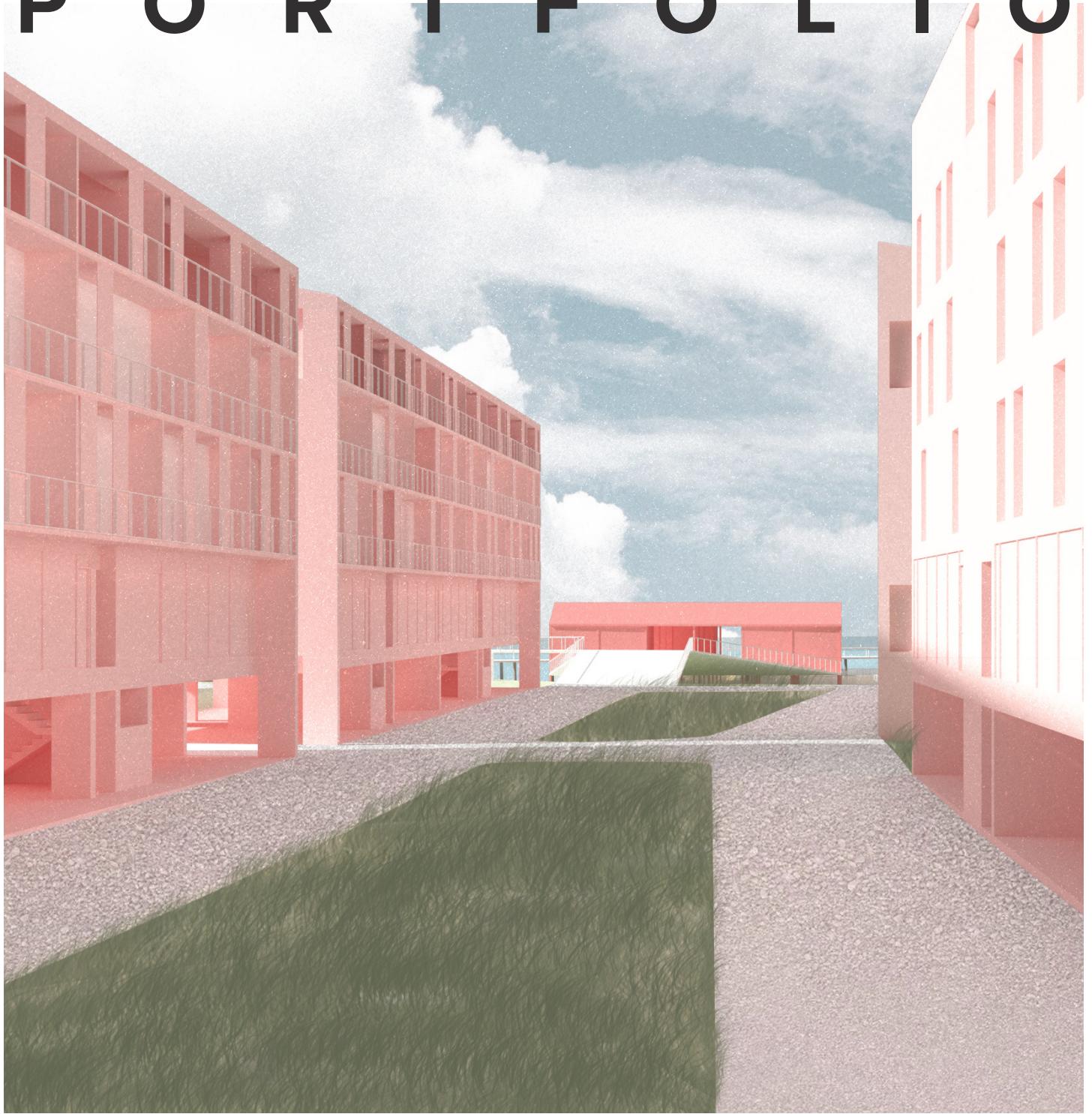


PORTFOLIO



Selected Works

2022- 2024

Bobby Zhao

Contents

01 Reimagining Casco Bay: Willard Beach	02
02 Cornerstone Muse	14
03 Urban Canvas	26
04 Miscellaneous	40



01

ENVISION RESILIENCE CHALLENGE

Reimagining Casco Bay: Willard Beach

Ecological Practice

Instructor: Kristine Stiphany

Partners: James Metzger & Anshuka Ahire

Fall 2024

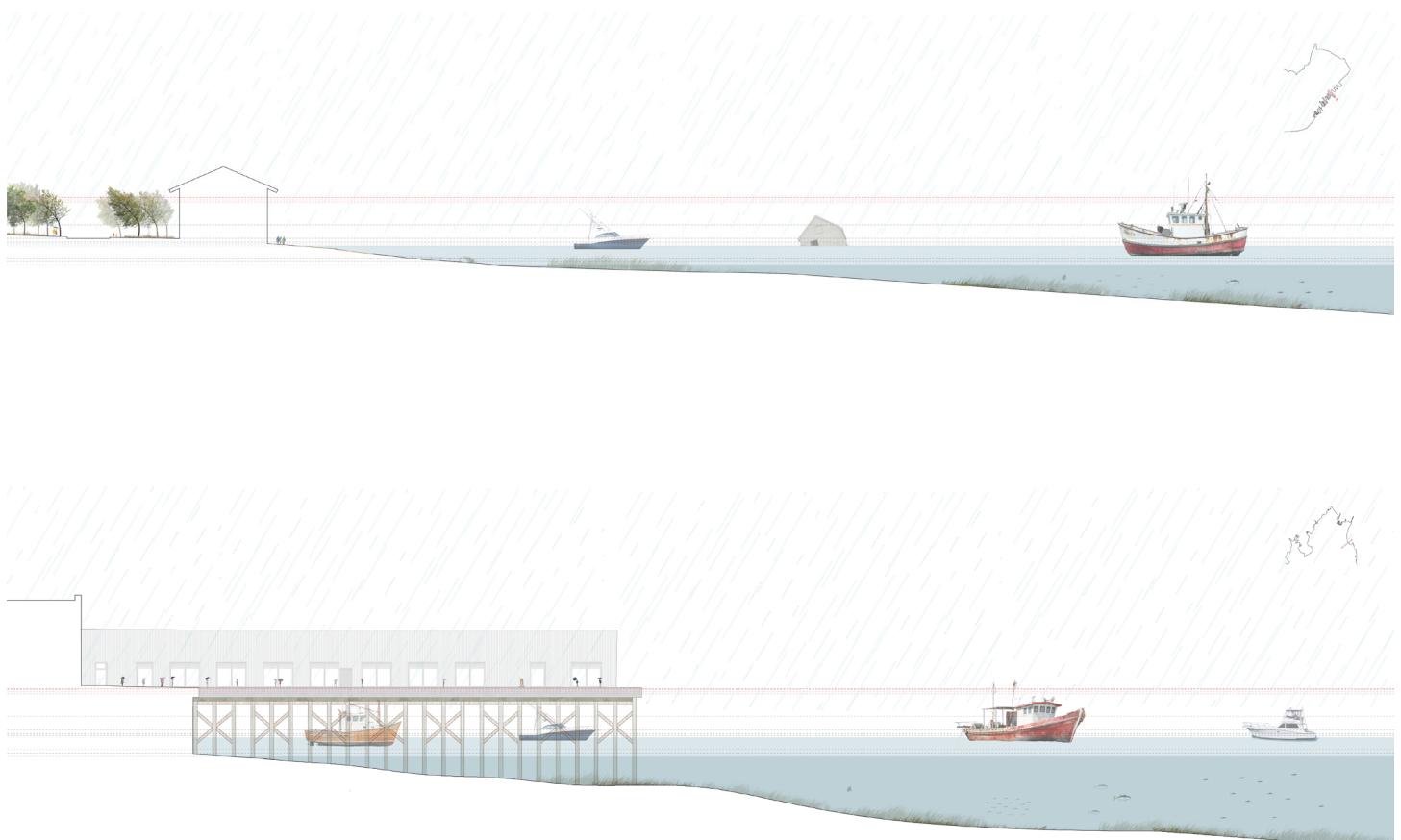
Global warming poses significant challenges to coastal cities, exposing vulnerabilities in traditional urban development models. There is now a growing emphasis within the disciplines on living systems as the foundation for more resilient adaptive reuse models, better equipped to address the uneven development and complex threats that urban areas face today.

Concentrated on Willard Beach in South Portland, one of the hardest-hit areas during the 2024 January storm. This location, characterized by its diverse and unique appeal, combines beach infrastructure, amenities, housing projects, and accessibility needs. The proposed solutions for this area include the creation of two working and recreational piers that allows access to the water even after flooding, the implementation of gabion wall platforms to prevent erosion while serving as community spaces that can eventually transform into seabeds, and the introduction of elevated platforms to maintain beach accessibility even when submerged. Additionally, reallocated housing complexes have been designed to provide accommodations and reliefs for individuals displaced by rising sea levels.



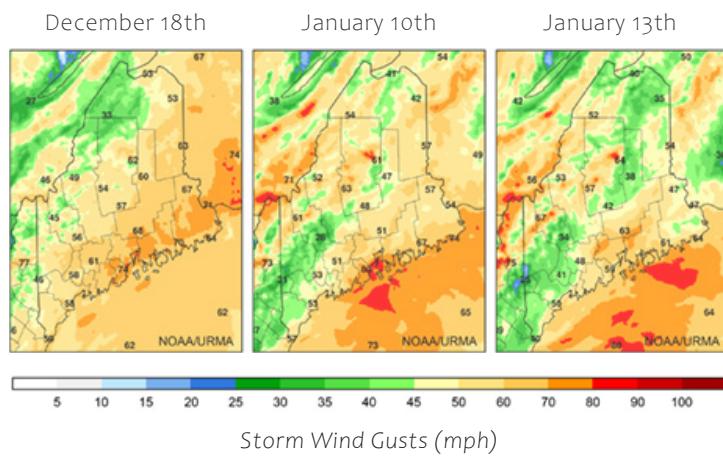
Sea Level Rise In Portland

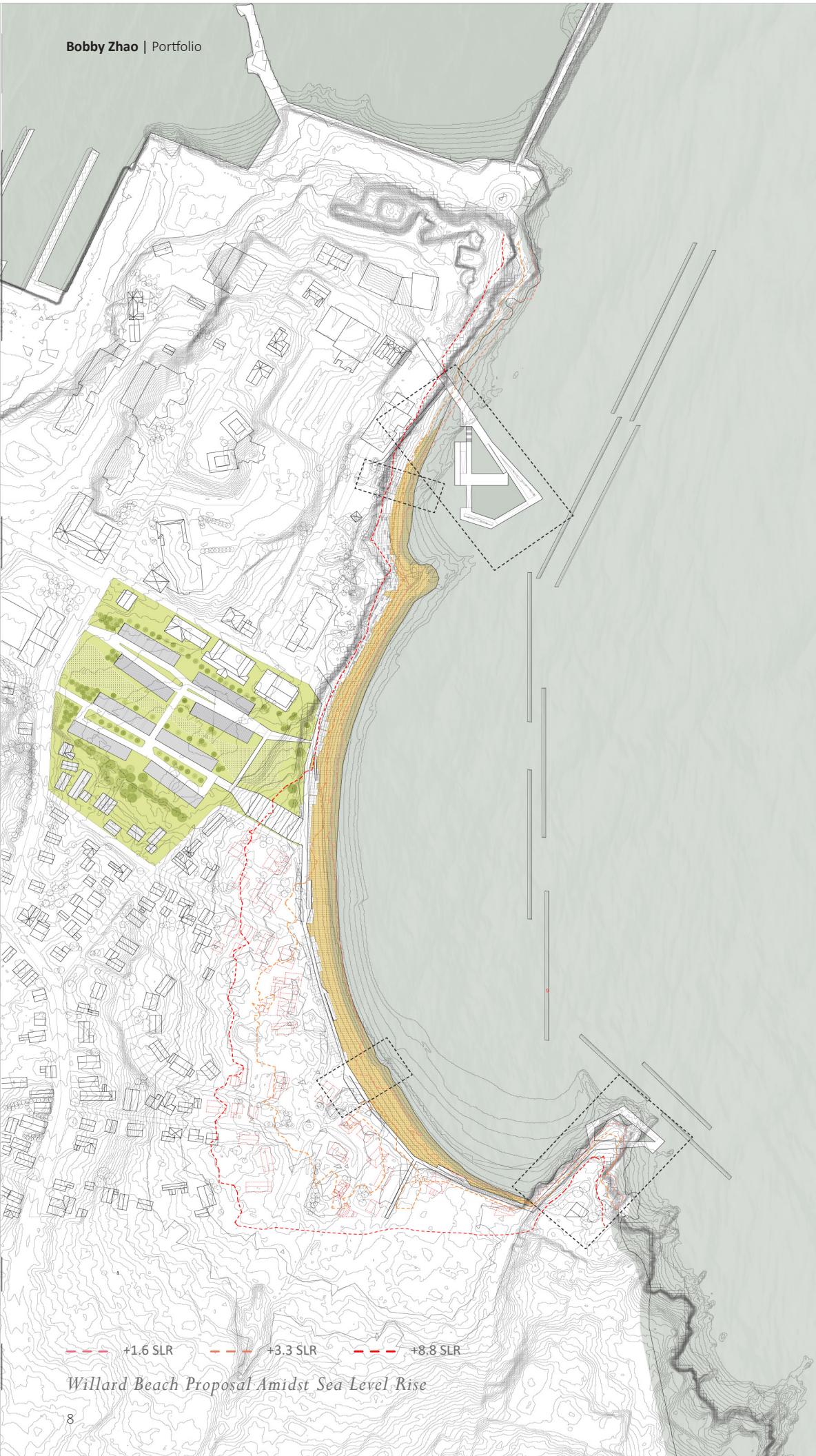
This historic waterfront community on the Gulf of Maine's Casco Bay is experiencing rising sea levels at three to four times the global average, a direct result of global warming driven by increasing greenhouse gas emissions. This rapid rise is causing record high tides, frequent flooding, and the destruction of historic structures and wharves, highlighting the urgent need for climate resilience in vulnerable coastal areas.

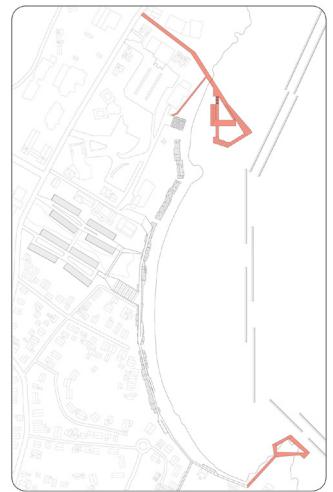
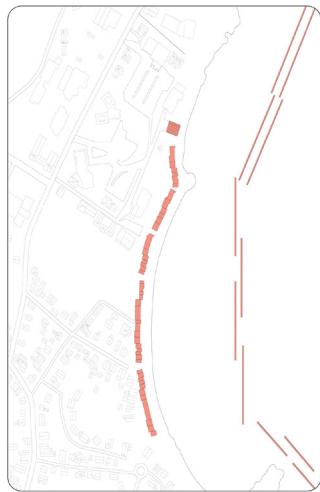


Portland January 2024 Storm

On January 10, 2024, seasonal high tides and heavy rainfall hammered Maine's coastline, causing record flooding and leaving coastal communities with extensive flood damage and repair needs. Record-breaking water levels were driven by the storm coinciding with the new moon, which amplifies tides.







Project Phases

01. Gabion Infrastructures

Coastal protection, sand dunes & berms. Future seabed & habitats.

02. Public Housing

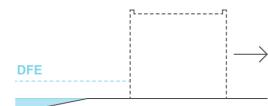
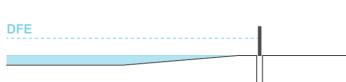
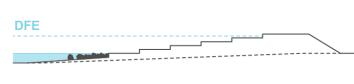
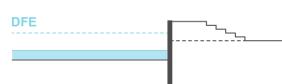
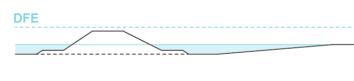
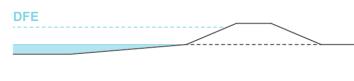
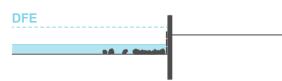
Affordable public housing, public infrastructure & amenities.

03. Elevated Walkway

Accessibility, habitat & terrain. Connection to water & frameworks.

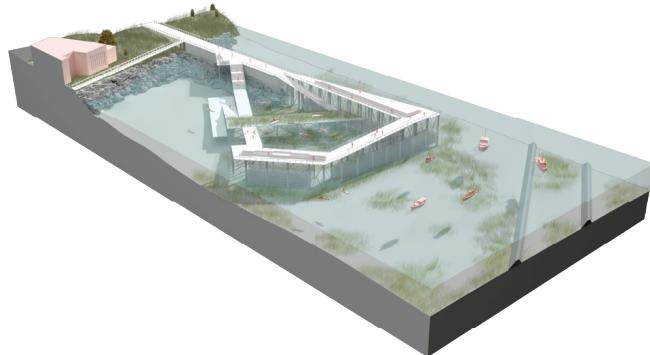
04. Community Piers

Living reef & elevated harbor. Oyster farm & marine growth.



Mitigation Strategies

Envision resilient edge mitigation strategies designed to combat sea-level rise, including breakwaters, floodgates, landform modifications, seawalls, and building adaptations.



01

Southern Maine Pier For Leisure

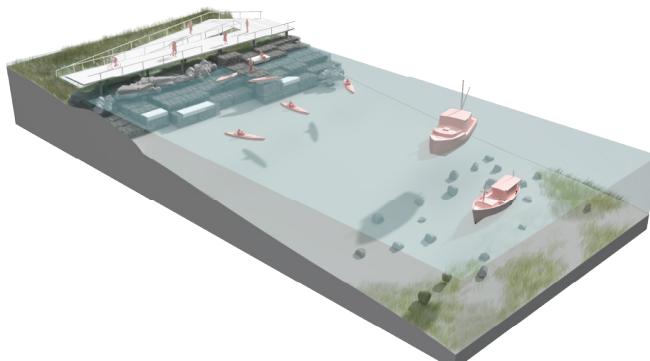
Encourages water-based activities, supports marine life, and fosters a strong community bond with the waterfront.



02

Fisherman's Point Pier

This landmark honors the community's history and resilience, symbolizing its enduring connection to the sea.



03

Beach Accessibility Pathway

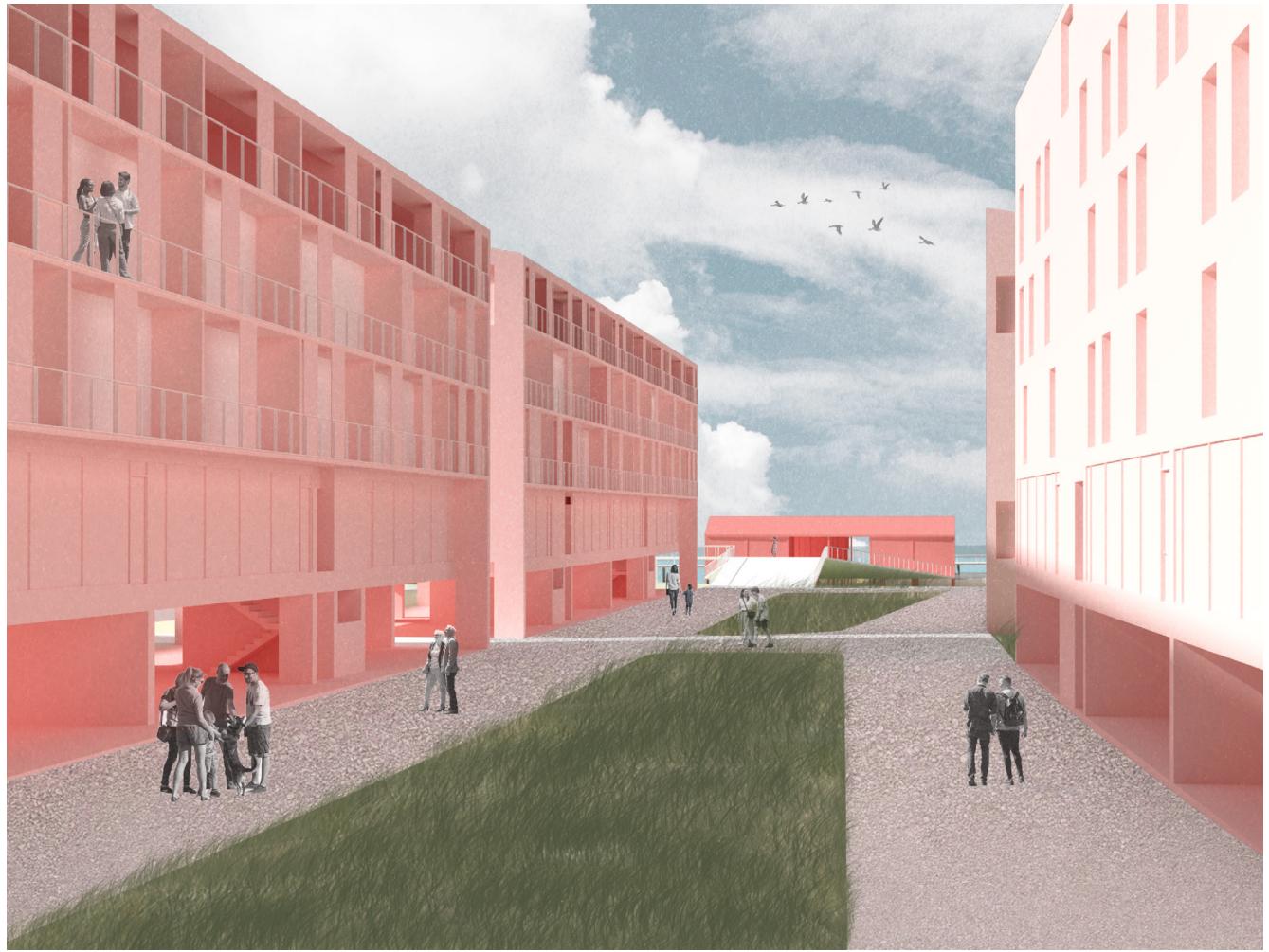
Designed to adapt to flooding, it will also serve as a connection for water activities, ensuring accessibility, resilience, and community engagement.



04

Gabion Wall Platform

Over time, the structure will transform into a seabed, fostering marine life and blending functionality with ecological restoration.



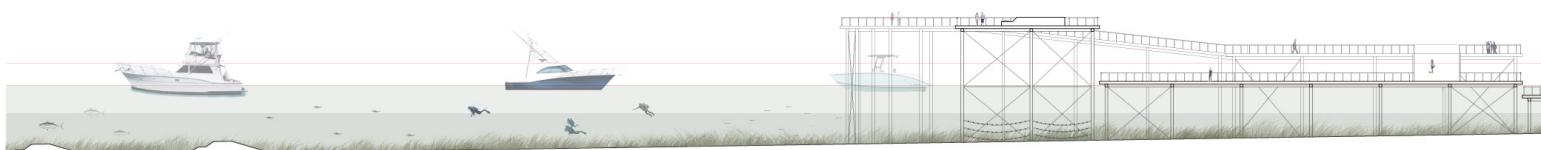
Willard Heights: Affordable Housing Proposal

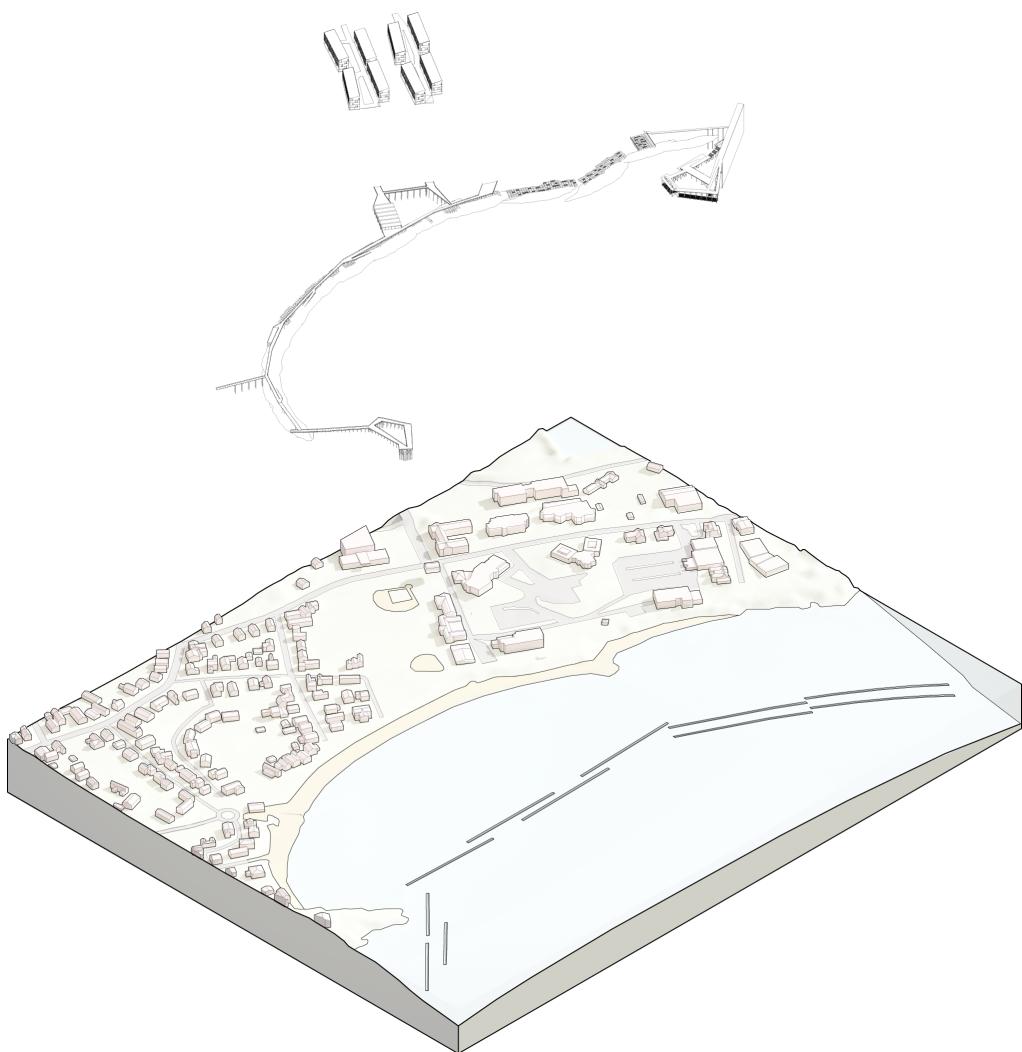
As sea levels rise and displace communities, this affordable housing proposal aims to replace homes lost to flooding while restoring space to areas now underwater. It balances resilience with equity, ensuring housing security and giving back to the built environment.



Living With The Tides

The vision of this project is to create a vibrant, resilient community that works in harmony with the natural resources of Willard Beach. By incorporating elements like breakwaters, community piers, elevated walkways, restored sand dunes, and affordable housing, the design addresses the challenges of sea level rise.





Coastal Resilience

Willard Beach Resilience: Structure will transform and adapt.





02

INTERGRATED DESIGN: THE CITY OF ARTS Cornerstone Muse Museum

Graduate Design Studio

Instructor: Annette LeCuyer

Partners: James Metzger

Spring 2024

The proposed museum design, located at the intersection of Allen Street and Delaware Avenue in Buffalo, represents a bold and innovative addition to the cityscape. It seeks to enrich the cultural landscape while revitalizing the urban fabric. At the heart of the design is the striking architectural gesture of lifting the building's corners, a deliberate move that serves multiple purposes.

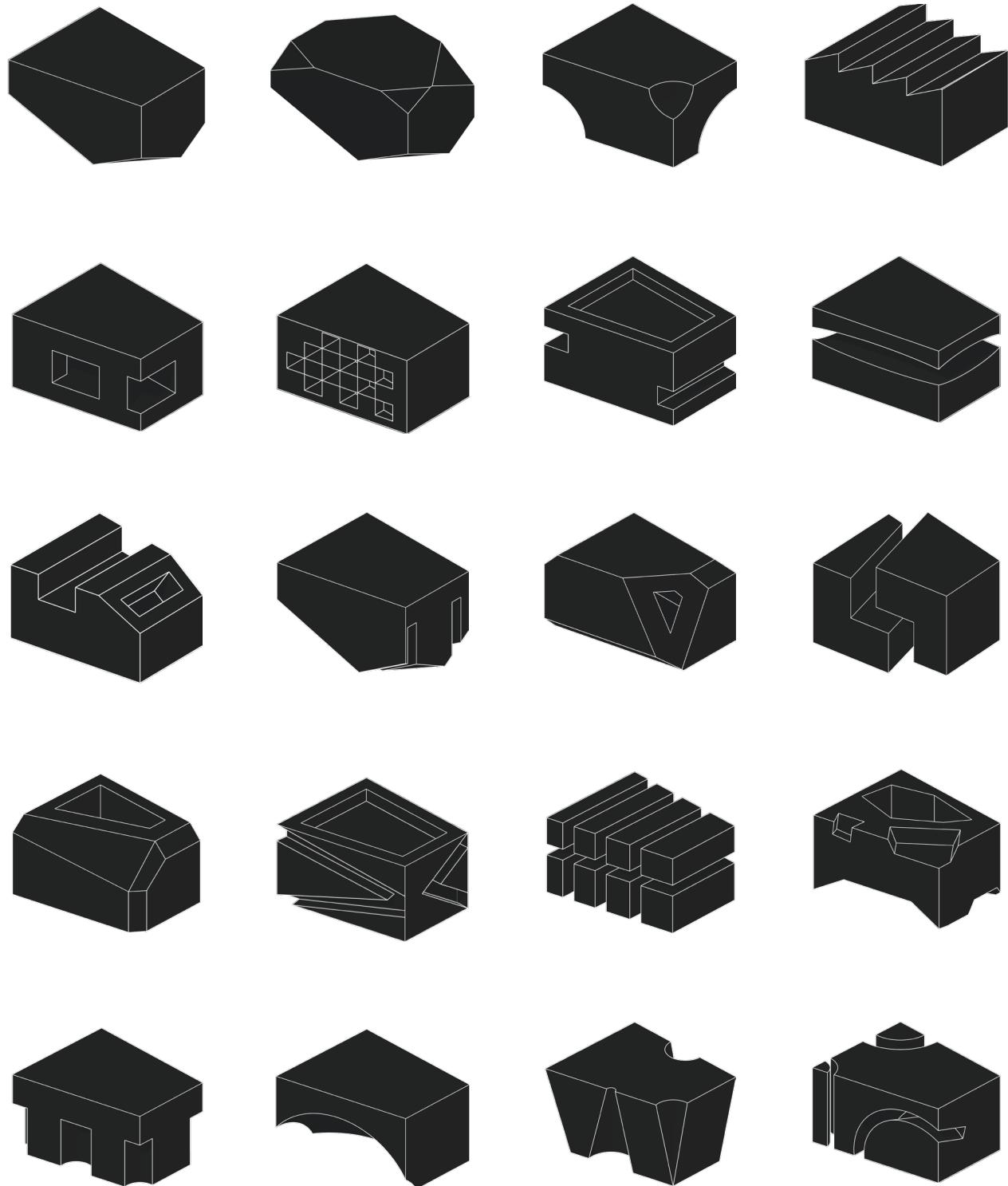
One of the key objectives is to create inviting and functional spaces for the community. By elevating the corners, the design opens up dynamic, sheltered areas at street level, offering pedestrians visually engaging spaces to gather and interact. The front of the museum is thoughtfully set back, forming an exterior atrium that acts as a transitional zone between the street and the interior galleries. This atrium not only enhances the building's aesthetic appeal but also functions as a versatile public space, capable of hosting events, exhibitions, and community activities. The result is a design that integrates its surroundings while fostering connection and engagement.



The Core

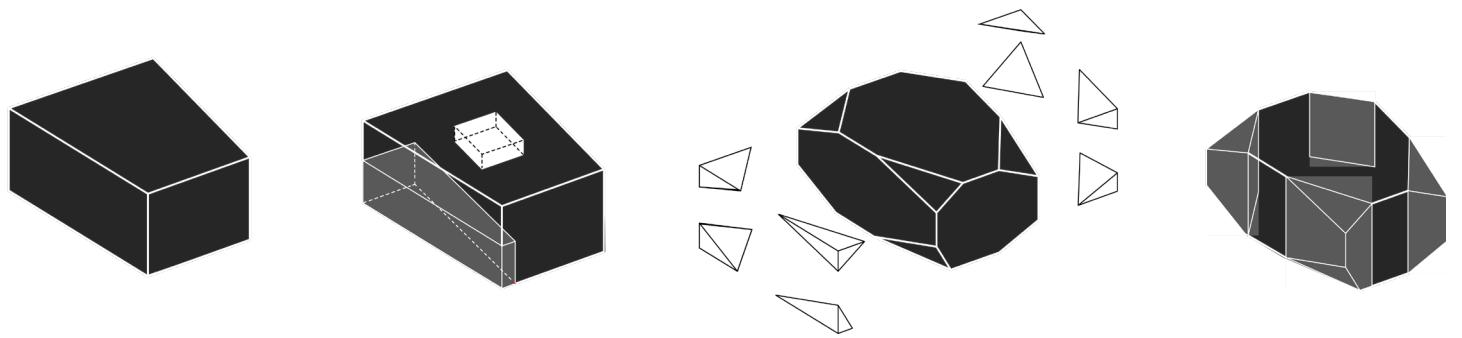
A dense urban environment, characterized by a mix of high-rise and residential buildings, surrounds the site.

The museum is designed to seamlessly integrate into this interconnected core, complementing the vibrant cityscape while enhancing the area's dynamic character.



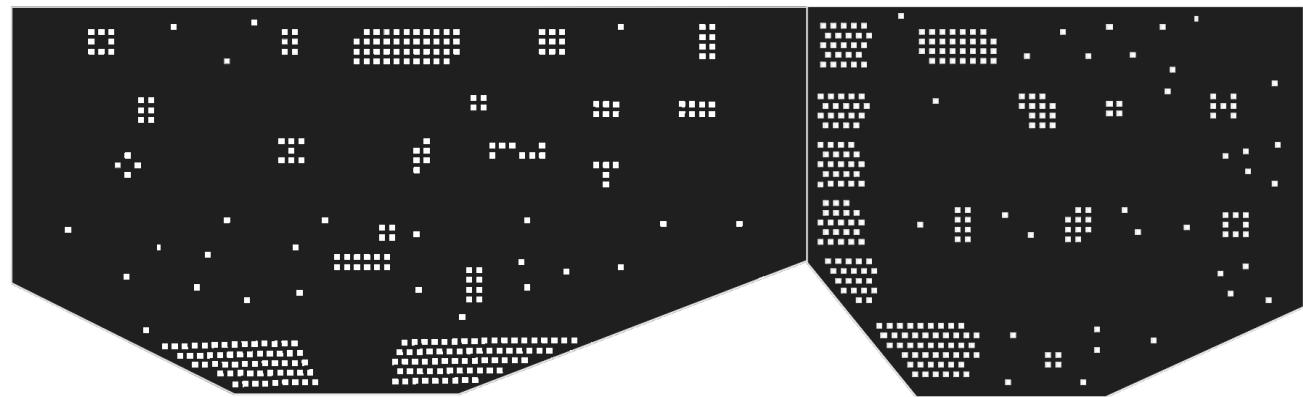
Form Finding

Exploring different cuts of corners and voids.



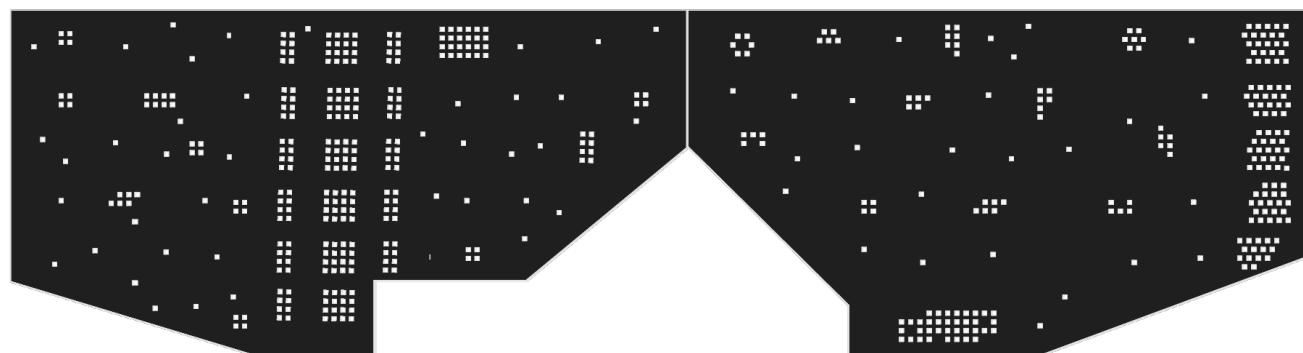
Parti

Lifts the building's corners to create welcoming public spaces that give back to the community, while the site is set back to form an interior corridor where art and people can gather. Additional voids at the corners introduce light chimneys, allowing natural daylight to flood into the museum, bringing life and vibrancy to the art collections. At the center, the rooftop is carved out to create a naturally ventilated, hybrid event space and a secluded sculpture garden.



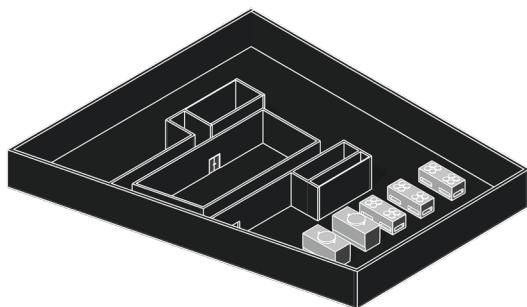
North & West Façade

More perforations along the streets, creating moments of small openings that accommodate offices, classrooms, and visitor spaces, fostering connectivity and engagement with the surrounding urban environment.

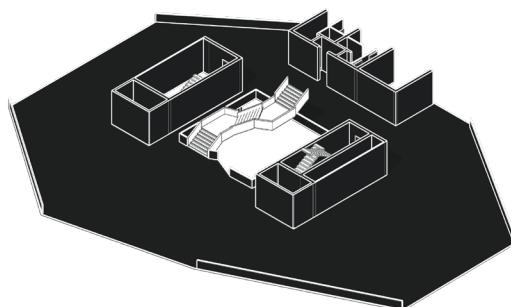


South & East Façade

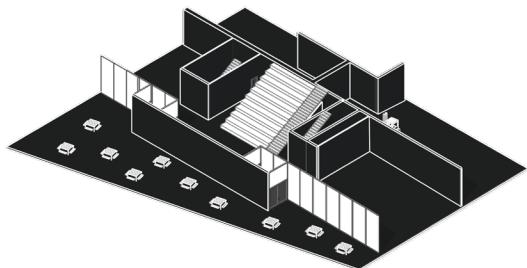
More privacy and solidity, with fewer perforations, while highlighting the building's verticality through the alignment of services and elevators, creating a sleek and functional aesthetic.



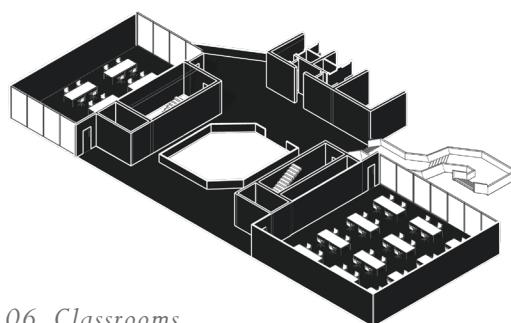
01. Services & HVAC Systems



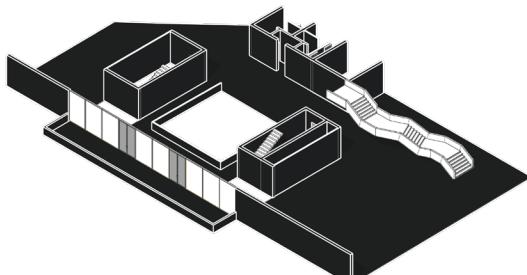
05. Gallery Type 2



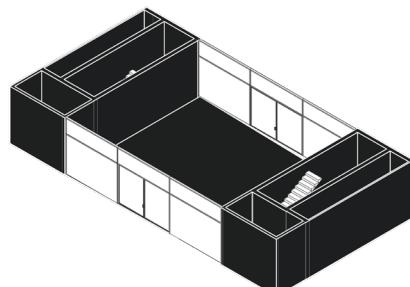
02. Ground Floor



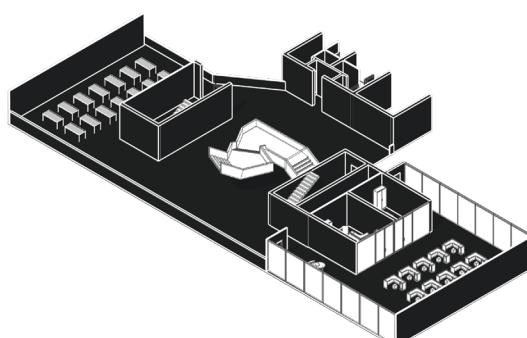
06. Classrooms



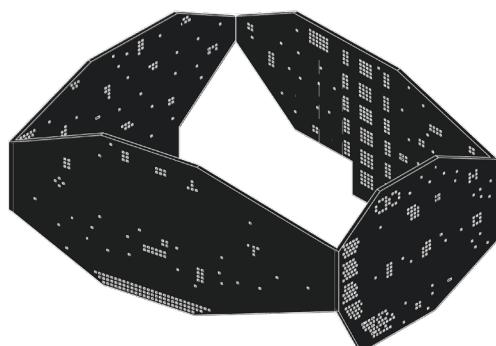
03. Gallery Type 1



07. Event Space & Sculpture Garden



04. Digital Resource & Office

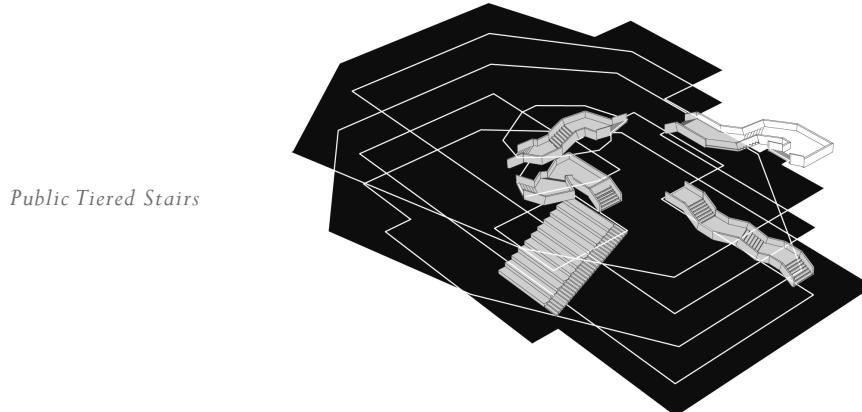


08. Façade

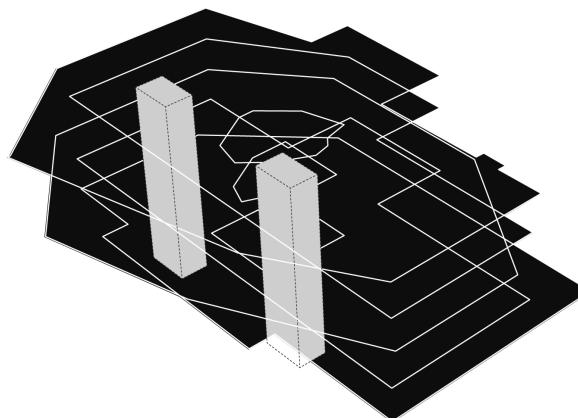


Exterior Atrium

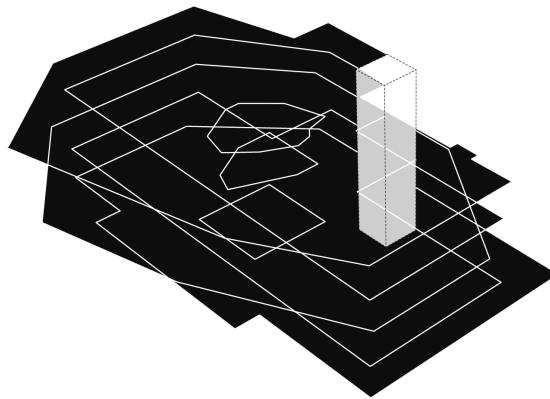
Engages the street front, returning space to the community while emphasizing the building's verticality through a tall void. This feature allows for the creation of an on-street sculpture garden, showcasing a variety of sculptures and artworks.



Public Tiered Stairs



People Elevator



Art Elevator

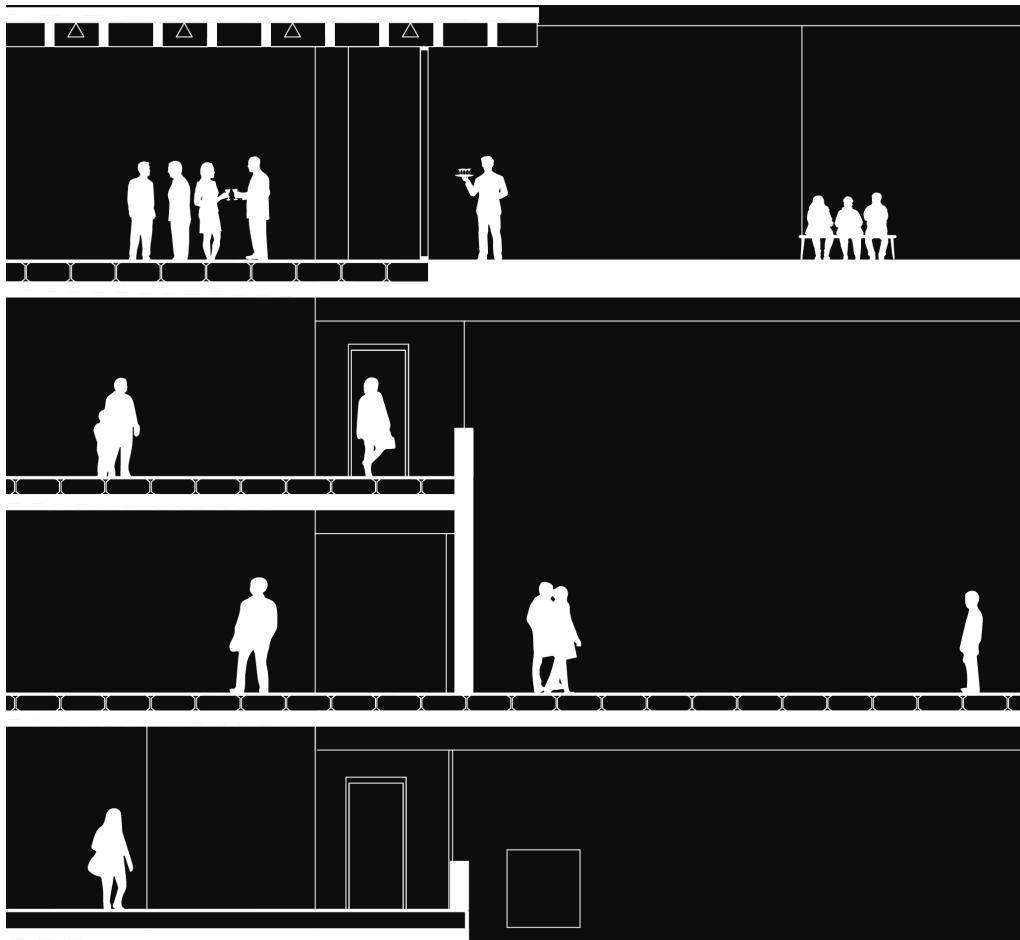
Circulation

The elevators and service cores are stacked to maximize efficiency and provide structural support, while also doubling as additional art spaces along the walls. The public tiered stairs lead visitors directly to the first gallery, creating an inviting entrance. From there, visitors are encouraged to explore and wander through the museum, discovering the wandering stairs that guide them upward to the next levels.



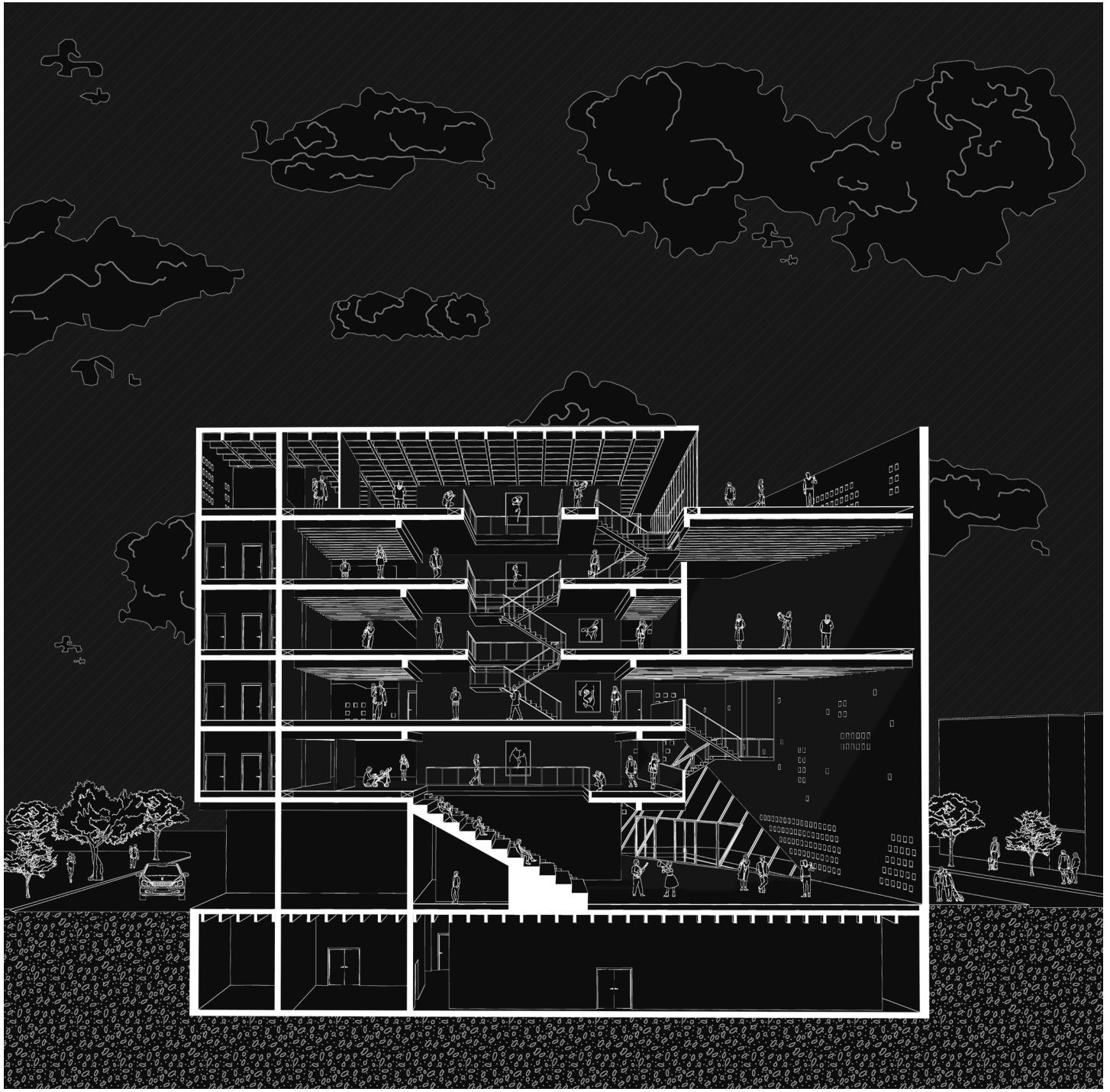
Rooftop Terrace

A carefully carved-out design that creates a naturally ventilated, hybrid event space paired with a secluded sculpture garden. This unique area serves as a retreat, offering visitors a peaceful escape from the bustling city streets below.



Light Chimneys

Located at each corner of the museum, the column of lights shines inward, filling the galleries with warm, natural daylight.



The Cornerstone Muse Museum



03

CENTER FOR SUSTAINABLE DYING

The Death of Street Arts: The Urban Canvas

Graduate Design Studio

Instructor: Adam Thibodeaux

Fall 2023

The Jesse Kregal Pathway is home to a diverse array of street art, which served as a key inspiration for the Black Rock Urban Canvas Center. The surrounding neighborhood, adjacent to the site, also features numerous street art pieces, particularly along a lively alleyway where people gather to dine. However, the authenticity of these commercial street art installations is somewhat diminished, as they are often created by commissioned artists, straying from the raw, unfiltered essence of traditional street art culture.

The goal of the Black Rock Urban Canvas Center is to create a space where stories are told and narratives are etched into its very fabric. It aims to serve as both a canvas for personal self-expression and a platform for thought-provoking, sensitive works that spark meaningful conversations and reflections along the way. This center aspires to become a beacon of artistic innovation, where every stroke, color, and design celebrates the power of self-expression and inspires dialogue. Through its vibrant tapestry, it seeks to leave a lasting impression on all who engage with it.



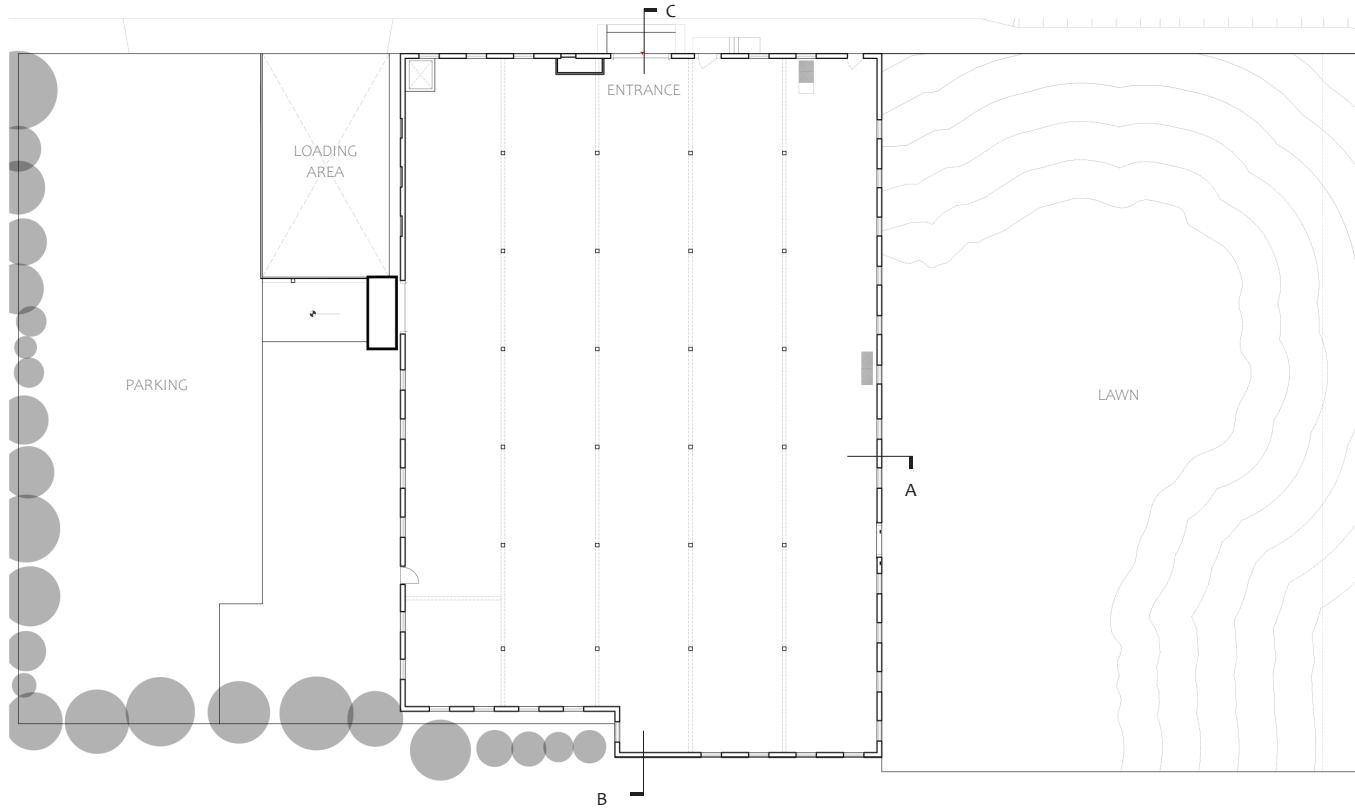
Hidden Street Arts

The Jesse Kregal Pathway, celebrated for its vibrant display of street art, offers a lively experience for pedestrians and cyclists as they travel along its green trail.



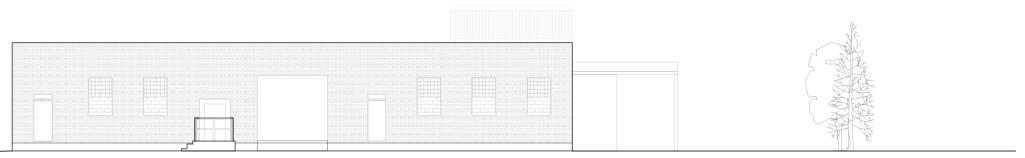
Black Rock: Chandler Street

Black Rock has been a central hub for Buffalo's music and entertainment scene, even before the revitalization of Chandler Street. Now, with its redevelopment, Chandler Street has blossomed into a lively destination, featuring vibrant murals, craft breweries, and a diverse food scene, embracing the neighborhood with its rich energy and creativity.

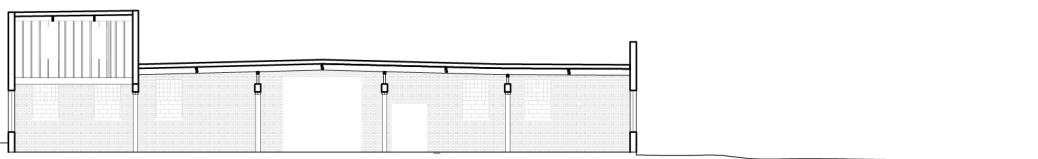


Existing Conditions

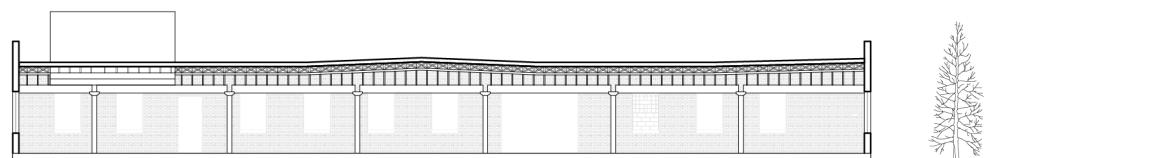
Currently, the site features an empty warehouse situated on bustling Chandler Street in the Black Rock neighborhood. Surrounded by bars, restaurants, and a vibrant residential community, the location offers a dynamic mix of activity and potential for redevelopment.



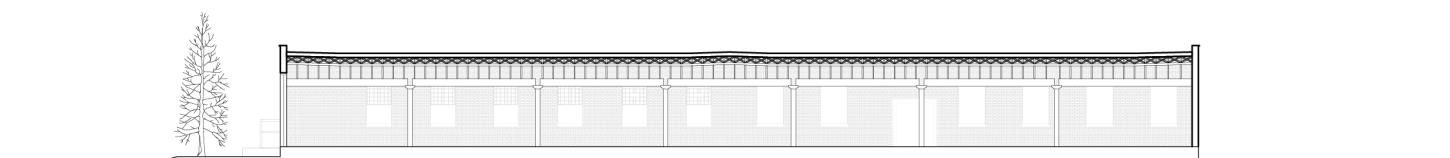
North Elevation



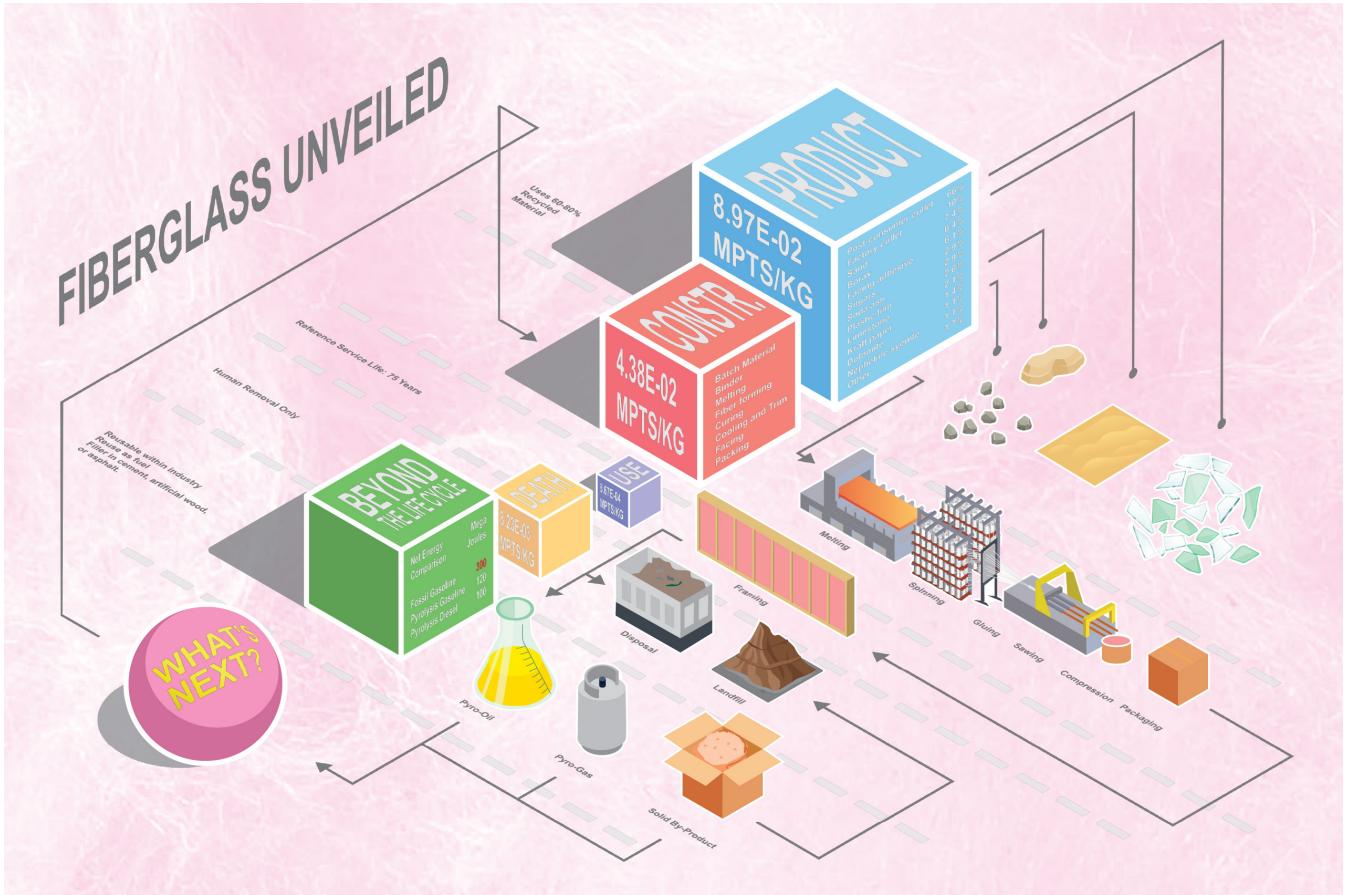
Section A



Section B



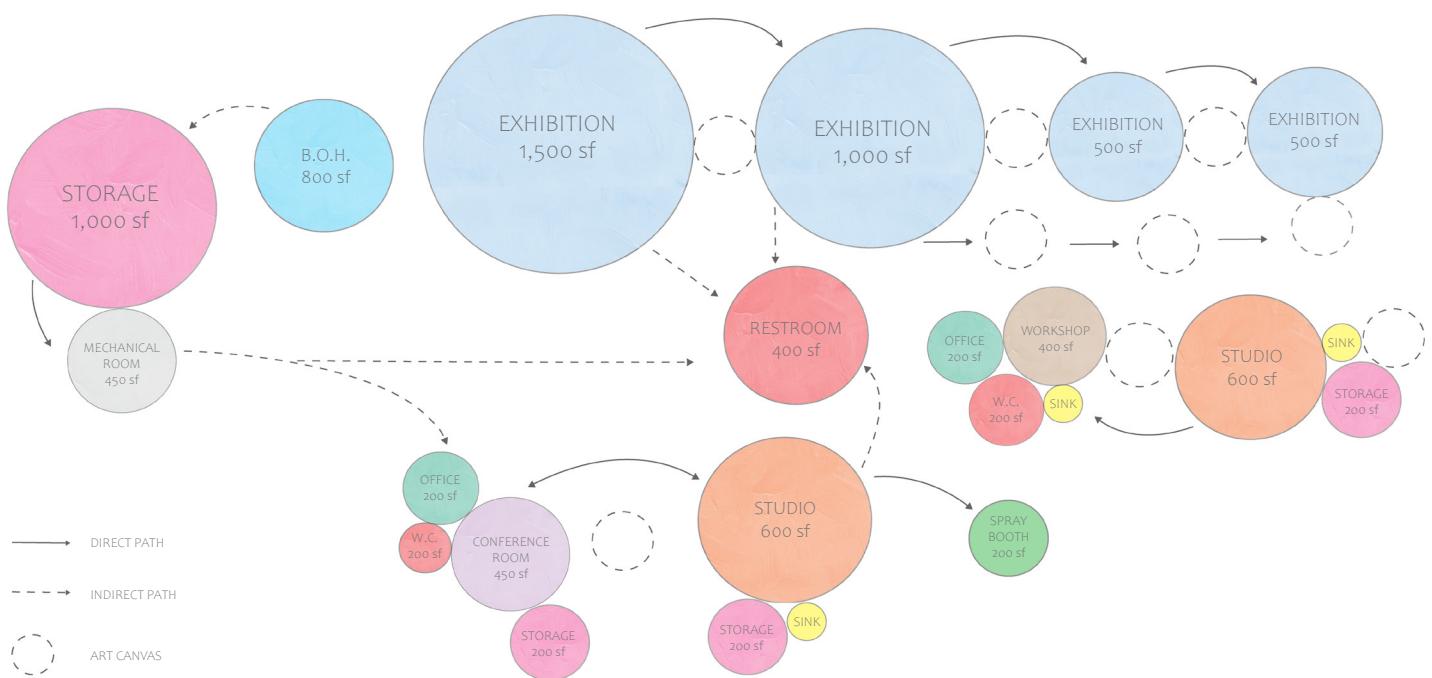
Section C



Black Rock: Chandler Street

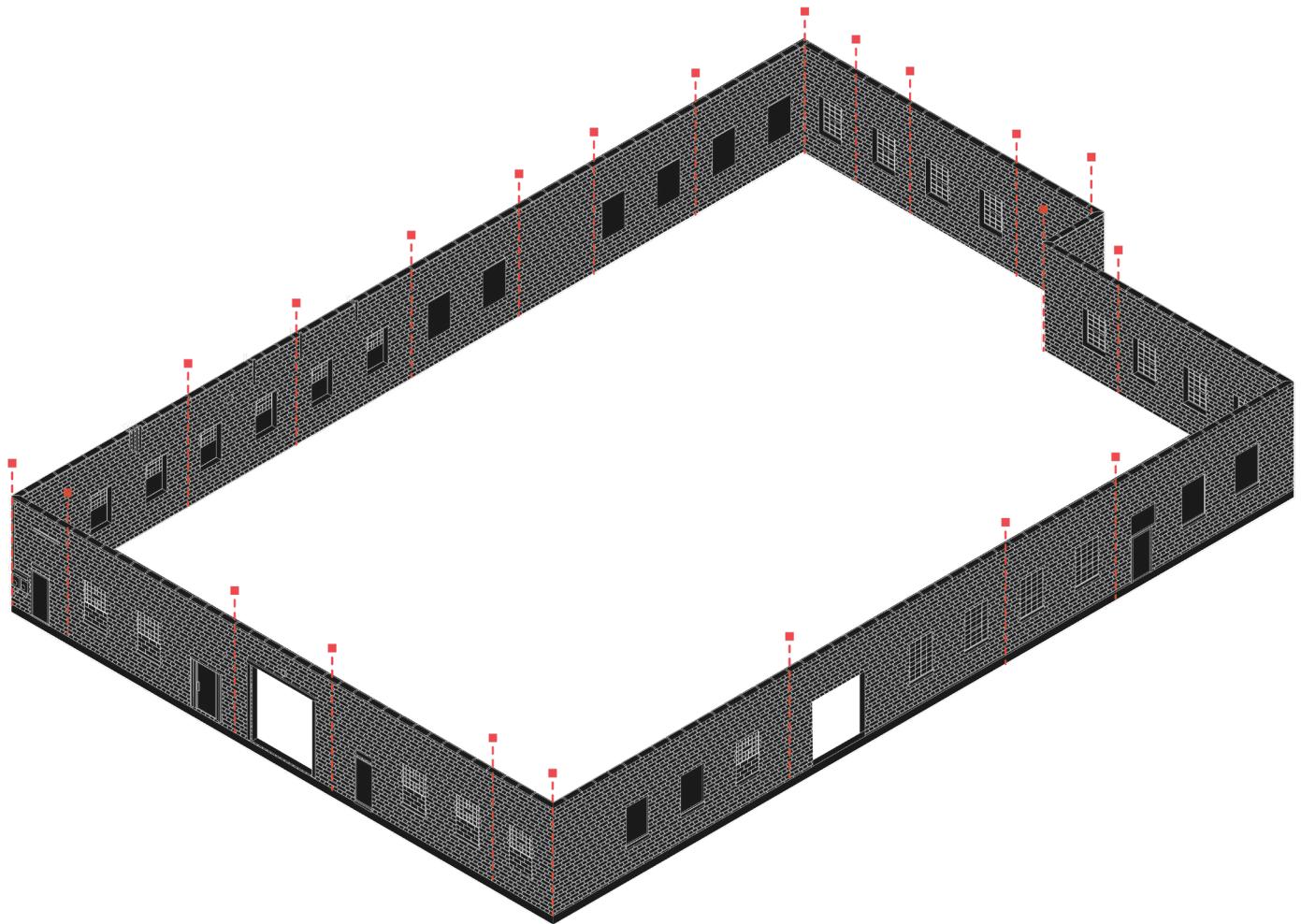
(In Collaboration With Safayath Rafat)

An exploration into the "life cycle" of a material, tracing its journey from creation to its eventual end. By examining how materials can be transformed, readapted, or given new life, it ensures a way in which they can continue to thrive, contributing to a more sustainable and resilient built environment.



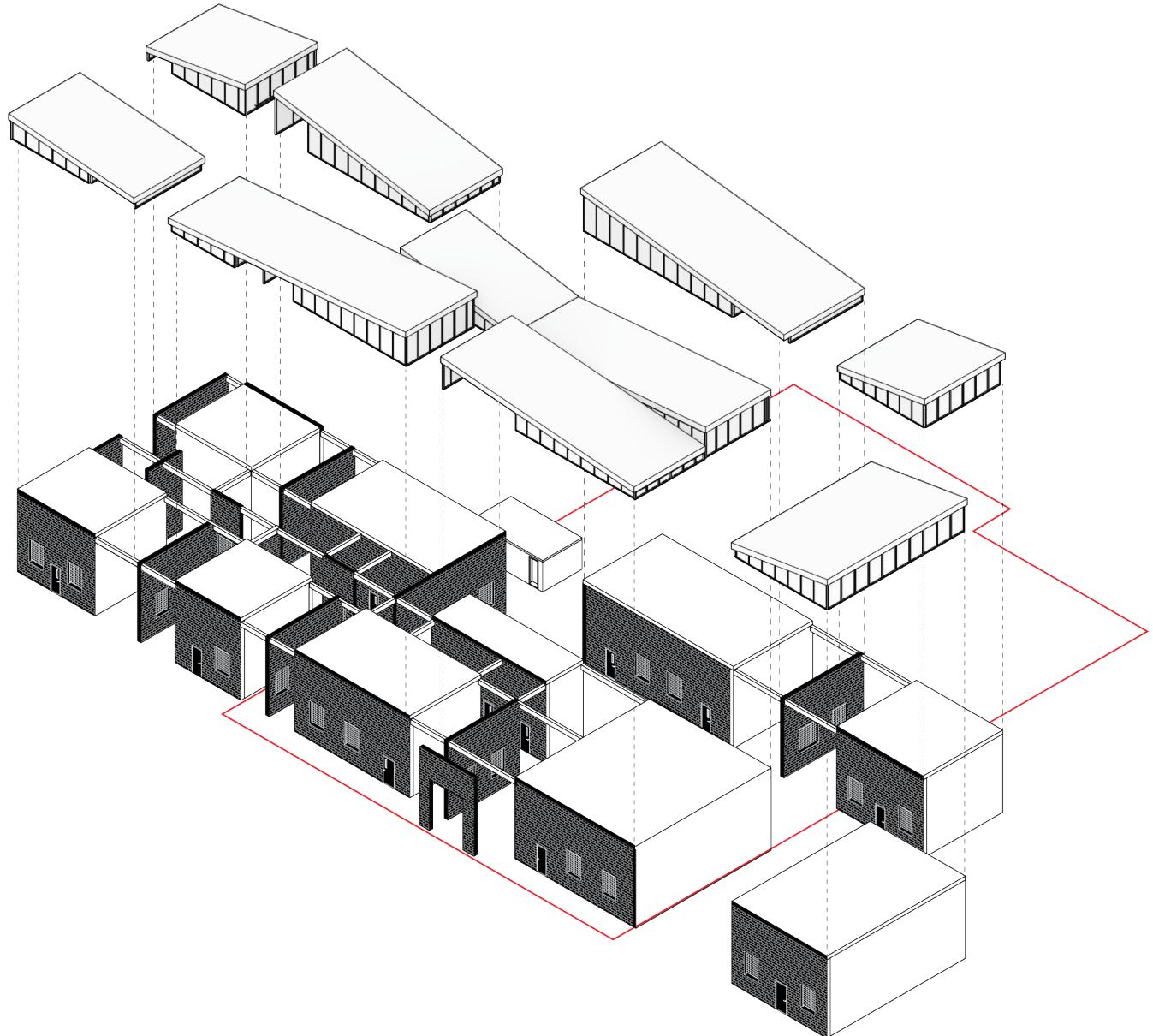
Bubble Diagram

A bubble diagram that was used to explore and illustrate the initial ideas for the site, providing a breakdown of the programs it will include. It also maps out circulation pathways and key points of interest, showcasing how people will navigate and interact with the space.



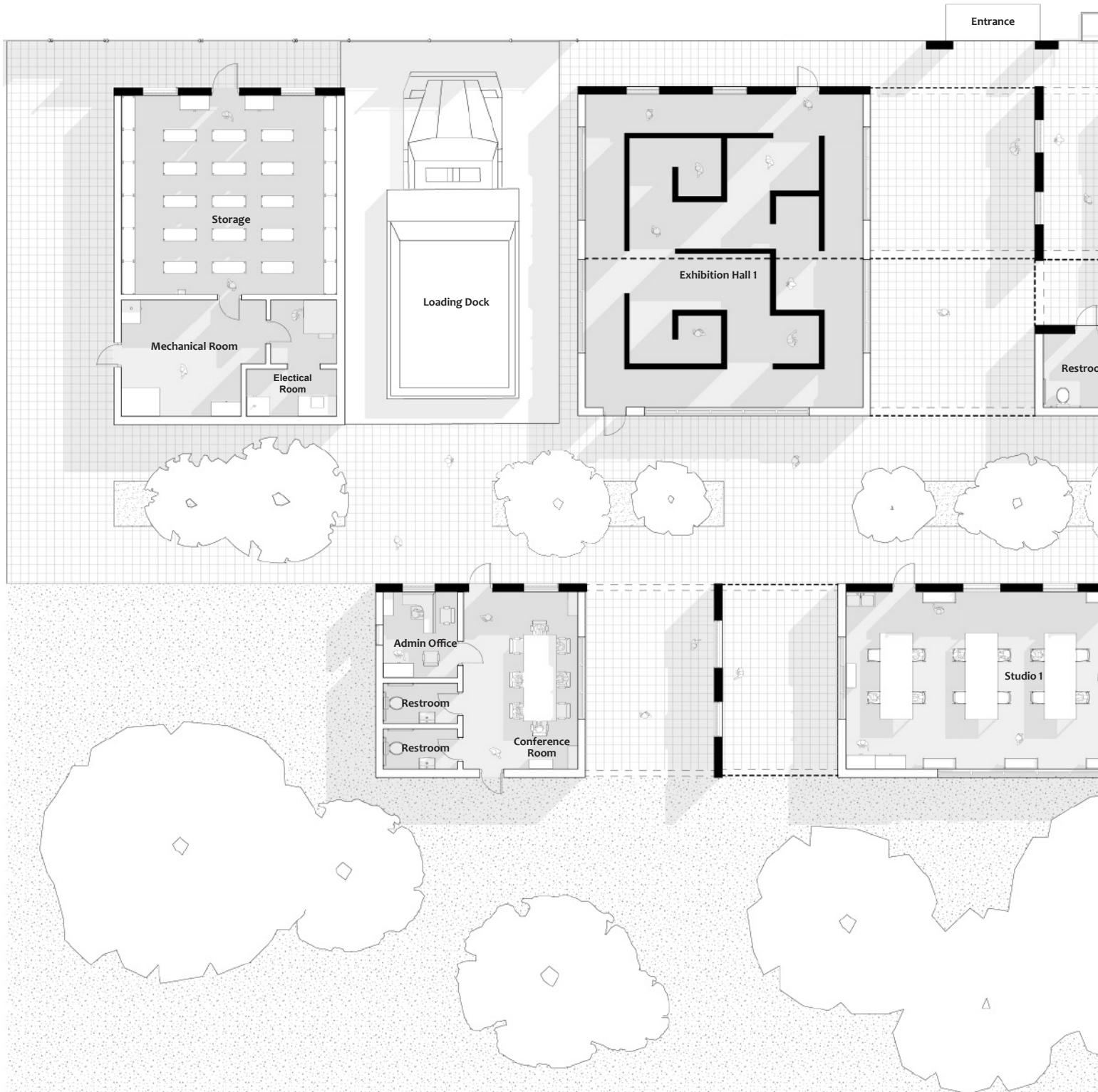
Evolving Walls

The project explores the idea of repurposing of a warehouse and incorporating it into new structures. This is done to allow more freedom of movement and creative possibilities. The initial idea is to create a maze of canvases where people can paint and express themselves. Over time, new walls are added to expand the space, making it more permanent and functional while keeping its interactive and artistic nature.

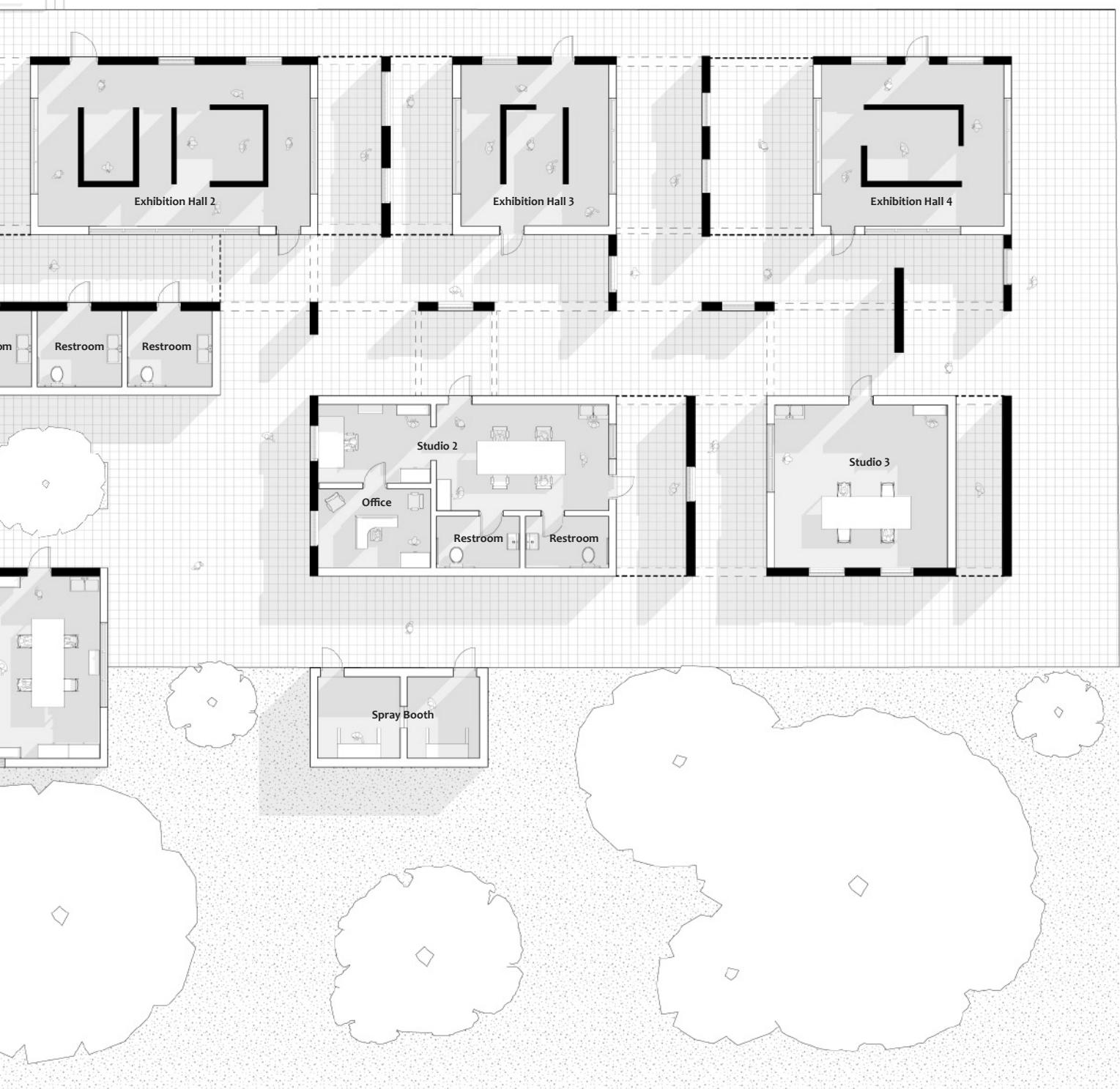


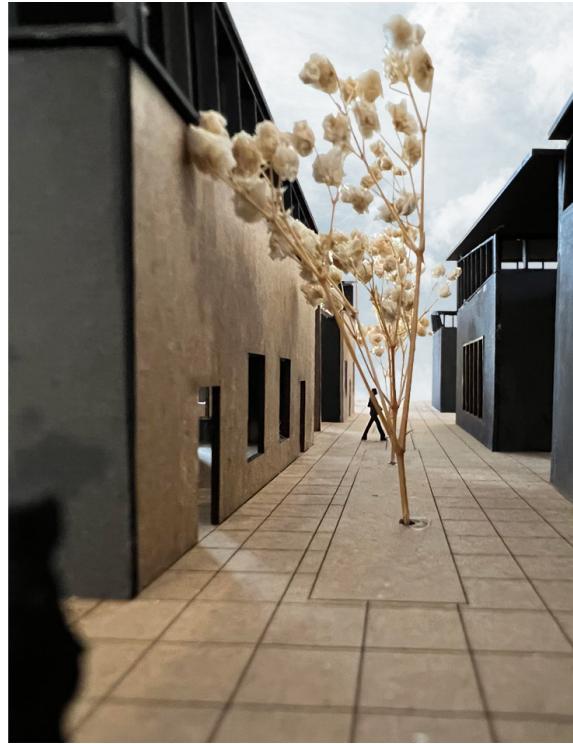
Living Canvases

The existing walls are colored black, contrasting with the white of the new construction. The structural bracing incorporates recycled butterfly trusses from the original warehouse, blending historical elements into the design. Every wall is open for painting, inviting creativity and interaction. Rather than confining activities to a specific area, the entire site is accessible and explorable, encouraging a sense of wander and discovery. This design transforms the space into a dynamic, ever-evolving canvas where art and architecture can come together.



Site Plan (0 2 4 8 ft)

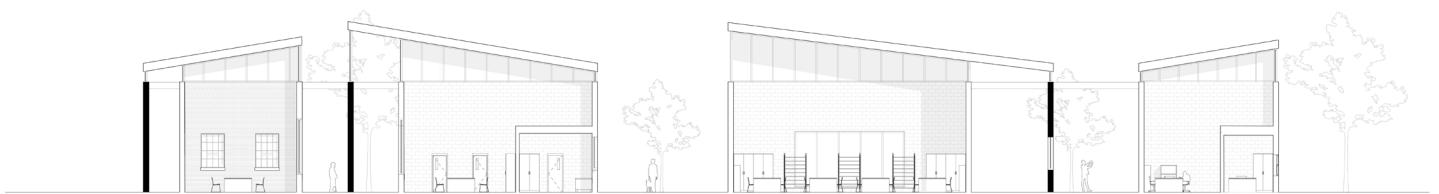
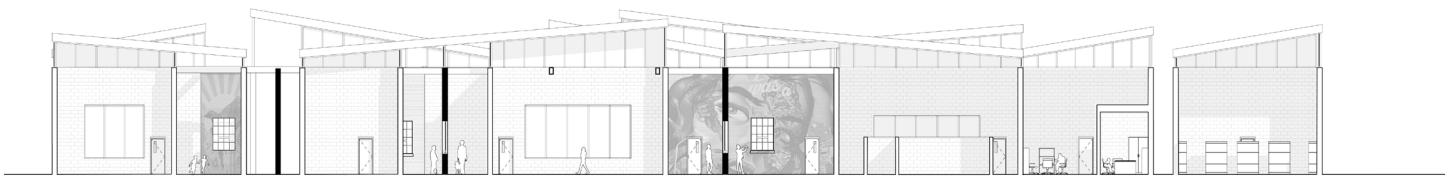


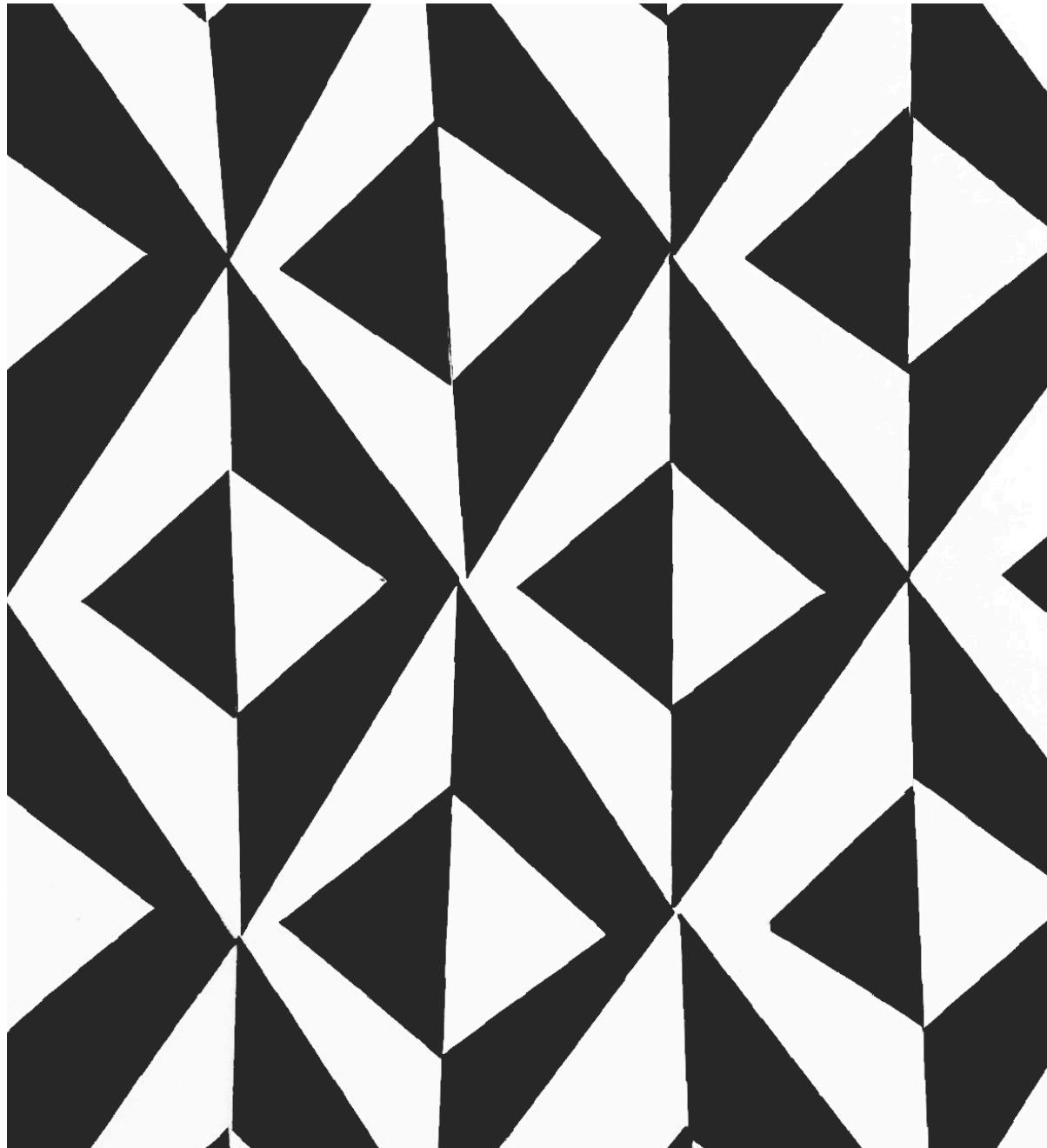


Maze

An immersive maze, inviting visitors to explore and lose themselves in its paths. Walls rise around every corner, creating a sense of mystery and discovery. As one wander, the layout encourages curiosity and interaction, with no set path or destination.







04 - 05

MISCELLANEOUS
Archived Works

2020-2024

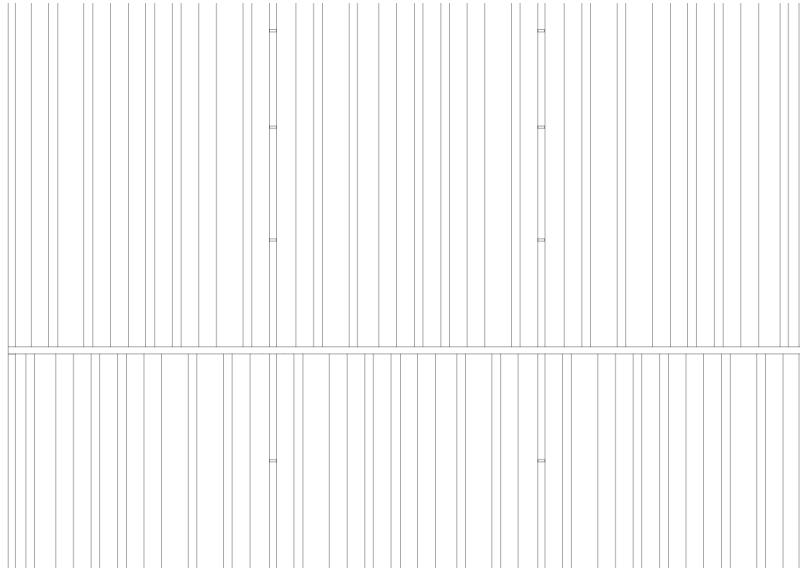
04 | CONSTRUCTION DRAWINGS

Flagship Store and Headquarters in London Architects: Squire and Partners

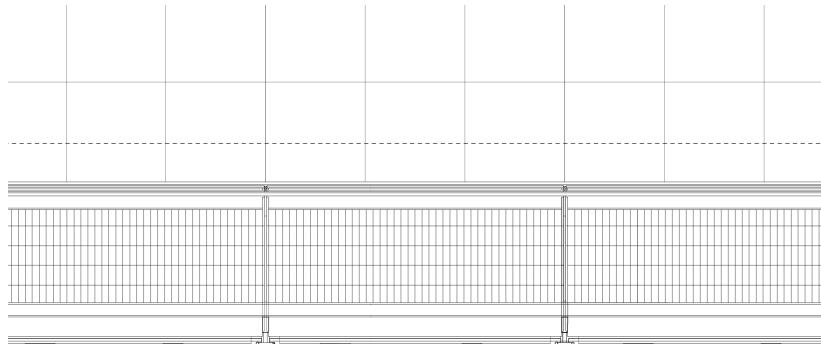
Professor: Annette Lecuyer | Spring 2024

Façade Specification Notes

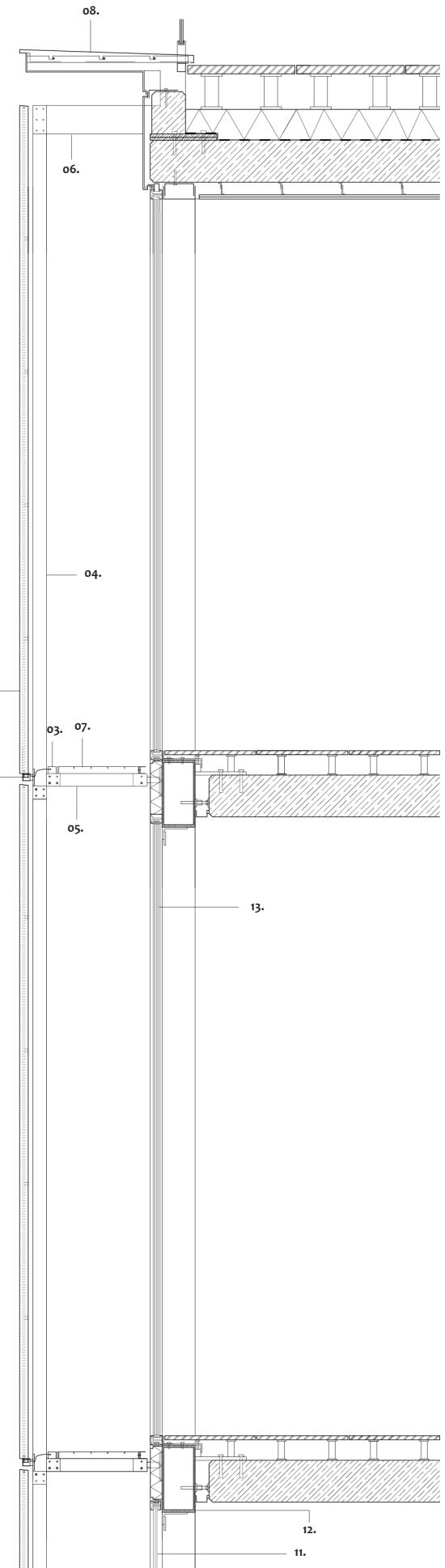
01. 30–50 mm acrylic panel
02. 42/42 mm aluminium section cover plate
A. Brushed, shrouding LED fitting
03. 40/70 mm bright mild steel structural cable tray
04. 30/80 mm steel RHS post, powder-coated
05. 30/80 mm steel flat, powder-coated
06. 30/170 mm steel flat cantilever beam
07. Maintenance deck: 40 mm steel grating, powder-coated
A. Aluminium coping fixed back to concrete upstand
B. Lateral close of facade cavity: toughened glass panel
08. Door: 2≈ 8 mm toughened glass bonded to bright mild steel frame
09. Retail facade: 2≈ 11 mm laminated safety glass
10. 200/400/5 mm steel beam
11. SSG curtain wall system
12. 2≈ 6 mm laminated safety glass + 16 mm cavity +
13. 6 mm toughened glass



FAÇADE ELEVATION



PLAN



SECTION

Façade Specification Notes

01. Roof

Raised roof cladding: 75 mm (3 inch) thick open jointed precast concrete pavers on pedestals and 200 mm (8 inch) void for drainage.

200 mm (8 inch) rigid insulation.

Waterproof membrane.

Parapet: Precast concrete upstand, aluminum overhanging coping fixed back to concrete upstand, and frameless glass balustrade.

02. Typical Floor

Raised floor: 50 mm (2 inch) thick precast concrete panels on pedestals, 150 mm (6 inch) void for services distribution, 250 mm (10 inch) site cast reinforced concrete slab, 200 x 400 x 5 mm (8 x 16 x 1/4 inch) rectangular hollow section steel beam.

03. Exterior Envelope (Inner Layer)

Structural Silicone Double Glazed Curtain Wall System:

2 layers x 6mm (1/4 inch) thick laminated safety glass + 6 mm (1/4 inch) cavity + 6mm (1/4 inch) toughened glass with clear sealant joints: and 200 x 800 mm (8 x 3-1/4 inch) rectangular hollow section vertical posts at doors.

Metal clad insulated spandrel panels to cover slabs.

04. Exterior Envelope (Outer Layer)

4a Structure:

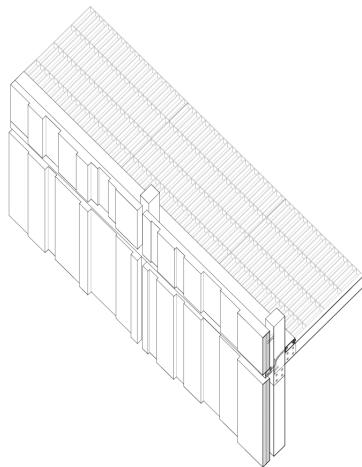
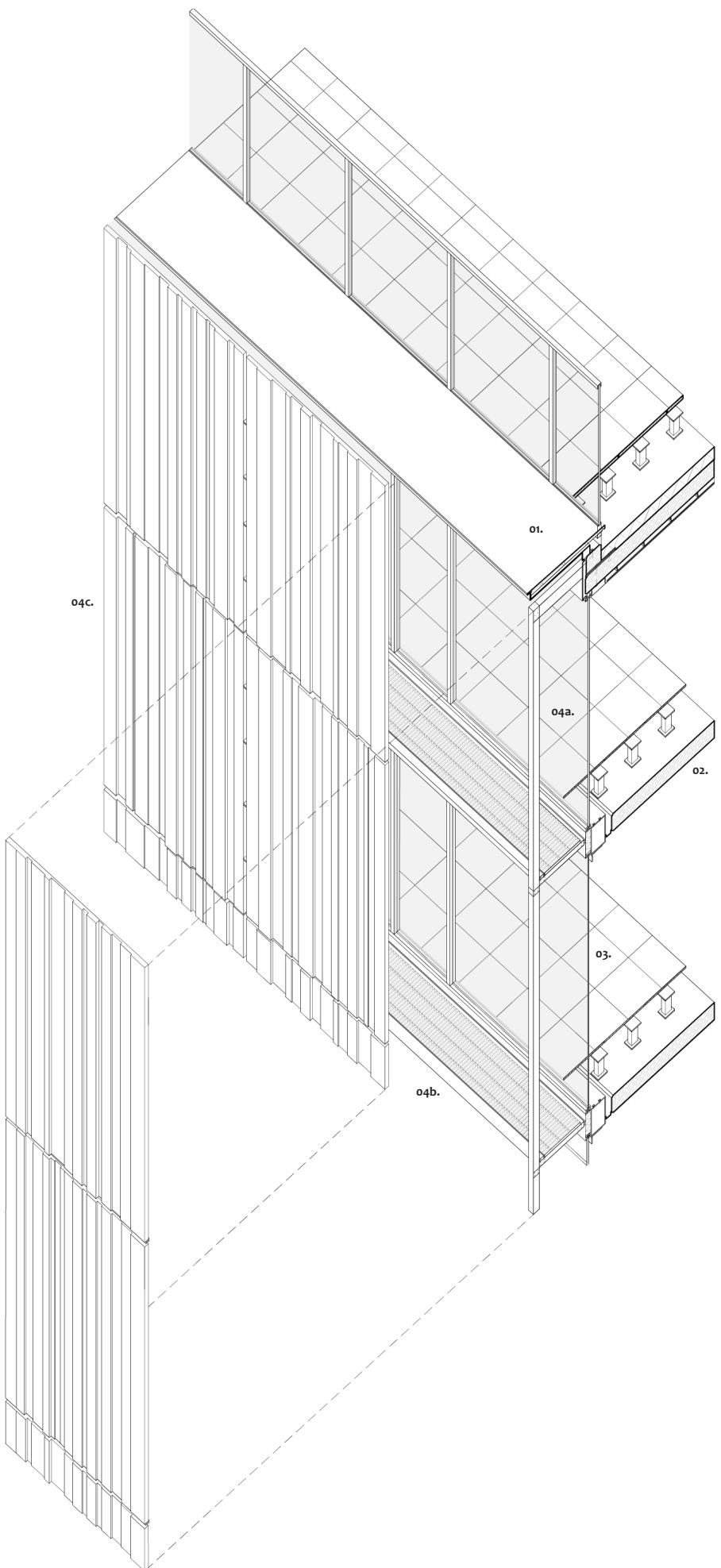
30 x 170 mm (1-1/4 x 6-3/4 inch) steel flat cantilever beam at roof, 30 x 80 mm (1-1/4 x 3-1/4 inch) steel flat beam at typical floors, powder coated, 30 x 80 mm (1-1/4 x 3-1/4 inch) rectangular hollow section post, powder coated, 7 mm (1/4 inch) diameter stainless steel lateral loading rods, 4 per floor, mechanically restrained back to post. Steel pin to loading rods, milled.

4b Maintenance Catwalk:

40 mm (1-1/2 inch) steel grating, powder coated, 40 x 70 mm (1-1/2 x 2-3/4 inch) bright mild steel structural cable tray.

4c Cladding:

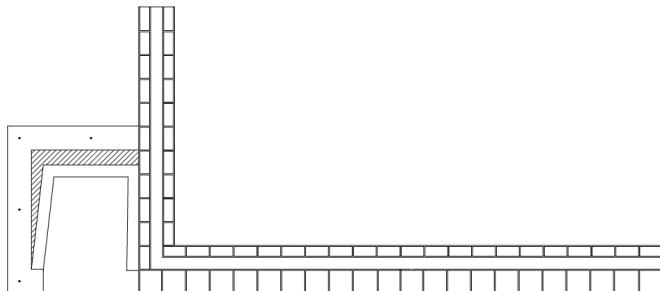
30-50mm (1-1/4 to 2 inch) thick acrylic panel secured with T-shaped recessed steel brackets, 42 x 42 mm (1-3/4 x 1-3/4 inch) brushed aluminum cover plate/ shroud to individually controllable and programmable LED fittings.



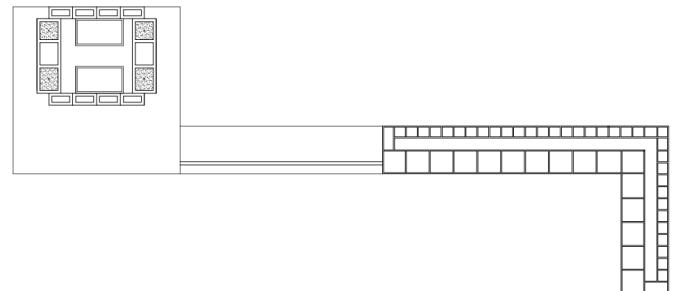
SECTION DETAIL

Menefee Cabin

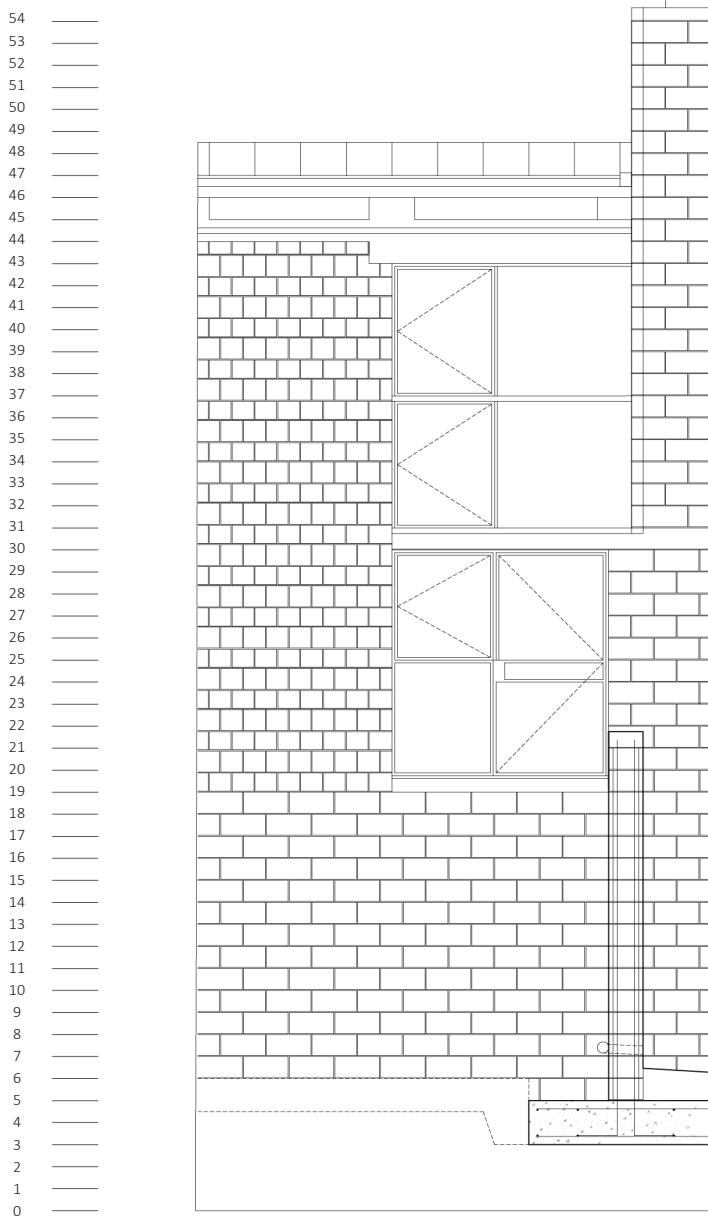
Clark & Menefee Architects



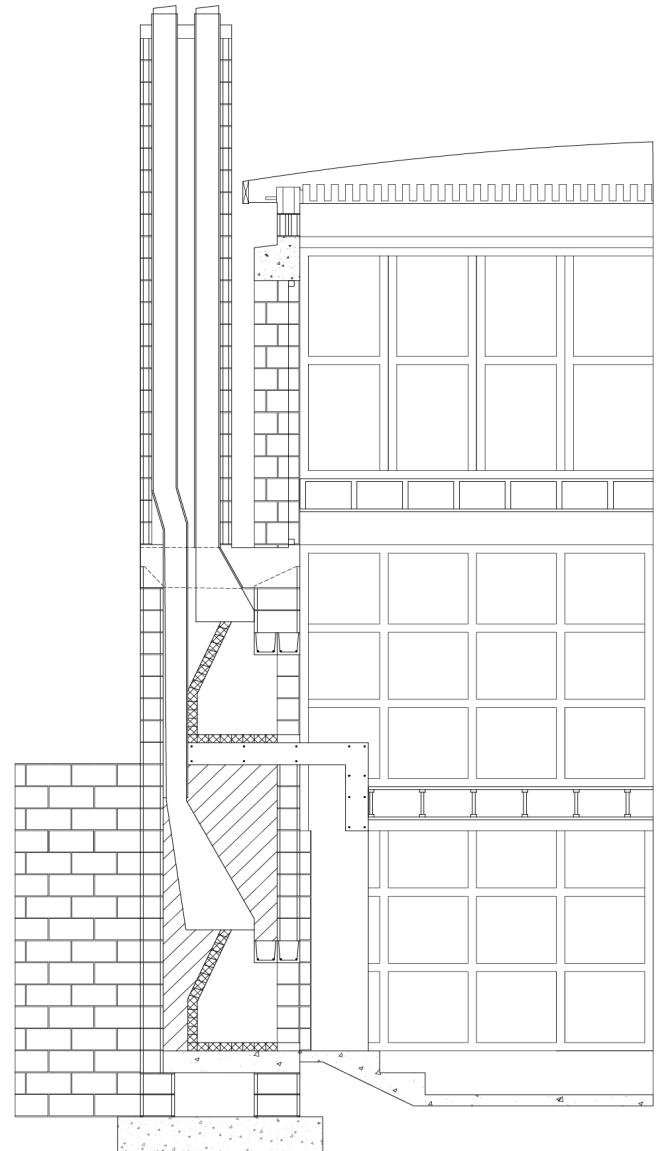
PLAN LEVEL 1 | BASEMENT



PLAN LEVEL 3 | LOFT



EAST ELEVATION



FIREPLACE / CHIMNEY SECTION

Chimney Specification Notes

01. Foundation for House Wall

30-inch wide x 12-inch deep site cast concrete strip footing with 3- #5 rebar long.

02. Foundation at Fireplace

12-inch deep site cast concrete pad footing to extend 6 inches beyond the outer face of masonry, with 10- #5 rebar north/south bottom and 8- #5 rebar east/west bottom.

03. Foundation at Retaining Wall

60-inch wide x 12-inch deep site cast concrete strip footing with 4-#5 rebar long top and bottom, and #4 at 12 inches OC short.

04. External House Wall Below Grade

8 x 16 x 16 single wythe CMU with #6 vertical rebar grouted solid at 24 inches OC outer face and 48 inches OC inner face, and horizontal joint reinforcement at 8 inches OC.

05. External House Wall Above Grade

8 x 16 x 8 CMU inner wythe with 3-#5 vertical rebar grouted solid at corners, each side of large openings, and 48 inches OC; horizontal joint reinforcement at 16 inches OC.

06. Retaining wall

8 x 16 x 2 CMU single wythe with #5 vertical rebar at 24 inches OC grouted solid; horizontal joint reinforcement at 8 inches OC.

07. Fireplace at Lower Ground and Upper Ground

Levels

8 X 16 x 8 CMU single wythe with 1-#5 vertical rebar grouted solid at corners and midpoints of walls; horizontal joint reinforcement at 16 inches OC.

8-inch site cast concrete L-shaped hearth with #4 rebar at 16 inches OC on top and bottom in the slab, and #4 rebar at 16 inches OC on both faces of the wall.

8-inch thick site cast concrete cap at living room level.

08. Fireplace Chimney

8 x 16 x 4 CMU single wythe with vertical rebar grouted solid at corners and horizontal joint reinforcement.

8 inch thick site cast concrete cap.

09. Living Room Floor

2 x 10 solid web wood joists/TJIs at 16 inches OC with batt insulation between.

2 x 6 tongue and groove wood deck

10. Loft Floor

W12 x 14 steel beam

3 x 10 wood joists at 16 inches OC

2 x 6 tongue and groove wood deck

11. Roof

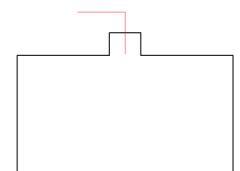
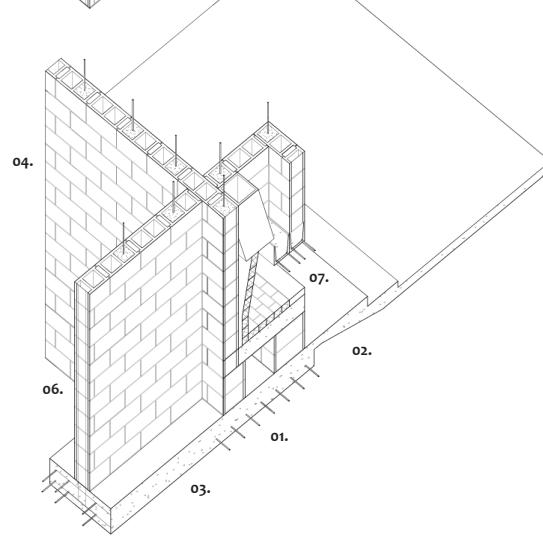
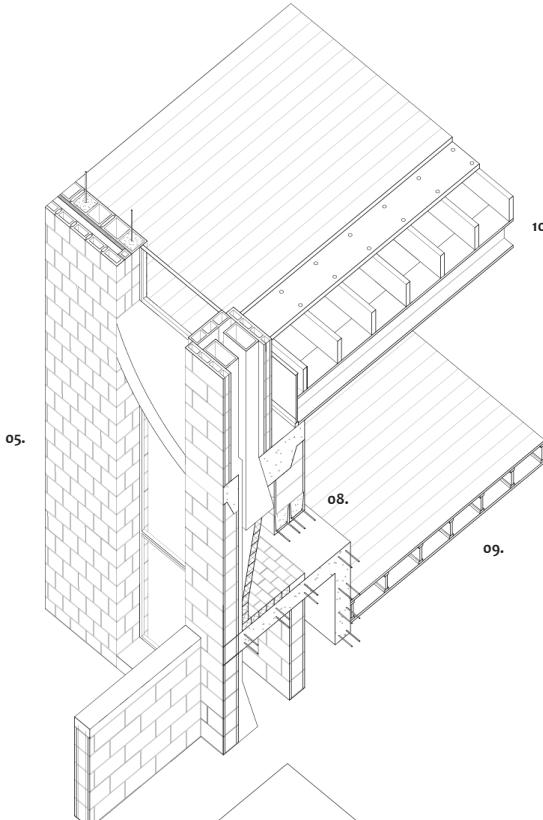
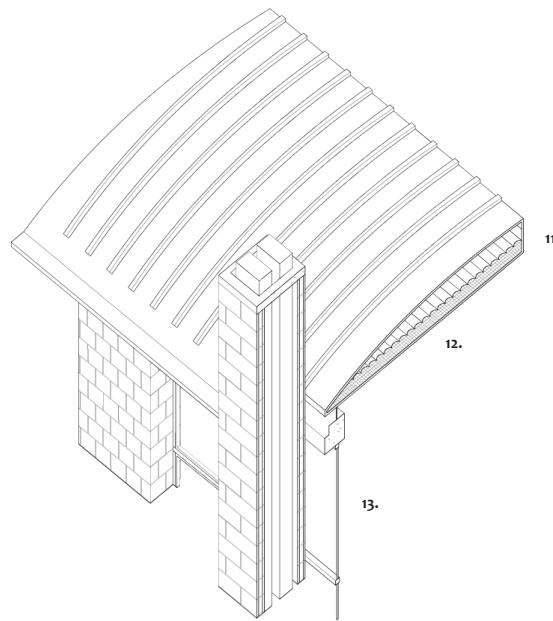
Flitch beam: 4-2 x 10 wood joists and 3/8 inch steel plate, stagger bolted.

2 x 10 LVL (laminated veneer lumber) joists at 16 inches OC.

Plywood sheathing

Underlayment/building paper

Standing seam metal roof



12. Ceiling

Batt insulation between LVL joists

Vapor barrier

Painted plywood ceiling

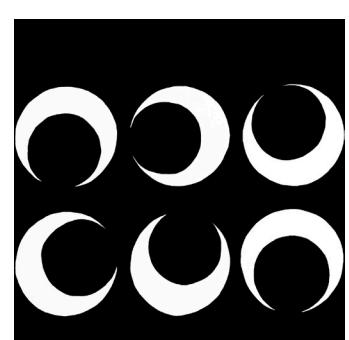
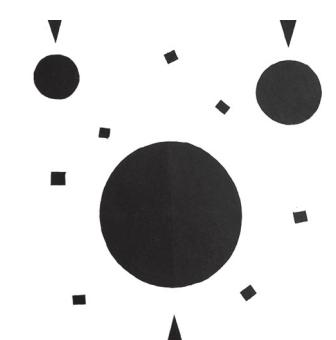
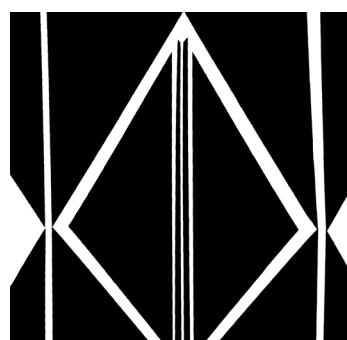
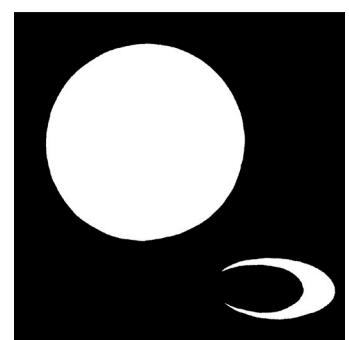
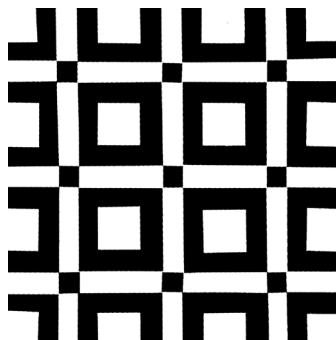
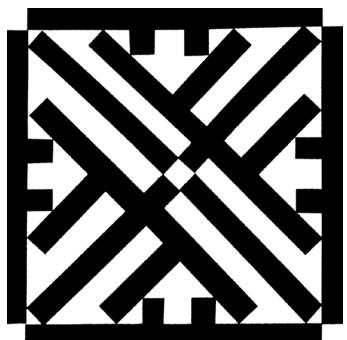
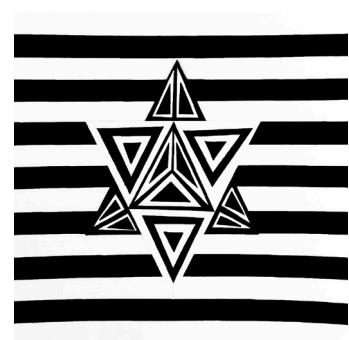
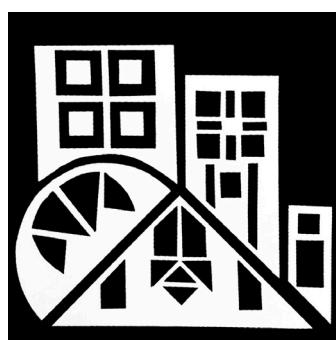
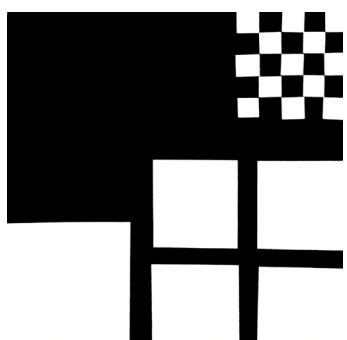
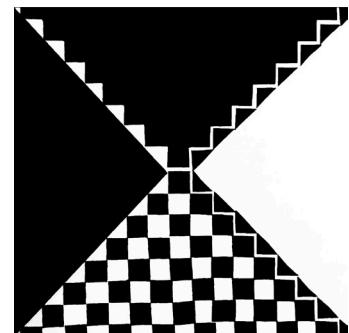
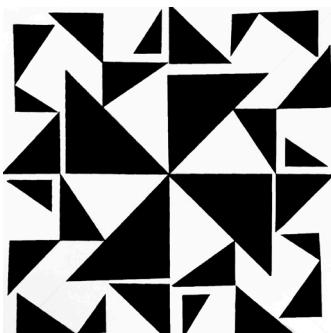
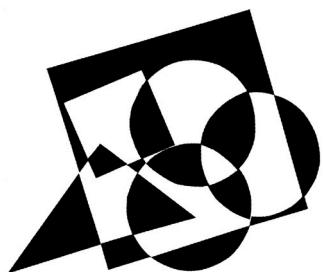
13. Window

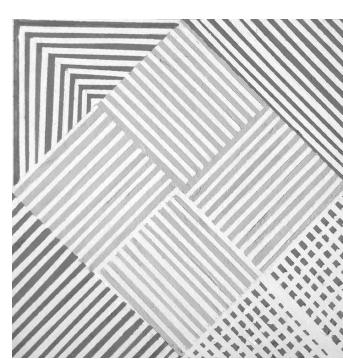
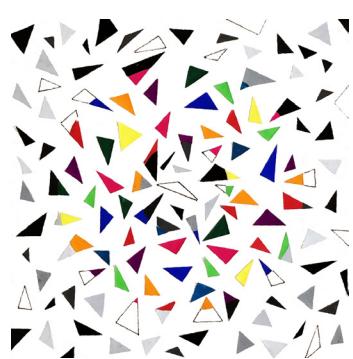
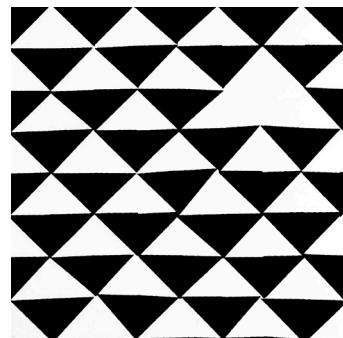
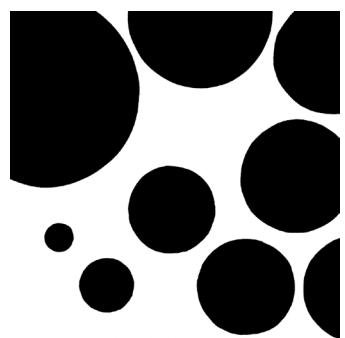
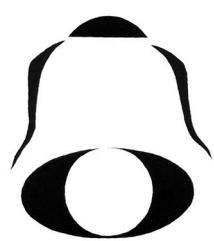
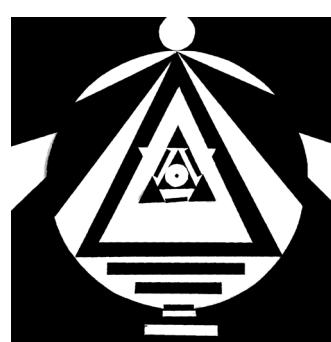
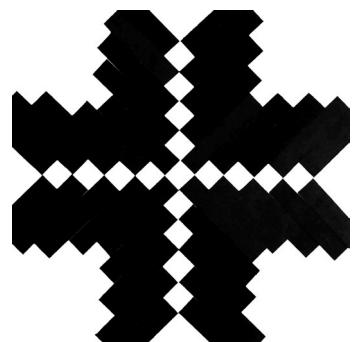
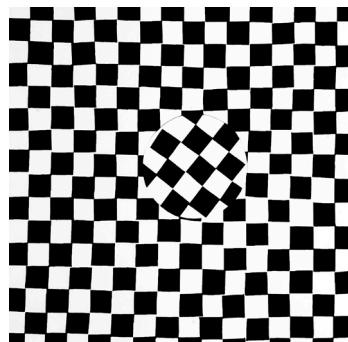
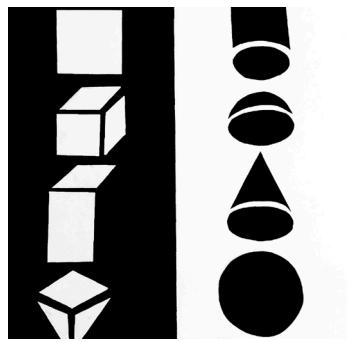
Site-cast concrete sill

16-inch high site cast concrete lintel

Steel-framed double-glazed window

05 | Collages & Artworks







Portrait Study



Drapery Study

Bobby Zhao

zzhao23@buffalo.edu