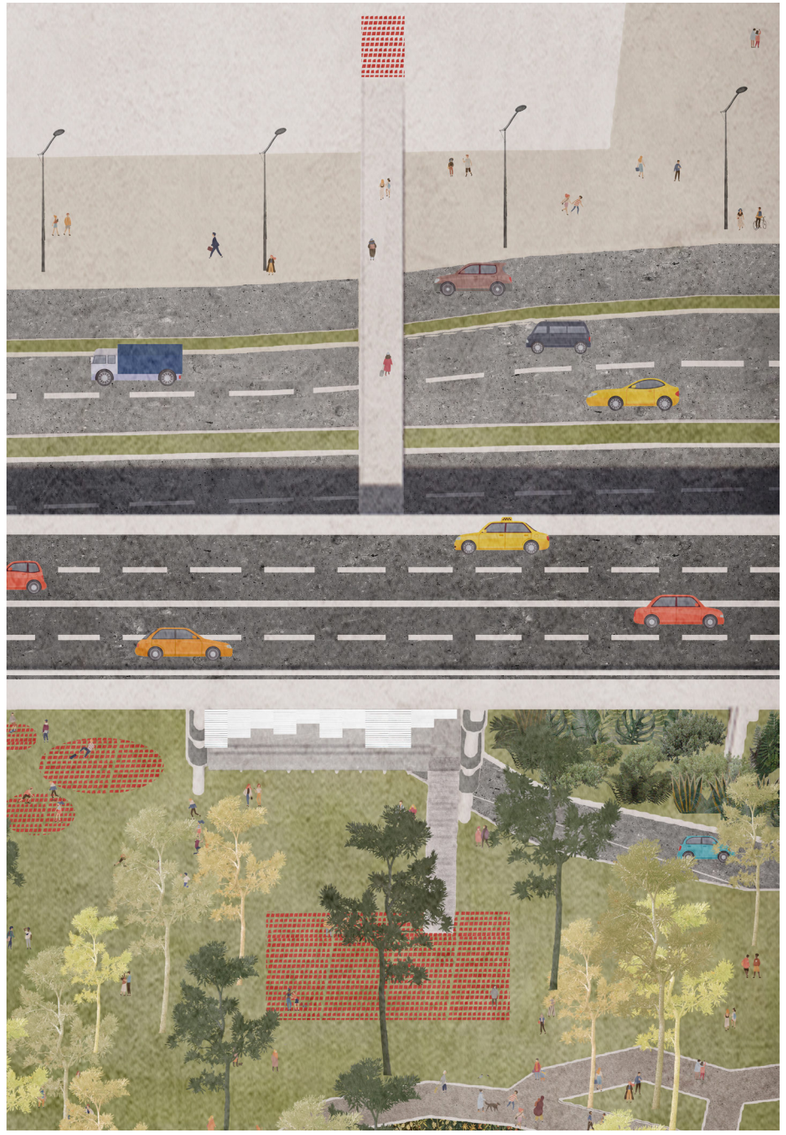
— From monofunctional to multifunctional.

— From divisive to connective.

— From oppressive to liberating.

Rethinking infrastructure in this way unlocks powerful possibilities. It allows us to heal the wounds of fragmented cities, creating breathing spaces in environments suffocating under density. It transforms symbols of separation into platforms for collective life.

Ultimately, infrastructure should not just move bodies; it should nurture souls. It should tell stories, creating places where the city's past, present, and future converge. Through this transformation, urban spaces can become vibrant, inclusive, and deeply human.







IV. APPENDIX



[Fig. 52] Pin-up board prepared for the final thesis review.



[Fig. 53] Final thesis review with the distinguished panel: AAP critics Ryan Whitby and Leslie Lok, alongside guest critics Tory Wolcott Green, Leandro Piazzi, and Il Hwan Kim.

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