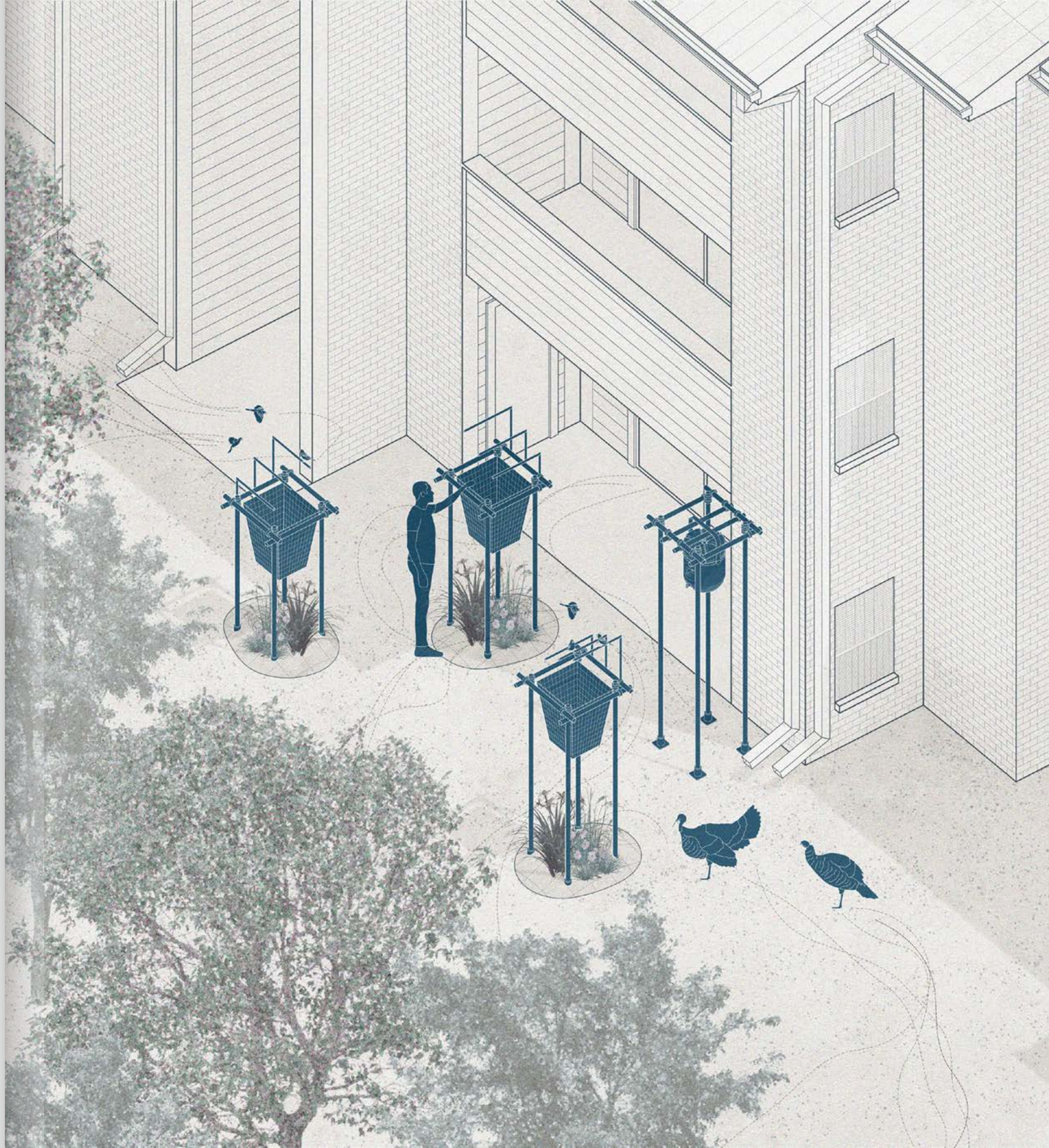
DANIEL BARRIO

2024 PORTFOLIO

SELECTED WORKS

INDEX

DESIGN



01

DIFFERENT, TOGETHER

THREE DEGREES OF LIFE

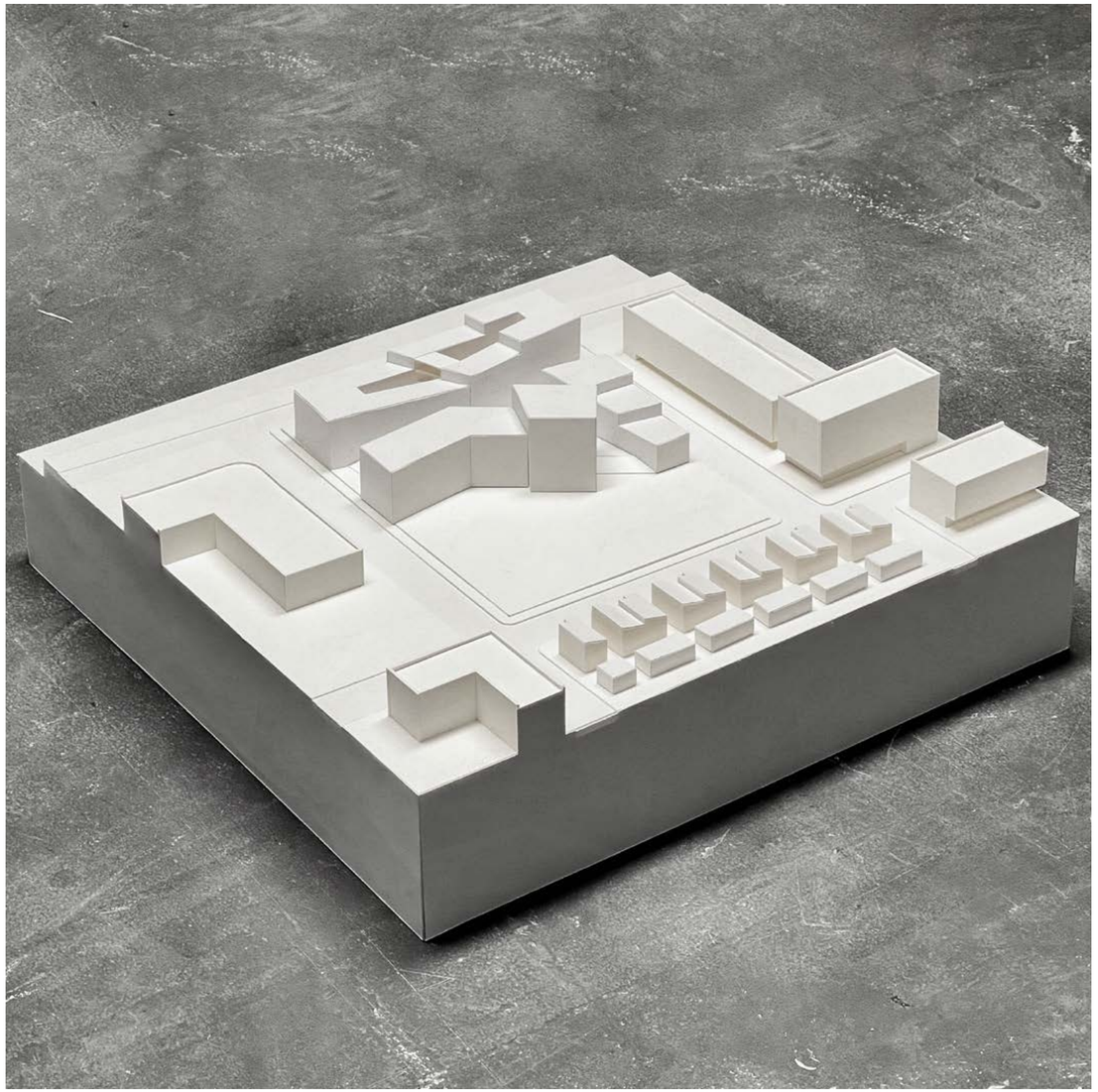
Winter 2023 | Collectives | Lars Graebner + Christina Hansen

Different Together investigates Midtown Detroit as a site for vibrant, diverse living. The project position is that the site itself is not a destination, but rather a blooming community that has begun to develop out of the slow but gradual reinvigoration of Detroit as a whole. With the development of the Selden Innovation Corridor adjacent to the site, the project is designed to engage its surroundings with the use of public and semi-public spaces to integrate an intimate, self-contained commune of itself and its immediate context.

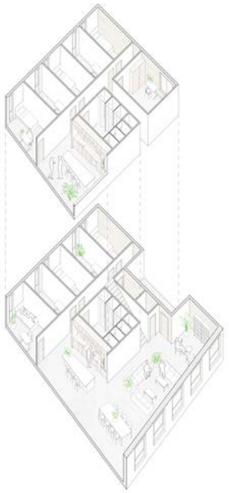
As such, the project looks to create a community that is greater than the sum of its parts - capturing the essence of density of living, diversity of lifestyles, and differentiation of collective spaces. The project employs a gradient of privacy that is present at landscape, building, and unit scale in a celebration of difference; through the various scales of privacy and interaction distributed across the project, lifestyles converge to form a dynamic community of people that would otherwise live disparately within existing housing typologies.

Project in collaboration with Akash Dhanturi, Iliya Mela, and Michael Salois.

Site Plan

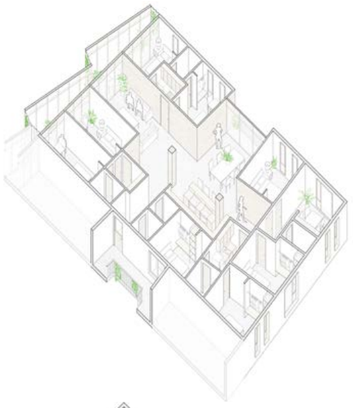


Massing Model



11BR CO-LIVE UNIT

Building: A
SF/Person: 394
Shared: Bathrooms, Kitchens, and Common Space
Private: Bedrooms



8BR CO-LIVE UNIT

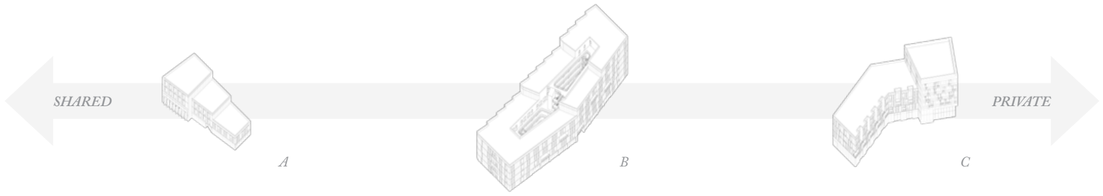
Building: B
SF/Person: 409
Shared: Common Space, Kitchen; Laundry and Common Spaces Distributed across Building
Private: Bedroom, Bathroom, Kitchenette Clusters

1BR UNIT

Building: B
SF/Person: 530
Shared: Laundry and Common Spaces Distributed across Building
Private: Entire Unit

3BR UNIT

Building: C
SF/Family: 1544
Shared: None
Private: Entire Unit; In-Unit Laundry, Private Porch



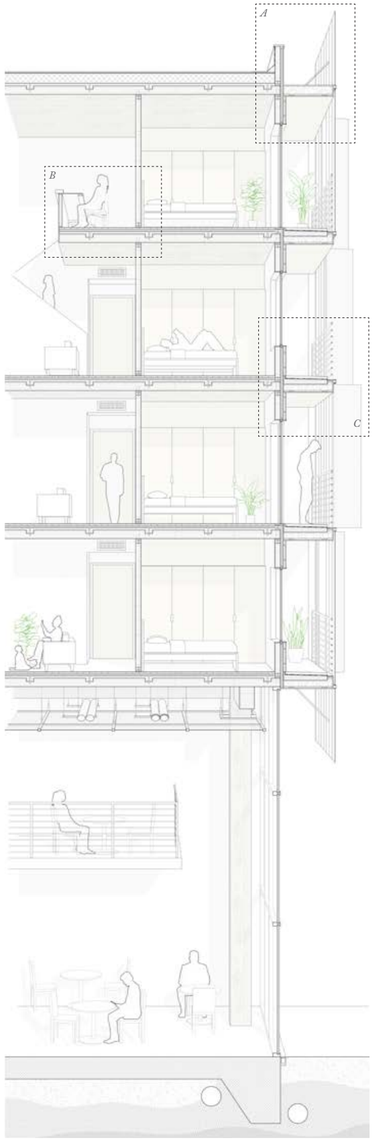
Degrees of Life / Privacy at Building and Unit Scale

First Degree: Public

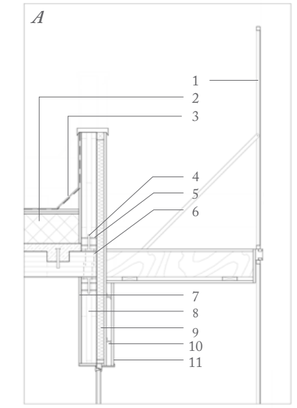
Second Degree: Semi-Public

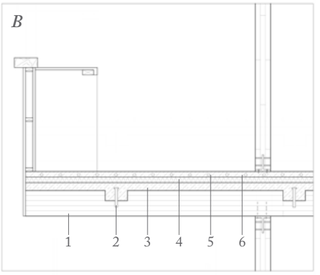
Third Degree: Semi-Private

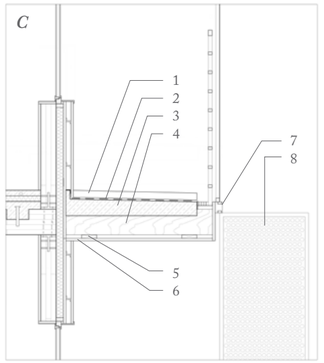
Collective Life Chunk Model



Wall Section







ENVELOPE AND DETAILING

The delicate programming of privacy levels at all scales is critical to the project's facade design. As such, the building envelope aims to evoke a sense of lightness and porosity that blurs the boundary between inside/outside and forms gradients, rather than binaries, of interactivity. The extensive use of exterior circulation, balconies, and fenestration helps achieve this while giving a varied character to each building's facade. The use of perforated metal screens as a unifying language across all facades brings these varying facades into one cohesive language and integrates them into the larger strategies of the project.

ROOF + EXTERNAL WALL (A)
1) Perforated Metal Screen
2) 8" Rigid Foam Insulation
3) Drainage Membrane
4) Metal Connection Plate
5) Tight Fit Bolts
6) Screws
7) 5/8" Gypsum Board
8) 3-Ply CLT (4")
9) 2" Fiberglass Batt Insulation
10) Air Gap
11) Stucco Finish

FLOOR (B)
1) 5-Ply CLT (6 - 7/8")
2) Shear Stud
3) Concrete Slab Topping
4) 1 - 1/2" Rigid Insulation
5) Heating Screed
6) 1 - 1/2" Concrete Finish

BALCONY (C)
1) Concrete Pavers
2) Impermeable Membrane
3) Pre-Fab Concrete Paver
4) Glulam Slab Extension
5) Battens
6) Cement Fibre Soffit
7) Track For Screens
8) Folding Perforated Metal Screen

Section Perspective: Revealing Collective Life

02

THE FOODWAYS PAVILION

U-M CAMPUS FARM

Fall 2023 | Propositions | Laura Peterson

The Foodways Pavilion will be built at the U-M Campus Farm and will support the organization's primary mission of serving as a living-learning lab through sustainable food growth and community-building. The structure intends to deepen users' knowledge of the intricate processes that go into food, acting as a celebratory site of its growth, preparation, and eating.

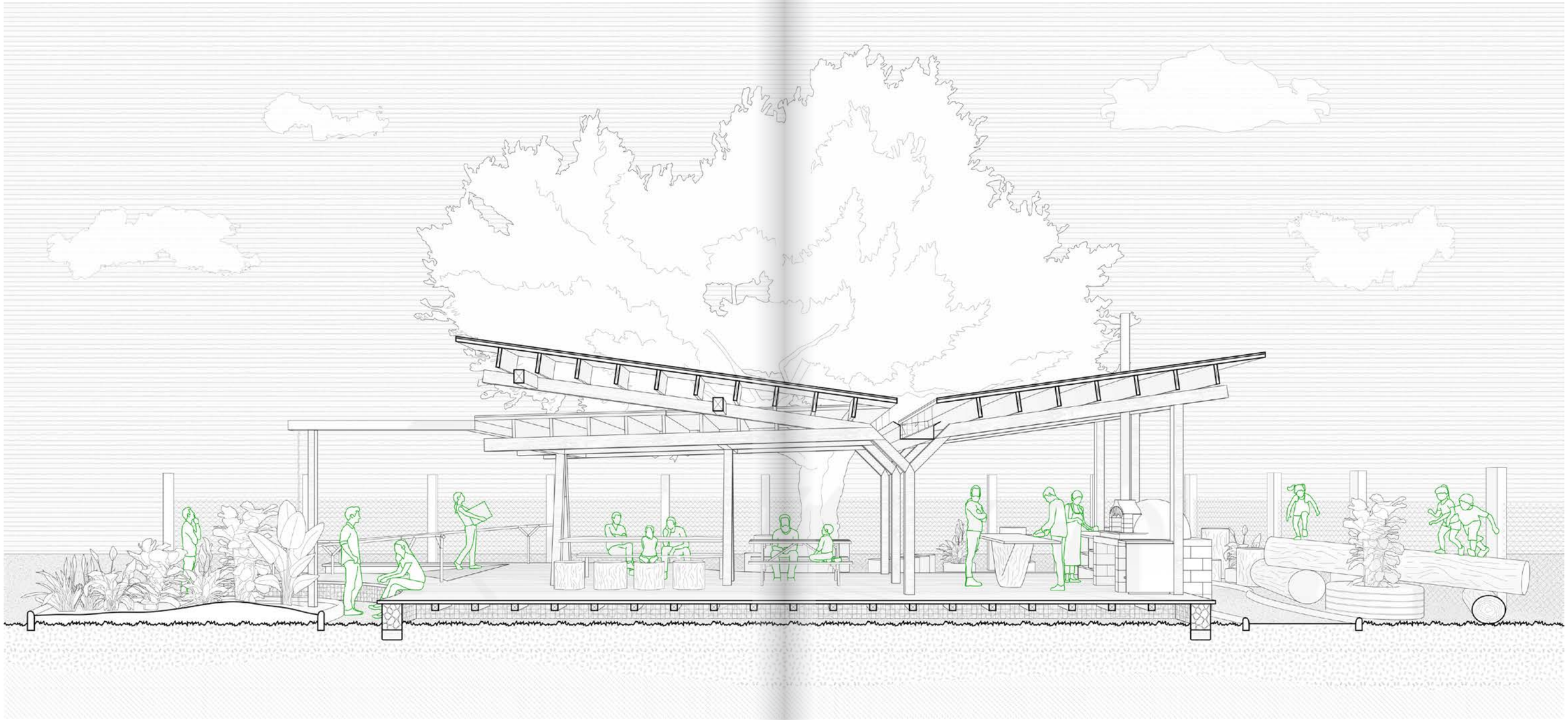
Formally, the pavilion connects to existing elements onsite - a black walnut tree, a pedestrian path, and the strawbale classroom - inviting all that use the farm to gather around food under it's roof and within the edible, planted landscape that surrounds it. The pavilion further minimizes impacting the existing site through the design of a new type of gabion foundation that removes the need for any digging or deep footings and uses reclaimed concrete from other demo sites on the U-M campus.

The structure will be built from fallen, old-growth trees sourced from the Ann Arbor Arboretum during August 2023's big storm, where 150+ trees fell (Maple, Red Oak, White Pine, Cherry, Poplar, and more). The varying tree species' densities, rot resistance, etc. were carefully evaluated in the creation of a physical collage of local tree species forming a unified structure.

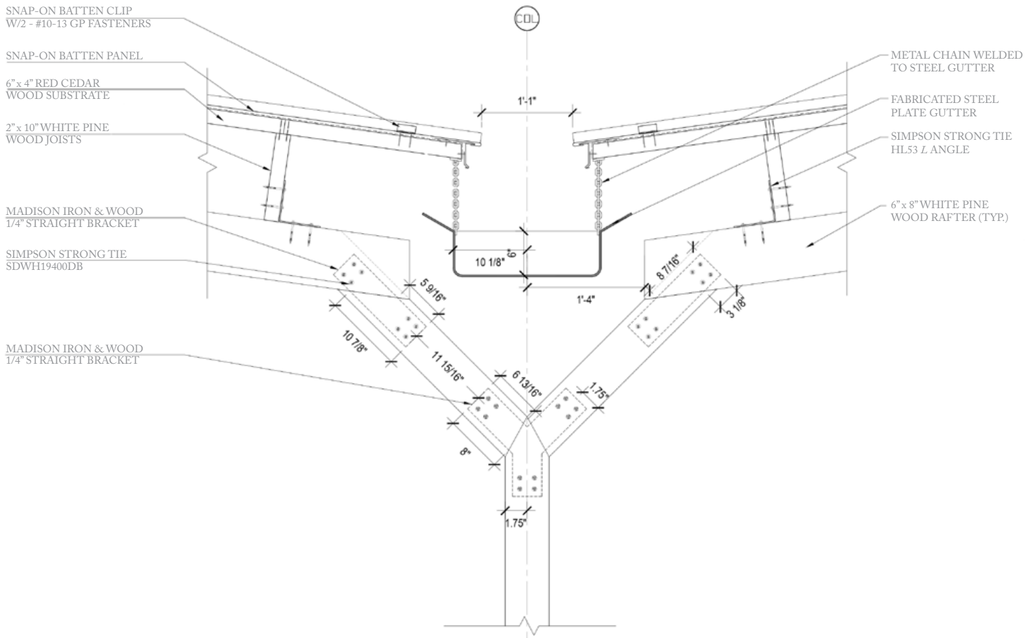
Final project completed in collaboration w/ full studio section. *Contributions:* Narrative and design concept; physical model; site plan, section, and wood sourcing drawings.

Site Plan

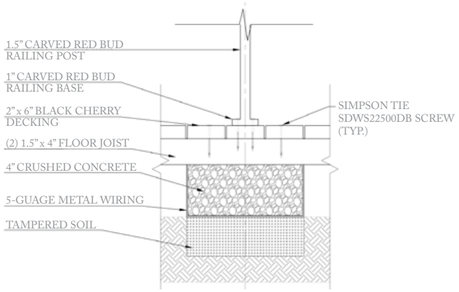
Rendered Views



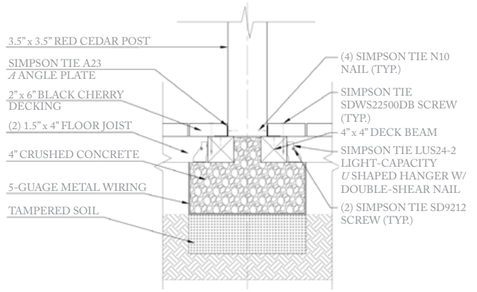
Section Perespective



TYPICAL 'Y' COLUMN + CENTRAL GUTTER DETAIL



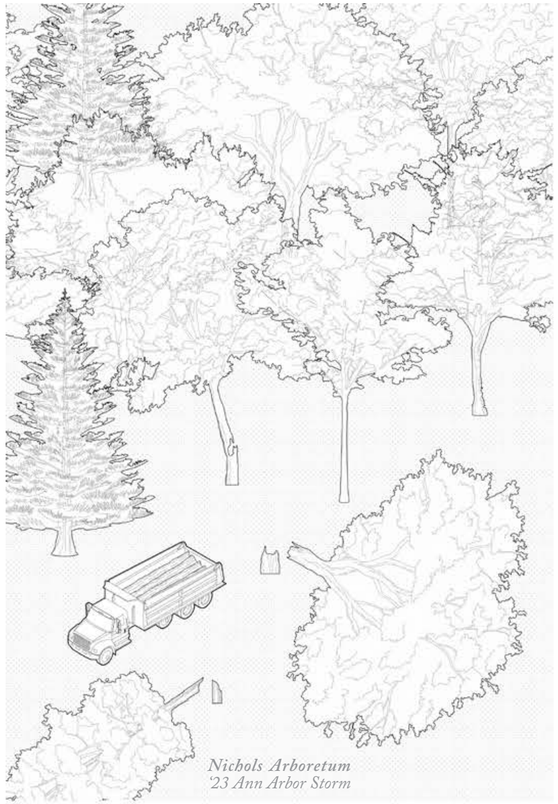
TYPICAL RAILING + GABION DETAL

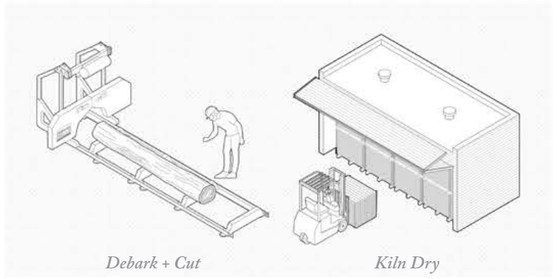


TYPICAL POST BASE + GABION DETAIL

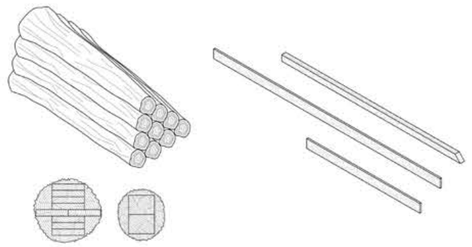
Sample Construction Documents

Final Model Photos



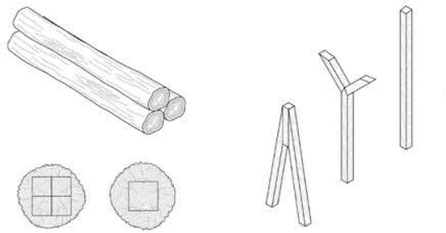


BEAMS



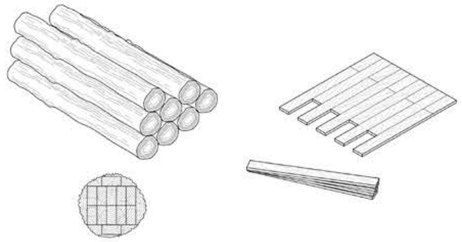
Pine - Plain Sawn

COLUMNS



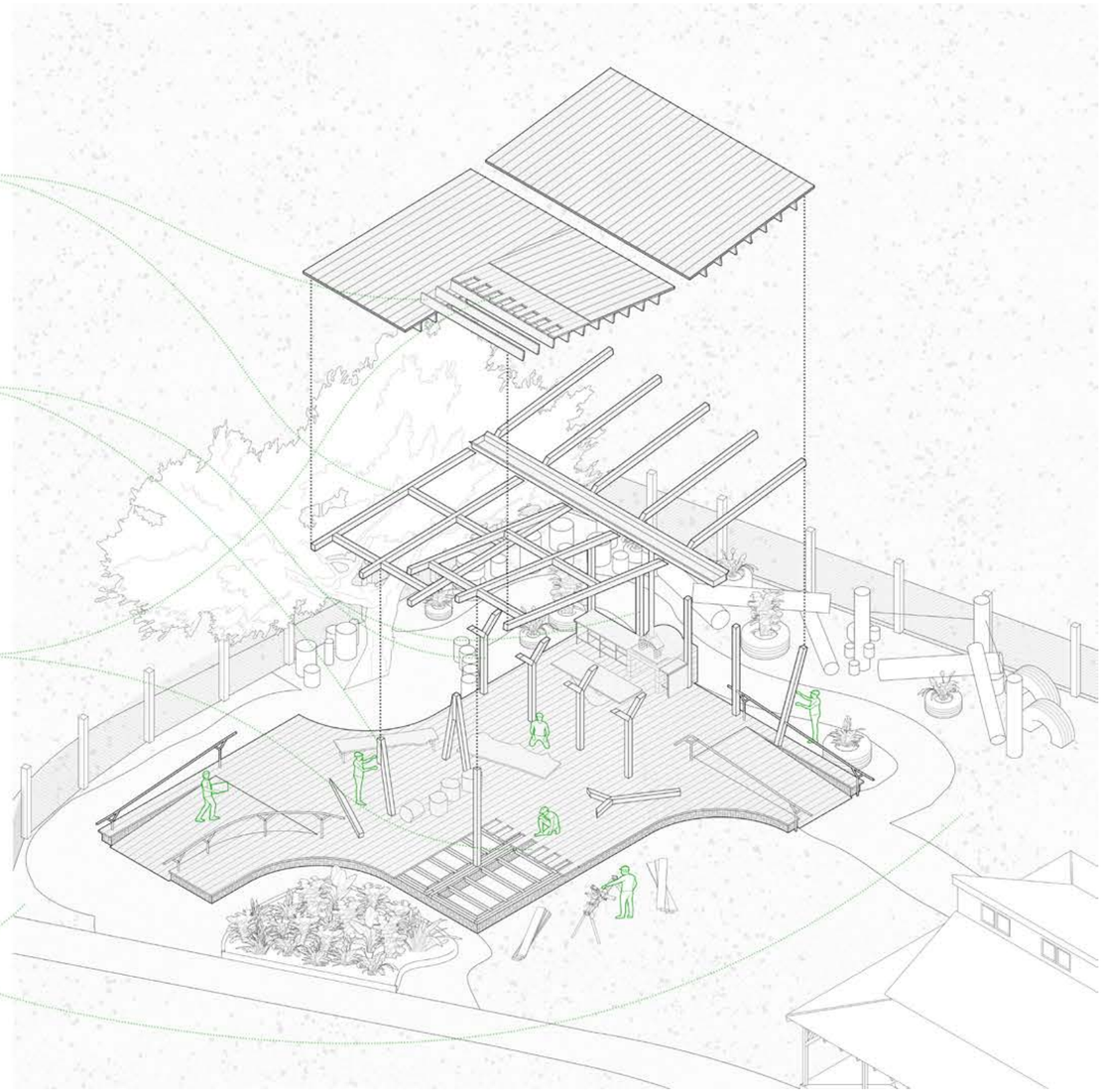
White Oak - Plain Sawn

DECK + ROOF



Red Cedar - Plain Sawn

WASTE



Wood Sourcing and Assembly Axonometric

03

ADJACENT ADVERSARIES

US EMBASSY IN HAVANA, CUBA

Fall 2022 | Institutions | Ana Morcillo Pallarés

In 2015, Cuban Presient Castro and US President Obama restored diplomatic relations between the two countries after almost 50 years of severed relations muddled with tension and animosity. A proclaimed symbol of American democracy, the existing embassy went unused by the US during the period of halted relations, yet stood tall as a billboard to the 'anti-imperialist' plaza across the street to the east. Historically charged, the site provided a significant opportunity to re-evaluate the diplomatic values that would inform the reoccupation of the embassy.

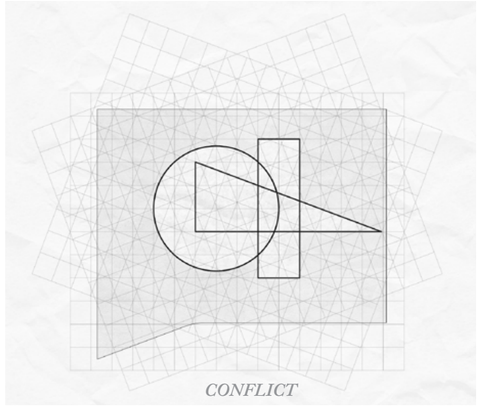
Adjacent Adversaries seeks to revisit the existing embassy, taking a cynical and absurdist view of the restored relations in an adaptive-reuse project that embeds diplomatic values across the design. The project is grounded on three core values of conflict, showmanship, and facadism in informing an embassy that pushes unity behind a screen of deceit and surveillance. As a product, the embassy is layered with deliberate adjacency of intersectional spaces, establishing the engulfing of Cuban space, the discomfort of adjacency, and the deceit of what lies beyond the division of spaces.

DIPLOMATIC VALUES

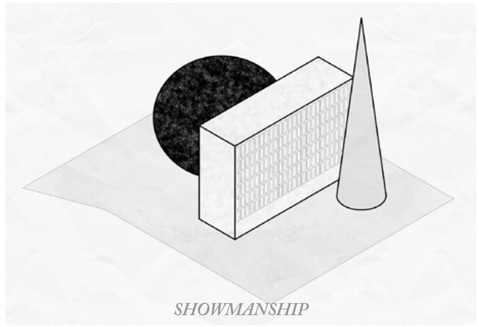
The project is deisnged around three core values, each with its individual presence across elements of the embassy: *Conflict, Showmanship, and Facadism.*

The concept of *conflict* amongst the countries is captured through the initial formal, geometric study of conflicting figures: The orderly existing rectangle of the tower, the piercing triangle that strikes the American billboard, and the circle that begins to explore ideas of surveillance. The figures are then considered as three-dimensional, incorporating the flashiness of *showmanship* as figures like a circle are morphed into the extravagance of a sphere. Finally, and most notably, *facadism* is incorporated in the argument that tensions are mediated in a self-servant way. The sphere is positioned less aggressively, hidden behind the billboard to preserve the anti-imperialist plaza, while the cone is positioned along the public Malecón as a catalyst and entry point for the public. Ultimately, however, public Cuban space, like an auditorium for performance and protest, becomes embedded in a manner that allows for surveillance and disengenous adjacencies defined by discomfort and paranoia.

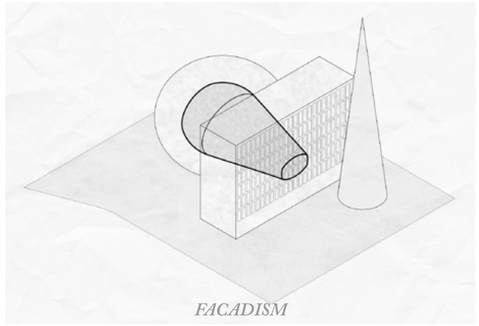
The resultant embassy is a sandbox of spectacle and absurdity, layered with intersection and adjacency that seeks to serve behind a smokescreen of unity and newfound coexistence.



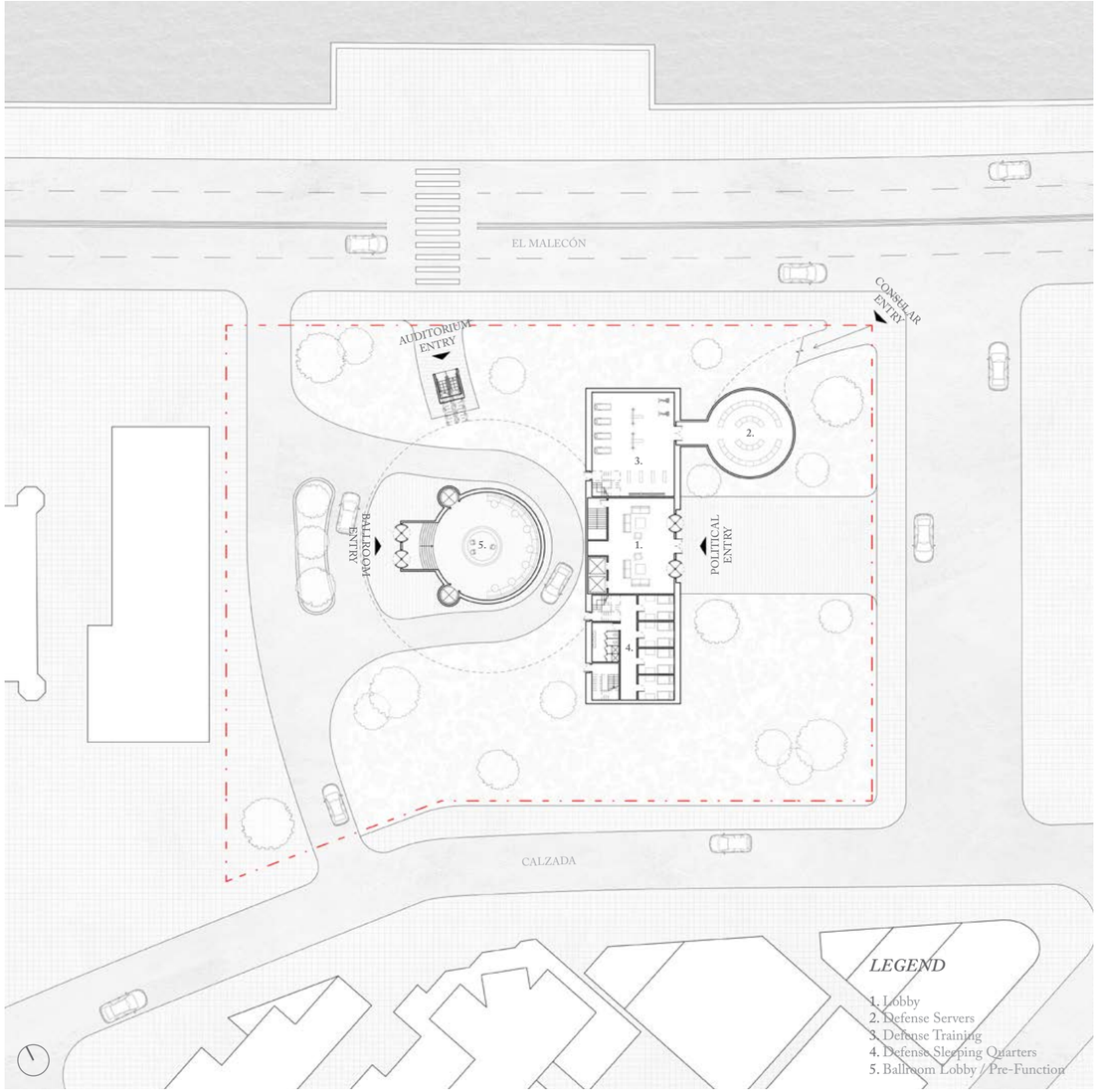
CONFLICT



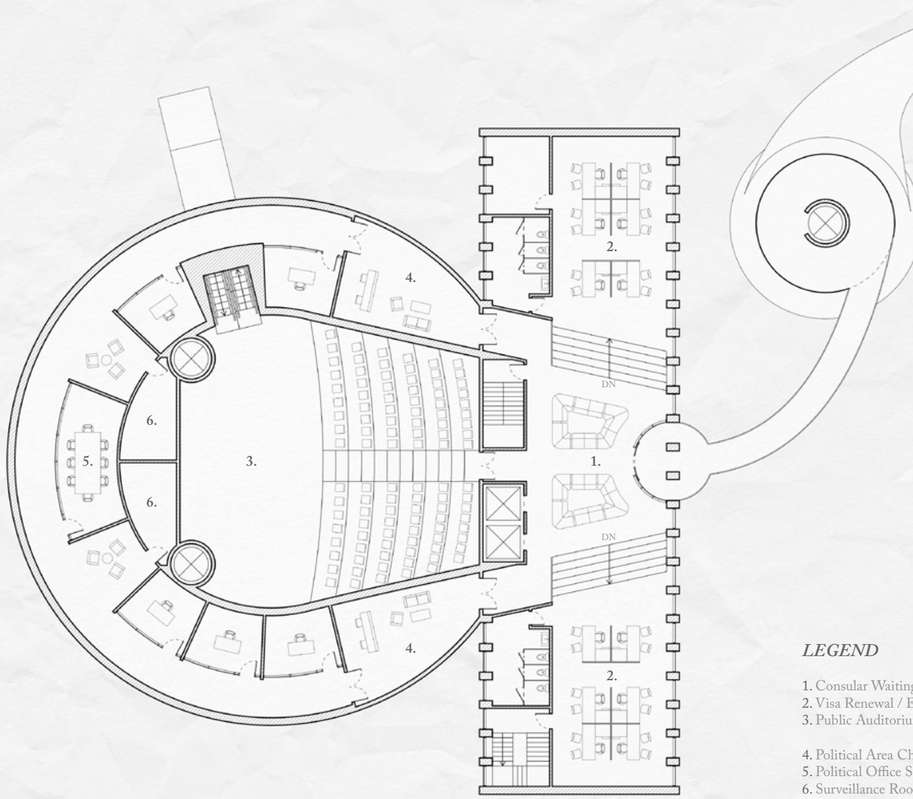
SHOWMANSHIP



FACADISM



Site Plan

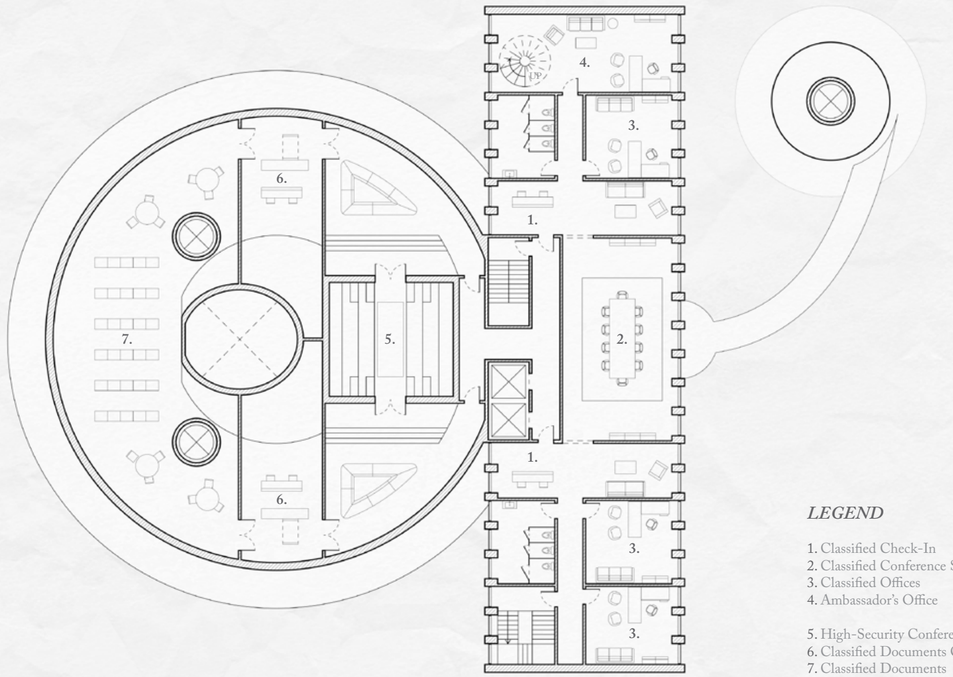


LEGEND

1. Consular Waiting Area
2. Visa Renewal / Exchange
3. Public Auditorium

4. Political Area Check-In
5. Political Office Space
6. Surveillance Rooms

Level 3 Plan: Most Public

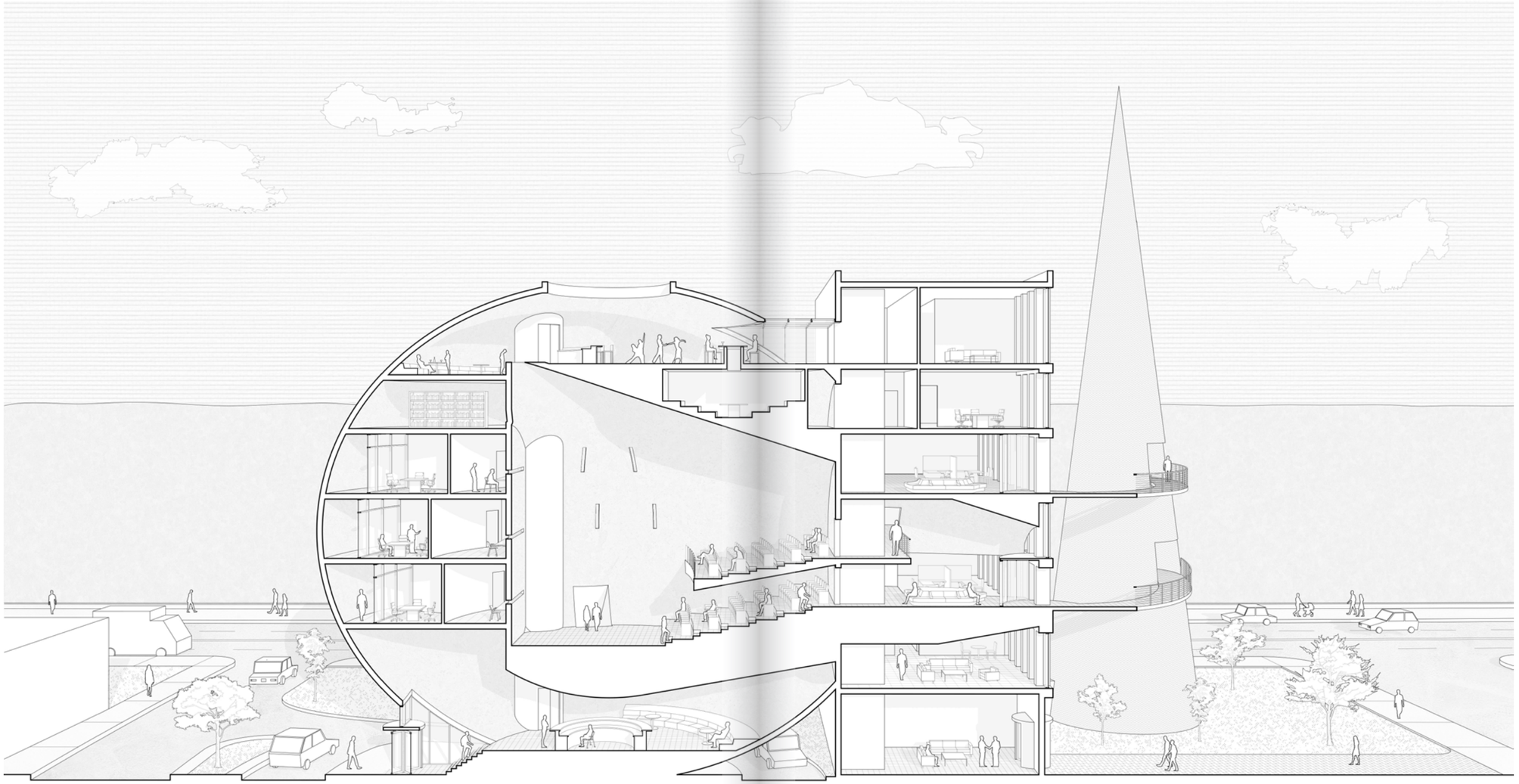


LEGEND

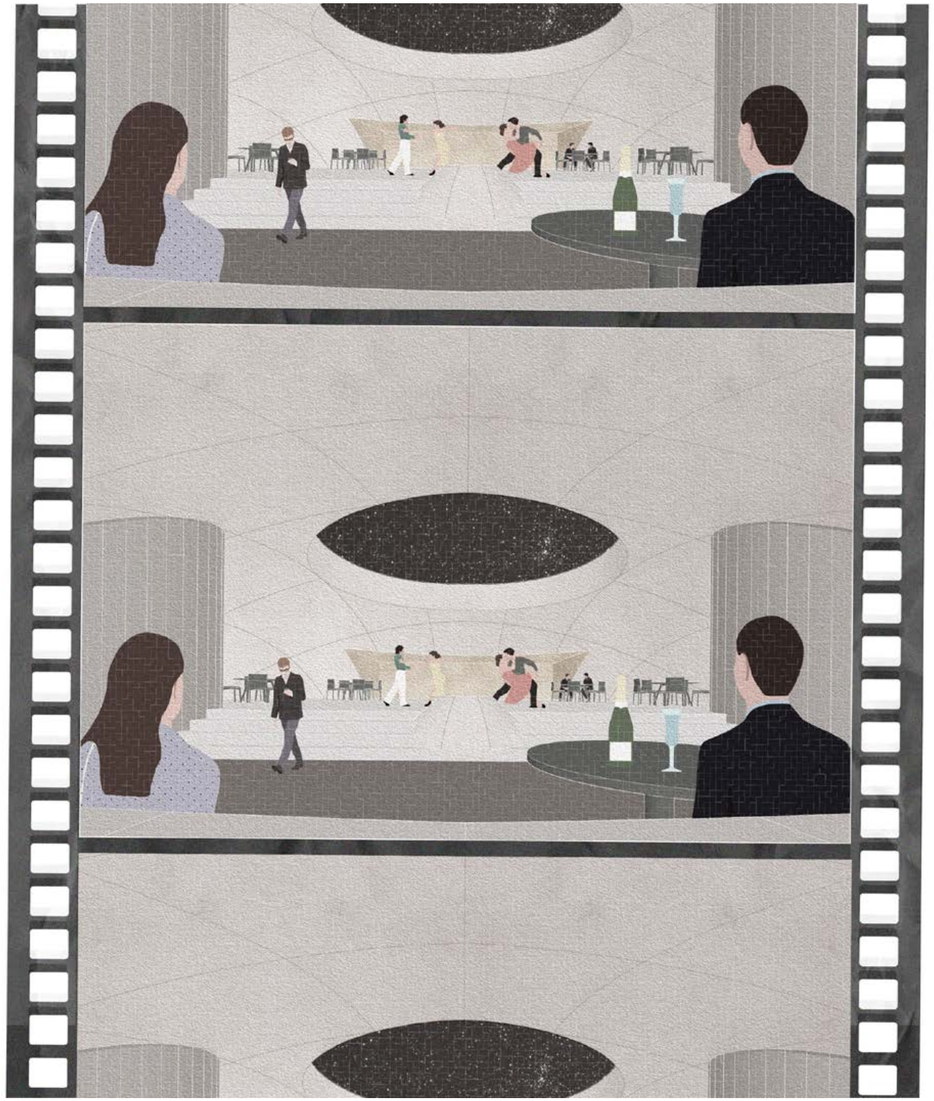
1. Classified Check-In
2. Classified Conference Space
3. Classified Offices
4. Ambassador's Office

5. High-Security Conference Space
6. Classified Documents Check-In
7. Classified Documents

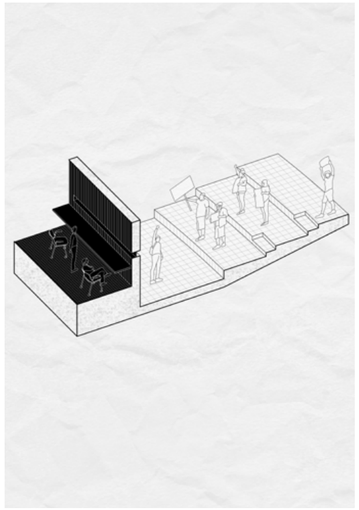
Level 6 Plan: Most Restricted

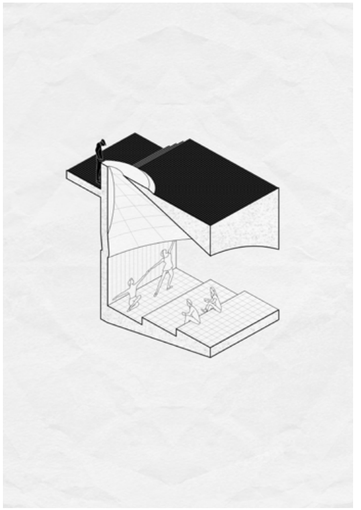


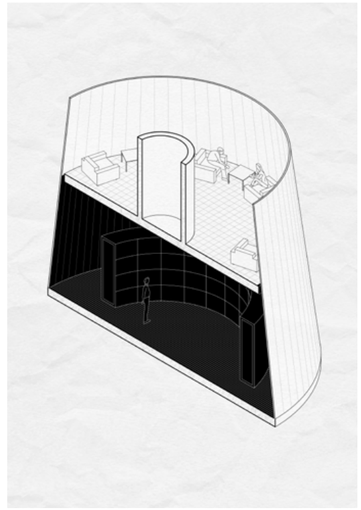
Section Perspective: Revealing Adjacencies



Ballroom Scene







Adjacency Model + Diagrams

04

BEYOND BACKYARDS

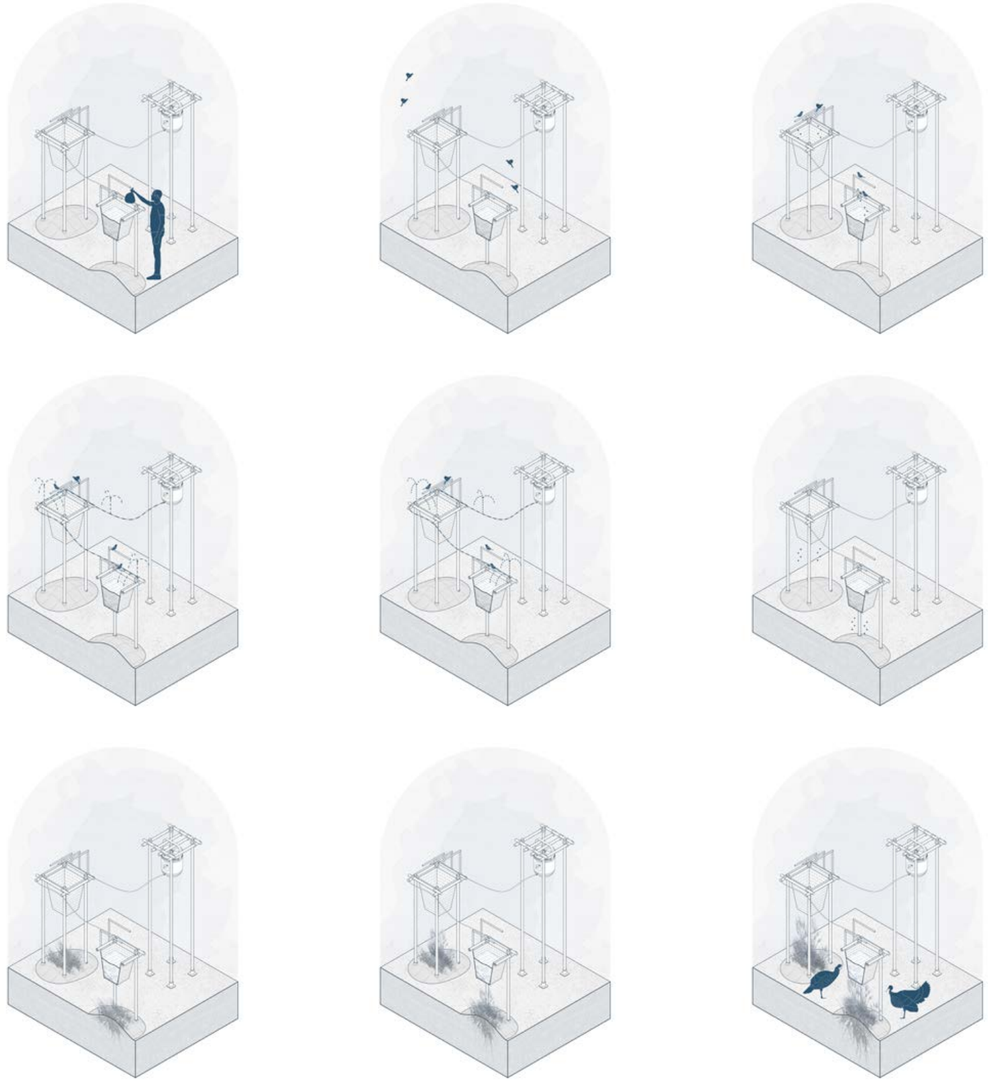
COMPOSTING TOWERS FOR INTERSPECIES HARMONY

Fall 2023 | Propositions | Laura Peterson

Contemporaneous to American sprawl, *Beyond Backyards* capitalizes on the threshold of the suburban backyard by proposing composting towers as a source of interspecies agency, allowing both human and non-human players to take an active role in biological processes. In doing so, the project creates nutrient dense landscapes for all species on the peripheries of suburbia, challenging the presumed and harmful binary of 'natural' versus 'man-made.'

Composting towers sit on the site in a stepping stone pattern that invites birds to leap beyond the trees they normally occupy, perching on the new towers. Humans, meanwhile, use the towers as suspended composting bins to dispose food waste. Combined with bird droppings, the bins over time create crumbly, nutrient dense composts that filter through mesh netting and drop to the surface below. Over time, the product is a series of microgarden mounds that invite wild turkeys to occupy and feed on.

The project is assembled from repurposed scrap material used to aid construction sites. From scaffolding, safety netting, and break room coolers to bird droppings and food scraps, *Beyond Backyards* celebrates waste as an essential component in creating beacons of fertility, giving multiple species agency to take an active role in novel, practical, and small-scale sustainable practices.



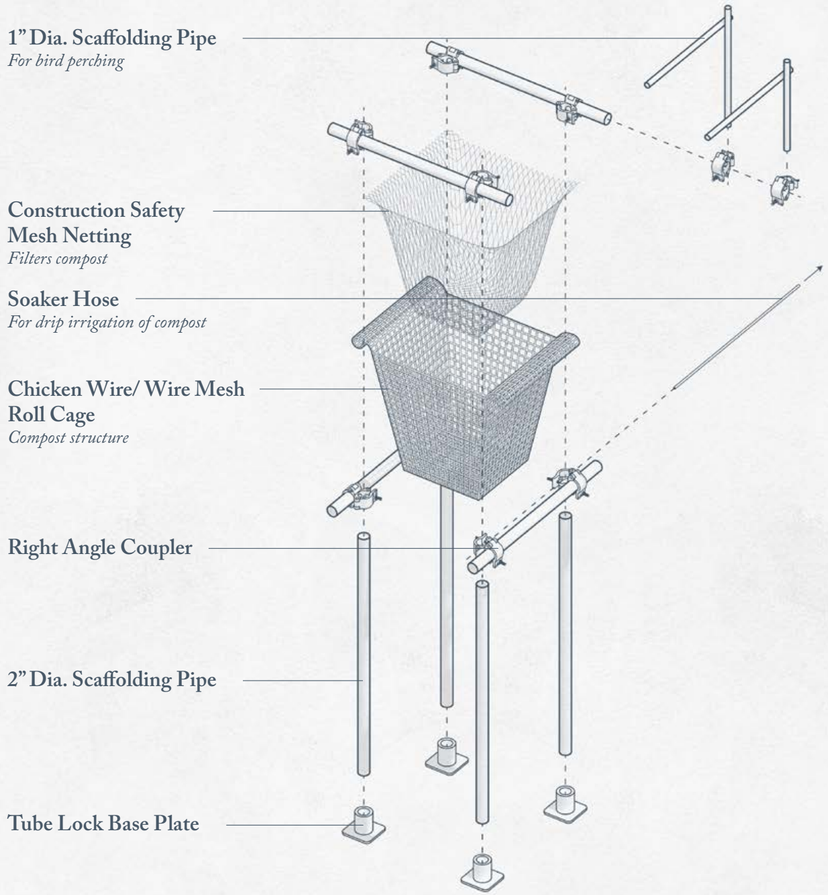
Site Isometric

Human + Turkey Perspectives

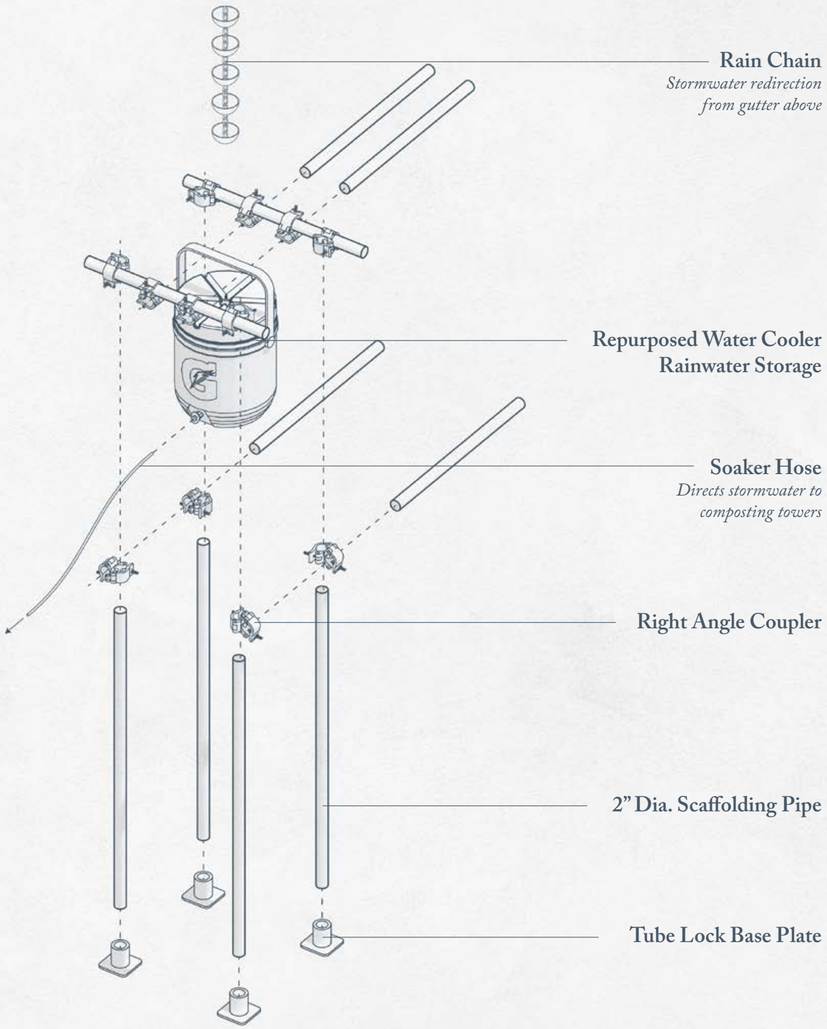
SITED ON THRESHOLDS

The composting towers are desinged to bridge the gap that exists in the thresholds between suburban sprawl and rural species populations. The given example studies the backyard of an Ann Arbor, Michigan apartment complex that is illustrative of the common typology present throughout the city. Located on the north side of the University of Michigan's North Campus, the site was studied over time as an observation of species presence and activity.

The predominant users were observed to be humans using their backyards, birds perching on trees, and wild turkeys foraging for food. These activities, however, happen asynchronous to each other. The propoed composting towers thus give each species agency in consolodating these practices into a productive interspecies process of food growth. They are ultimately meant to be viewed from an interspecies perspective, celebrating the beacons of collaboration and interaction they become in establishing microgardens on the peripheries of suburbia.



Composting Tower Assembly



Watering Tower Assembly

FABRICATION

05

ASSEMBLED AGGREGATES

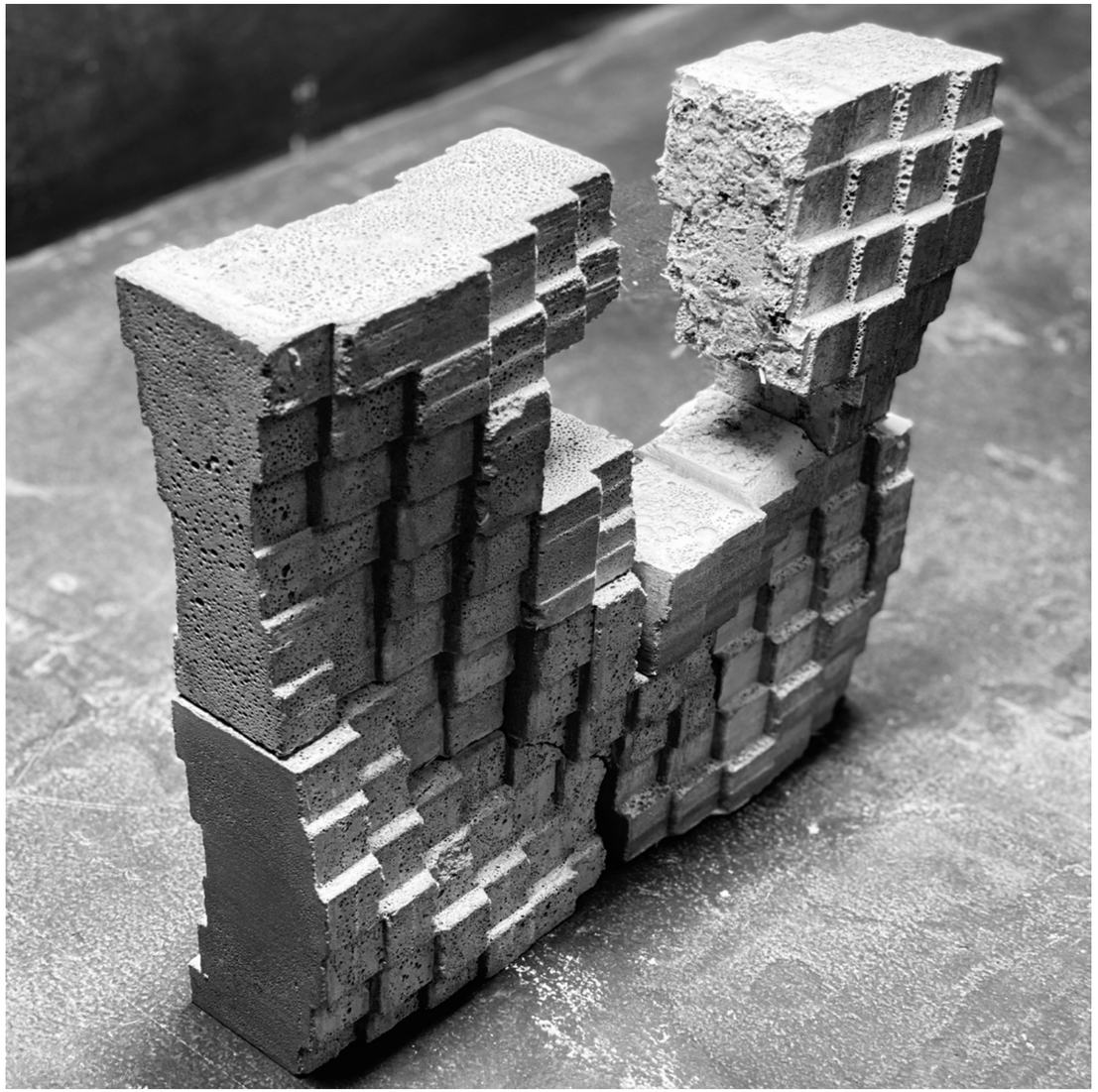
EXPLORING CIRCULAR ECONOMY IN CONCRETE TILE FORMWORK

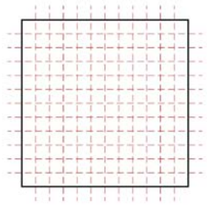
Fall 2023 | Thesis Seminar | Tsz Yan Ng

Assembled Aggregates explores parametric design, formwork making, and casting processes to create four interlocking tiles that can channel water in a controlled manner. Formwork is carefully considered as a critical part of the design process: It is a multi-part arrangement that requires a sepecific order of assembly and disassembly, reusability, and, most importantly, thoroughly assesses circular economy. The project ultimately serves as a catalyst for a semester-long thesis exploration in circular formwork design utilizing computational design and digital fabrication.

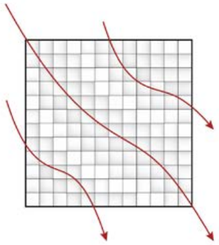
The tiles were designed with the formwork's material stock in mind as a design constraint, considering how to minimize and productively reuse any material used. Half-inch plywood was selected as a versatile material stock that would allow for a effective basis of material use given that it comes in standardized sheet sizes. The ultimate product is four unique, interlocking tiles that define channels for water flow and are formed using only a single sheet of 20" x 30" half-inch plywood.

Project in collaboration with Taylor Douglas.

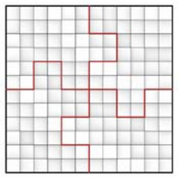




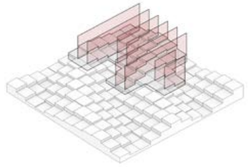
1. CONSTRAINT



2. SURFACE TREATMENT



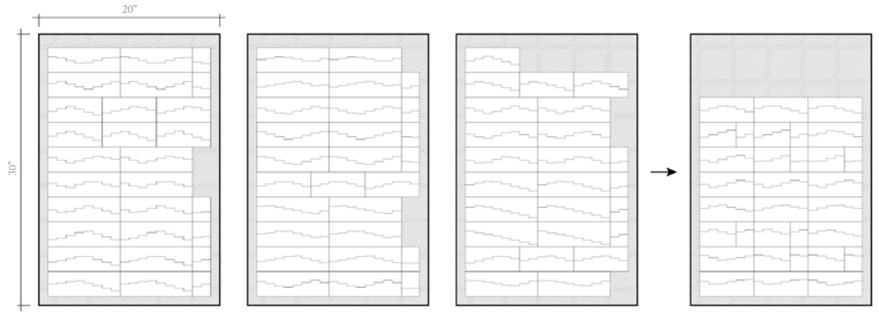
3. DIVISION



4. EXTRACTION

5. REDEFINE PROFILES

6. SPLIT



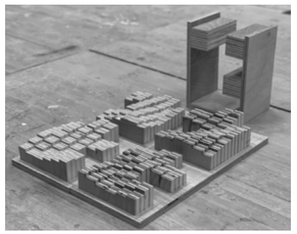
INITIAL STOCK

FINAL STOCK

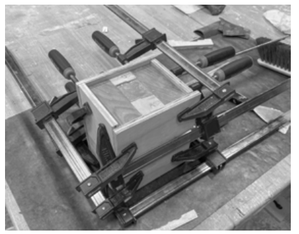
DESIGN + REDUCTION OF STOCK MATERIAL

The tile arrangement was considered as a composition that would redirect water using valleys established by variable heights. As a primary constraint, the project was catered to the formwork material of half-inch plywood. The composition was thus split into 1/2" sections that would be extruded at heights dictated by a script to create channeling valleys. With circular economy in mind, the extracted profiles were then redesigned to minimize stock material; by designig the plywood profiles to be split from mirrored profiles, the stock was able to be reduced by over 66%. The result is four unique molds (A, B, C, D) that can be reused and assembled in varying combinations to define four distinct tiles.

01.

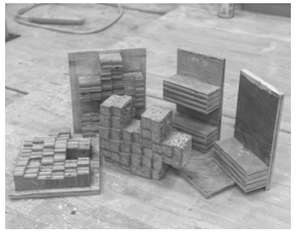


02.



03.

04.



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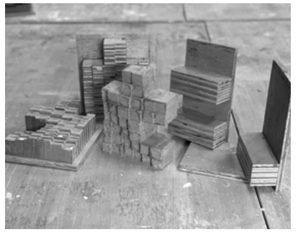
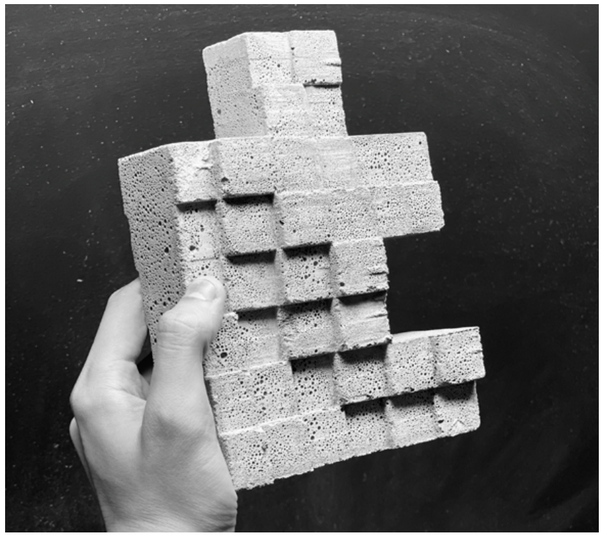


06.

01. Formwork Assembly of 1/2" Plywood Layers
02. Completed Formwork Molds: A/B/C/D
03. Tile 1 Cast
04. Tile Demolding
05. Tile 1 (Formwork Combination A/C)
06. Tile 4 (Formwork Combination B/D)
07. Demolded Tile 4



07.

06

FUZZADE

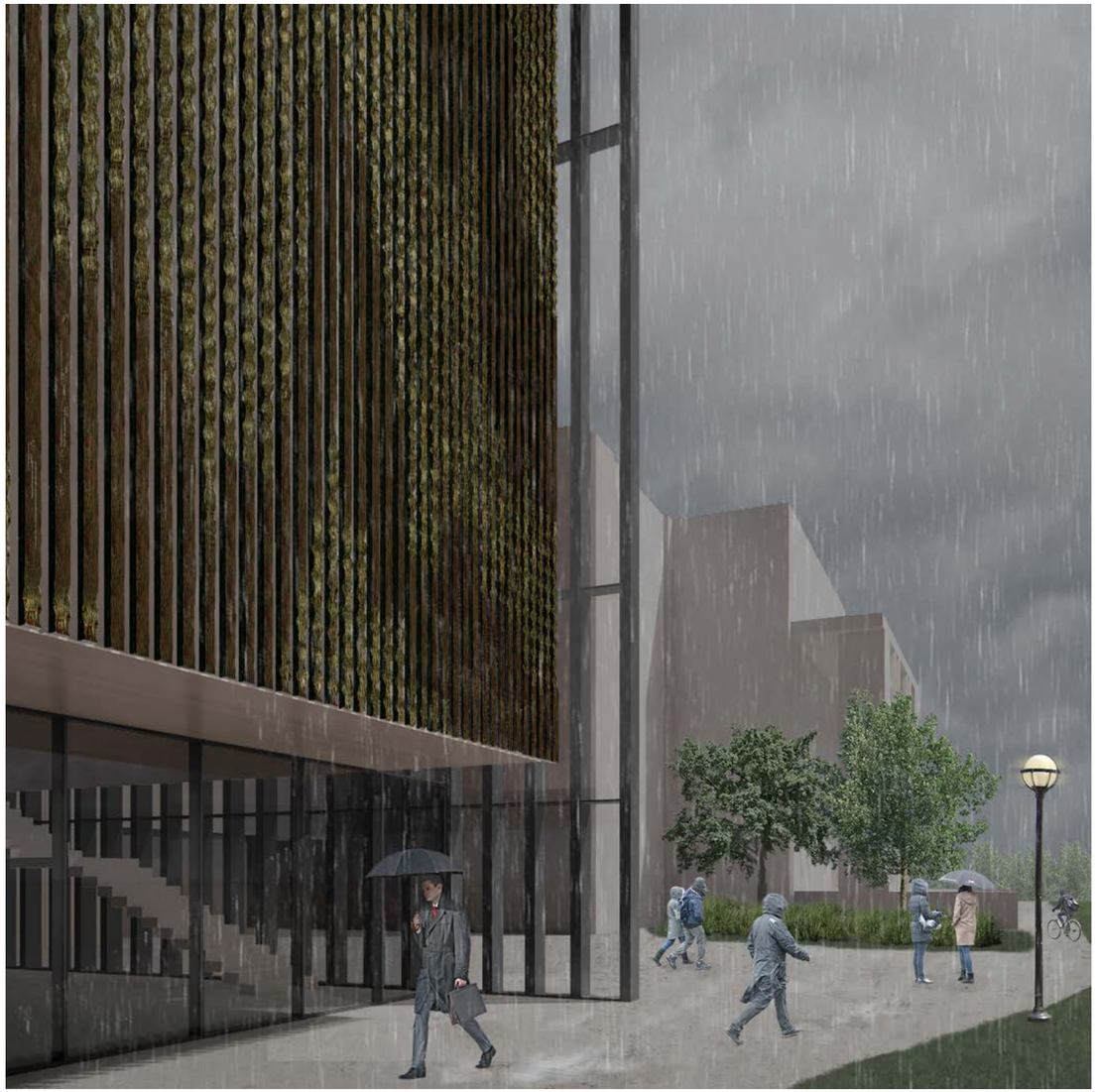
FABRICATED CERAMIC FACADE TILES

Fall 2023 | Elective | Christopher Humphrey

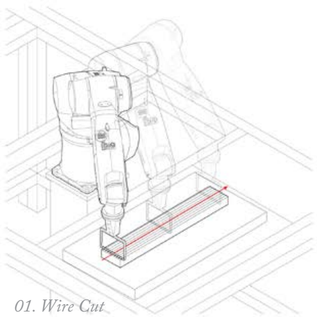
Fuzzade is a façade component system composed of three distinct tiles that are tailored to promote varying degrees of water retention and moss growth. The tiles range from *A)* 'industry standard' extrusions, to *B)* transitional tiles, to *C)* highly customizable robotically carved forms.

The tiles are designed with the manufacturing process inherently tied to their degree of complexity; each tile compounds an additional robotic toolpath for increased surfacing and ability for water retention and moss growth. The tiles operate on the logic of macro and micro geometric surfacing – Macro geometries establish deeper valleys that control moss growth zones, while micro geometries establish the surface texturing needed for effective water pooling and moss attachment. As a result of robotic toolpaths producing a high degree of moss control, the three tiles can be composed in an infinite range of possibilities on any façade, driven by the degree of moss growth that is desired. Much of the façade can be composed of cost-effective *A* tiles, where *B* and *C* tiles are used to define micro-climates of moss growth across the surface.

Project in collaboration with Mollie Davis and Taylor Douglas

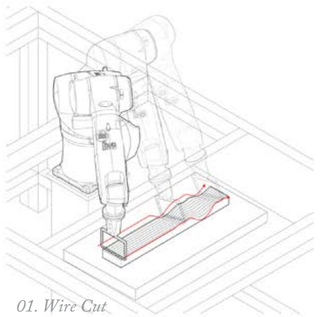


TILE A: ONE OPERATION

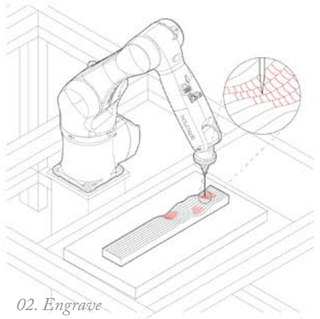


01. Wire Cut

TILE B: TWO OPERATIONS

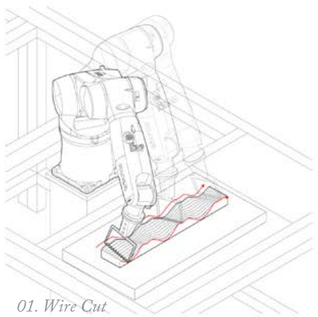


01. Wire Cut

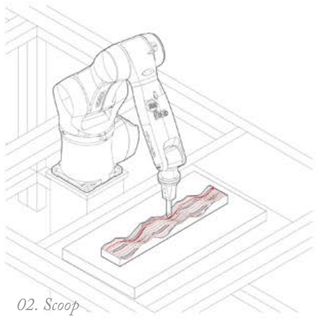


02. Engrave

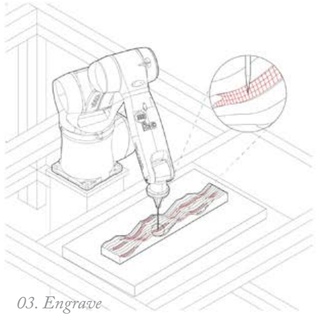
TILE C: THREE OPERATIONS



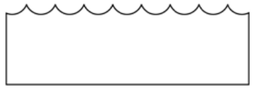
01. Wire Cut



02. Scoop

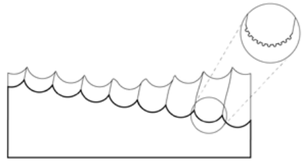


03. Engrave



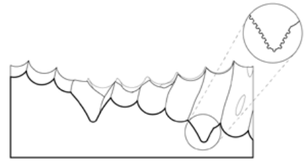
TILE A

A single straight run wire cut defines a cost-effective, 'industry standard' tile.



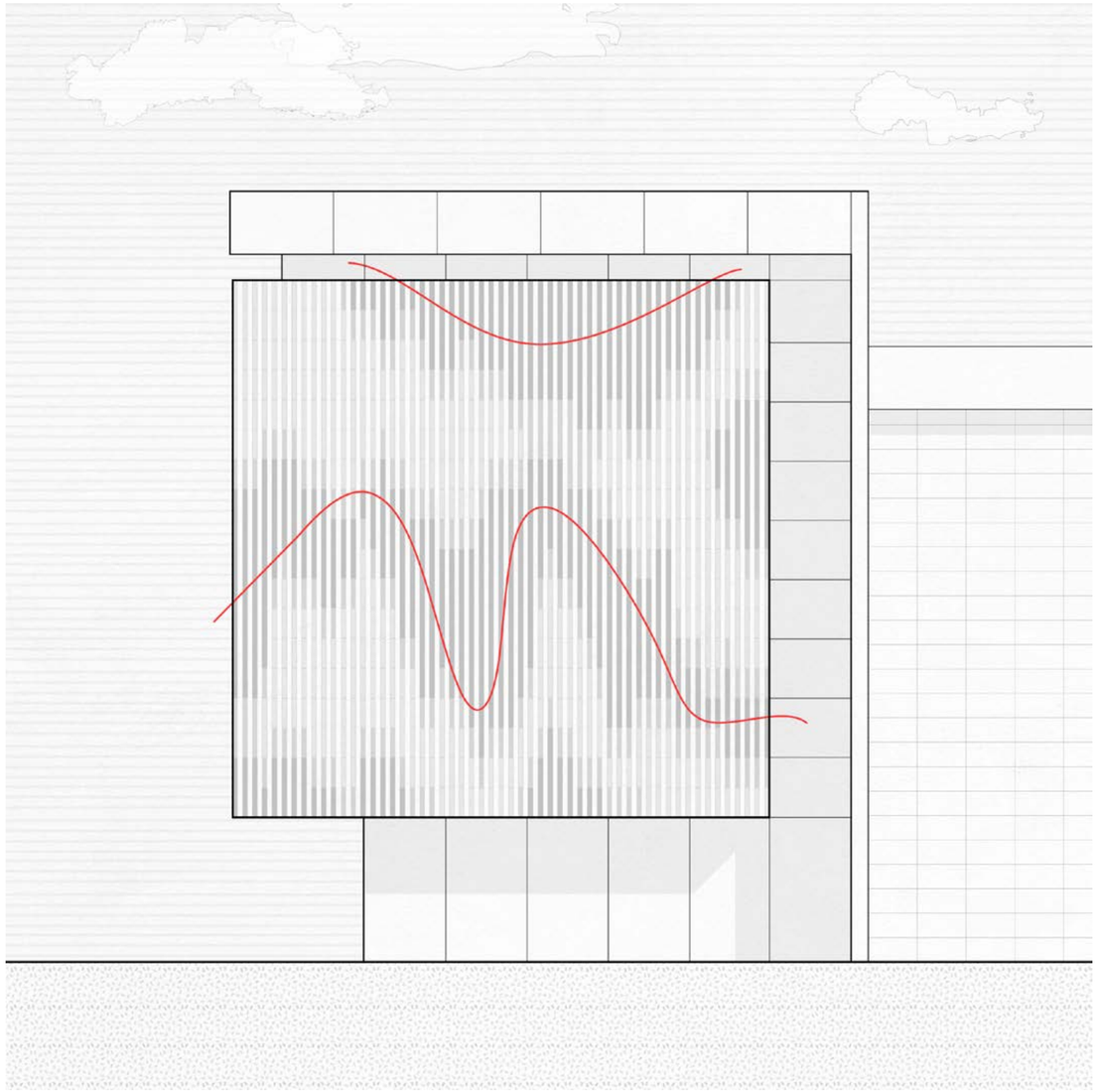
TILE B

Two compounding tool paths create a transtion tile. Engraved patches create zones for water retention and define transitional moss growth areas.



TILE C

Three compounding tool paths define deep, engraved grooves that allow for maximum water retention and moss attachment. These are the primary moss zones.



Distribution Script for Sample Tile Arrangement

Full Scale Mockups + Glazing/Moss Samples

07

WOOD + STEEL + CONCRETE

FABRICATED MATERIAL STUDIES

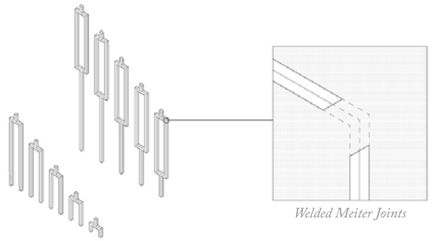
Spring 2019 | Construction | Dana Buntrock + David Jaehning

Three construction projects explore the three most common building materials: wood, steel, and concrete. The projects take fabrication as an opportunity to study beyond the poetics of space in design, shifting focus towards careful management of the limitations of building materials in real-world assembly. Each of the projects manages the imperfection and intractability of material to produce effective forms. In addition, each project provides a particular challenge in efficiency, in which excess material and cost is deemed objectionable.

Projects in collaboration with Nadine Aderhold, Isabella Kennedy, and Cuiting Yu

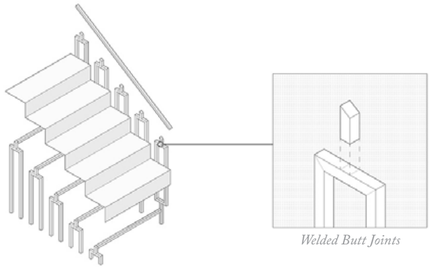
WOOD

The wood project is a 12' tall tower composed of various independent members with a cantilever to hold a minumum of 8 pounds. The tower is designed as a modular composition of 5 parts, with heavy emphasis on verticality and setbacks. The striping creates distinct parts that can slot into others seamlessley, utilizing both lap joints and cross-lap joints as a means of easy assembly/disassembly without the need for any nails or screws.



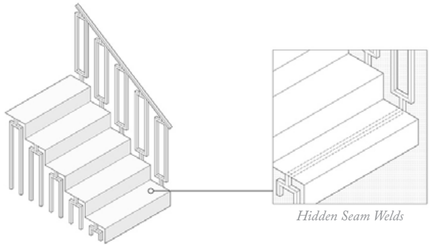
Steel Bars Establish Rhythm of 'Baby Head Rule'

Welded Meiter Joints



Sheet Metal + Support Bars Welded to Rhythmic Frame

Welded Butt Joints



Hidden Seam Welds

STEEL

The steel project is a half-size construction of a staircase that complies to code standards. The design is dicated by the 'baby head rule,' in which no balustrade opening can exceed 4 3/8." This constraint is used to establish harmony and rhythm to an otherwise standard architectural component. The balustrade is further emphasized by the sheet metal's reflectivity and by the shadows it casts.

CONCRETE

The concrete project is a canopy composed of four half-hyperbolic paraboloids. In order to obtain such a form, close care is taken into the construction of proper formwork, made of wood frames, fabric, and steel wire reinforcement. Furthermore, the project investigates color and texture as deifning qualities, with various samples studied prior to the final pour.