

PORTFOLIO

Columbia University, Graduate School of Architecture, Planning and Preservation

Master of Science degree in Advanced Architectural Design
2024 - 2025

HOWARD LEE

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SOLAR DIVIDEND HOUSING

Site: Solano County, SF Bay Area, CA
Project: Individual

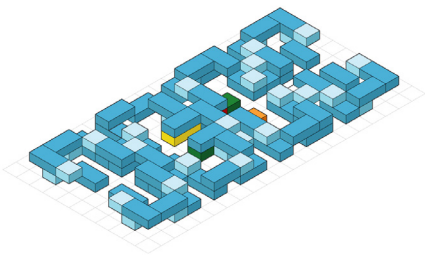
Solar Dividend Housing reimagines homeownership and energy equity by challenging the inefficiencies of the single-family housing model. Beginning with a forensic analysis of private equity's growing control over the rental market in Atlanta, the project critiques material waste and speculative real estate practices that drive up housing scarcity. In response, the proposal introduces a low-rise, high-density mat-building typology inspired by the Free

University of Berlin. Located in Solano County, California at the contested site of the California Forever development, it offers an alternative vision rooted in affordability, modular construction, and collective benefit. The building comprises compact, stackable living units organized around shared courtyards and terraces, all beneath a vast solar roof. Nearly 2,000 custom-designed V-formation solar modules generate over 3 million kilowatt-hours of renewable energy

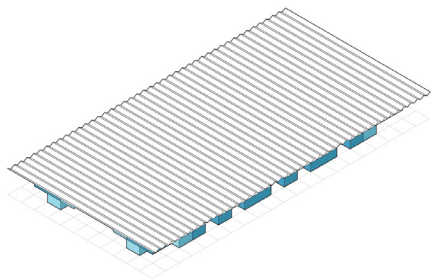
2025 Spring | Adv Studio VI
Michael Bell and Chris Munsell, Professor
Hudson Matz and Vikrant Ghate, Clinic Partners

annually. Energy sales are redistributed as a monthly 500-dollar dividend to each household, reframing energy infrastructure as a form of basic income.

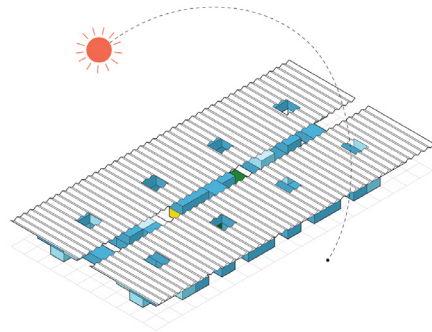
By aligning architecture with economic justice and climate performance, Solar Dividend Housing proposes a new model for living that treats housing not only as a new asset class but also as a shared resource embedded in a regenerative system.



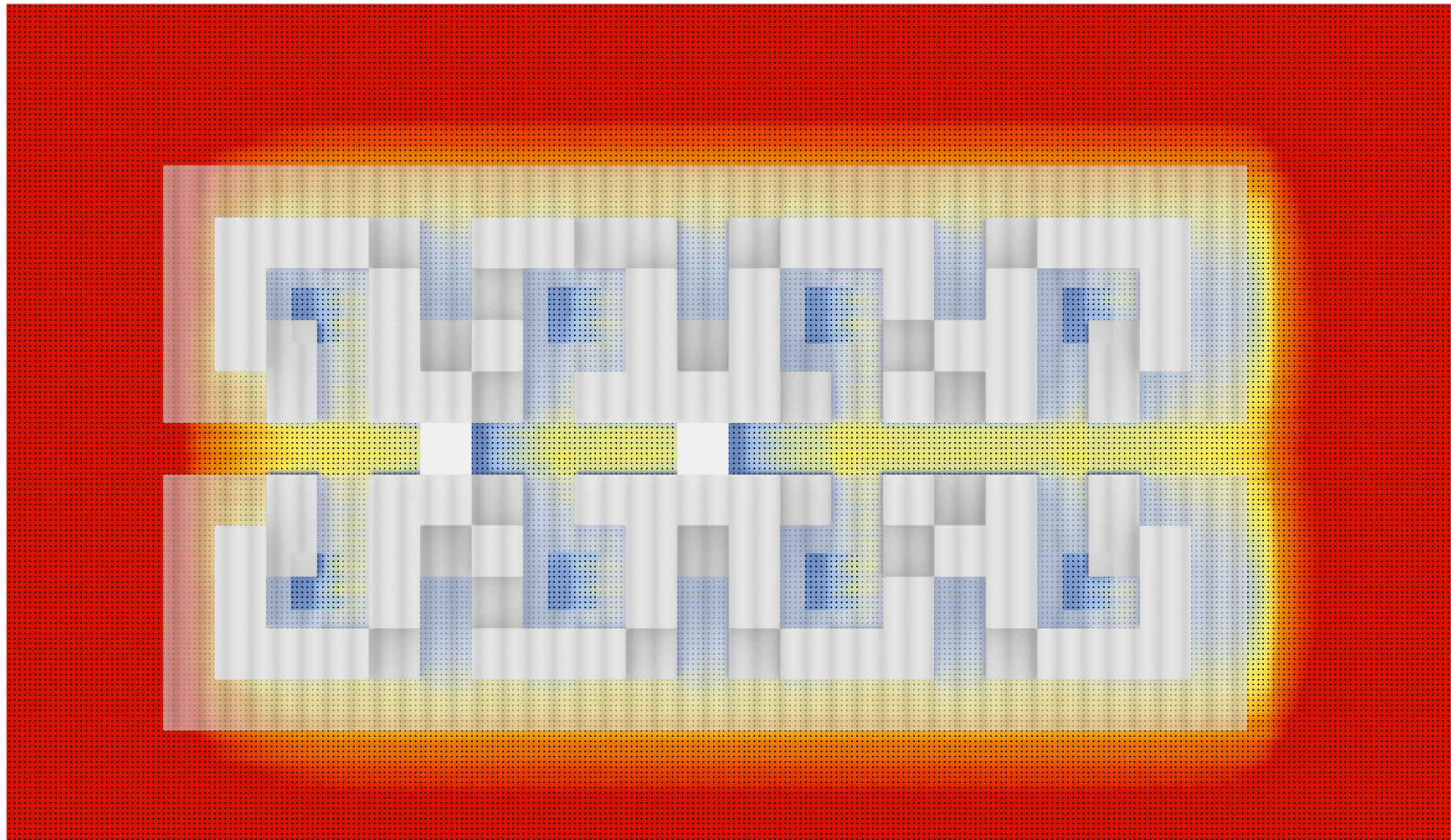
1. Program Stack



2. Solar Panels Array

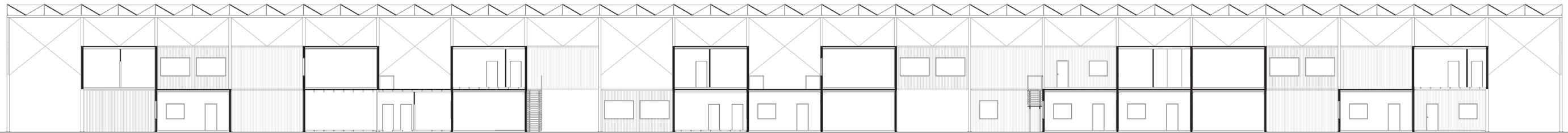
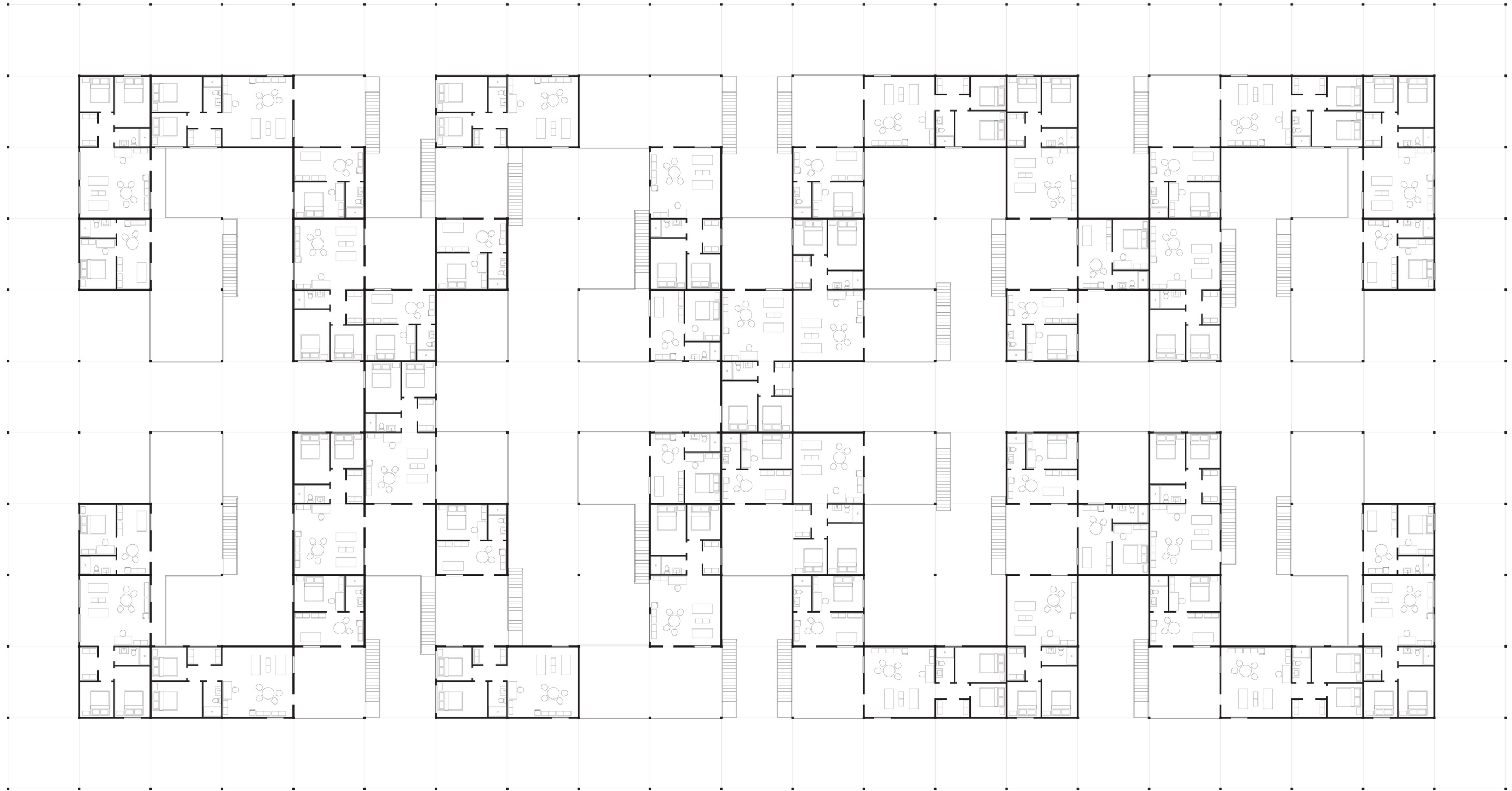


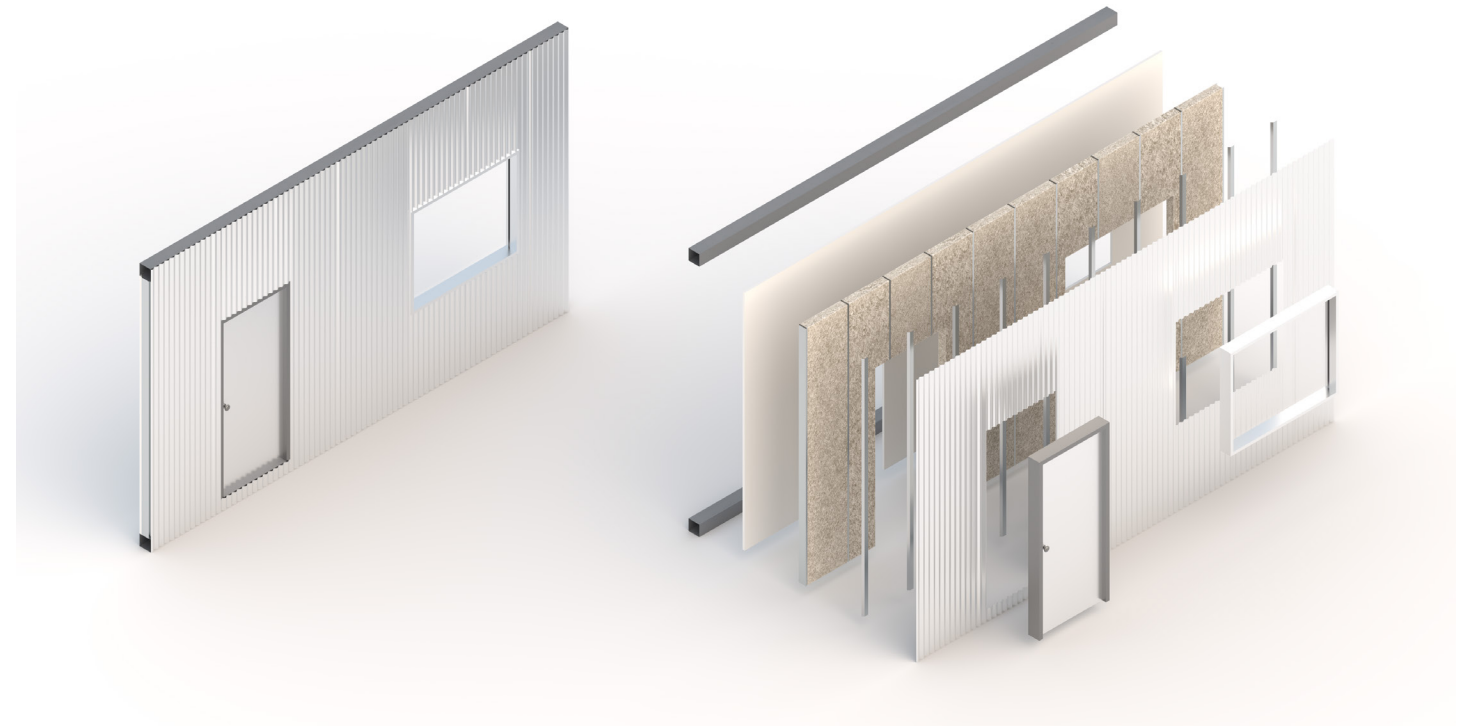
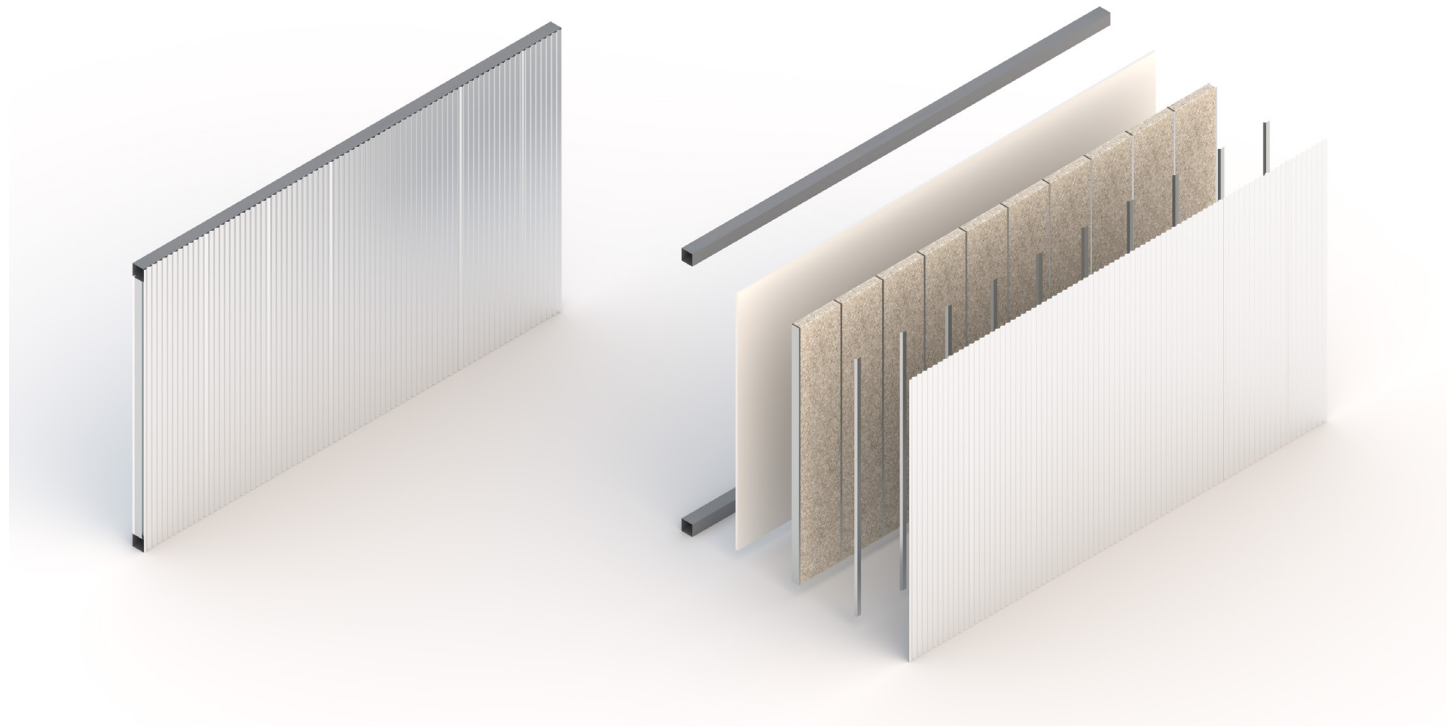
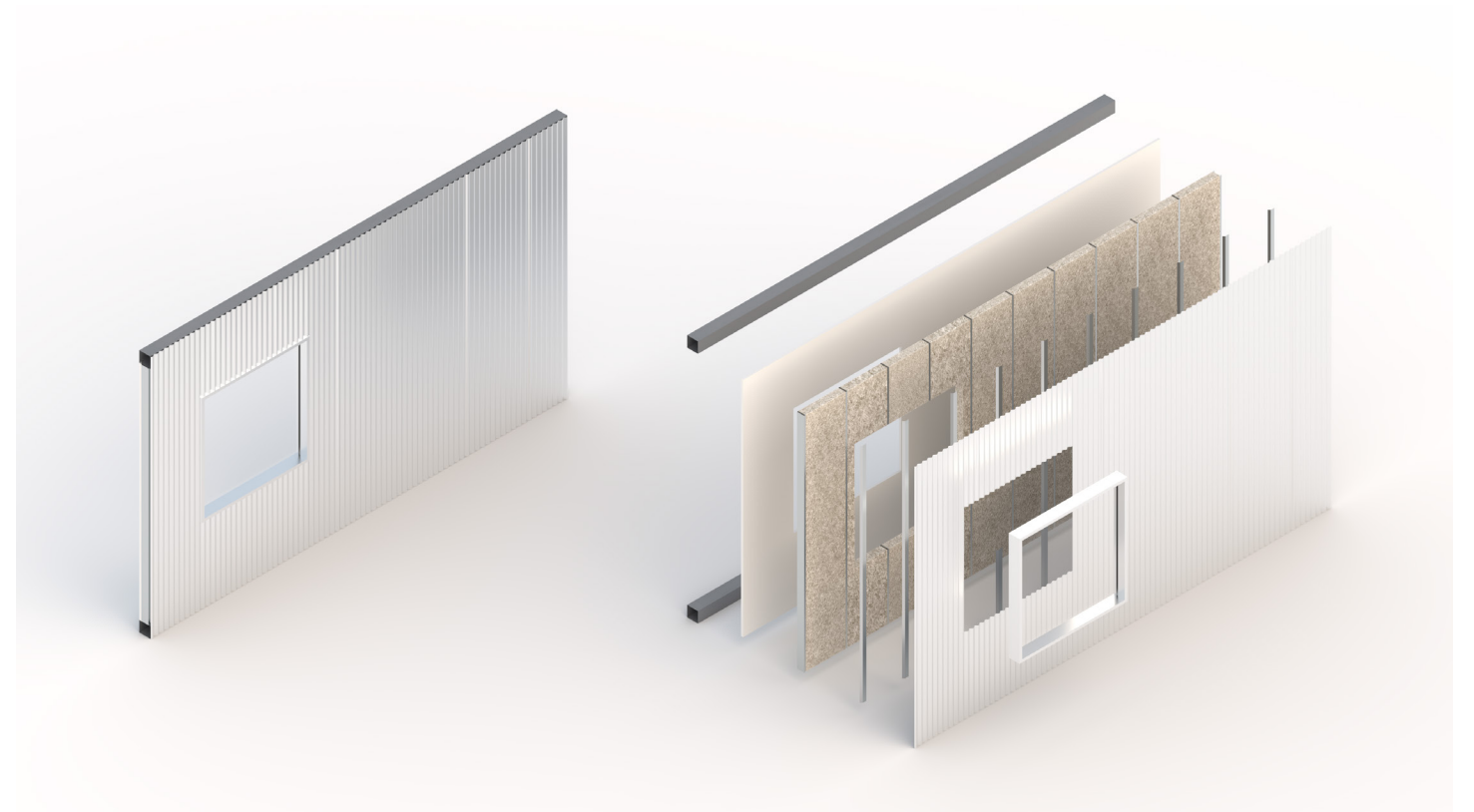
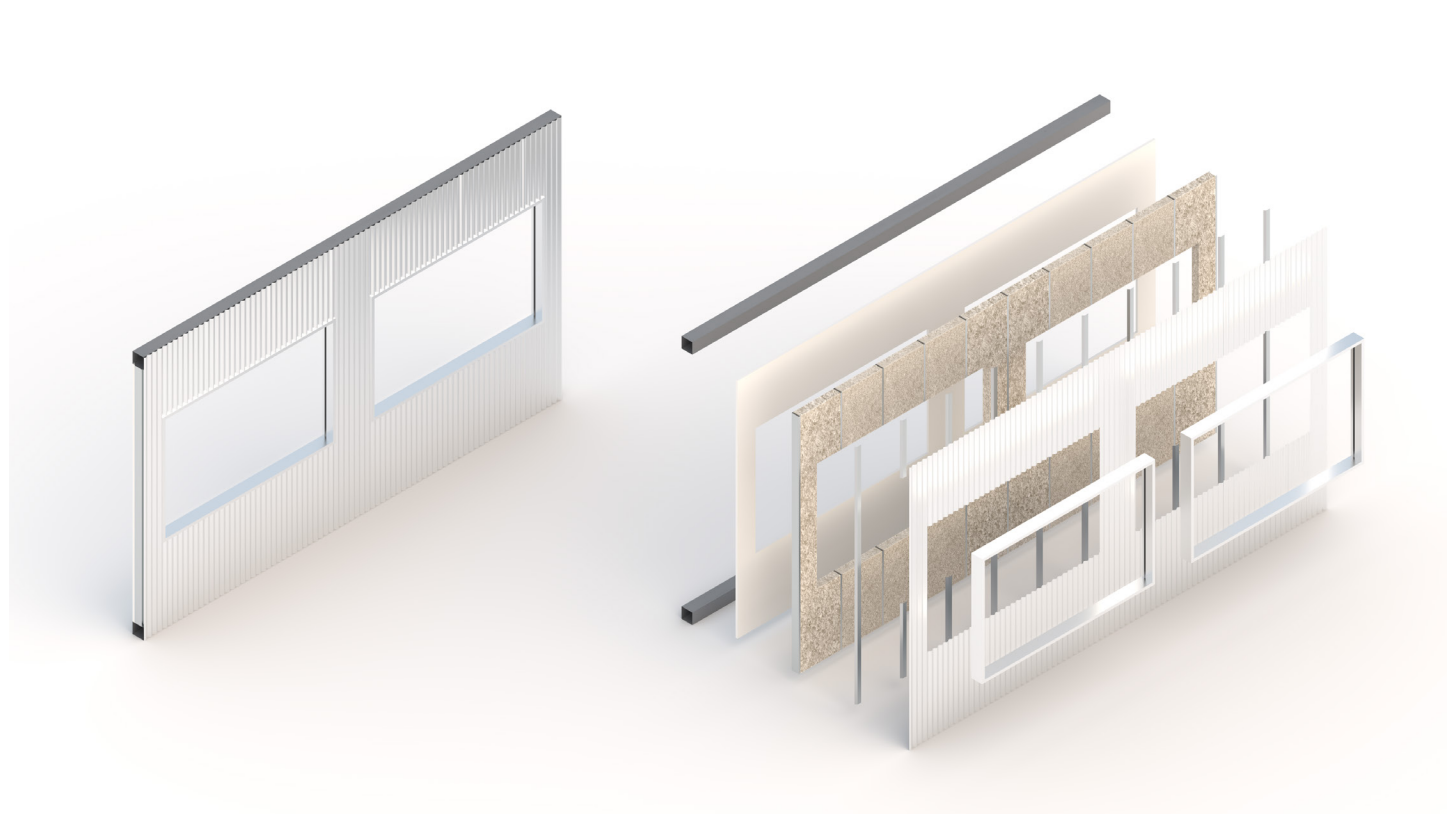
3. Openings for Natural Light

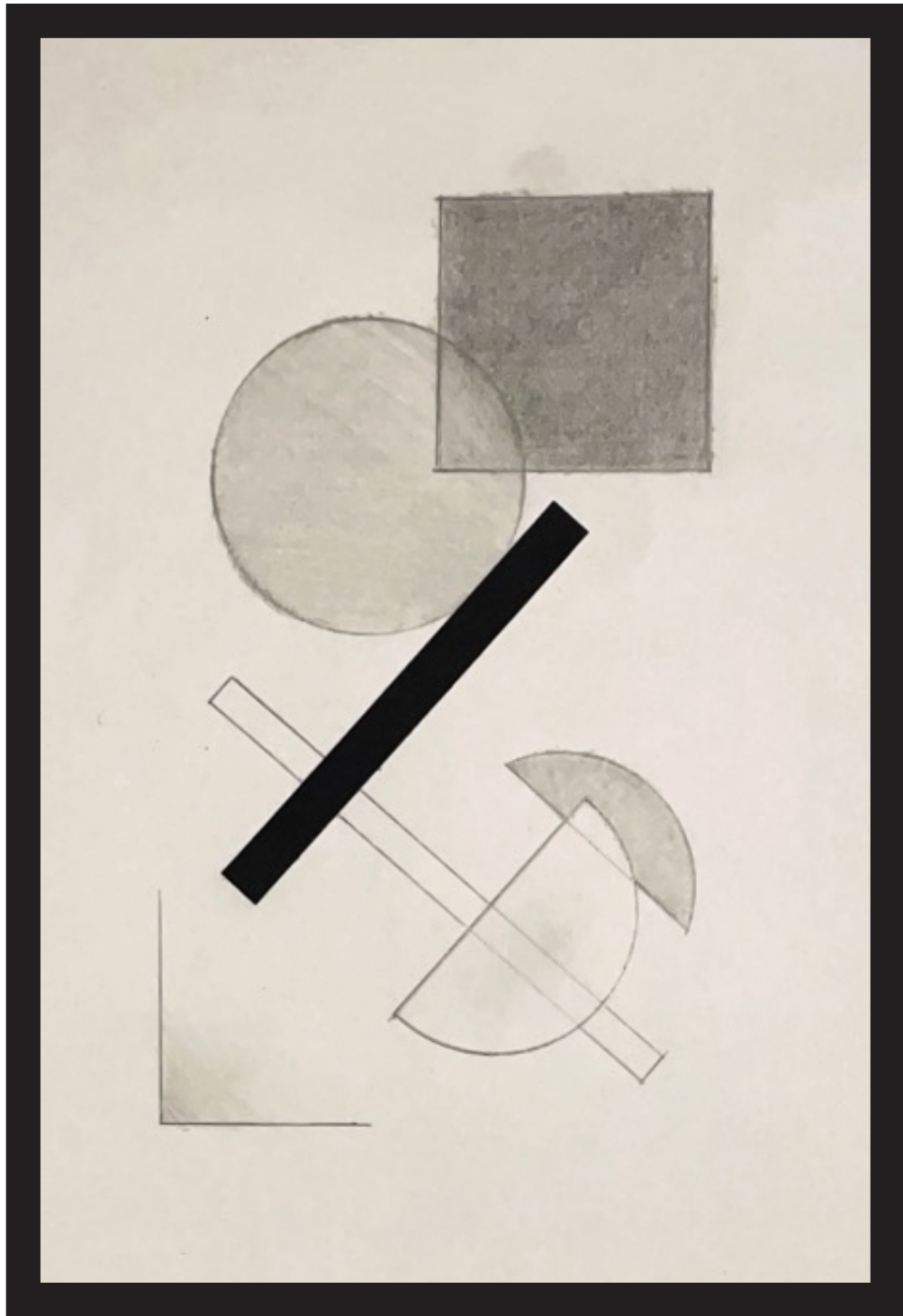
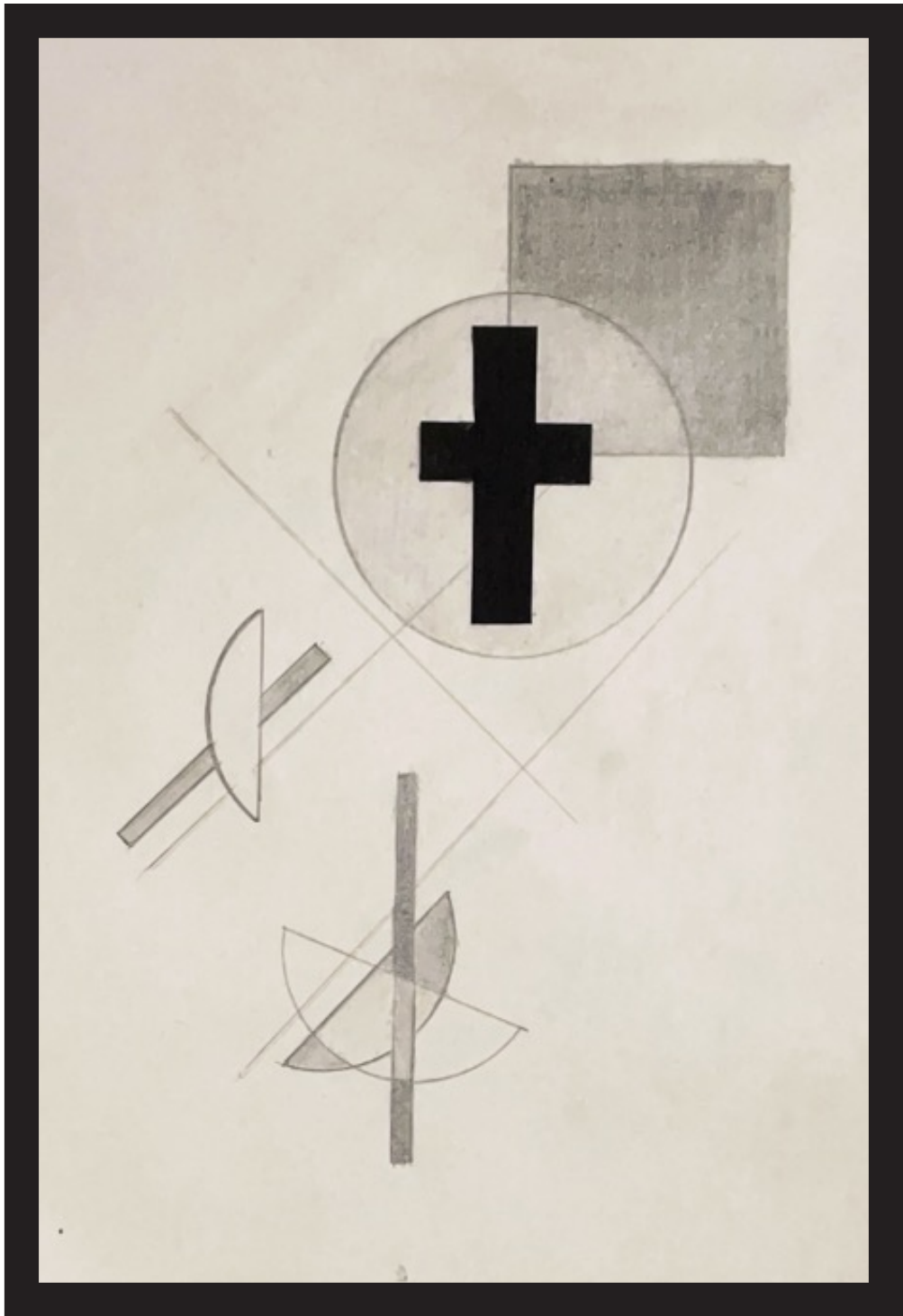
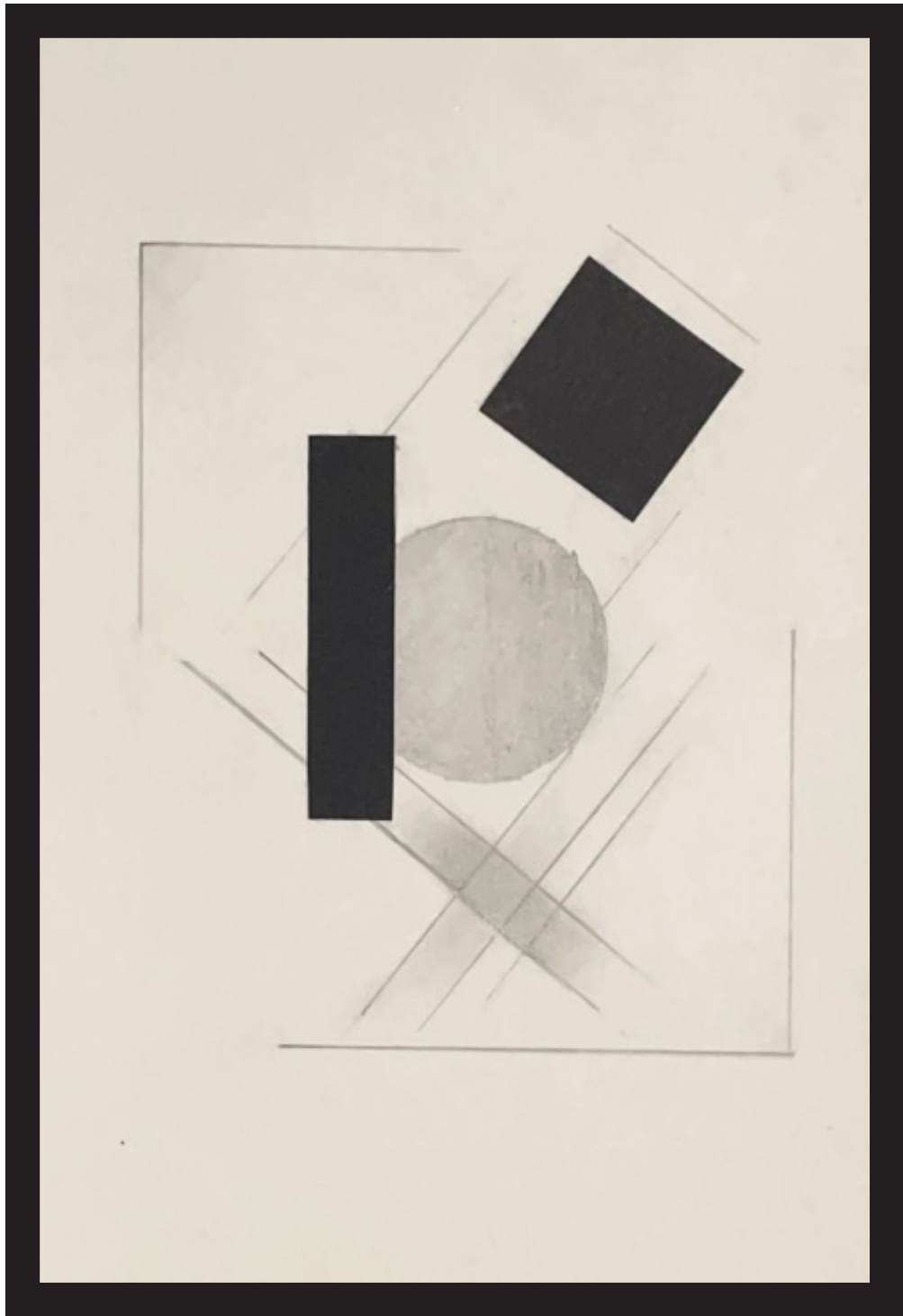


0 kWh/m² 1500 kWh/m²









COMPOSITIONS AND DEPTH: LÁSZLÓ MOHOLY-NAGY

Research Subject: László Moholy-Nagy
Project: Individual

My project focuses on a graphic reinterpretation of selected works by László Moholy-Nagy, a pioneering figure of the Bauhaus movement known for his experimental approach to composition, space, and form. I created a series of original illustrations inspired by Moholy-Nagy's "Constructions: Kestner Portfolio 6 (1923)" and "All (1924)," exploring the geometric abstraction, spatial tension, and visual rhythm central to his style.

My process began with a close analysis of Moholy-Nagy's compositions—how he used layering, transparency, and structural balance to create depth within two-dimensional space. I also compared his work to contemporaries like El Lissitzky to better understand the broader context of Constructivist and Bauhaus aesthetics. From there, I developed a set of three illustrations that reimagine these ideas through a modern digital lens, while staying true to Moholy-

2025 Spring | Architecture Apropos Art

Steven Holl and Dimitra Tsachrelia, Professor

Nagy's emphasis on dynamic composition and experimentation.

Each illustration in the series interprets different aspects of his visual language: the first emphasizes spatial equilibrium through overlapping planes; the second isolates structural elements to highlight tension and asymmetry; the third plays with depth and minimal color to echo his photogram and typographic influences.



VISUAL BUFFER FOR AVERY

Site: Avery Hall, Columbia University, New York
Project: Individual

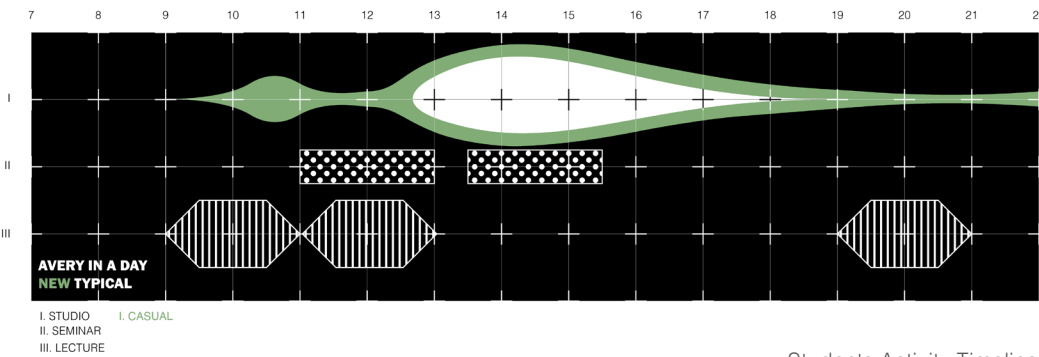
The concept of "visual noise" encompasses the discomfort caused by the visual perception of disorganized spaces, such as exposed mechanical elements and general messiness. This issue is particularly impactful for neurodivergent students, often leading to sensory overload. "Visual Buffer for Avery" reimagines the 500 level of Avery Hall at Columbia University as a visually comfortable work and social environment through organizational approaches.

One significant contributor to "visual noise" in the current studio environment is the exposed mechanical systems on the ceiling. By introducing a PTFE fabric ceiling, all the mechanical systems can be concealed underneath this fabric ceiling. Furthermore, the mess, such as physical models and books, can be hidden from sight by including more storage spaces within the studio space. In addition, the current studio layout is underutilized and serves a single

function. When the studio becomes a more visually pleasing place, it has the potential to attract more students for both work and socialization. This increased activity necessitates the inclusion of casual social areas and adaptable furniture configurations, fostering an environment that supports creativity, collaboration, and comfort.

2024 Fall | Adv Studio V

Bryony Roberts, Professor



Students Activity Timeline



500 Hallway (Social Mode)



500 Hallway (Exhibition Mode)



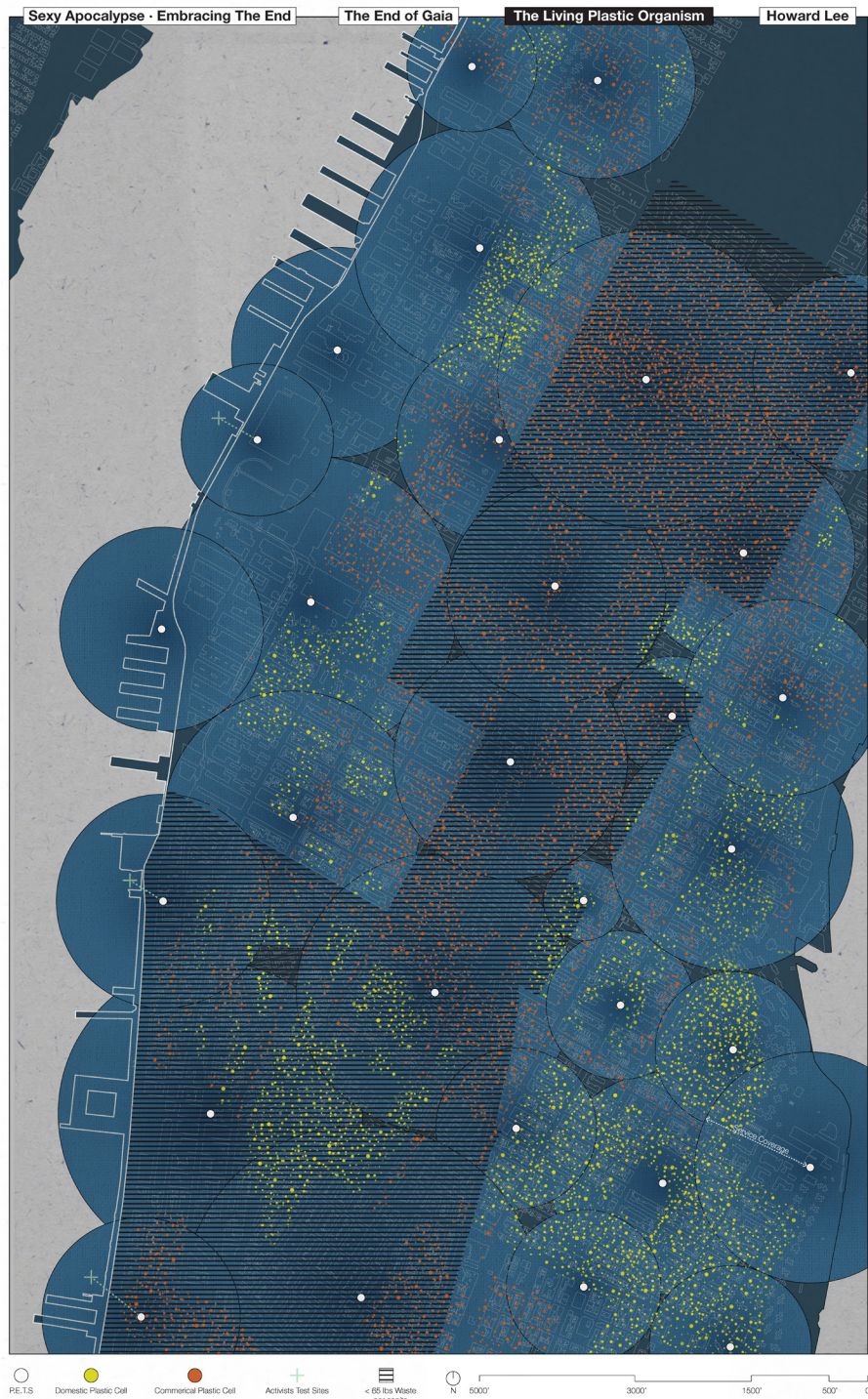
Room 505 (Review Mode)



Room 505 (Lecture Mode)



5' 0'

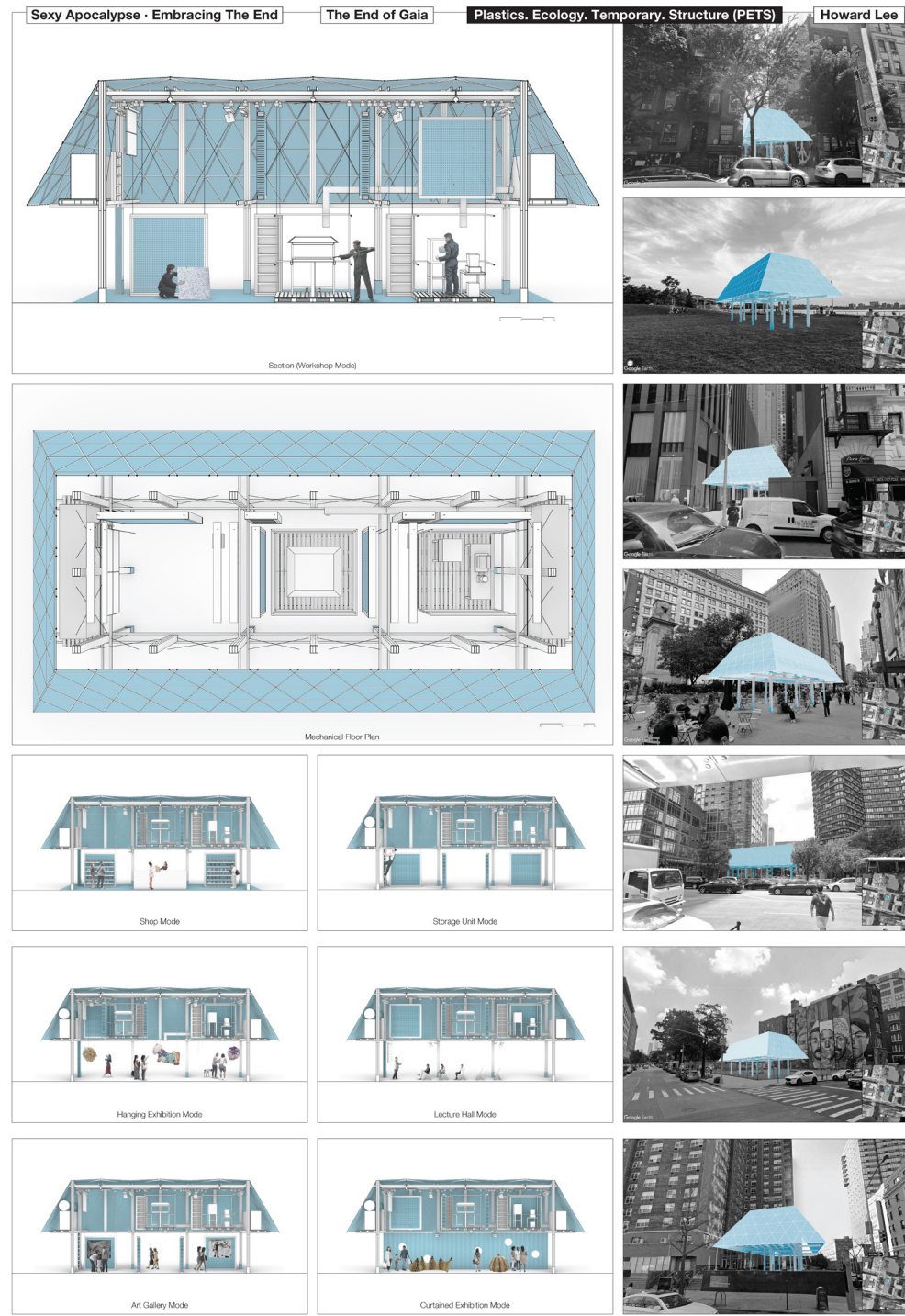


THE LIVING PLASTIC ORGANISM

Site: New York City, NY
Project: Individual

Embracing the optimistic view that everyone can be a recycler and save the Hudson from the plastic economy. At the core of each cell is a Plastic Ecology Temporary Structure or PETS that repurposes plastic waste into reusable food ware and building material. Learning from Atelier Bow-Wow's Tsukamoto and Kajima, the temporary structure is separated into the mechanical space and the community space, functions like a Swiss army knife that changes the

setting of the ground floor depending on the program, for example, a workshop for plastic recycling using machines from the company Precious Plastics, a market to sell recycled plastic products, a storage unit, a lecture hall, and various forms of exhibition spaces. All programmatic machinery is connected to the fully operable ceiling track system and lowered to the ground by cables. In addition, the openings in the ceiling allow hot humid air to escape. Each specific site calls for a

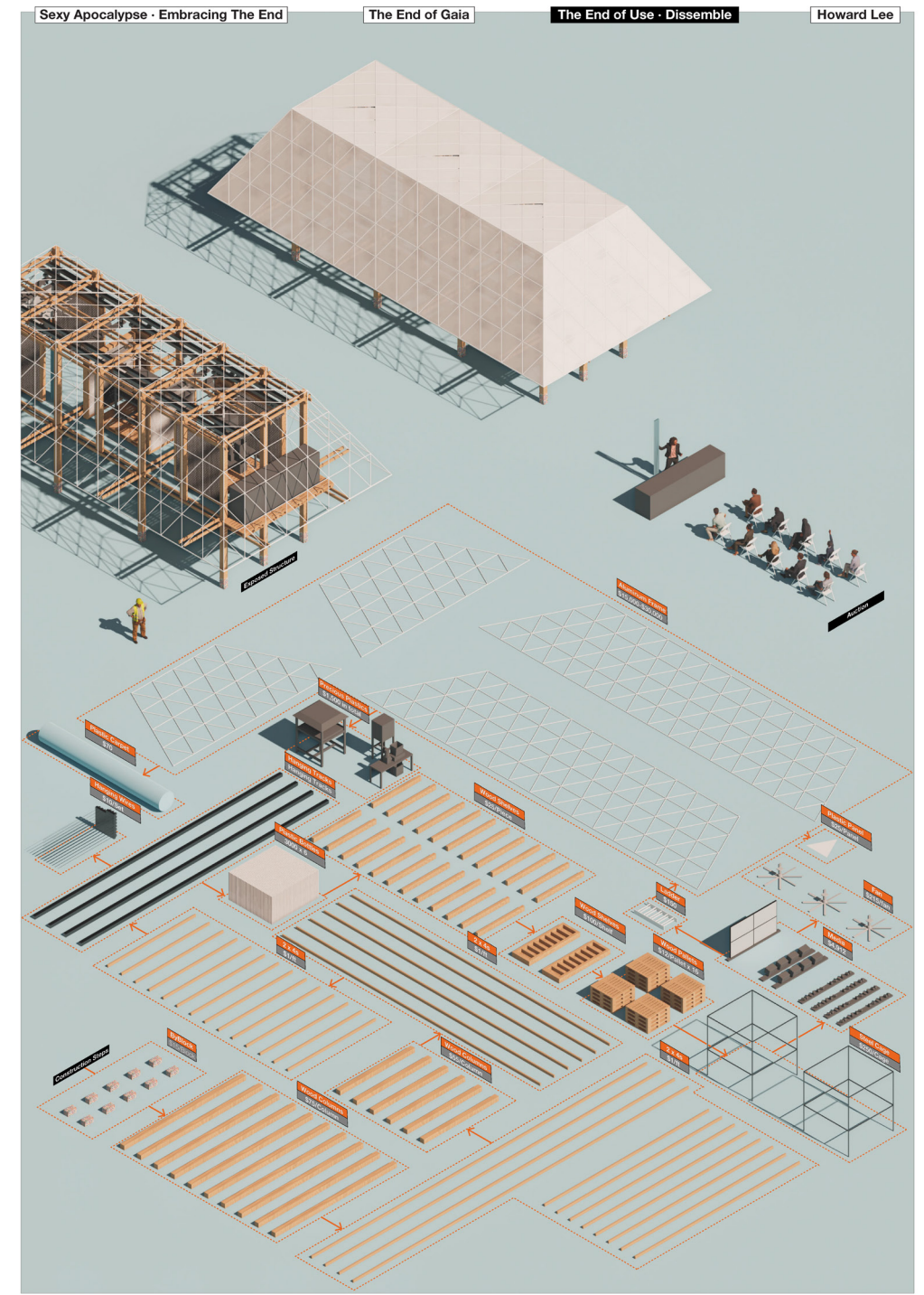


2024 Summer | AAD Studio

Uriel Fogué, Professor

different interaction under PETS. From being sandwiched between buildings to functioning as pavilion.

The Living Plastic Organism will appear as a prophecy of a possible end-of-the-world scenario and then presume to disappear after it serves its purpose. All materials used are designed with the intent that they can be disassembled, repurposed, and auctioned off at the end of use.



Howard Lee

Lucia Galaretto

August 4, 2024

Microscopic Paradox in Urban Filtration: How the Floating University Revealed a Shortcoming of the Interventionist Approach

Despite what the name suggests, the Floating University is not floating or a university. Designed by Raumlabor in Kreuzberg, Berlin, in the summer of 2018, its first iteration primarily functioned as a water filtration system to gather rainwater runoff and to experiment with water usage and conservation. Practitioners who work on this project simply call it "Floating" or "Floating Association" since the term "university" is a protected term under Berlin laws.¹ Though constructed to preserve and distill the basin water, the installation revealed the shortcomings of an interventionist approach on microbial ecology.

At the core of this "wood-built microbiology lab" is an intricate system that provides purified water for the kitchen, the bathroom, and the greenhouse. The rainwater was collected on the roof and turned into drinkable water by a membrane filter for dishwashing. The basin water was lifted by a "Ferris wheel" to the top of the water tower. Both sources of water would then cascade through nine "bathtub biofilters", which consisted of mushrooms, biofilms, sand, and

¹ Kafka, George. "Floating University in Berlin, Germany by Raumlabor." Architectural Review, September 26, 2022. <https://www.architectural-review.com/buildings/floating-university-in-berlin-germany-by-raumlabor>.



(Figure 1) Kafka, George. "How Berlin's Floating University Charts the Course for Future Architectural Education." ArchDaily, October 9, 2018. https://www.archdaily.com/903465/how-berlins-floating-university-charts-the-course-for-future-architectural-education?ad_medium=gallery.

activated carbon. At last, the team would test the water before consumption. Through repeated experiments, the team discovered microorganisms and bacteria, such as algae, lead, copper, zinc, and chrome, were in abundance at the basin.² Hence, it became a great medium to understand the connection between the mechanism of the project and the existing organisms on site.

Before Raumlabor's architectural intervention, the rainwater landed on the Tempelhof Airport building and accumulated to form the basin water. Drained into the basin by rain, where the structure was situated, were automobile oil, rubber, and cigarette chemicals. In their experiment in 2018, they found that the filtration system did not improve the basin water up to their expectations and that the filtered water was not drinkable or usable. Even worse, the team learned that all the effort they put into treating the water pales in comparison to the natural

² Ball, Katherine. "Water Filtration System: Floating University Berlin." The Blackwood, June 2021. <https://www.blackwoodgallery.ca/publications/sduk/diffusing/water-filtration-system-floating-university-berlin>.

filtration of the reed bed.³ The reed's microbes convert ammonia in the waste into nitrate, and the algae and plants then consume the nitrate and release harmless nitrogen into the air.

Responding to this discovery, the team adopted a more light architectural approach for the following iterations and shifted their focus to research and education. The once-ambitious vision of purifying toxic water from an abandoned airport had evolved into passive observation. To sincerely preserve and understand our nature, requires us to respect the symbiotic relationship between the microscopic world and our built environment. The essence of this discovery implies that the natural reed bed exhibits a form of intelligence and knowledge that goes beyond the modernist view of nature as a resource for consumption and control. Raumlabor's best attempt to remove harmful artificial waste in the basin with an interventionist strategy fell short of the mechanism of the natural reeds. The microscopic universe living a few inches underneath the "floating" was a place uniquely different from the human-centric world and that the designers did not fully compromise. The most glaring irony is that the reeds were better at cleaning our waste than we were. Since then, the "university" has floated above the basin but never intervened.

³ Karrer, Roman. "It's Not Floating and It's Not a University! • Floating Berlin." FLOATING BERLIN, October 14, 2021. <https://floating-berlin.org/voila-its-not-floating-and-its-not-a-university/>

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