Architecture Portfolio

# SHAREL LIU

**About**

Columbia GSAPP
Master of Architecture 2025

**Contact**

Sharel Liu
linkedin.com/in/sharelsj

Project Index

01
**Hammock Tower:** Climate Resilience for a +4°C Future

*Climatic Architecture*
Paris, France
Fall 2024
Critics: Philippe Rahm & Mariami Maghlakelidze

Advanced Studio 5

02
**Farm-to-City Agriscape**

*Masterplan, Civic Renewal, Mixed-Use, Bioeconomy*
Newark, NJ
Spring 2023
Critic: Josh Uhl

Core Architecture Studio 2

03
**Intergenerational Urban House Living**

*Affordable, Intergenerational Housing, Integration with Nature, Adaptive Reuse*
Morningside Heights, NY
Fall 2023
Critic: Eric Bunge

Core Architecture Studio 3

04
**Adaptive BioCanopies:** Waste-to-Energy Campground

*Civic Renewal, Bioregeneration*
Staten Island, NY
Spring 2024
Critic: Esteban de Backer

Advanced Studio 4

05
**Narrative in Scale and Texture:** From Artifact to Island Nation Twin

*Climate, Nation, Digital Twin*
Tuvalu
Spring 2025
Critics: Marina Otero & Dan Miller

Advanced Studio 6

06
**Exteriorizing the Interior:** Retail as Social Interface

*Commercial, Social*
SoHo, New York, NY
Fall 2022
Critic: Amina Blacksher

Core Architecture Studio 1

# **Hammock Tower:** Climate Resilience for a +4°C Future

99 Av. des Champs Elysées

Paris, France

Envisioned for a +4°C Paris in 2100, this climate-resilient tower redefines enclosure as a scaffold suspending modular pods—balancing density, structure, and **free cooling** via Venturi effect, thermal mass, radiation, evapotranspiration, and convection. Drawing from stacked hammocks and climate simulation tools like **Autodesk Forma, SimScale,** and **NVIDIA Omniverse**, the design maximizes airflow to reduce mechanical loads.

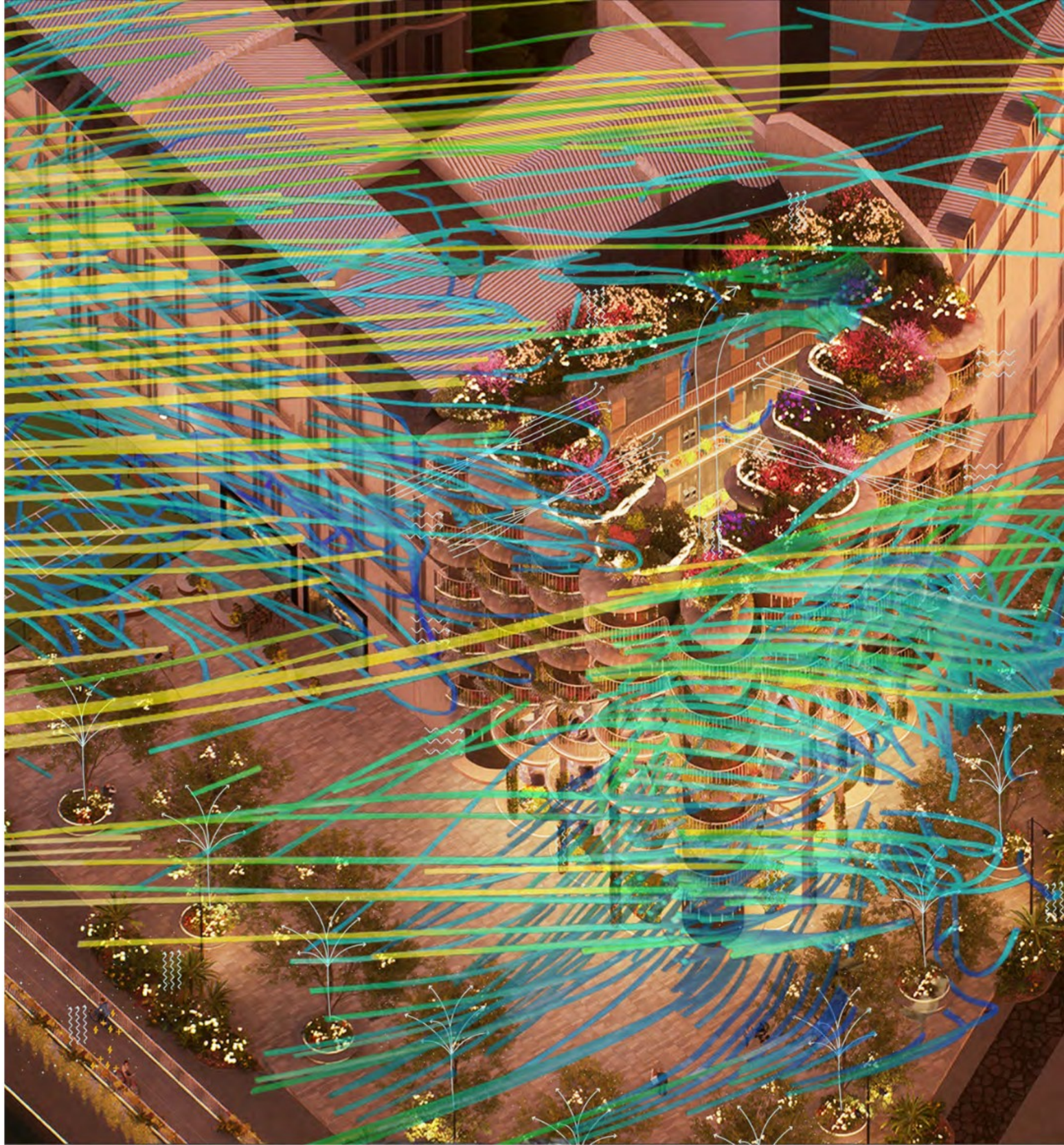
Each pod's sectional form accelerates cooling, while an open base enhances convective flow from street to sky. A rear core consolidates services, freeing up **climate-responsive** facades. Greenery boosts evapotranspiration, and recycled stone walls provide thermal inertia.

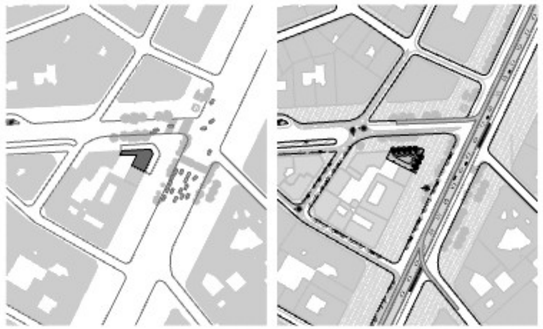
At the urban scale, cars go underground to prioritize piezoelectric pedestrian and bike lanes, while semi-permeable tiles and canals enhance flood resilience. The Hammock Tower proposes a new climate paradigm: form follows climate, shaping not just sustainable architecture but new urban life.

2024
Critic: Philippe Rahm & Mariami Maghlakelidze

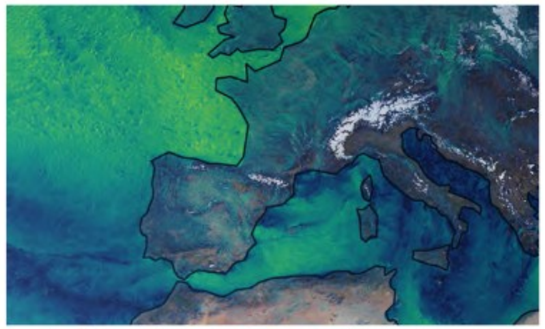
**Accolades**
Invited to guest lecture at Spitzer School of Architecture at The City College of New York
Invited to speak at Cesium Developer Conference
Featured by D5 Render
Featured by Autodesk
Featured by GSAPP
Selected for 2024 GSAPP End of Year Show
Accepted at Spatial Intelligence Association Annual Exhibition
Featured by Philippe Rahm architectes
Featured by Maraimi Maghlakelidze

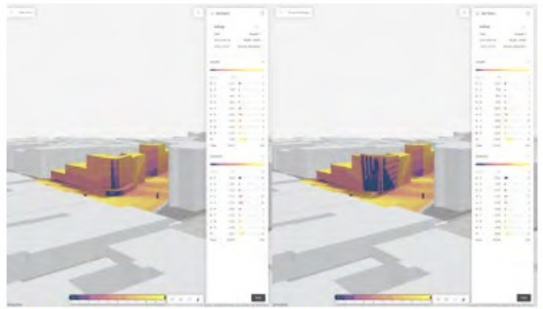
Site: 22,380 ft² / 2,070 m²
Height: 80 ft / 24.5 m
Program: climatic architecture

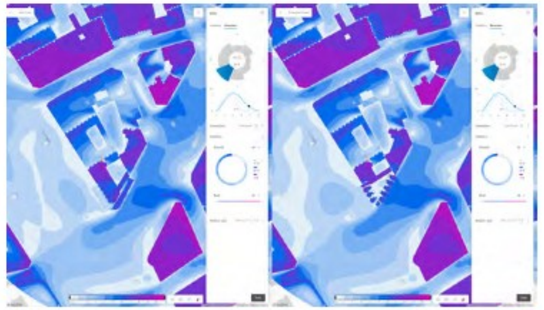


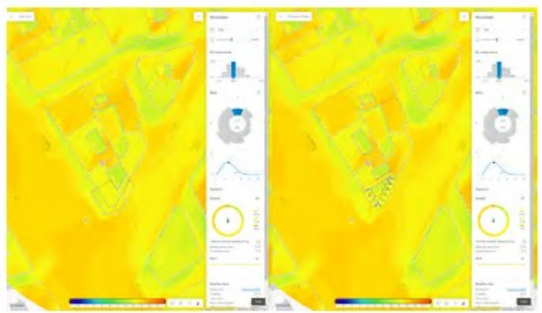


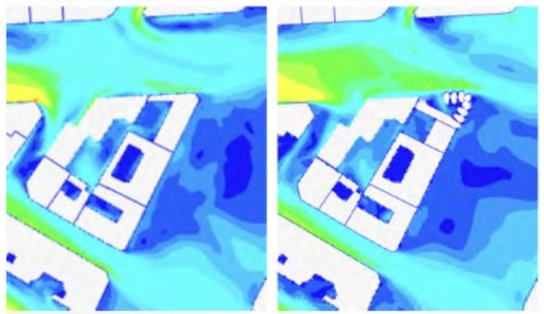


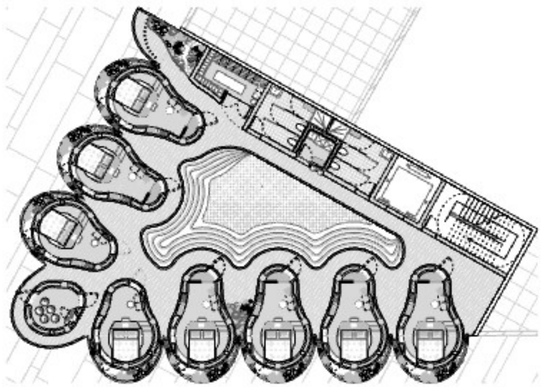




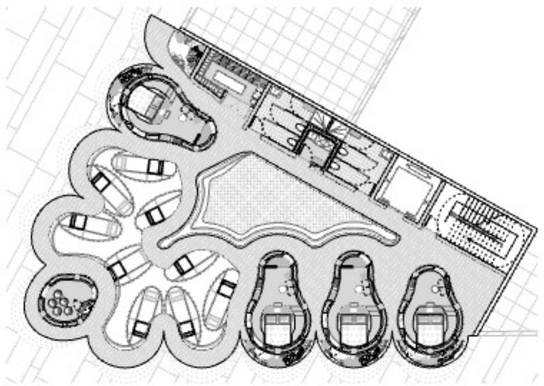




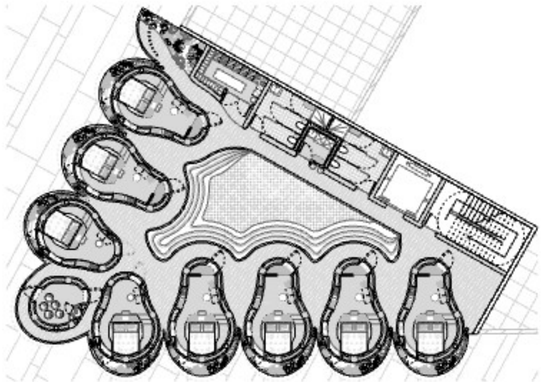




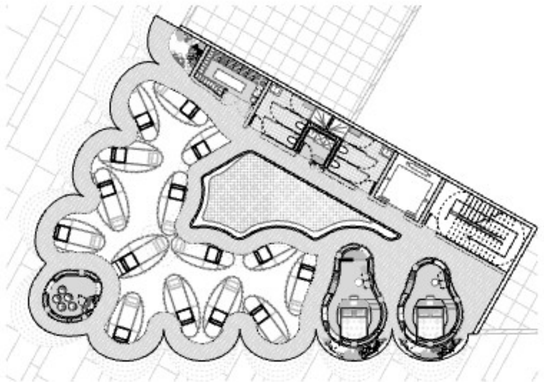
L6



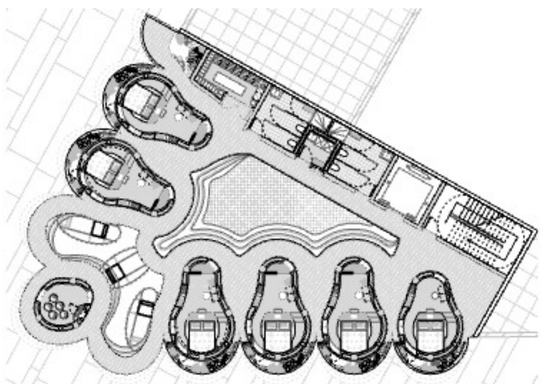
L3



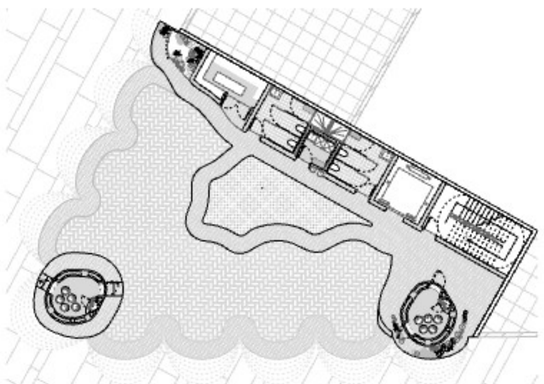
L5



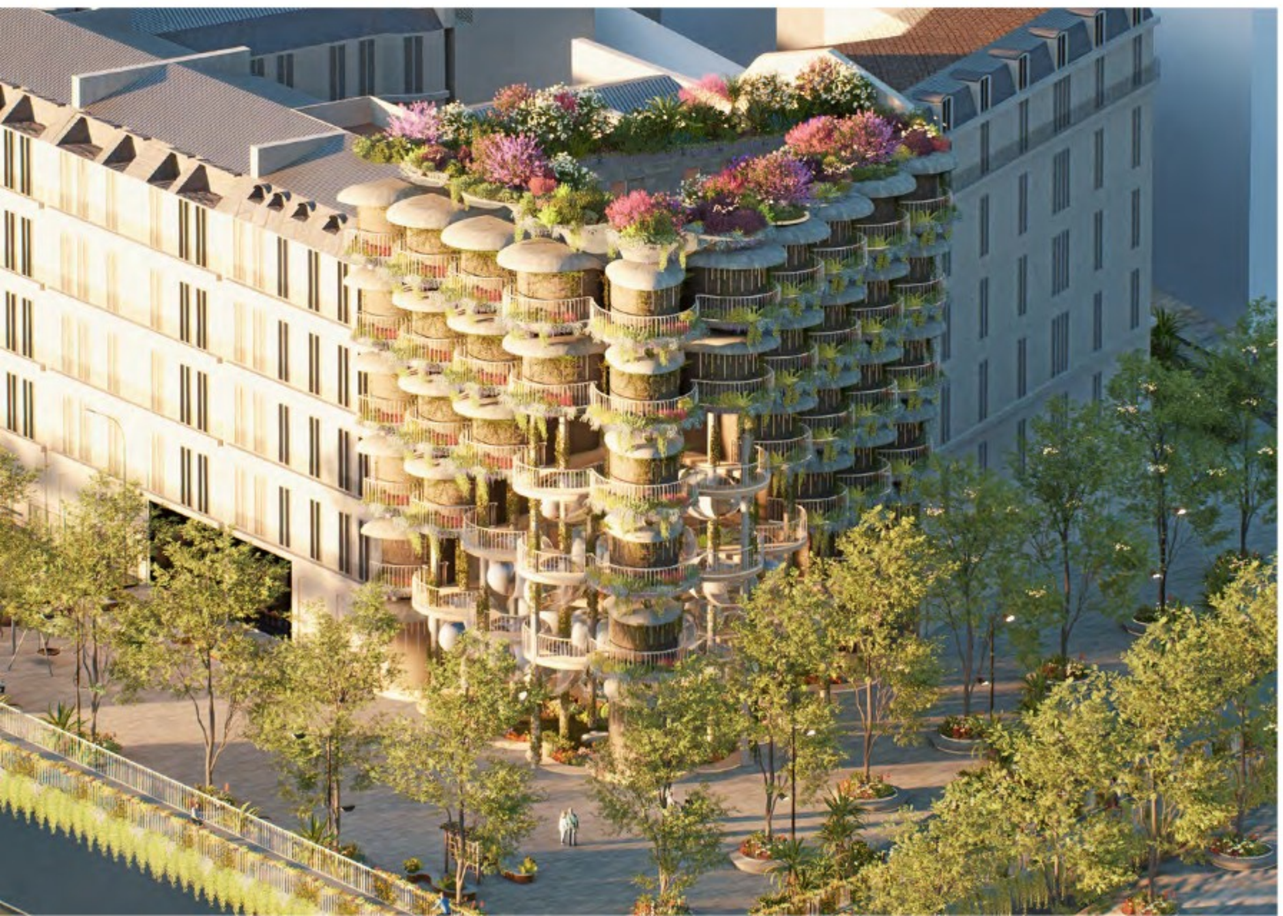
L2

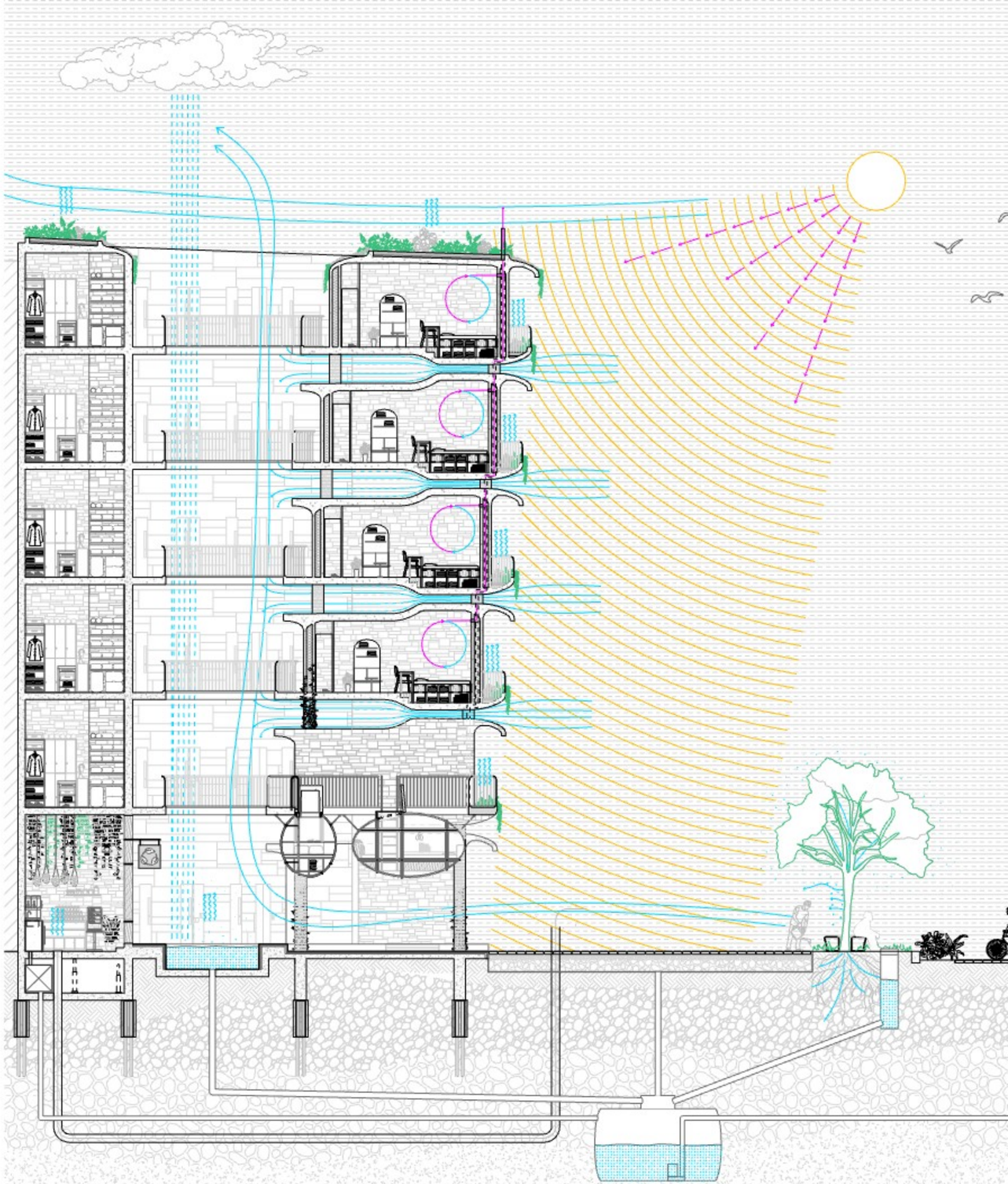


L4



L1





TYPE A



TYPE B



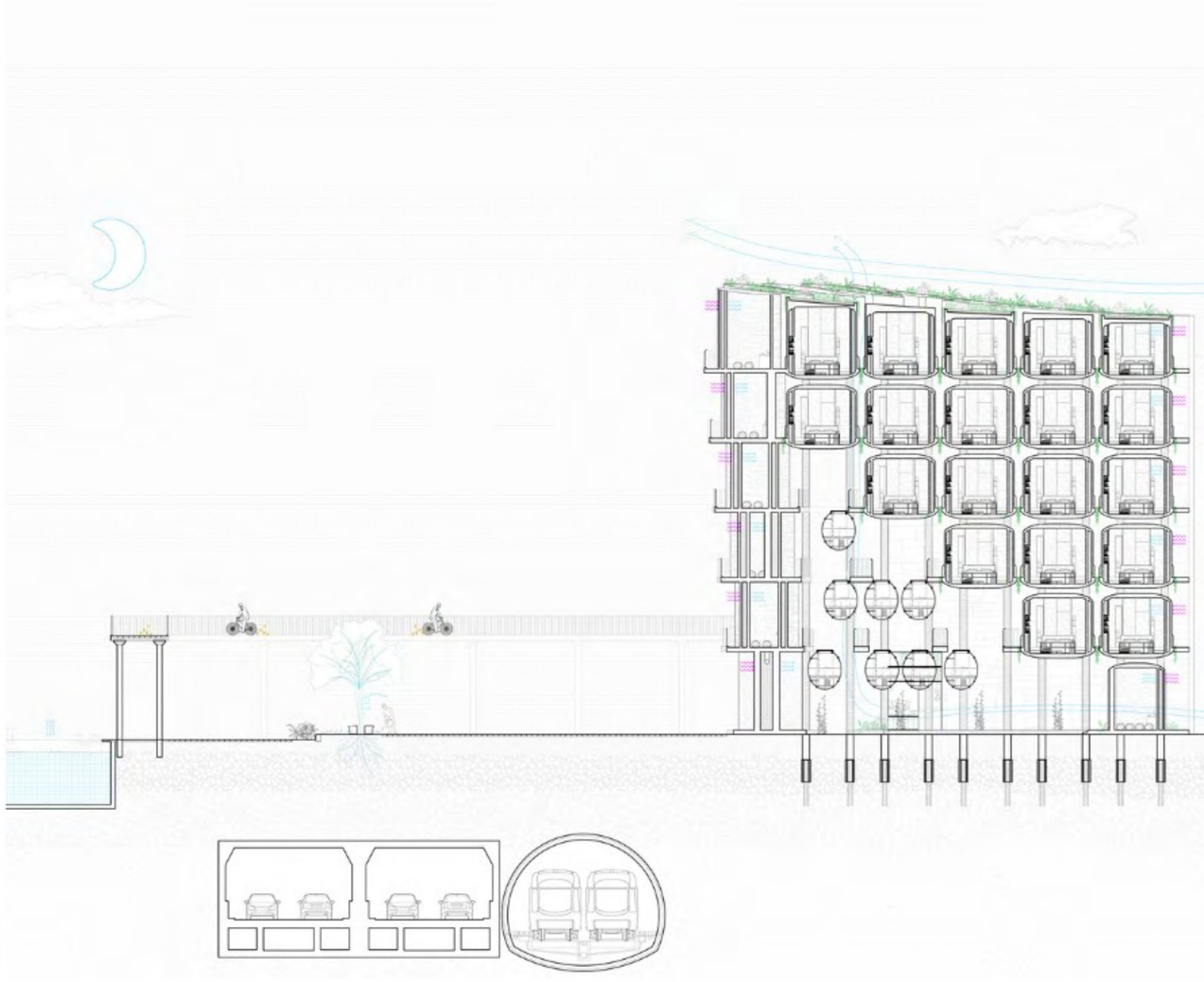
LOUNGE

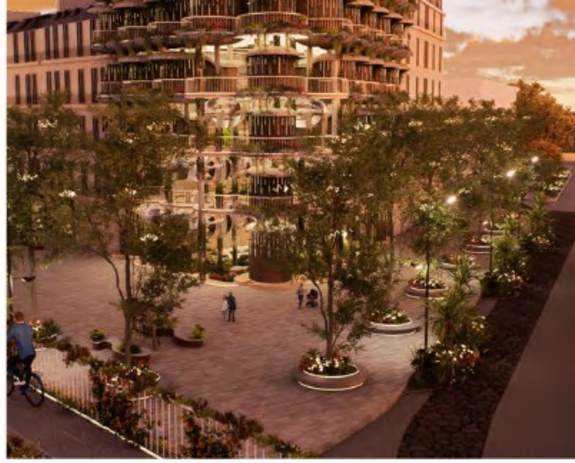






POD





# Farm-to-City Agriscape

## 281-285 Ferry Street

Newark, NJ, USA

Responding to a prompt of "damage control," by revitalizing Newark's dioxin-polluted landscape, this project transforms a grocery store site with surface parking into a flourishing green space that employs **phytostabilizing** plants to cleanse the soil and features iconic follies woven into an iconic ETFE canopy for **rainwater** reclamation and **daylight** regulation, creating a recognizable neighborhood addition that glows warmly at night and serves as a wayfinding icon during the day.

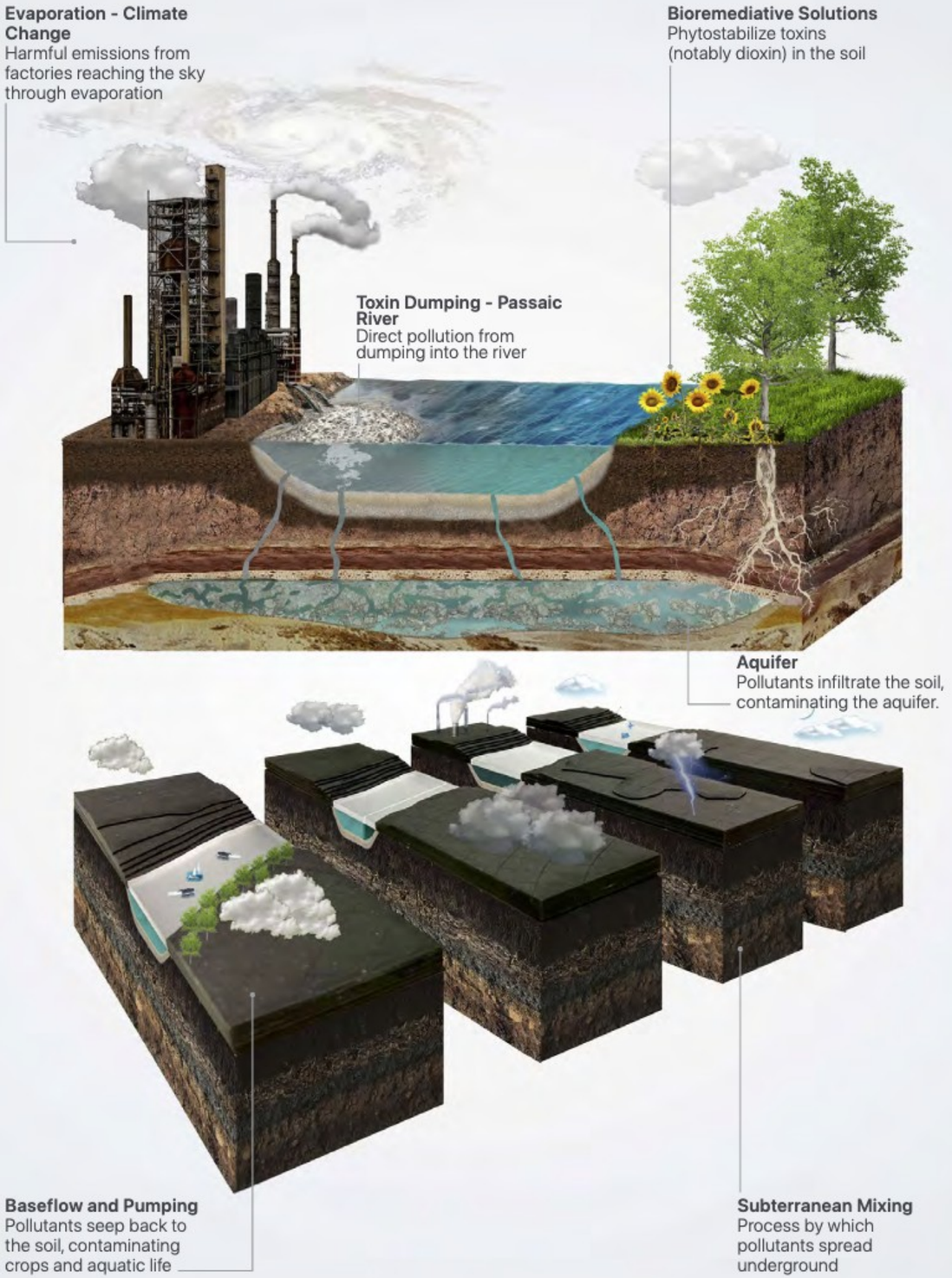
On-site **agriculture** is supported through roof gardens, establishing a farm-to-city grocery model that redefines Newark's **identity** from a polluted area to a center of food production while fostering a vibrant **civic hub** that nurtures community resilience with programs catering to all times of day and all walks of life.

The civic nature of this grocery and green space extends into the surrounding residential areas, where roads are redefined to promote pedestrian and cyclist **mobility**, rerouting vehicles to boulevards. This design responds to the work-from-home trend by encouraging residents to step out for morning yoga, enjoy afternoons at the splash pad, run grocery errands on the way home, relax at lunch spots with tiered public seating, attend mid-afternoon local band concerts, and watch **community** movies in the evening.

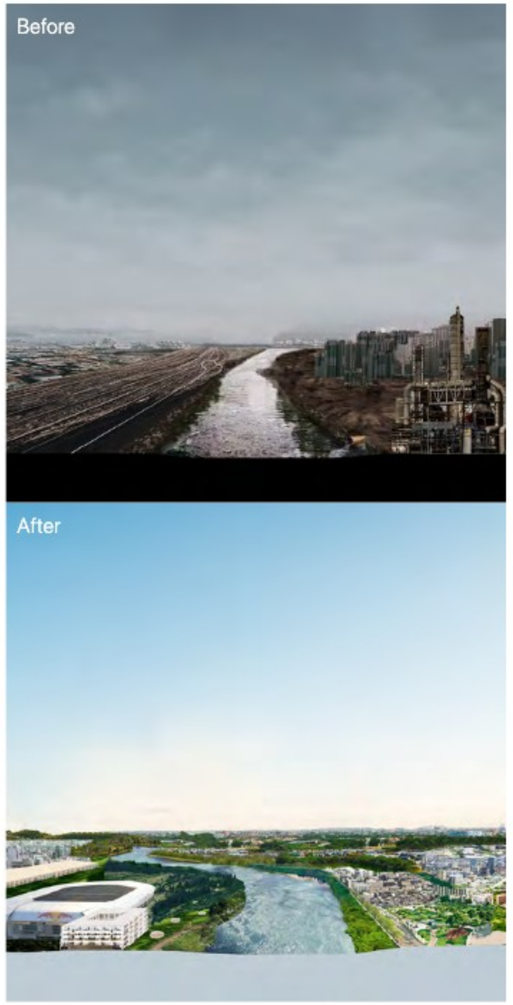
2023
Critic: Josh Uhl

**Accolades**
Featured on GSAPP website
Selected for 2023 GSAPP End of Year Show
Selected as model project for 2023 GSAPP Tech III and Tech IV Sequence

Size: 525,000 ft² / 48,770 m²
Program: masterplan, civic renewal, mixed-use, bioeconomy






**Concept Rendering of Revitalization: From Polluted Landscape to Thriving Green Civic Space**

*Left*

### Analyzing the Damage System: Subterranean Water Infiltration & Percolation

The industrial toxin dumping into the Passaic River, seeping into underground aquifers, informs this project's damage control strategy by employing **bioremediation** techniques, including phytostabilization, which uses specific plants to absorb and stabilize toxins in the soil and remediate pollution damage over time.

### Site Selection and Analysis

The bioremediation strategy guided the identification of a site where reintroducing vegetation would have the greatest impact - an area of high residential density, high surface parking, and a relatively low surface area of greenery. Analyzing the damage system resulted in selecting a location with extensive surface parking adjacent to a grocery store and nearby houses.

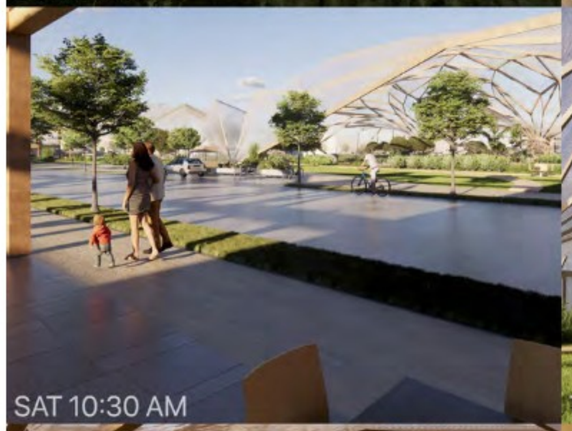
**Where is Greenery Needed?**
Metric: a park within 15-ft of residence

- Needs greenery: no greenery within 15-ft radius
- Moderate need: greenery within 15-ft radius
- Surface parking

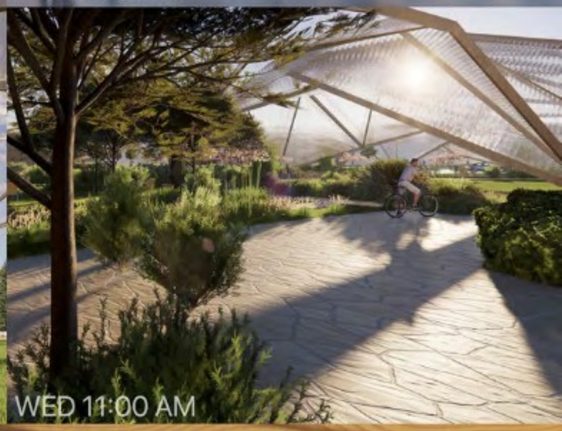

## From Remediation to Revitalization: A Social and Environmental Strategy

This design transforms an environmental remediation effort into a vibrant social strategy, welcoming all walks of life throughout the day. From morning yoga and work-from-home spaces to evening concerts and movie nights, it prioritizes walkability, greenery, and inclusive gathering spaces. Under the canopy, inviting seating, splash pads, and co-working areas foster a strong sense of place—especially for newcomers seeking connection in the city.



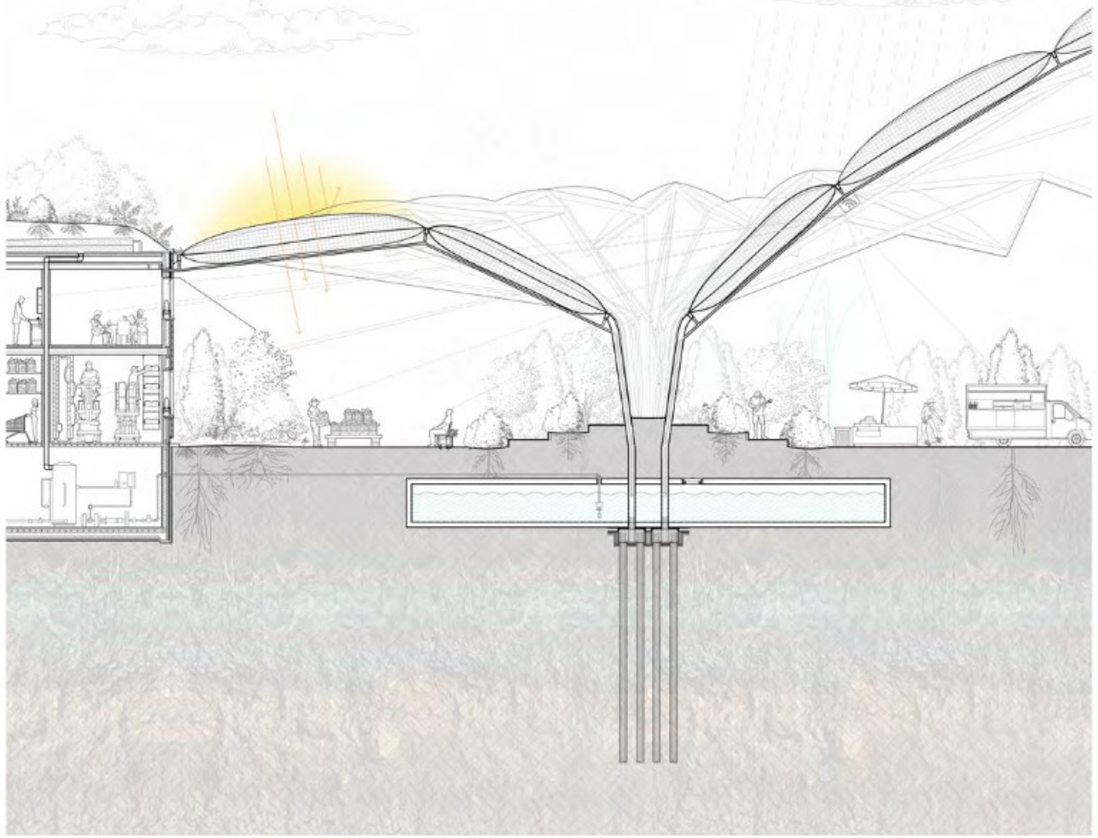









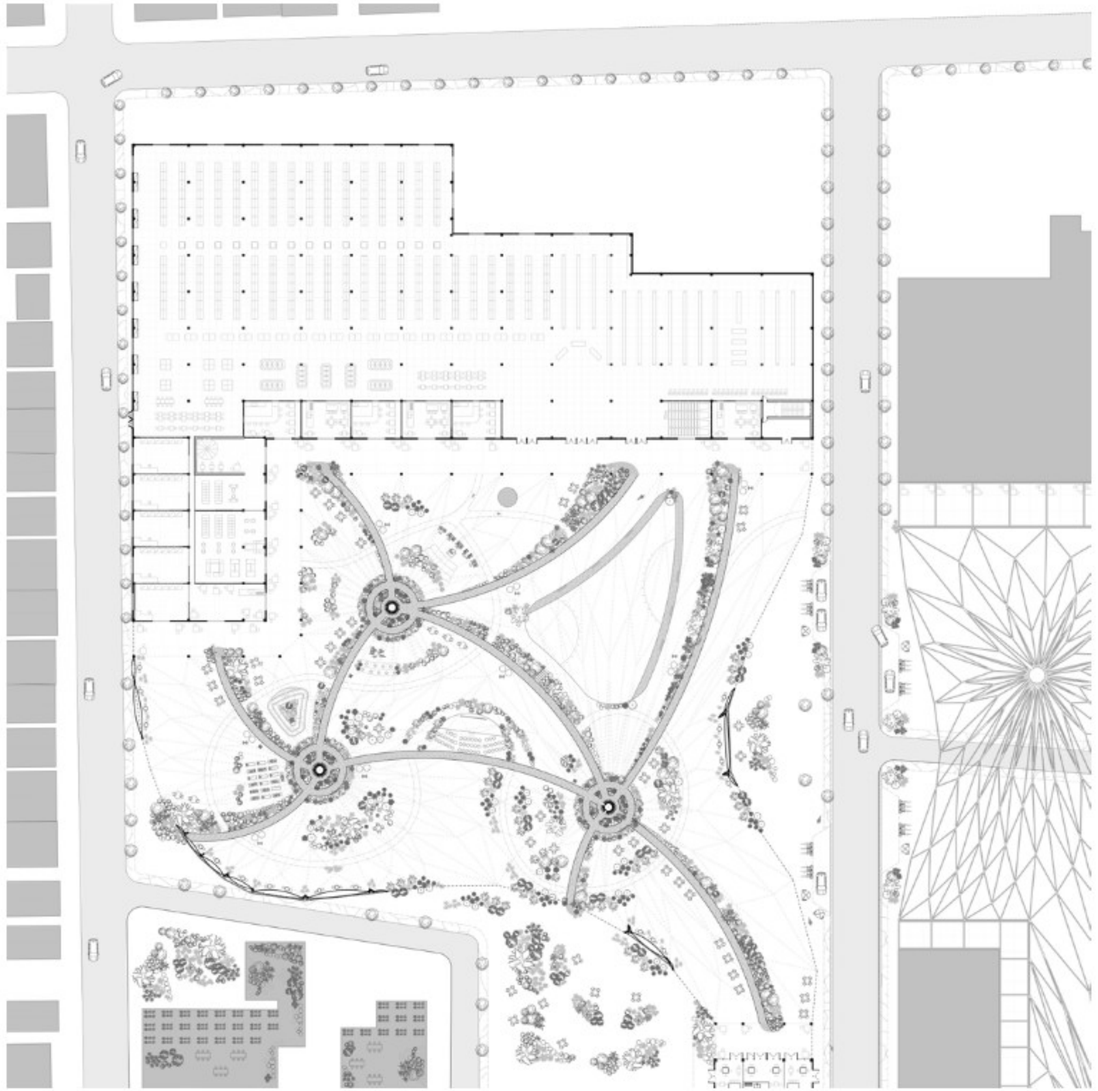


*Section*

**Integrating Rainwater Collection, ETFE Innovation and Social Activity**

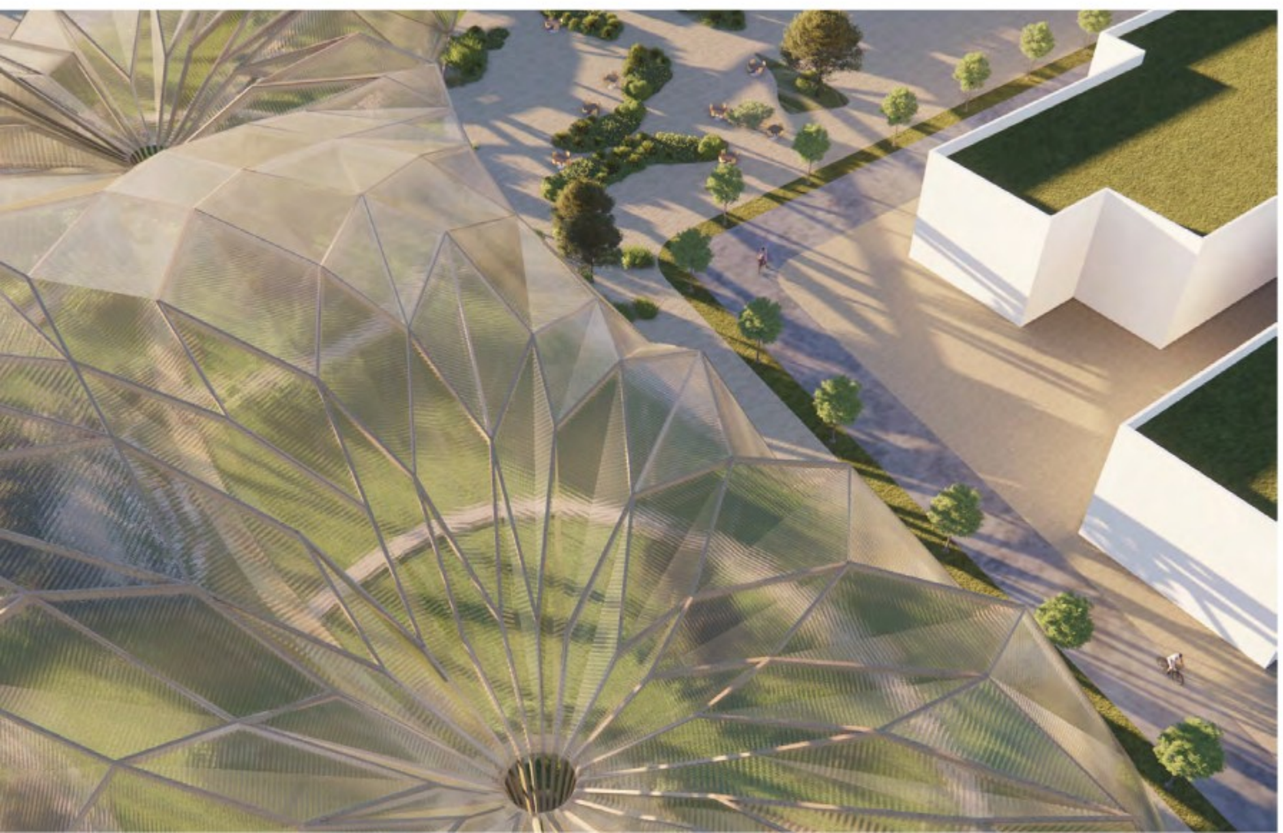
This section illustrates the intervention of rainwater collection systems and ETFE canopies, enhancing sustainability through efficient water management while creating a light-filled, resilient civic space.

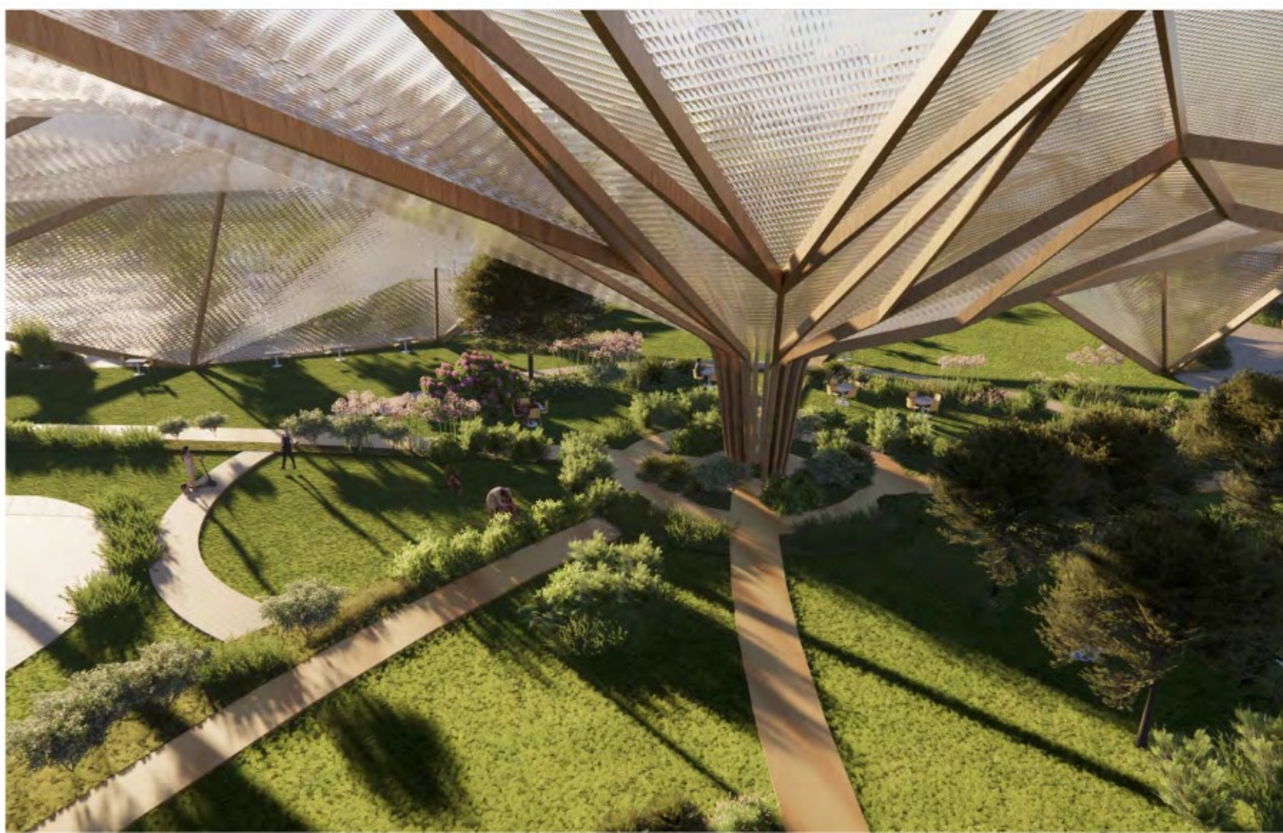


*Plan*

**Walkable Paths & Community Connectivity**

The design integrates bioremediative greenery, strategically placed nodes woven into a canopy to regulate sunlight over surface parking, and accessible pathways that seamlessly connect the grocery store to surrounding residential areas. Prioritizing walkability and bikeability, it fosters a dynamic community hub while embedding sustainability at every step.





# Inter-generational Urban House Living

## 16 Covenant Avenue

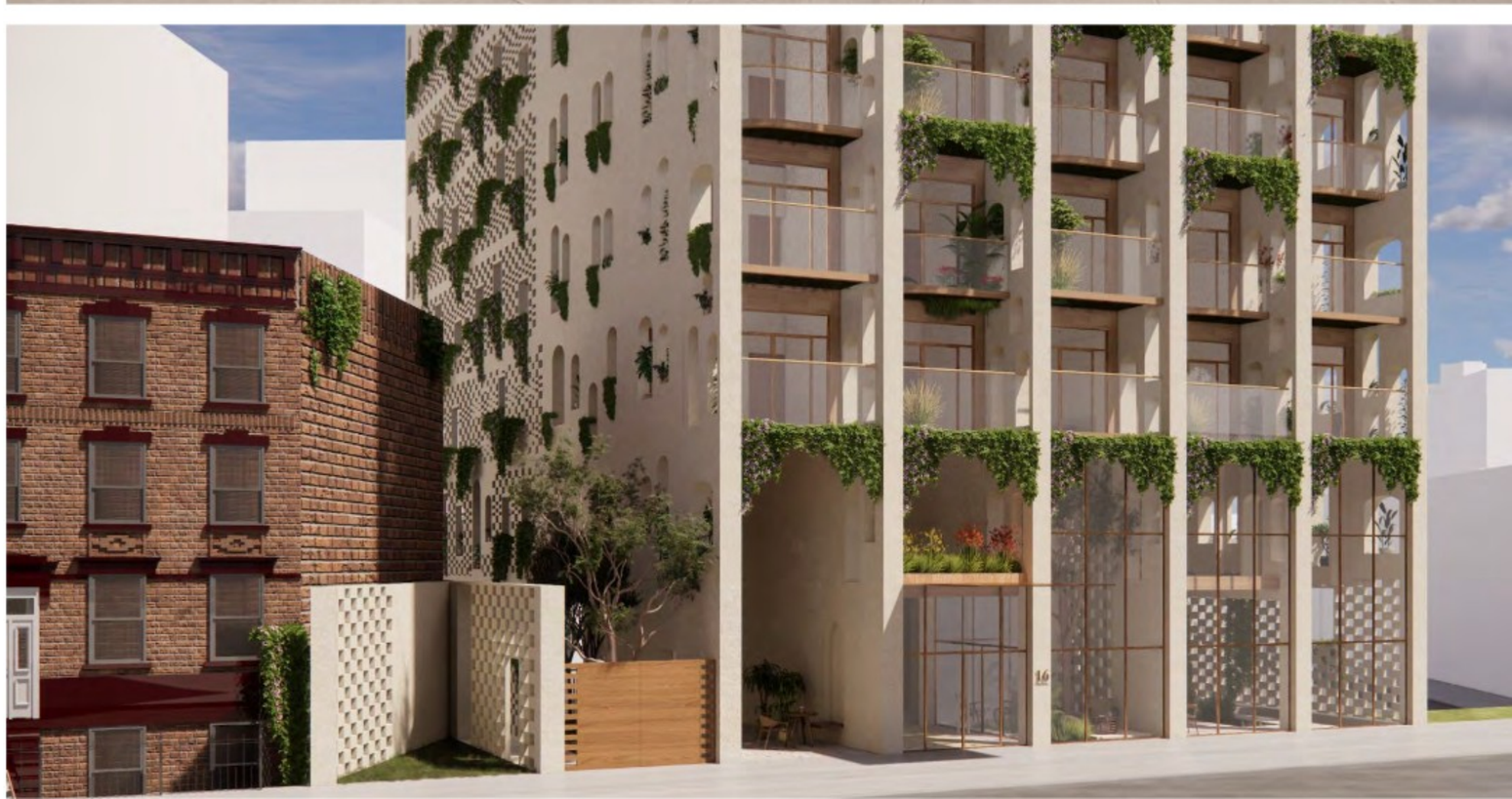
Morningside Heights, NY, USA

This project addresses the need for **affordable housing** while fostering a **connection to nature** and promoting sustainable **adaptive reuse** of existing infrastructure. Focusing on how to create a sense of home, this project envisions a blend of suburban house living and community, reinterpreting **intergenerational living** within an urban context. The design extends the existing column structure of an existing building on site to create a language of walls that evoke the natural width of townhouses in NYC, blending seamlessly with the residential context while enhancing the sense of belonging for residents of all ages.

2023
Critic: Eric Bunge

In collaboration with Russell Liang MArch'25. This portfolio focuses on elements of housing project independently completed.

Size: 129,600 ft² / 12,040 m²
Height: 80 ft / 24.4 m
Program: affordable housing, intergenerational living, integration with nature, adaptive reuse

*Concept*

## Biophillic Connection + Urban House Living

Connecting to nature and creating a sense of "home" within New York's urban density.

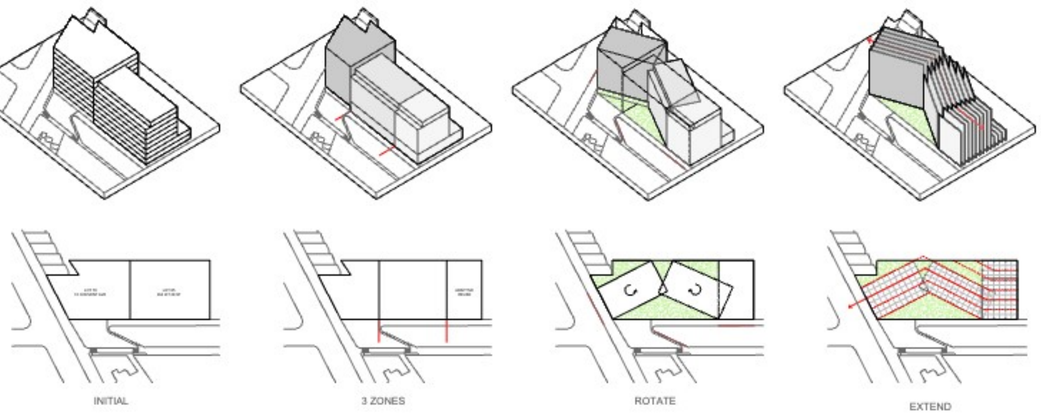
*Existing neighborhood scale 20' Townhouses*

*Existing neighborhood scale 20' Townhouses*

*Spatial and Social Strategy*

## Living Between Walls

Adapting existing structure to inform space and function




*Existing Site*

*Human Scale Breaking up volumes to enhance variety of street expreience at a human scale*

*Give Sense of Approach Rotate volumes to face directions of approach (red)*

*Adaptive Reuse Extend existing columns, echo*

*Right: Model*

## Wall as Townhouse

Recognizing 20' townhouse as social divider. Challenge to think about how to fit. combine the concerns of adaptive reuse. very new york challenge.

**Site Plan**


*Plan*
**Typical Plan (L3-6)**


16
CONVENT AVE


16
CONVENT AVE

# **Adaptive BioCanopies:** Waste-to-Energy Campground

## Freshkills Park

Staten Island, NY, USA

This proposal envisions a biogas processing site integrated with an ETFE-canopied campground at Freshkills Park, Staten Island, and transforms the former landfill into a vibrant civic space.

The initiative revitalizes the **waste-to-energy** process by utilizing semi-annual grassland mowing as biomass. The mowed grass will enrich the soil as fertilizer, while the surplus will be processed underground for biogas production. This biogas will power camping activities and energize surrounding neighborhoods. The canopies will dynamically expand and contract according to biogas storage levels, **regulating light** to create an engaging ambiance that **connects visitors** to the performance of the site.

2024
Critic: Esteban de Baker

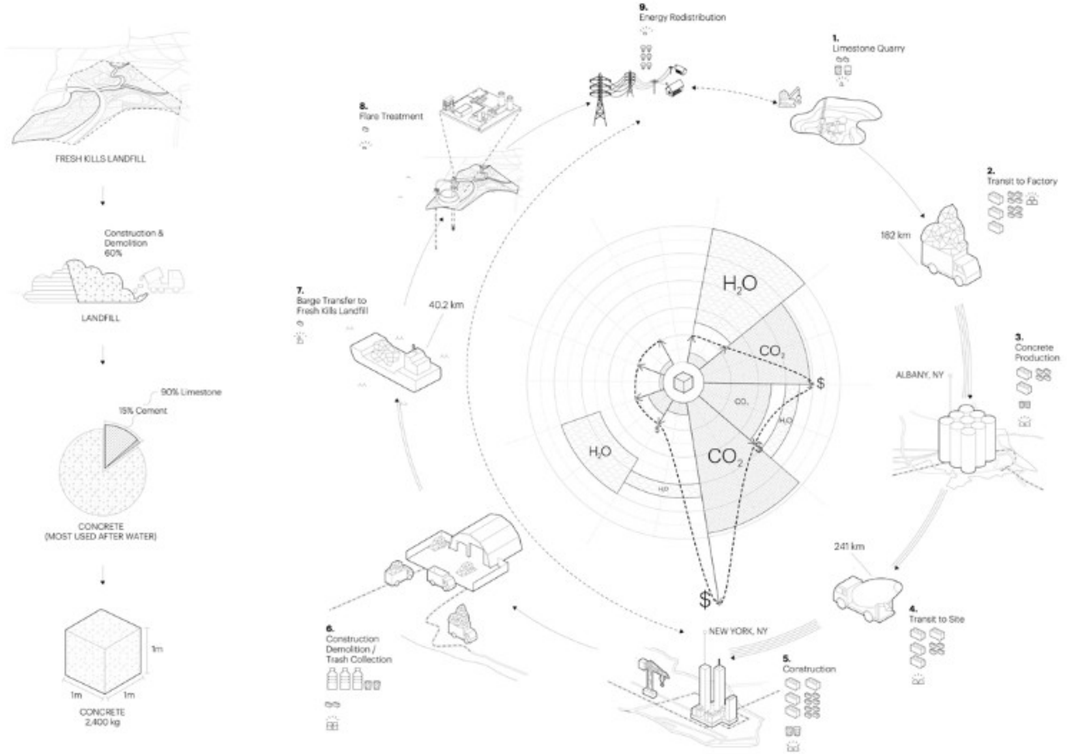
**Accolades**
Featured by D5 Render
Featured on GSAPP website
Selected for 2024 GSAPP End of Year Show
Featured by Go Architecture
Featured by The Young Archs

Size: 130,400 ft² / 12,100 m²
Height: 94 ft / 28.7 m
Program: civic renewal, bioregeneration

*Analysis of Site Dependencies*

## Intervening in the Construction to Waste to Land Fill Cycle

This intervention breaks the construction-to-waste-to-landfill cycle by rethinking material lifecycles. Inspired by the legacy of Freshkills, where trash prompted a shift toward waste-to-energy thinking, the project explores sustainable strategies that prioritize reuse and circular design.




*Right: Studio Dependency Diagram*

## Chain of Processes Connecting Waste

Mapping the interconnected chain of processes that link construction, consumption, and waste to highlight the dependencies between material sourcing, use, and disposal, revealing opportunities for intervention and circularity. Developed in collaboration with Mia Henry, Caroline Smith, Ben Vassar, Norman Keyes, Mauro Rodriguez, Thea Bertin-Levecq, Laurent Huang

**Custom AI *Model2Rendering* Night and Day Views**

Campgrounds are situated below a canopy of **inflatable biogas storages** that inflate according to the volume of gas processed and correspondingly **regulates light**. It integrates ecological restoration, energy recovery, and recreational amenities, feating areas for passive and active recreation, such as hiking trails, bike paths, picnic areas, playgrounds, while incorporating educational facilities to inform visitors about sustainability and the site's history.

**Site Plan**

**Program Plan**

**Elevational Section**

# **Narrative in Scale and Texture:** From Artifact to Island Nation Twin

## Tuvalu

### Digital Twin, Environmental Memory

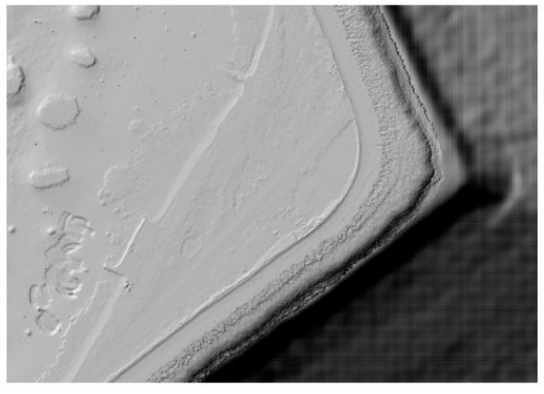
This project challenges the myth of the digital twin as a seamless, singular source of truth. Centered on the island nation of Tuvalu, it explores how building a digital twin is both a technical and emotional process - defined as much by what is lost as what is preserved.

From LiDAR scans and GPU-intensive renderings to open-source GIS data and field footage, the project assembles fragments into a textured reconstruction across scales, from satellite terrain to domestic artifacts. Yet fragmentation is not failure. In Tuvalu, memory is distributed: families safeguard oral knowledge, and relational networks fill archival gaps. Likewise, the digital twin here is plural, layered, and collaborative, not centralized nor complete.

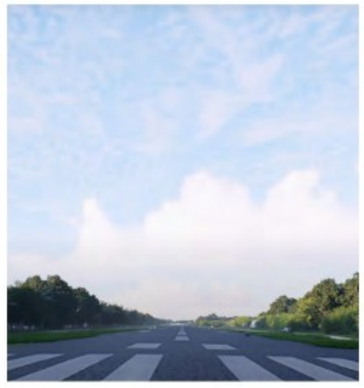
This approach embraces data mourning: the impossibility of full fidelity is acknowledged as part of the work. Rather than chase photorealism, the project seeks emotional resonance. It asks: How do we twin a place changing faster than we can model? The resulting twin becomes a model of contested memory - where glitches, absences, and atmospheric artifacts render legible the nation and its story.

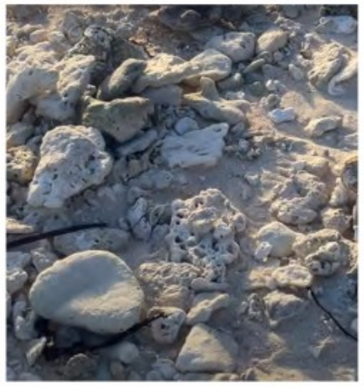
Advanced Studio 6
Spring 2025
Critics: Marina Otero & Dan Miller

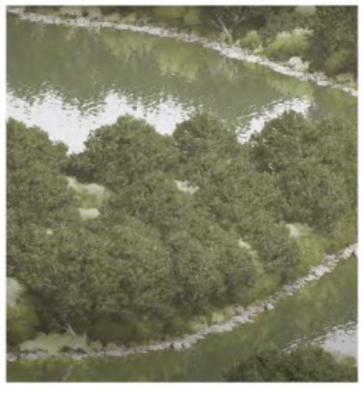
Size: 10.04 $mi^2$ / 26 $km^2$
Height: 6.56 ft / 2 m above sea level
Program: climate, nation, digital twin

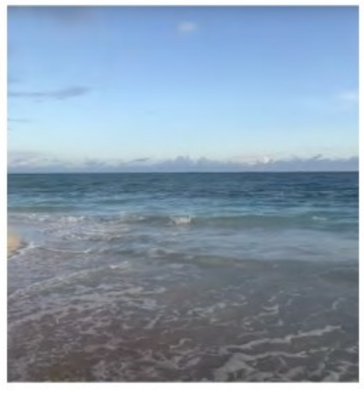



*Terrain Inputs*









*Digital Twin Animation*

# **Exteriorizing the Interior:** Retail as Social Interface

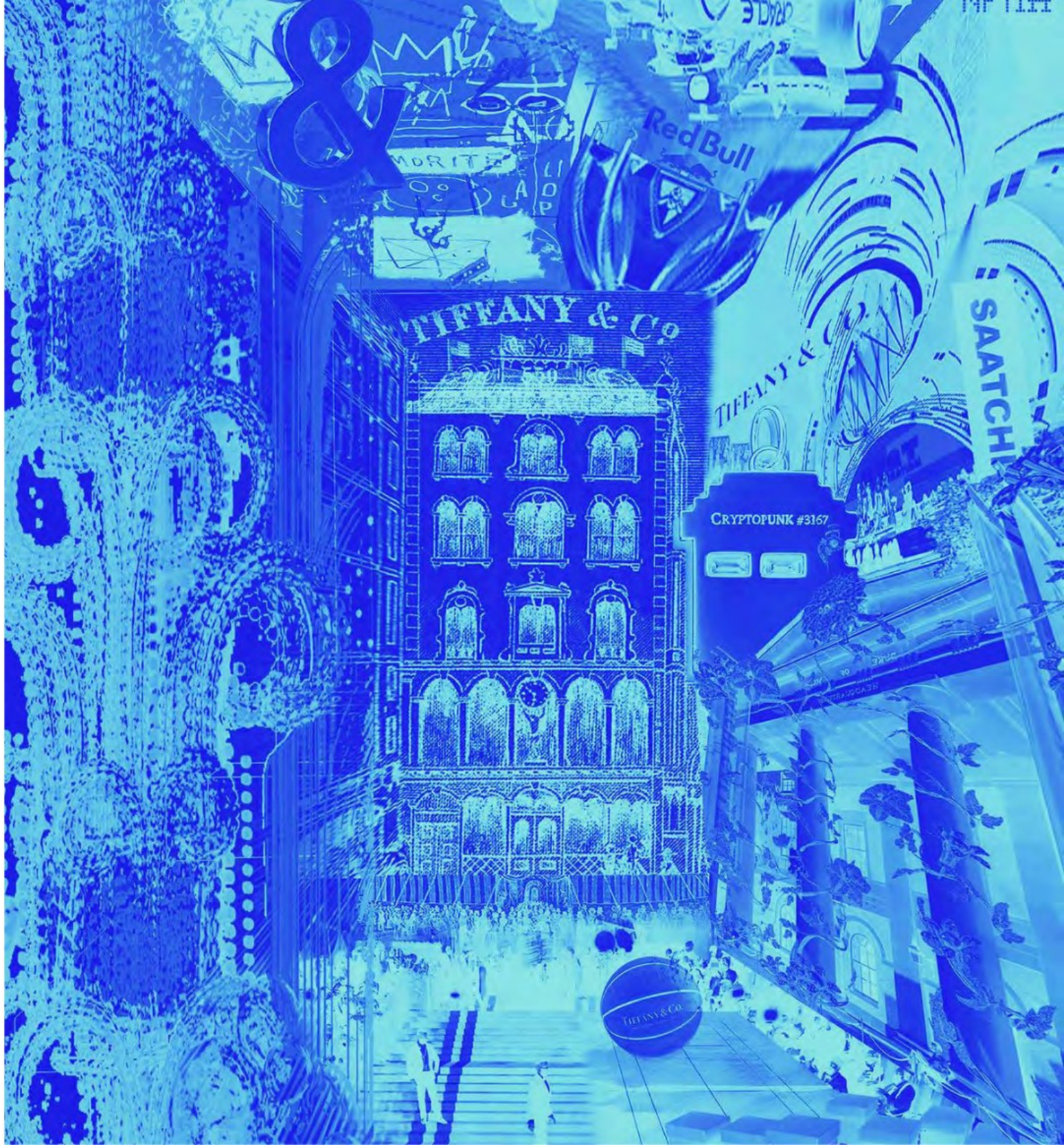
## 15 Union Square West

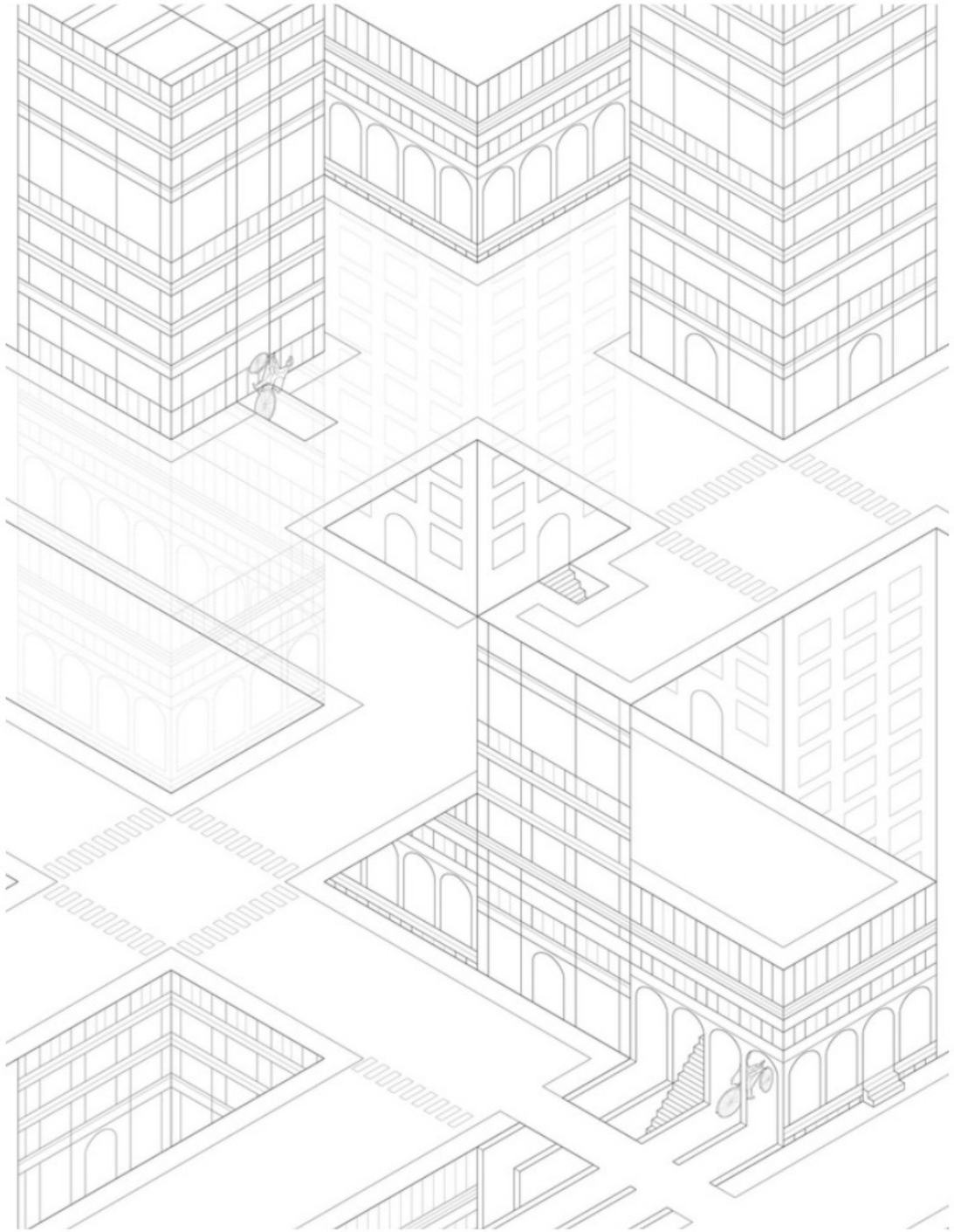
SoHo, NY, USA

Even if the majority of retail needs can be met online, this project proposes another reason to shop in-person in retail-turned-gallery-spaces individuals may visit to see and be seen.

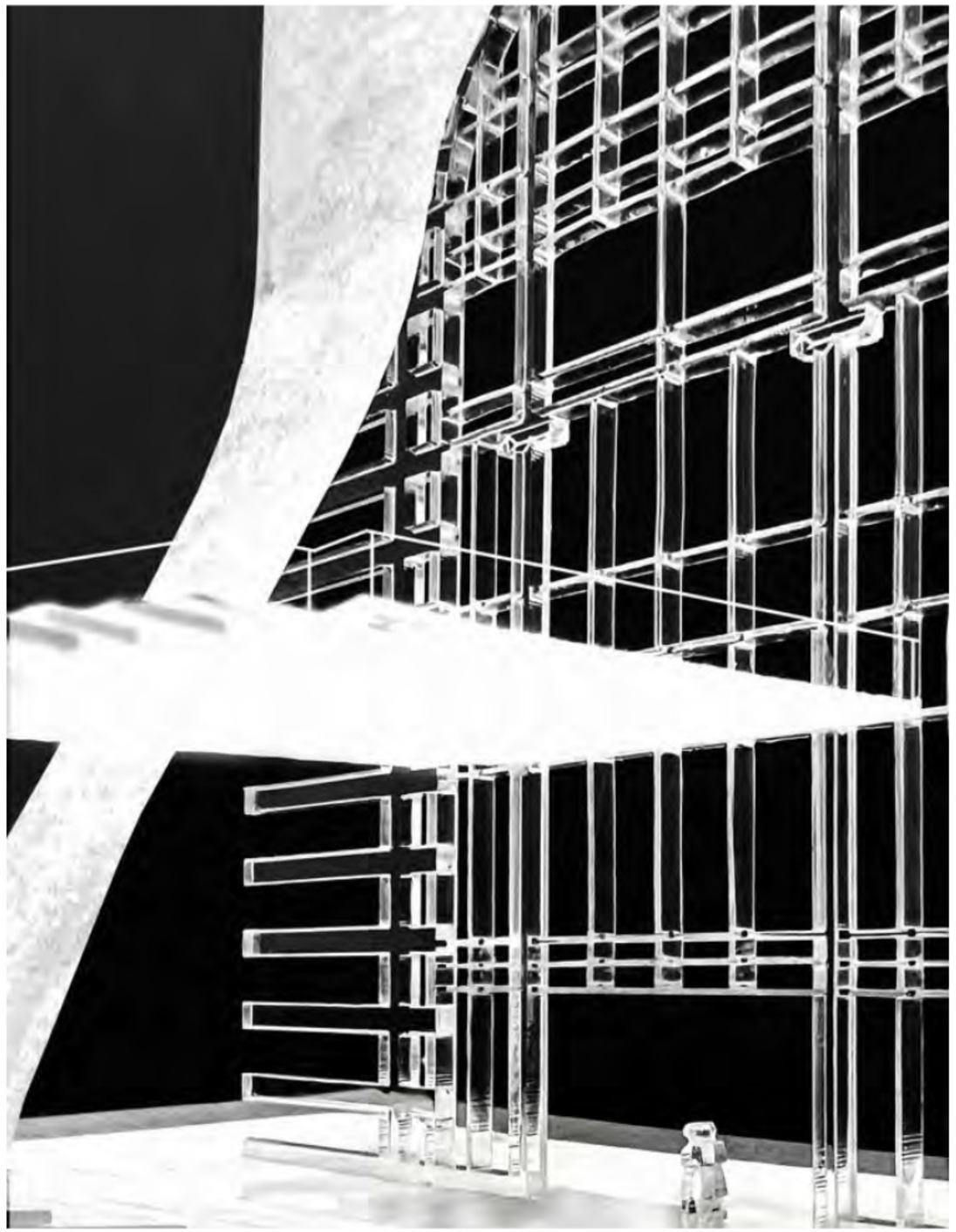
Core Architecture Studio 1
Fall 2022
Critic: Amina Blacksher

Size: 102,550 ft² / 9,525 m²
Height: 144 ft / 43.9 m
Program: commercial, social





*Line Drawing: Rationalizing Abstraction in NYC*



*Model Photograph*

*Model Photograph*

*Model Photograph*

Architecture Portfolio

# SHAREL LIU

**About**

Columbia GSAPP
Master of Architecture 2025

**Contact**

Sharel Liu
linkedin.com/in/sharelsj