PORTFOLIO FOR PROMOTION + TENURE

Jennifer Smith

Assistant Professor
School of Architecture, Planning + Landscape Architecture
College of Architecture, Design + Construction
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SUPPORTING DOCUMENTS
The document is submitted as a portfolio of supplemental materials to accompany my third-year review for promotion and tenure in the School of Architecture, Planning, and Landscape Architecture at Auburn University.

Further documents that should accompany this portfolio include my university-format *dossier*, and *curriculum vitae*.

PURVIEW
This portfolio highlights professional and academic work from the past thirteen years. For a full account of teaching, research, service, and professional activities see my *curriculum vitae*.

introduction

Dear Reviewer,

Environmental Design has a history, albeit brief, of addressing the aggregate of artifacts, programs, systems, and deployments in the constructed landscape. In an excerpt from *Radical Pedagogies* titled, "The Methods of Environmental Design," Joaquin Medina Warmburg explains that the emergence of "the term 'environment' in the 1960s brought with it the promise of a greater connection between traditionally distinct design disciplines such as industrial design, architecture, or even city planning." He elaborates, "Since it was apparent that the sum of 'good design objects' did not in itself add up to a 'good design environment,' the focus of attention shifted from the design of individual artifacts to an open system of relations [...]."[1] The territory of my scholarship, teaching, and practice resides here.

"A jack of all trades is a master of none… but oftentimes better than a master of one."

Since early undergraduate design work, I have been testing the boundaries of architecture, interrogating the profession's admiration for the artifact. As a practitioner, myself, I simultaneously respect and critique the profession as siloed responses struggle to meet increasing complexity. While the international community experiences early pains of climate change, sea level rise, and tangential social inequities, interdisciplinary designers focused on the interdependence of design decisions across scales, programs, and artifacts are requisite. This emergence is transforming design practice as witnessed at preeminent firms like Weiss Manfredi, Heatherwick Studio, Alloy Development, and Bjarke Ingels Group, to name a few. Nevertheless, the shift in practice has yet to inform undergraduate design education beyond the confines of the foundation studio model, as popularized by the Bauhaus. It is my position, as explored through scholarship, teaching, and practice, that a portion of designers must intentionally untether from specialized disciplines in order to advocate for more holistic and integrated design projects. Aligning with this position, there are three tenants guiding my work:

1) foundation design as translatable methods across diverse design disciplines
2) ideation of diverse typological responses (systems, programs, deployments, and artifacts) for a given site & brief
3) interdisciplinary design as a resilient response to increasing complexity

EARLY INCLINATIONS

A decade ago marks the beginning of my acute awareness of the interdependence of design decisions. Not only did I begin critiquing the revered artifact, I simultaneously experienced a growing interest in interdisciplinary design as an umbrella discipline spilling into non-physical territories. Addressing systemic, imminent concerns requires system-, program-, and deployment-design traditionally beyond the architect's scope of work and reserved for "non-design" professionals like engineers, public administrators, and logistics specialists. The design vs. non-design chasm is a problematic framework, and contemporary society not only yearns for its dismantling, it requires a new framework for interdisciplinary thinkers applying rigorous design processes to physical and non-physical resilient efforts, alike.

Smith developing site drawings in rapidly urbanizing Battambang, Cambodia.

These early inclinations commenced in Battambang, Cambodia while working internationally and in partnership with local communities. As a fresh intern architect, I repeatedly witnessed unresilient development patterns as commonplace and the result of omitting critical systems like regulatory policies, planning, and social and economic programs.
One memory is catalogued here:

> *While standing on the cracked, sun baked earth, I wipe my brow. Between the unrelenting sun and humidity, Southeast Asia promises a tropical... oasis. The ground rumbles as trucks caravan past one after the other unloading soil as hills construct the newly elevated landscape. "What is going on?" I wonder as dirt mounds rise two meters high across this thirteen-hectare site. Increasing the elevation is an effort to keep the site dry and free from flooding as sprawling development transforms former rice fields into "buildable" land. I stand on a future university campus, and it is one of a hundred projects chasing a water-free plateau. Inevitably, the water must go somewhere, and I wonder when the soil will remember its wetland origins.*
>
> *Later the same day, I discover where the seemingly infinite amount of dirt originates. Beyond the city limits, massive earth carvings are visible as alien ponds speckling the horizon. It is a strange landscape - uninhabitable and solely for the benefit of encroaching development. Still, this cut and fill process is standard in Cambodia. Rural-to-urban migration patterns and an increasing population pressures rapidly developing economies to increase density and overall footprint, and most of these economies have few, if any, architects guiding the process.*

What I witnessed over the years was disturbing. While our architecture project was cultural appropriate, responsive to passive design strategies, and born of the local population, I wondered what of the rice fields, the agricultural economy, and the sacrificial landscape laid waste? What of the non-physical systems left unconsidered and beyond the architect's domain? A myriad of systems beyond our reach demanded redesign if resilient environments were to be achieved.

INTERDISCIPLINARY THINKERS

It is only natural that I found a home in Environmental Design – a program for interdisciplinary design education. The program suggests that while education and practice are increasingly specialized, even hyper-specialized,[2] contemporary wicked problems require additional designers who work between disciplines to develop emergent fields of study and collaborative processes. Interdisciplinary design is critical in undergraduate education and professional practice as they promote diverse typological responses, rather than advocating for physical artifacts nested within traditional disciplinary boundaries. This is where my scholarship, teaching, and practice are grounded.

scholarship

My area of scholarship is at the nexus of two allied threads: interdisciplinary design and the oscillation between human placement and displacement. It is first and foremost my position that a resilient future aimed at mitigating and adapting to climate change requires interdisciplinary thinkers applying design processes as problem-solving methods to physical and non-physical systems. Related, my research into post-disaster housing emerges from a deep interest into one's attachment to place and the critical role temporary, permanent, and temporary-to-permanent (temp-to-perm) housing plays in increasing community resilience and mitigating diaspora. Over the past half-century

Alabama has increasingly experienced the devasting effects of tornadoes, hurricanes, coastal storm surge, and chronic inland flooding. A recent study by the National Oceanic and Atmospheric Administration (NOAA) found that Alabama experiences the highest quantity of tornado events nationally, meaning the territory of "tornado alley" continues to morph alongside changes in jet streams and weather patterns.[3] It is vital that research engage local realities of increasing volatile weather and how communities respond through resilient initiatives.

Lastly, the Deep South is in continual tension with its racial history. Erasing, forgetting, and displacing are common threads in our complicated narrative, and as a result, our constructed landscapes remain hollow, holding layers of redacted stories. While there are a myriad of mappings documenting the "mostly lost and uncommemorated grounds upon which the history of African-Americans has unfolded,"[4] much remains censored. My research aims to unearth local stories in order that all Americans can "find their own social history preserved in the public landscapes of their own neighborhoods and cities."[5]

teaching

Naturally, scholarship informs teaching as projects find roots in local narratives and pedagogical investigations inform methods. Teaching engages four topics: civic engagement, foundation design, interdisciplinary design methods, and resilient design practice.

It is paramount that future designers engage in social and environmental movements, and when possible, classes partner with local non-profits, programs, and city representatives to develop design proposals responding to localized challenges. This ought to be the norm as design courses (lab, studio, and seminar, alike) provide the framework for students to co-design with end-users in community transformation. As community change-makers, designers no longer create in ivory towers, rather, they partner with stakeholders to listen, to understand context, and to disperse agency. As Sambo Mockbee observed, "The practice of architecture not only requires participation in the profession, but it also requires civic engagement." It is my aim to continue this legacy through the Environmental Design program.

Related, a number of seminar classes focus on post-disaster housing and overall urban resilience as these issues are undoubtedly tethered to future work. Because central Alabama is plagued by devastating tornadoes, there is an increasing interest for disaster mitigation efforts. Community shelters, resilient and affordable housing, and open source debris clean-up programs are a few examples of design problems in need of addressing. The Environmental Design program, due to its focus on interdisciplinary design methods, is well suited to focus on these challenges through local engagement, research, and a diversity of design typologies.

Lastly, germane to contemporary design challenges focused on collaborative responses to real world complexities, interdisciplinary design methods embedded in a degree that does not suppose students later specify an area of study is essential. Design pedagogy centered on interdisciplinary design practice and methods are centeral to teaching. As stated previously, it is my position that in order to prepare graduates for an emerging future of professional practice, designers must engage in interdisciplinary design prior to graduation. Personal experience in practice and academia stand as testaments to our siloed design disciplines where territories, scopes of work, and risk management are delignated, rather than fostering collaboration and emergence. Resilient projects like the BIG U, Little Island, Benthemplein Water Square, and Olympic Sculpture Park illustrate our growing need for interdisciplinary design.

practice
My interest in interdisciplinary design practice is evident through a history of non-traditional work experience. While I have always found myself in an architecture practice, per se, the firms I have worked with organize themselves in an interdisciplinary manner as they foster a rigorous design process while integrating fringe industries like manufacturing and construction. I found more experimental practices operating on the edge of the discipline to be avant-garde in their expansive understanding of architecture's territory. From these experiences I came to comprehend that architects could design logistics, construction methods and schedules, fabrication strategies, and the practice, itself, as a renegotiation of the business model. In these spaces the chasm between what is traditionally designed and what remains relegated to "non-design" professionals is interrogated. Furthermore, these practices immerse themselves in the systems and deployments driving design decisions regarding the formal architecture. Needless to say, my experience in practice informs current teaching and scholarship as well as future trajectories.

EXPANDED TERRITORIES

Moving forward, it is my aim to continue working at the fringes of practice by engulfing research, practice, and teaching in resilient land-use development. I am doing so through book publications, papers, and through the pursuit of doctoral studies. Presently, I am finishing a publication manuscript titled, "*Post-Disaster Housing: Design for [dis]Placement,*" and this 250-page book (contracted through Routledge Publishing; manuscript due Sept '23) illustrates successful post-disaster housing case studies. I have included samples on the following pages. Additionally, it is my intention to commence doctoral studies fall 2024 through a PhD in Building Construction focusing on real estate development as a misled interdisciplinary design practice.

It is my position that development projects should perform as resilient, disaster-mitigating infrastructure; however, they frequently omit environmental and social goals, ignorant to the systemic ramifications of design decisions. Developers have long been the antithesis of thoughtful, resilient design, preferring short-term financial gains over long-term layered benefits. Nevertheless, these antagonists hold tremendous agency in the construction of our landscapes, especially when municipalities advocate for laissez-faire policies. These realities reside at the core of why I wish to pursue an architect-developer model of research and practice. Developers ought to have the highest training in interdisciplinary design as mediators between design, construction, finance, and collaborative processes. Rather than a radical notion, it seems transparent that designer and developer would recouple through interdisciplinary practice to limit the "senseless spread of profit-motivated building"[6] common to our would-be rich landscapes.

"Without a level of integration throughout the development of the various building professions, these future team members greet one another as strangers for the first time the day they graduate from academia."

Regards,

Jennifer Smith, AIA
June 2023

ENDNOTES

1. Colomina, Beatriz, Galán Ignacio G., Evangelos Kotsioris, and Anna-Maria Meister. "The Methods of Environmental Design." Essay. In *Radical Pedagogies*, 194. Cambridge, MA: The MIT Press, 2022.
2. "Design Thinking and Innovation." HBS Online. Accessed November 28, 2022. https://online.hbs.edu/courses/design-thinking-innovation.
3. "National Weather Service Annual Severe Weather Report." National Oceanic and Atmospheric Administration. Published February 2023. Accessed April 21, 2023. https://www.noaa.gov/weather.
4. Barton, C. E. (2001). *Sites of Memory: Perspectives on Architecture and Race.* Princeton Architectural Press. 2001, 27.
5. Hayden, Dolores. *The Power of Place.* The MIT Press, 1995, 46.
6. Clark, W.G. Writings, 11

Top left: BLOX prefabrication
Top right: chronic flooding in rapidly urbanizing Cambodia
Bottom: site analysis in Nepal following the 2015 earthquake

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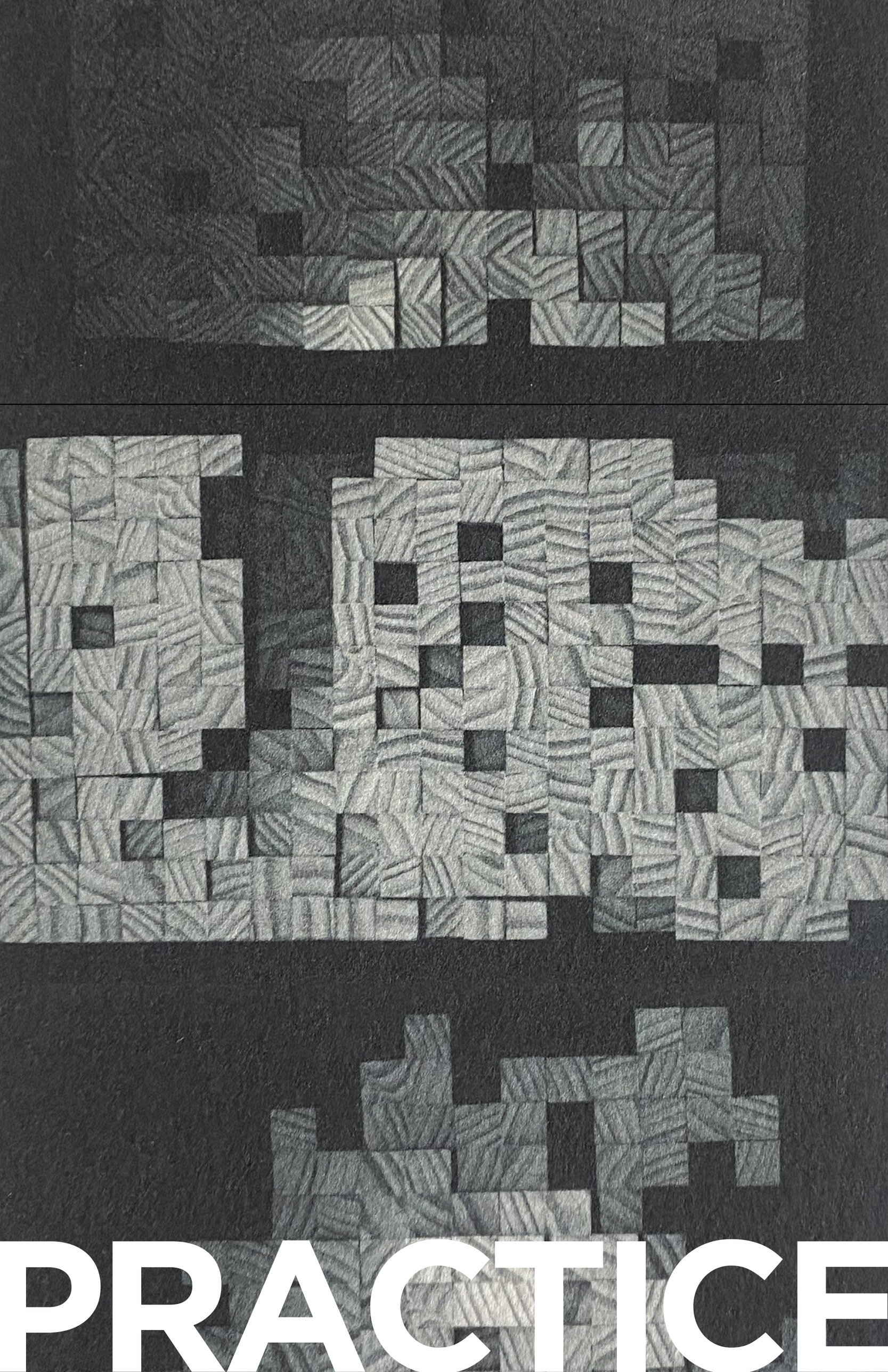


PRACTICE

expanded territories

In my thesis year of undergraduate architecture study, I began realizing the value of interdisciplinary design. Thesis provided a year-long framework for studying diverse questions relevant to a particular site, project parameters, and individual interests. My final project honed in on productive urban landscapes in Montgomery, Alabama as a strategy for adapting the multitude of surface-level parking lots and integrating agricultural land that was quickly being eroded by urban sprawl. The project blended architecture, landscape, and industrial design into more than a Gesamtkunstwerk as it provided a holistic strategy that could be adapted to various sites and alternate cities experiencing similar conditions.

From the beginning my interest in design, while anchored in architecture, oscillated across scales and disciplines. This is evident in a history of interdisciplinary design practice and non-traditional work experience. While I have always found myself in an architecture practice, per se, the firms I have worked with organize themselves in an interdisciplinary manner as they foster a rigorous design process while integrating fringe industries like manufacturing and construction. I found more experimental practices operating on the edge of the discipline to be avant-garde in their expansive understanding of architecture's territory. From these experiences I came to comprehend that architects could design logistics, construction methods and schedules, fabrication strategies, and the practice, itself, as a renegotiation of the business model. In these spaces the chasm between what is traditionally designed and what remains relegated to "non-design" professionals is interrogated. Furthermore, these practices immerse themselves in the systems and deployments driving design decisions regarding formal architecture.

My experience in practice informs current teaching and scholarship as well as future trajectories. On the following pages, you will see design work employing a labeling system borrowed from Rem Koolhaas - S, M, L, XL. This notes projects ranging in scales: graphic design (S), industrial and installation design (M), architecture (L), and urban design (XL). Rather than being an expert in any discipline outside of architecture, it is my position, that germane to contemporary challenges, designers who work between disciplines to develop emergent fields of study and holistic design strategies through the application of progressively divergent thinking are essential. This body of work best illustrates this perspective in practice.

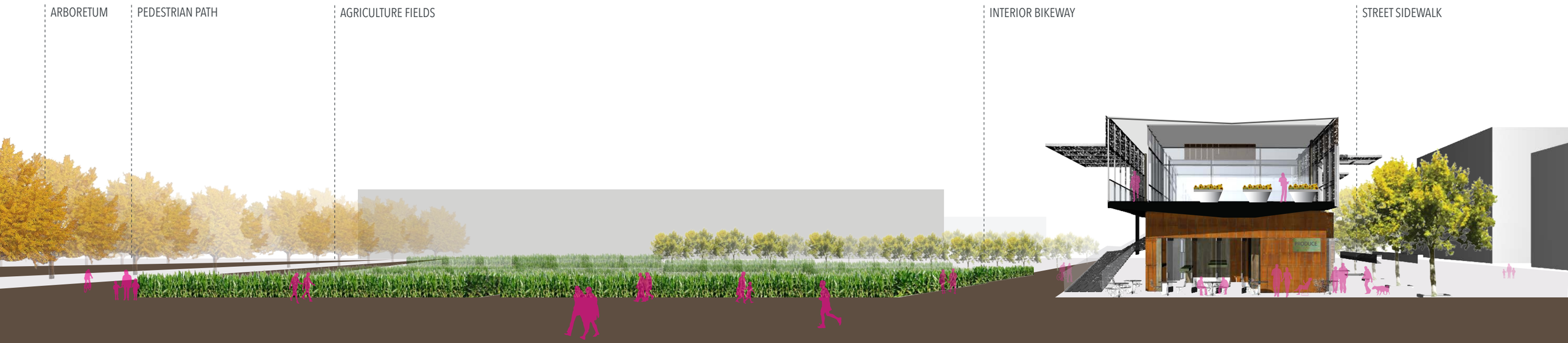
productive urban landscapes

2010
MONTGOMERY
ALABAMA

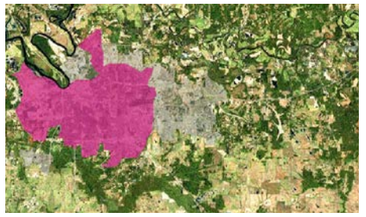
In Smith's final thesis critique, one reviewer posed the pointed question, "So, why design a building?" The telling inquiry exposed that the problems being investigated could be solved, only in part, through architecture. The project traverses scales - urban design, landscape architecture, programs, industrial design - and represents Smith's initial interests in territories beyond the traditional scope of the discipline. Rather than an intentional attempt at a *gesamtkunstwerk,* it offers holistic opportunities at various scales and within a range of disciplines.

The thesis inquiry examines eroding argricultural landscapes and increasing vehicular parking in centalized downtown areas. Architecture is undoutedly part of the response; however, the systemic issue demands systemic responses spilling across scales, fields, and even nonphysical domains. Productive Urban Landscapes are the culmination of her research-driven response.

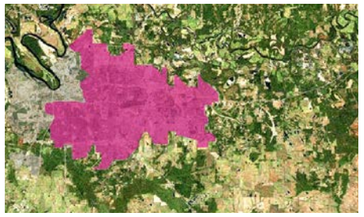
1_Cafe
2_Greenhouse (above) and Market (below)
3_Admin Office
4_Orchard
5_Bus Stop
6_Agriculture Plots
7_Mobile Work Carts
8_Pavilion, Restrooms,
9_Pedestrian Paths
10_Arboretum



1973

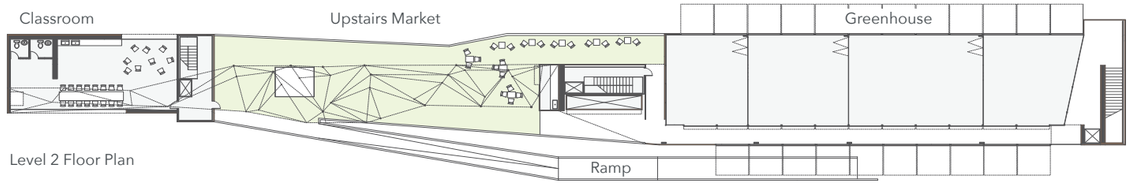


1984

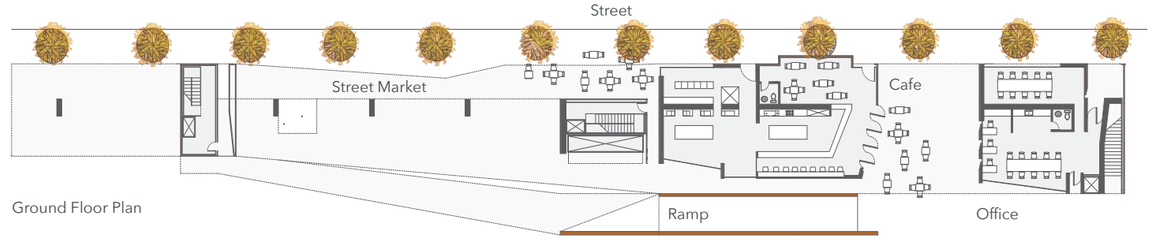


1998

Diagram of Montgomery County sprawl to the east, deterioration of urban density, and loss of agricultural land. While Montgomery has not experienced the caliber of population growth like that witnessed by other U.S. cities, it has lost exceptional quantity of farmland.



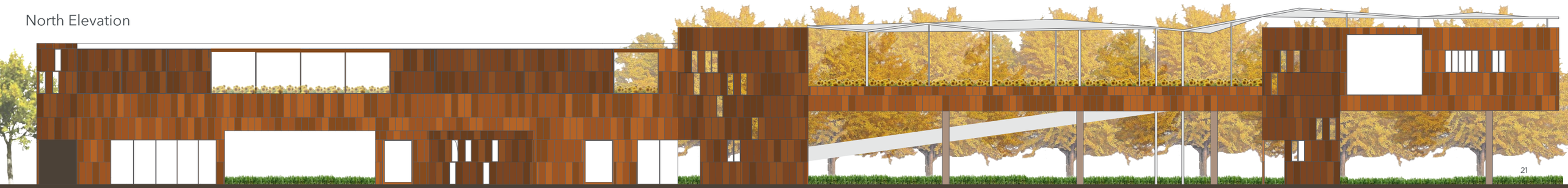
Level 2 Floor Plan



Ground Floor Plan

South Elevation

North Elevation



proposed garden carts

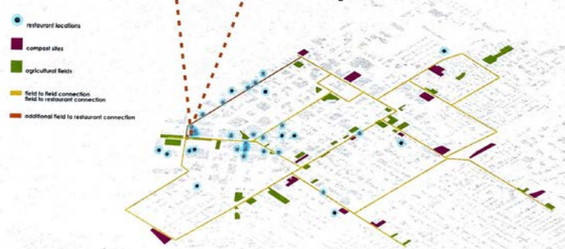
tool shed
[open]

compost to harvest

bike ways through agricultural fields

field proximity

field+restuarant+compost



perspective at street level

perspective at level 2
market outside of greenhouse

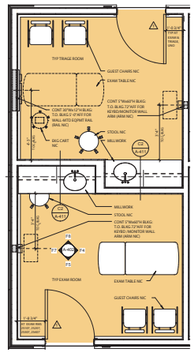
GA STUDIO + BLOX cva

2010
BIRMINGHAM
ALABAMA

The client is a specialized medical practice of 32 doctors, operating out of two clinics in separate hospitals, and a third location with business operations and administrative offices. They sought consolidation, improved efficiency and an option for future growth. GA Studio spent nearly a year analyzing the client's operational flow and opportunities for efficiency gain.

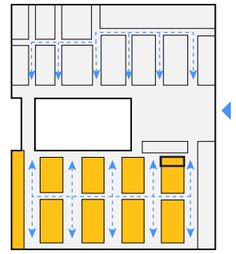
By studying their weekly routines and applying lean principles, GA Studio was able to deliver design for a singular building with approximately 25% less area of programmed space than the doctors believed they needed at the onset. The building layout is customized for optimal patient flow, clear circulation, daylit public spaces and the inclusion of surplus space for immediate tenants, which can be converted to accommodate growth for the client as needed in future years.

This represents GA Studio's second large-scale prefabricated and stick-built project. Smith's focus centered on schematic layouts, document coordination, and Revit-produced construction documents.

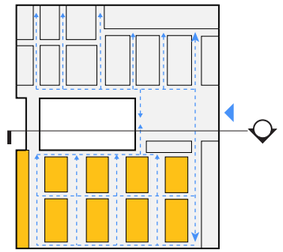


Level 2 Plan
Staff circulation

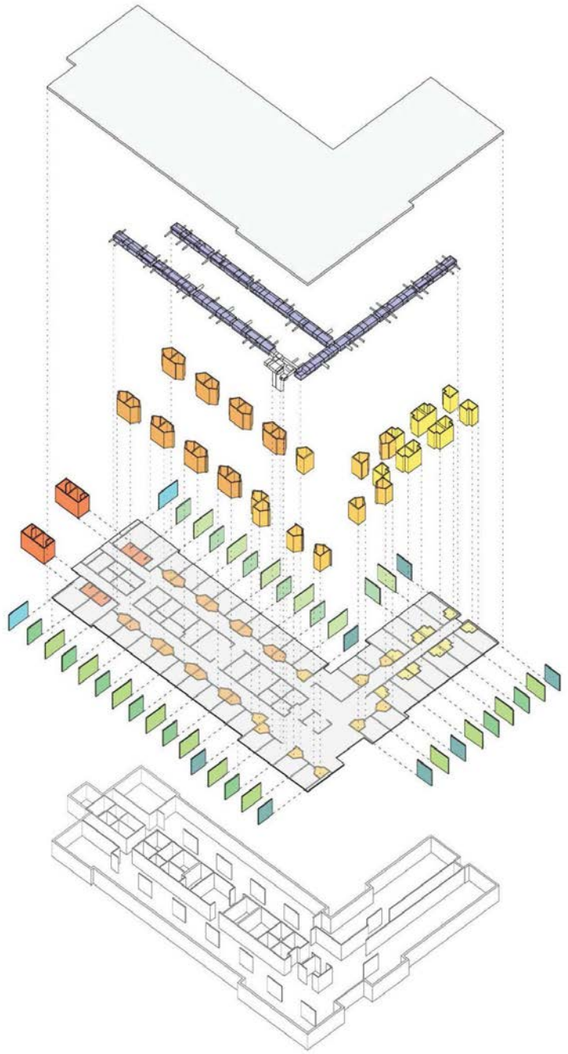
Prefabricated exam room

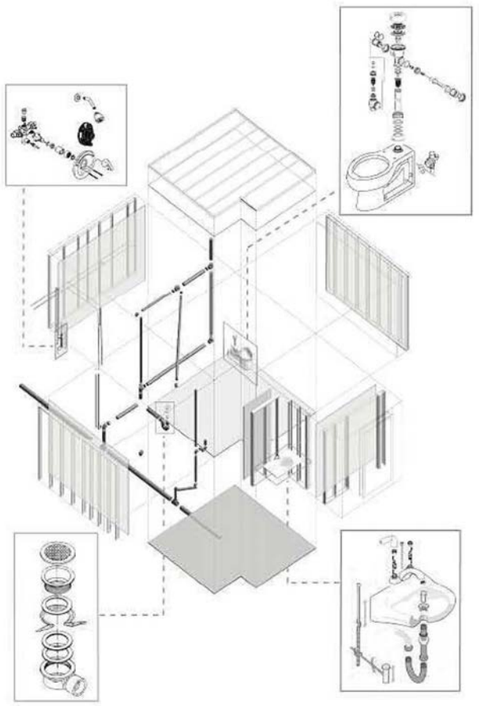


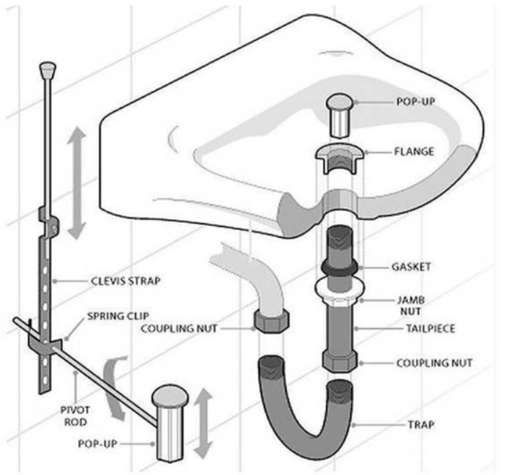
Level 2 Plan
Patient circulation



Combined GA Studio and BLOX form a design, manufacturing, and construction company focused on prefabricated modules, panels, and assemblies.





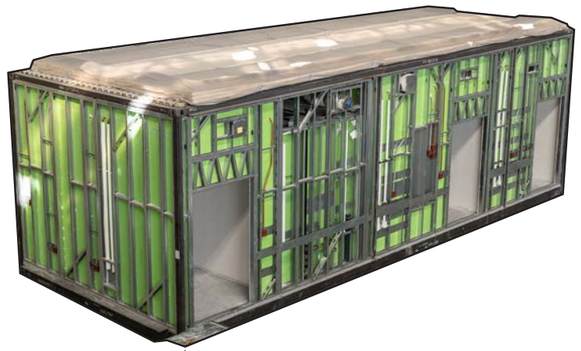


COMPONENTS:

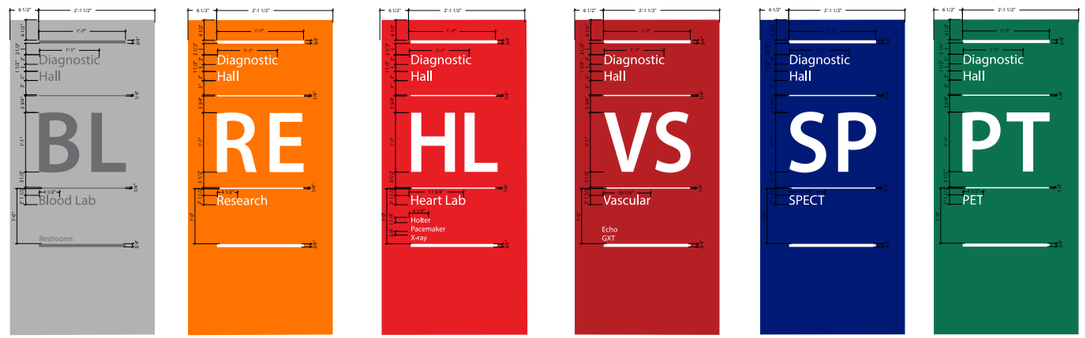
BR.01.LR.1		10
BR.02.LR.1		1
BR.03.LR.1		9
BR.04.LR.1		8
HW.02.LR.1		40
FW.02.LR.1		40
OR.03.00.1		12

SPEC	WARRANTY	CARE AND CLEANING	PARTS
BR.02.L.1	BR.02.L.1	BR.02.L.1	BR.02.L.1

BLOX is GA Studio's interdisciplinary design, manufacture, and construction practice. Prefabricated assemblies, panels, and modules are created and shipped from the Bessemer, Alabama factory.



This interdisciplinary project included architectural drawings, manufacturing of prefabricated panels and modules, as well as a signage package. Smith acted as lead on the signage and wayfinding package.



GA STUDIO intermodal

2011
BIRMINGHAM
ALABAMA

Ushering in new era of public transportation into the center of Birmingham, the new Intermodal Facility is envisioned as being a catalyst for continued growth and development for the area. Located on three blocks adjacent to the raised rail-bed main artery, the Intermodal Facility accommodates multi-modes of transportation, including Amtrak passenger trains, Greyhound intercity bus, BJCTA local bus system, taxis, shuttles, automobiles, bicycles and pedestrians. While each of the three blocks contains unique services for the Intermodal Facility, use of a common durable, neutral material palate pulls the unique buildings together into a strongly delineated complex.

As the portal through which Birmingham citizens and visitors alike enter and leave the City, this facility projects a progressive, modern stance, with a focus of providing a positive alpha and omega experience for the rider. The building contains approximately 45,000 sf of enclosed space and 45,000 sf of sheltering canopy. The second block is the hub for BJCTA, the local bus system, and the third provides supporting vehicular parking.

Transit and flow patterns act as Smith's main focus for the project, where the urban scale is central to her design contributions.

As an intern architect, Smith assisted with 3d digital modeling and renderings as well as traffic studies for the integration of bus, train, vehicular, pedestrian and bike transit at this centralized urban intersection.

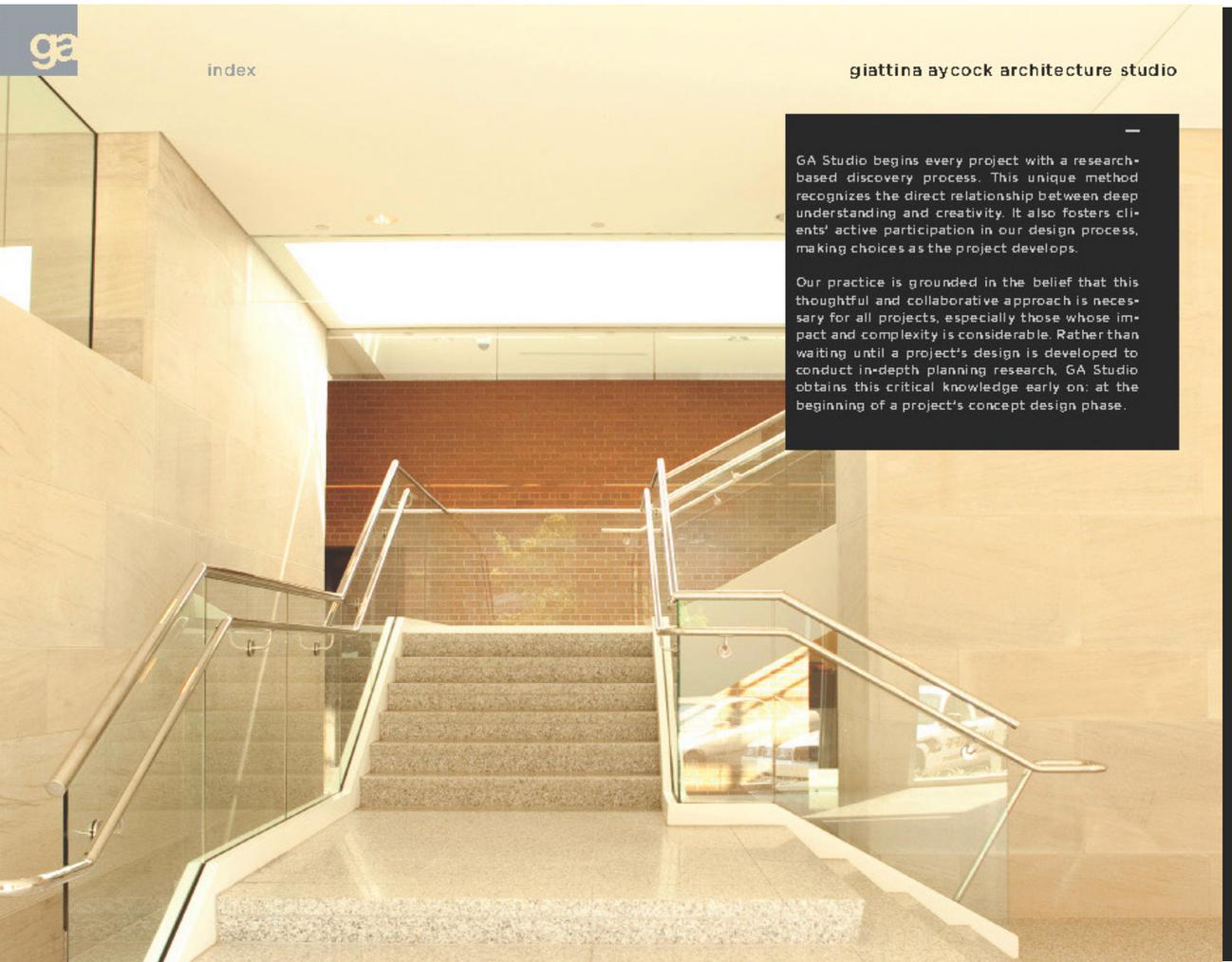
GA STUDIO website

2010
BIRMINGHAM
ALABAMA

Giattina Aycock Architecture Studio, later known as GA Studio, conducted a brand redesign just following the 2009 recession. Rebranding included a revised firm name, business cards, signage, and a newly formatted website.

As part of this effort, Smith designed and developed the firm's website focused on manifesting studio values including contemporary design, accessibility, and an elemental organizational system.

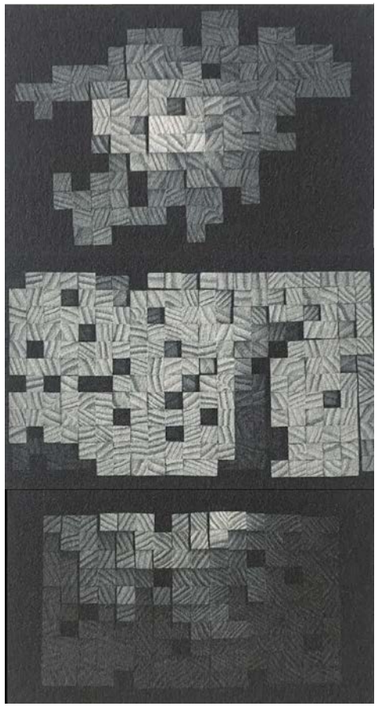
The grid allows for projects to be added, as needed, viewing of multiple projects simultaneously, and the ability to examine the entire site at once while eliminating a frenetic experience. To do so, Smith learned Wordpress (the leading platform at the time) and researched a myriad of excellent design websites informing the graphic design and user-experience. The site continues to be used by GA Studio.
gastudio.com

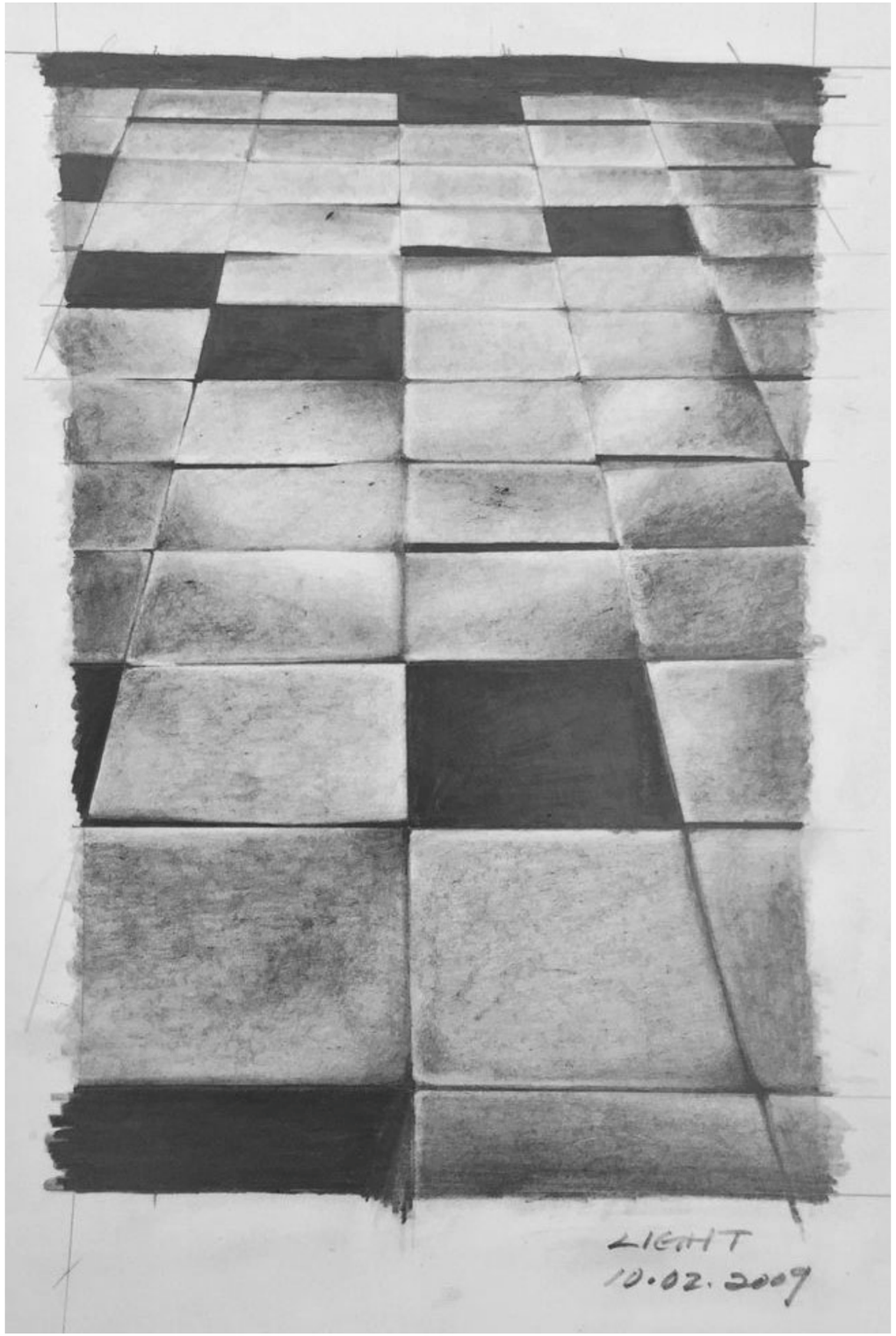


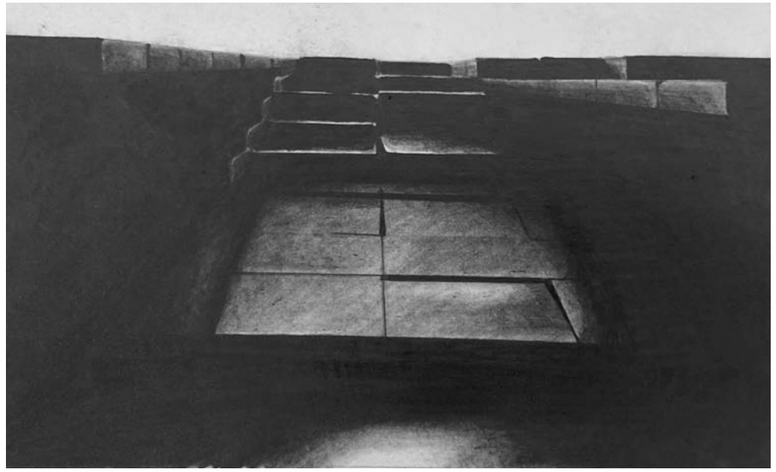
SPATIAL STUDIES

2010
AUBURN
ALABAMA

Designers explore spatial sequencing, materiality, atmosphere, and light through a myriad of means. Drawing has consistently felt the most natural method for interrogating these elements. These studies represent my inquiries as simple wood modules are cut, laminated, erased, and layered to create a series of spatial studies. Then, graphic drawings are developed exploring various architectural elements - ceilings, planes, depth, and so forth.





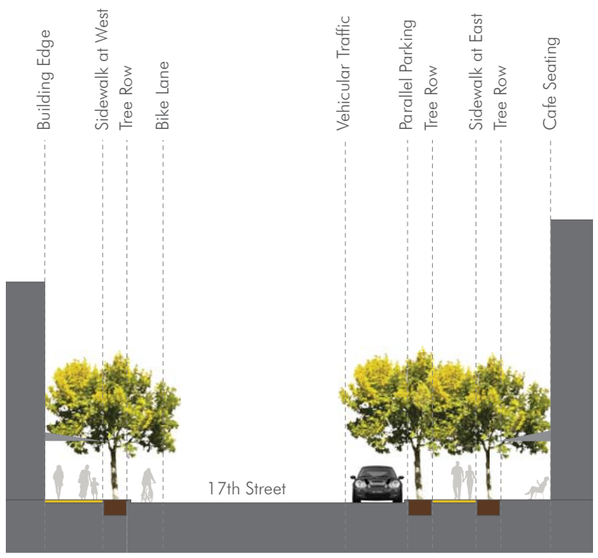


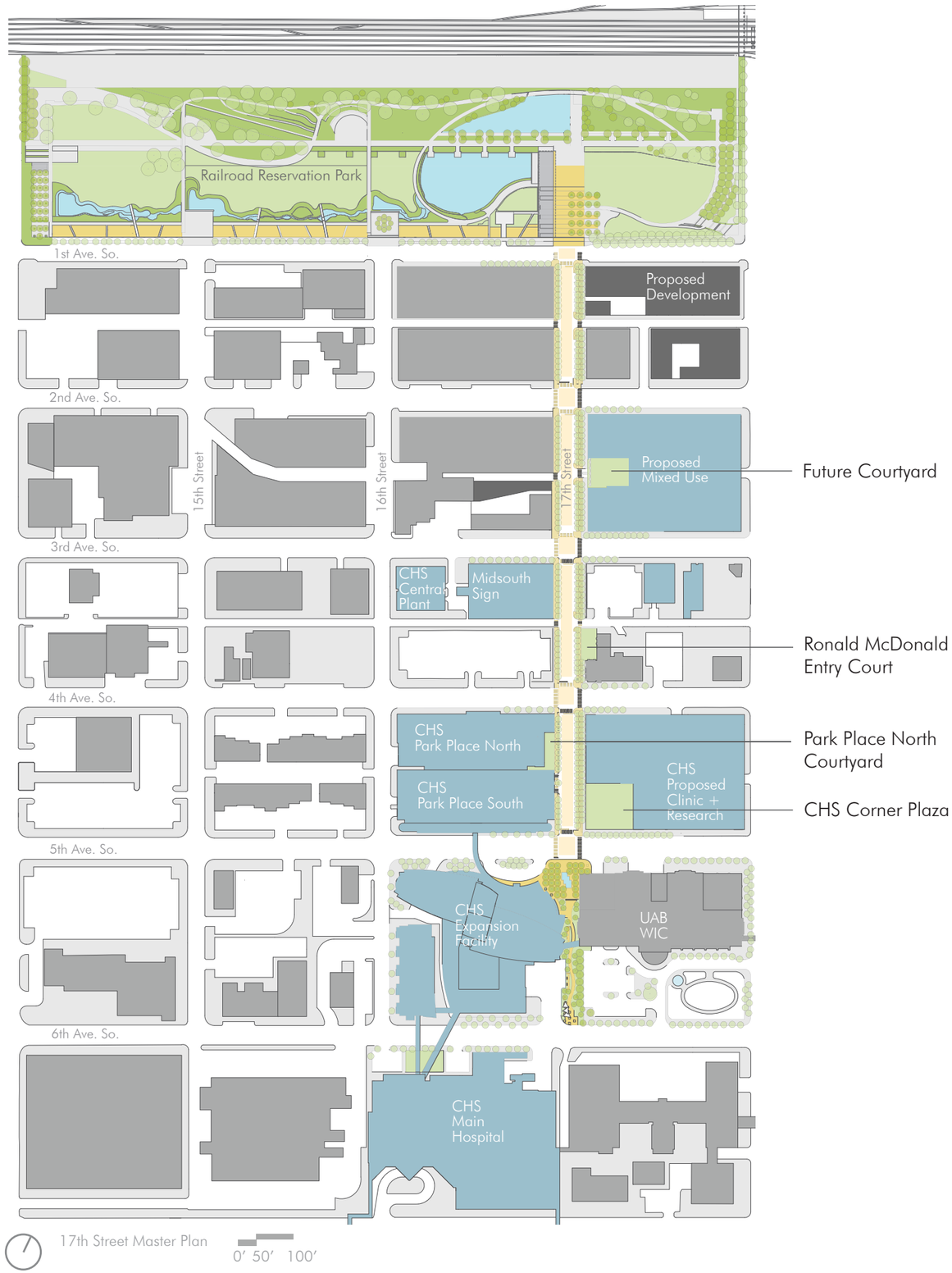
XL GA STUDIO 17th street

2012
BIRMINGHAM
ALABAMA

Children's Hospital located in downtown Birmingham, seeks creation of urban links from the main hospital to various satillite facilities to Tom Leader's Railroad Park. GA Studio was hired to design an urban proposal for redeveloped streetscapes and pocket parks allowing children and their families to safely walk and play outside while accessing the centralized public park.

Design interventions include a road diet, on-street parking, enlarged sidewalks, retail at ground level, and a series of pocket parks adjacent to the 17th Street Corridor. Smith acted as lead on the design and development of renderings and orthographic drawings for Children's Hospital System (CHS).





100 FOLD STUDIO
stillwater high school

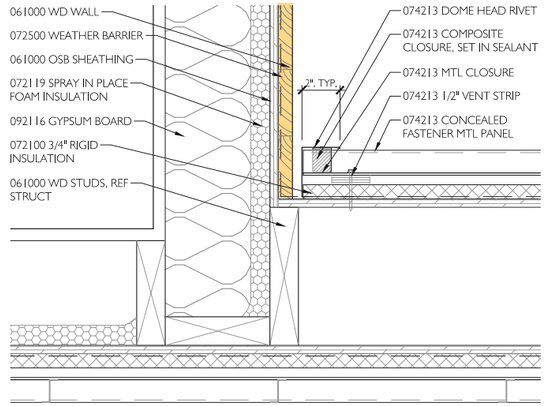
2014
KALISPELL
MONTANA

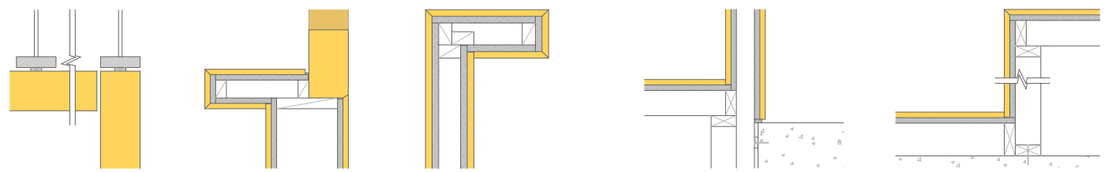
100 Fold Studio designed a high school addition fitting the unique pedagogy of Stillwater School in Kalispell, Montana. The addition allows for future expansion and the flexible floorplan accomodates moveable walls as classes change to meet varied curriculum. With a simple budget, the architectural team provided a collegiate atmosphere for high school students. Smith acted as the project manager under a licensed architect's guidance leading client meetings, coordinating consultant drawings, developing construction documents, and co-managing construction administration.

100 Fold Studio is a non-profit architecture firm located in Kalispell, Montana and focuses on design projects in developing economies where few, if any, architects are practicing. The firm annually hosts a "Summer Studio" design-build project for university architecture students.

Stillwater High School required a lobby, community center, and senior thesis presentation area adjacent to the gymnasium and soccer fields. With a limited budget, 100 Fold Studio designed a 2x6 wood stud enclosure providing stadium seating, cafe seating, and a noise-reducing screen.

With an efficient budget, the architects applied a simple materials pallette of wood, steel, and concrete to create vibrant, contemporary, and durable spaces.





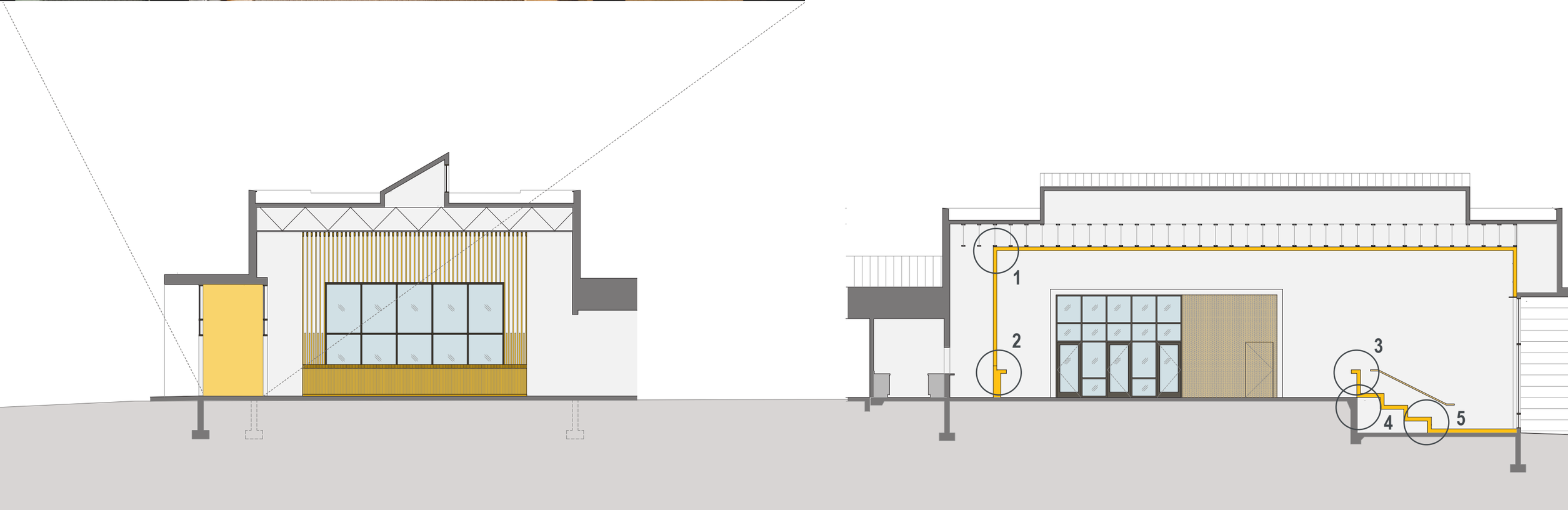
1 Ceiling Detail

2 Countertop Detail

3 Countertop Detail

4 Stadium Seating Detail

5 Stadium Seating Detail



100 FOLD STUDIO
community catalyst

2015
LAKESIDE
MONTANA

100 Fold Summer Studio participants partnered with West Shore Visitors Bureau of Lakeside, Montana to design and build a concert pavilion to host events and concerts in the Lakeside community. This centralized pavilion offers the only venue in Lakeside where the community can come together for concerts, increasing tourism, commerce, and engagement.

While numerous small towns in Montana have experienced investment and economic growth over the past decade, Lakeside, a town adjacent to Flathead Lake, continues to experience poverty and the stresses of oscillating tourism. The visitor's bureau, park, and concert pavilion act as community catalysts for the main downtown artery.

The Summer Studio not only provides a design-build experience for international architecture students, it offers a lecture series from award-winning firms. Pictured: Rick Archer, principal of Overland Partners.

0w 100 Fold Story
Lecture: Orientation
Lecture: Ross Lackey, AIA
Lecture: Jennifer , intern architect
Lecture: John Hudson, AIA
Lecture: Ron Smith, leadership
Lecture: Mark Masucci, leadership

1w **Client Meeting**
Guest Lecture: Rick Archer, AIA
Guest Lecturer Dinner
Lecture: Kadyn Schmautz, Graphic Designer
Studio
Lecture: Gordy McDonald, leadership
Lecture: Garrett Morrison, Intern Architect

2w **Workday: Past Projects**
Guest Lecture: Lis Cochrane, Entrepreneur
Guest Lecturer Dinner
Lecture: Ross Lackey, AIA
Studio
Lecture: Arnold Rottier, Community Development
Glacier National Park

3w
Guest Lecture: Matt Griffith, AIA
Guest Lecturer Dinner
Studio
Lecture: Jake Heffington, AIA
Lecture: Dawn Masucci, Team Dynamics
Client Meeting

4w
Guest Lecture: Stacy Burtelson, AIA
Guest Lecturer Dinner
Design-Build

Lecture: John Hudon, AIA Business Models

5w
Guest Lecture: Ken Elzinga, UVA
Guest Lecturer Dinner
Design-Build

Lecture: Ross Lackey, AIA
Lecture: Jeremy West

6w
Design-Build
IDP Documentation
Brunch/ Graduation
Client Meeting/ Project Completion

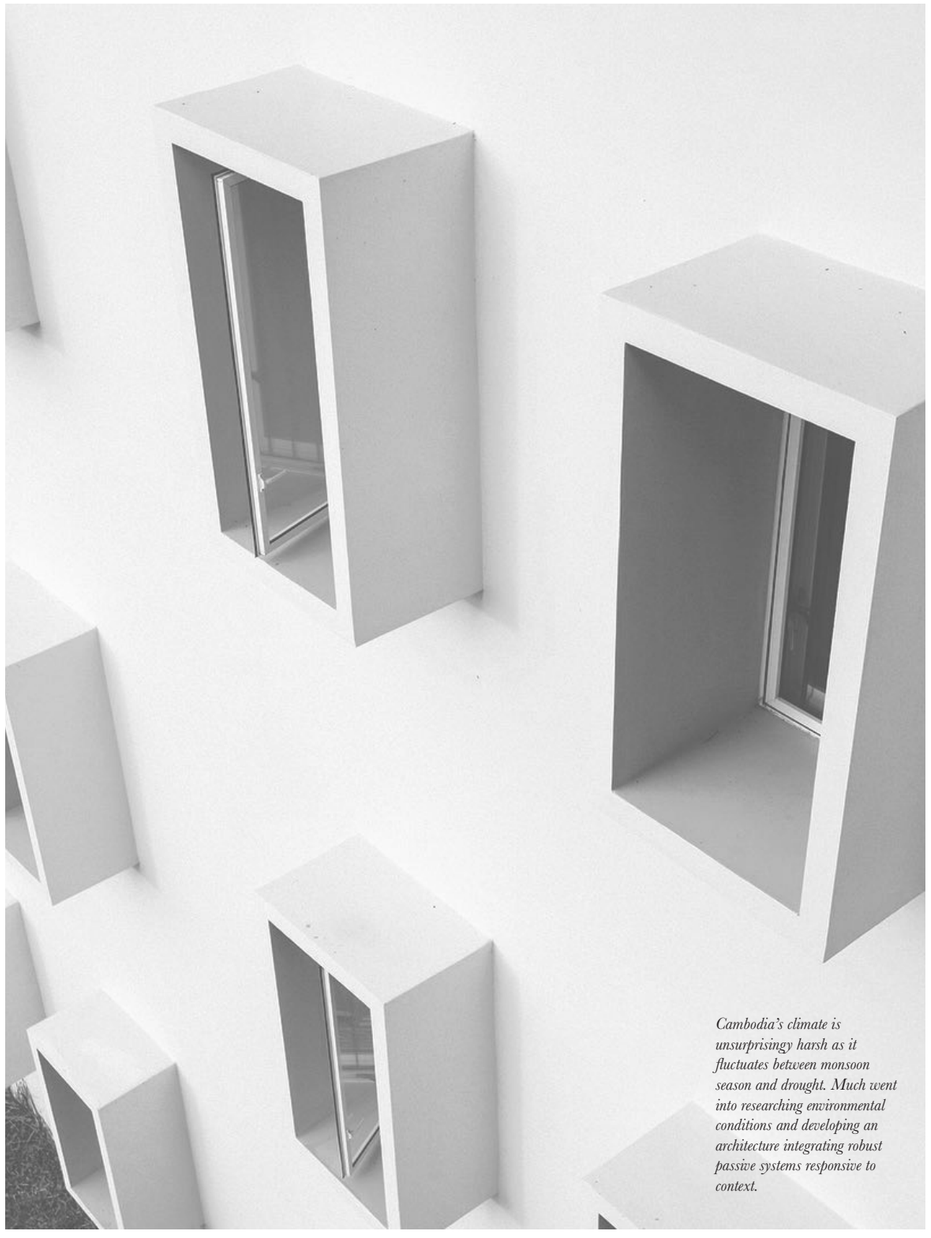
LXI

100 FOLD STUDIO
battambang university

2014
BATTAMBANG
CAMBODIA

100 Fold Studio provided a campus masterplan and individual facility design for the University of the Nations in Battambang, Cambodia. This thirteen-hectar site is comprised of housing, classrooms, recreational fields, a cafeteria, and more. Each structure was designed with clients, local stakeholders, and national consultants. Even more, the architectural langauge, materials, and environmental systems were strongly researched for local appropriateness.

Smith provided schematic design work, international site visits, and construction documents.



Cambodia's climate is unsurprisingy harsh as it fluctuates between monsoon season and drought. Much went into researching environmental conditions and developing an architecture integrating robust passive systems responsive to context.

100 FOLD STUDIO
chiang rai school

2014
CHIANG RAI
THAILAND

Proposed for a tight, sloping lot in rapidly urbanizing Chiang Rai, this multi-purpose educational building houses classrooms, administrative offices, a large cafeteria, lobby space, and dormitory housing. Vertical circulation at the south exposure provides shading from the harsh sun and incorporates group and individual gathering zones. These gathering spaces not only afford views of the soccer field and surrounding city, their form is a vertical reinterpretation of traditional Thai salas. Sala, or pavilion, populate the Thai landscape and provide communal shaded areas for public use. Additionally, the building provides passive cooling strategies, implements locally-sourced materias, and provides an accessible roof, another common feature in Thai culture. Smith provided international site visits, research into local means and methods of construction, and schematic drawings and renderings.

100 FOLD STUDIO
sports training facility

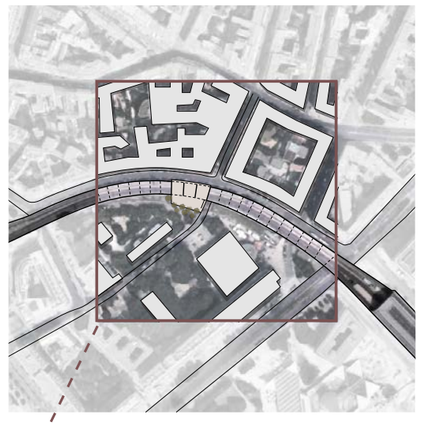
2016
BIRMINGHAM
ALABAMA

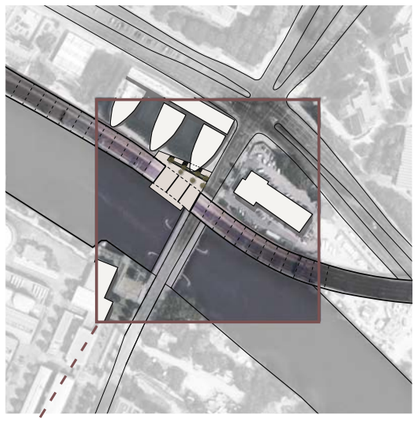
Godspeed is an elite sports and physical training facility in Hoover, Alabama, and 100 Fold Studio designed the 6500sf facility including a turf field, batting cages, and an indoor gym. The facility uses simple materials such as concrete masonry units, a steel super structure, and glass. Smith assisted with schematic design through construction documentation.

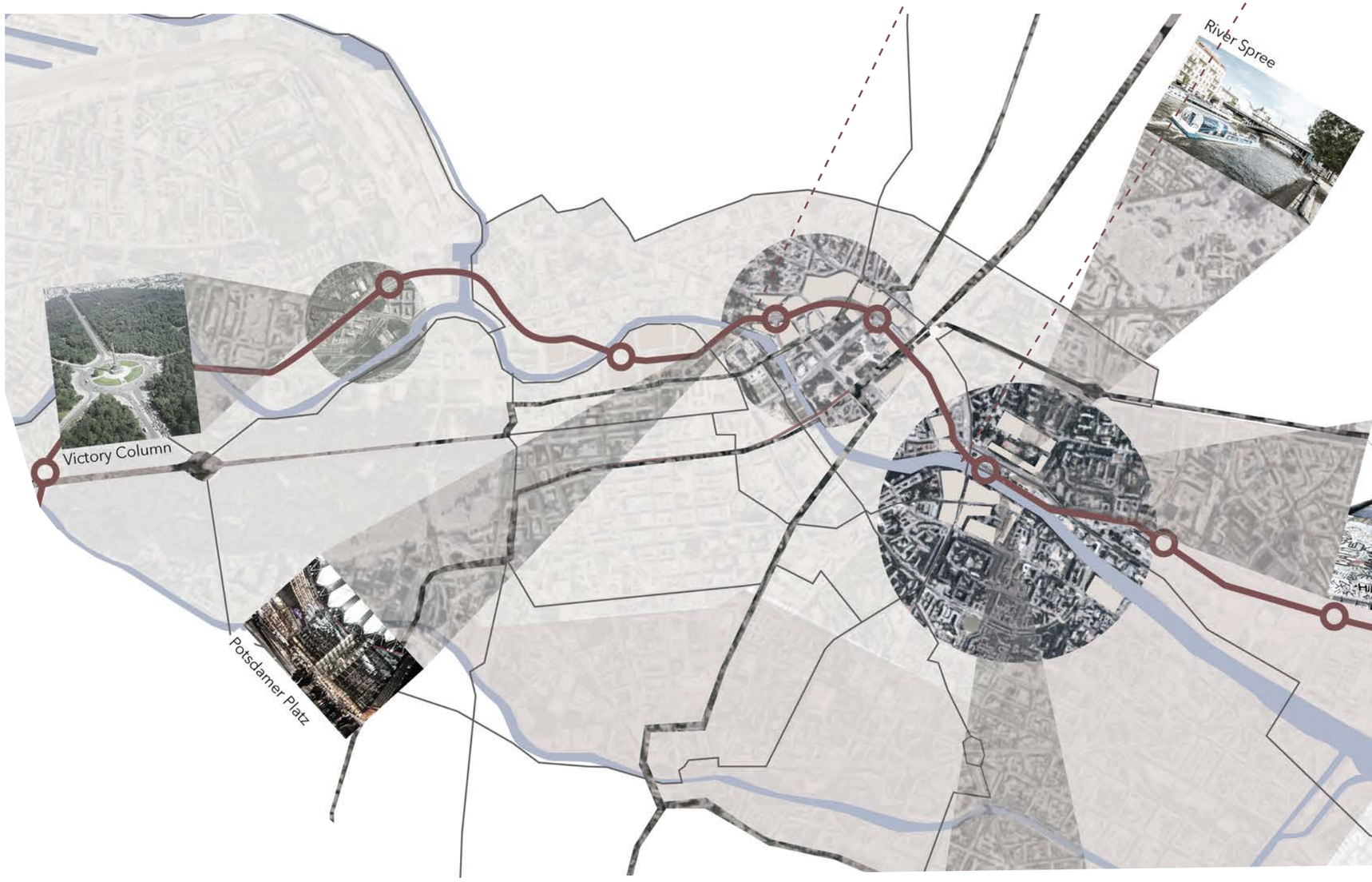
COMPETITION
eisenbahnmarkt

2017
RALEIGH
NORTH CAROLINA

Smith joined a team of two architects and one public administrator to develop a design and operational plan for a marketplace in Berlin, Germany that would benefit refugees seeking asylum. The team spent two-months developing a proposal that would place new markets under Berlin's existing S-bahn railway system that runs east-west through the city. The goal is to pilot two marketplaces in culturally diverse Berlin districts with the aspiration of incremental growth over time as resources allow. The marketplace would be built for under US $100,000 and would provide space for selling products, a workshop for learning and developing skills, and a classroom for courses easing the immigration process. Smith developed the overall concept, operational plan, and drawings, and the project was selected as a finalist by an international committee.







Berlin map indicating phased marketplaces (self-produced)

45
46
47
48

PHASE 1 : HOLTZMARKSTRASSE

market
workshop
classrooms/
administration

NEIGHBORING DISTRICTS

Mitte
Kreuzberg
Neukolln

ALEXANDER PLATZ STATION

JANNOWITZBRUCKE STATION

DEVELOP AFFORDABLE
HOUSING ALONG RIVER

WALKING DISTANCE TO

East Side Gallery	22 min
Sonnenalle	35 min
Turkish Market	40 min
Potsdamer Platz	45 min

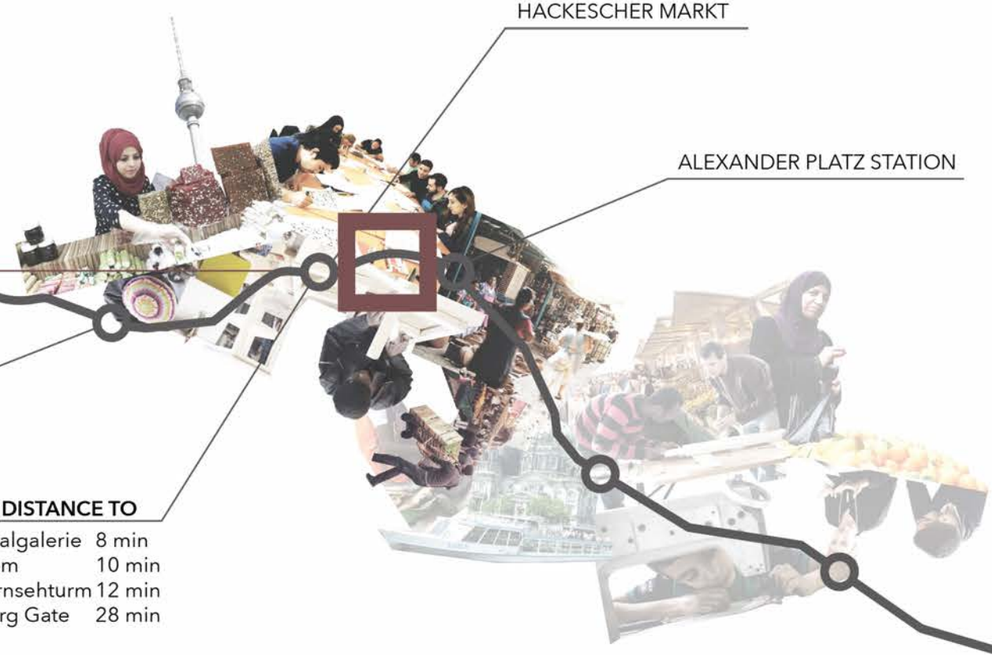
OSTBAHNHOF STATION

132
133
134

PHASE 2 : DIRCKSENSTRASSE

market
market
workshop

HACKESCHER MARKT

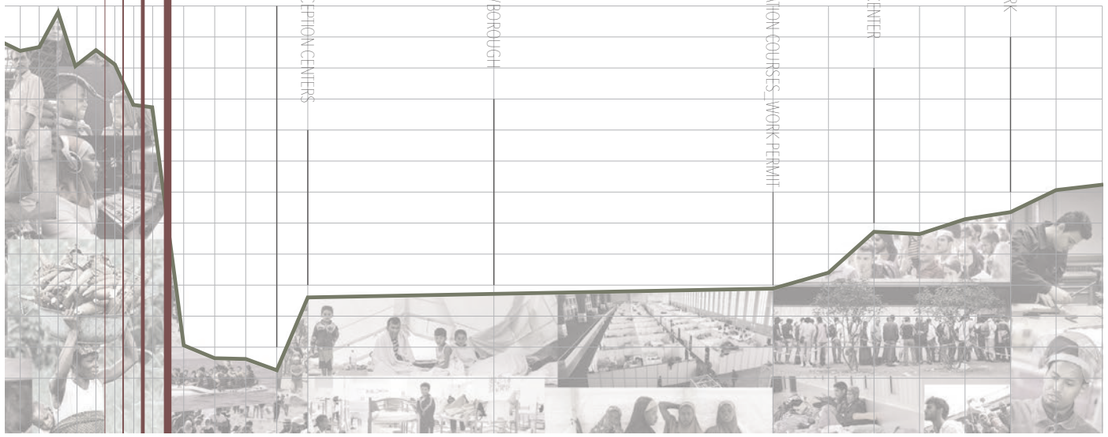


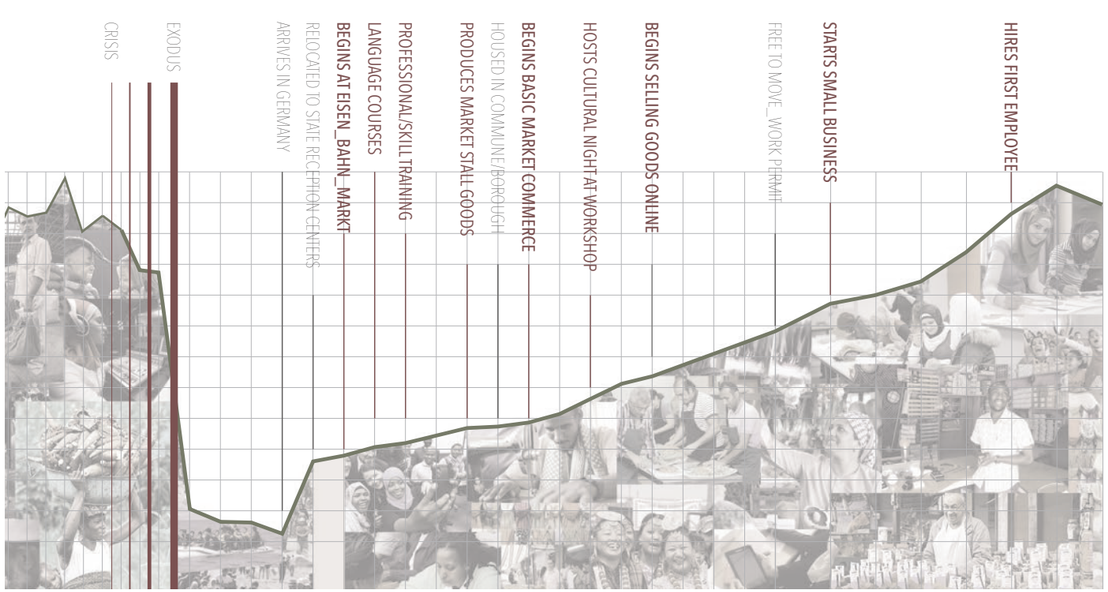
HACKESCHER MARKT

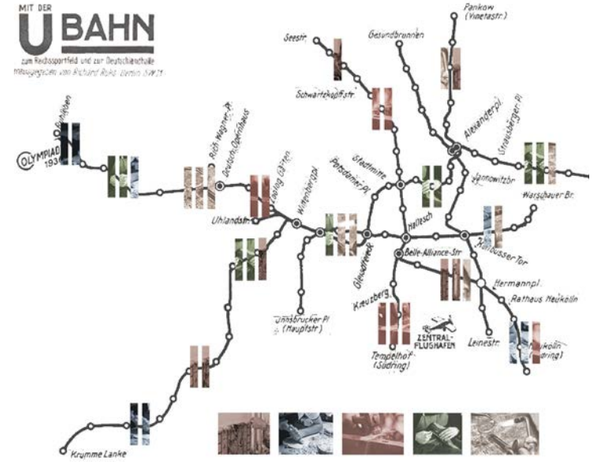
ALEXANDER PLATZ STATION

WALKING DISTANCE TO

Alte Nationalgalerie	8 min
Berliner Dom	10 min
Berliner Fernsehturm	12 min
Brandenburg Gate	28 min



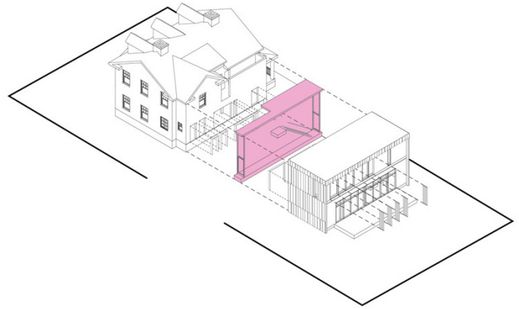




Rendering of Railway Marketplace

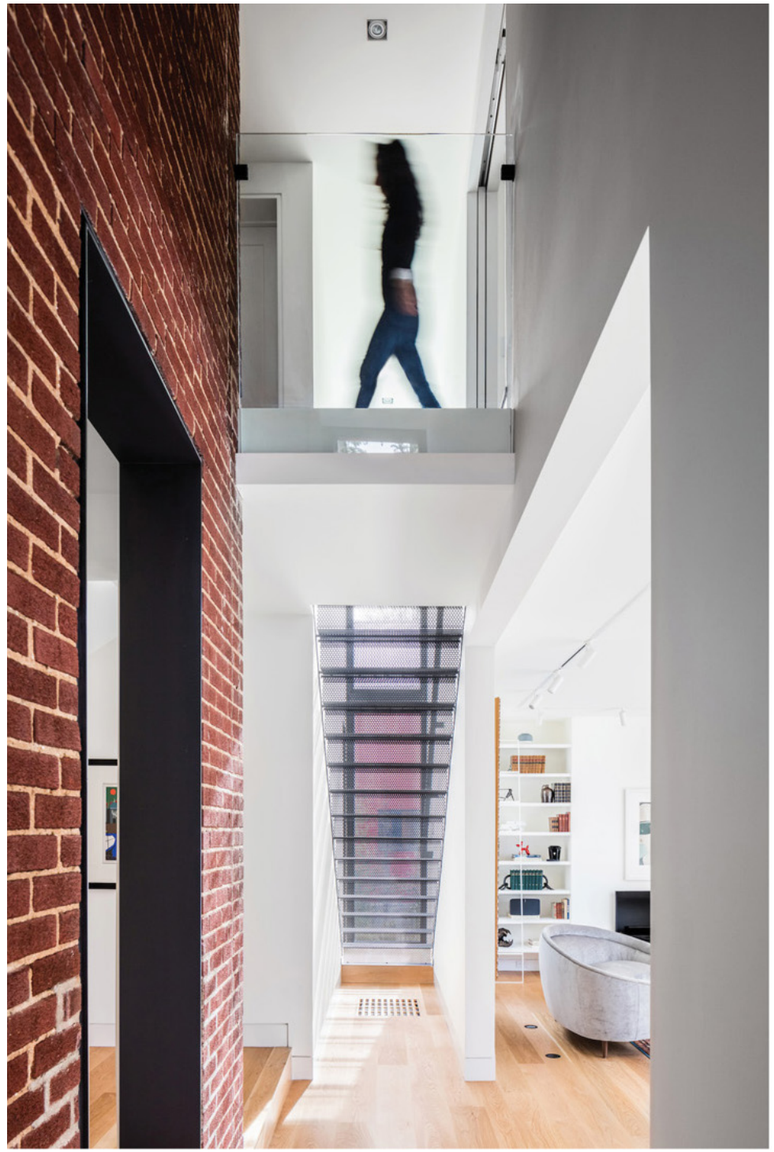
TONIC
hillcrest residence

2017
RALEIGH
NORTH CAROLINA

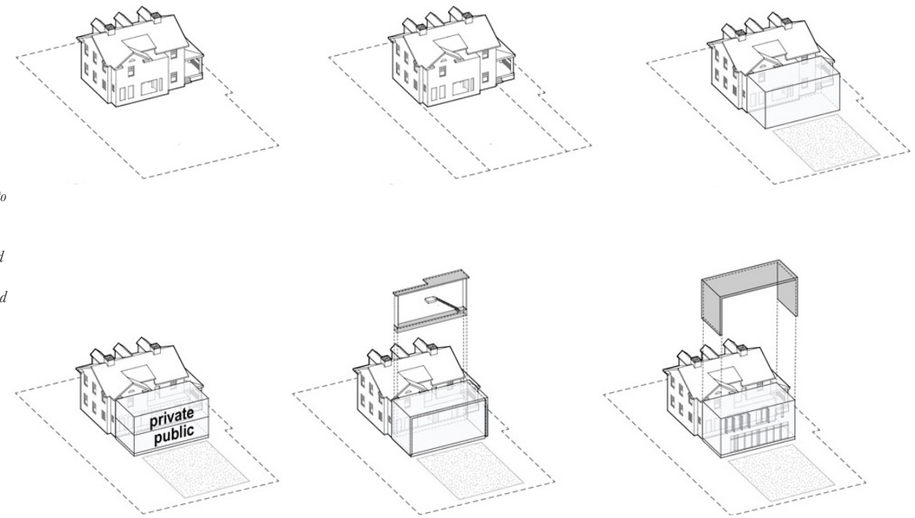


The juxtaposition between old and new, historic and modern was the inspiration for this project. The 1500sf addition responds to the intent of the old 1916 Georgian-Revival house and builds upon its existing narrative of family, heritage, fine taste, and social grace. Simultaneously, it introduces an entirely new narrative that tells the story of a more open, relaxed lifestyle with 21st century amenities and attention to energy efficiency. Both narratives are articulated through materiality (brick and steel), form (a historic foursquare box and a simple, modern, rectilinear appendage), and spatial relationships created through floorplan and section. Smith assisted with site photos, as-built documentation, and schematic design work.

Katherine Hogan Architects, formerly known as Tonic Design and Construction, is an award-winning design-build firm in Raleigh, North Carolina.



The clients sought a modern addition to their Georgian Revival home. While maintaining the classical front to the street, a contemporary, two-story addition was proposed for the rear. Old and new are joined by a thin "neck" of vertical circulation separating public and private zones.



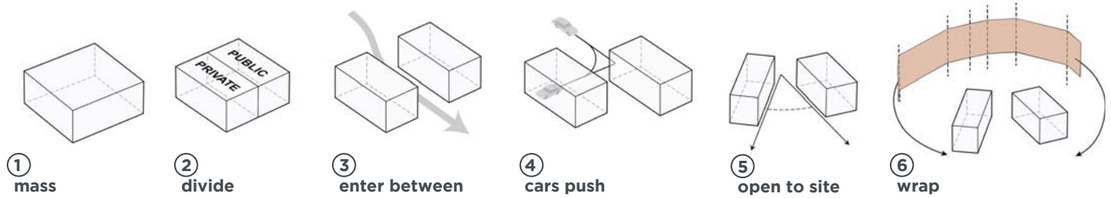
TONIC
piedmont retreat

2017
DURHAM
NORTH CAROLINA

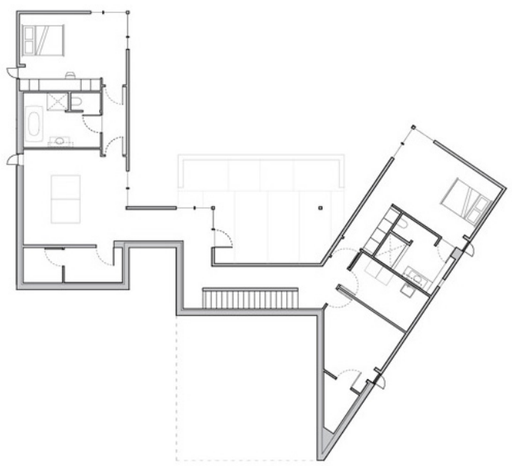
Set in a wooded cul-de-sac neighborhood on the edge of Durham, the community is characterized by a strong topography. Bounded by a quiet and introverted exterior, a thick Geode crust, the corten steel forms a protective barrier to the street. This skin will eventually find its final weathering point and blend seamlessly into the landscape. In contrast, the living spaces open to an array of shifting perspectival views within and throughout the house. The daily process of circulating through the spaces is grounded by seeing the building from within the building and discovering a new vantage point of the site.

In contrast to the interiority of the neighboring houses, the owners were inspired to live in a house that was modest in public presence but directly connected to the lush green North Carolina landscape of their site. They wanted a private, low maintenance house, that was livable and would allow them to blur the boundaries between their indoor and outdoor spaces.

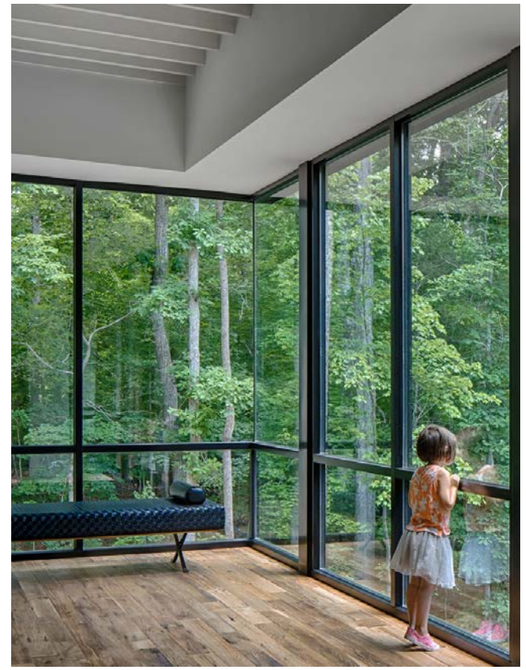
Smith assisted with construction documents, site visits, and material and product specification.



lower plan



upper plan



The entire residence is an oscillation between the geode's shell and transparency. This not only occurs visually but spatially as the plan connects and deligniates areas through a calibrated architecture.

TONIC
1700 glenwood

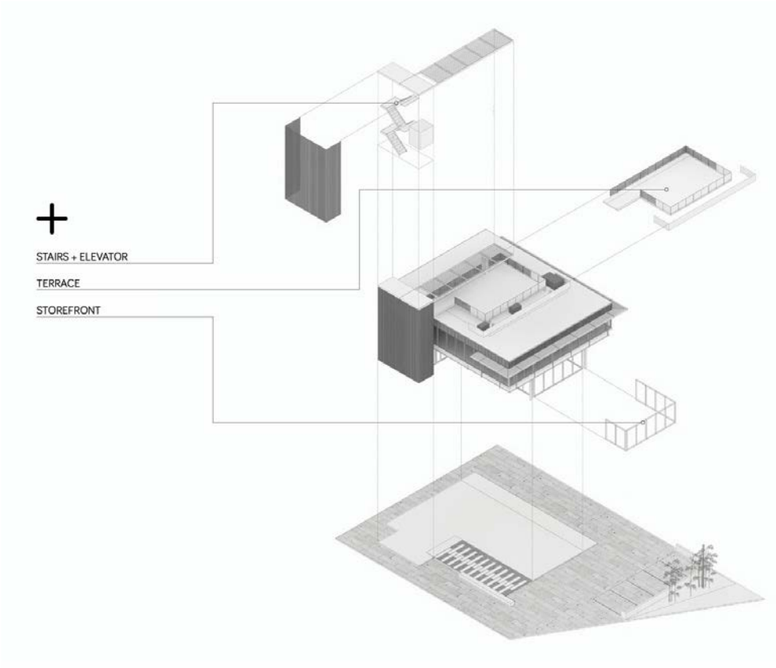
2017
RALEIGH
NORTH CAROLINA

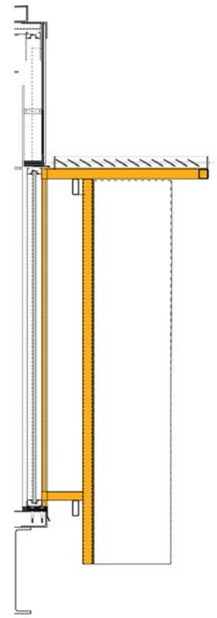
1700 Glenwood sits prominently at Raleigh's Five Points intersection, on the corner of Fairview and West Whitaker. It was built in 1964 for a progressive mechanized dry cleaner, designed to display the machinery and cleaning process in its large, elevated glass expanses. The current owners purchased the building in 1979 and launched a new and quickly evolving business, Audio Buys, which sold and repaired audio video and computer equipment. In 2007, the shop closed and with it, left a high-profile vacancy at a bustling intersection.

After sitting vacant for a number of years, the owners decided to undertake a renovation, with a specific commitment towards sustainability and an energy-efficient future. A proactive architectural solution was employed, using new insulated glazing, long-lasting zinc siding and a custom shade system to increase energy efficiency. The building now shades its interior space from glare and reduces summer heat gain by more than 70%. Through this transformation, the building is not only far more energy efficient but is a highly desirable space, ready to be leased by the next generation of tenants. Aesthetic strategies of layering, depth, shadow, and structural articulation not only reference the architectural detail of the adjacent church but also create a deep framework for the shading system that screens the glass. The result is a dialogue between two buildings that serve as icons of the neighborhood. The renovation focuses on revitalizing the building, in terms of efficiency and aesthetics, to be an up-to-date and iconic piece of architecture, deeply rooted in and sensitive to its surroundings, and a positive example for the future, where reuse is a key part of sustainability.

Smith assisted with schematic drawings and renderings.

The adaptive-reuse modern structure, situated at Raleigh's prominent five-points intersection, affords views of the historic streetscape not only through exterior, shaded glazing, but additionally through the newly constructed accessible roof.





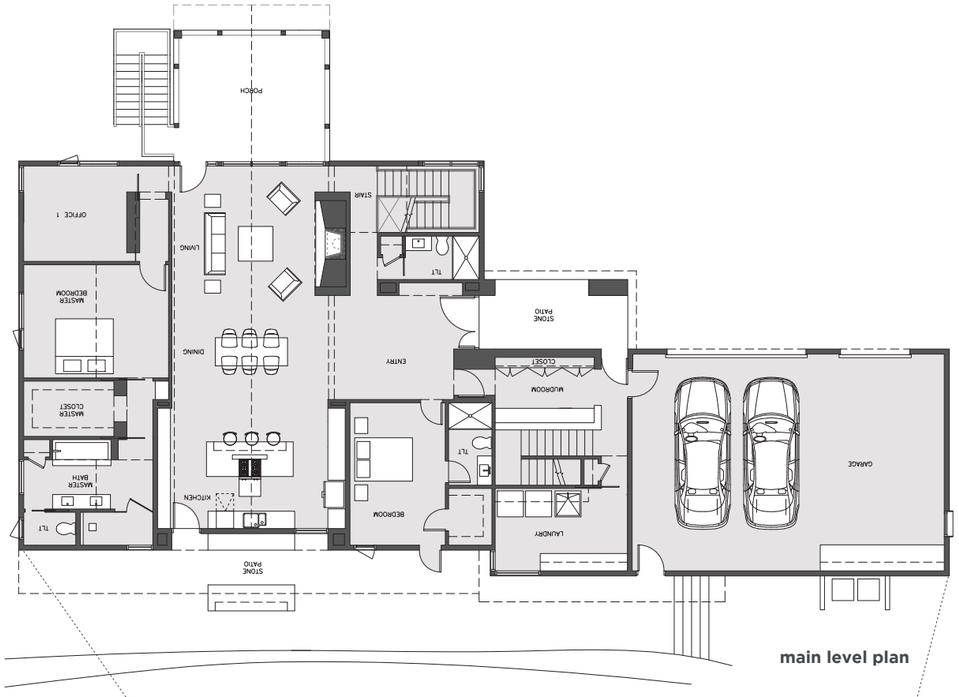
ASSEMBLE
montana way

2020
AUBURN
ALABAMA

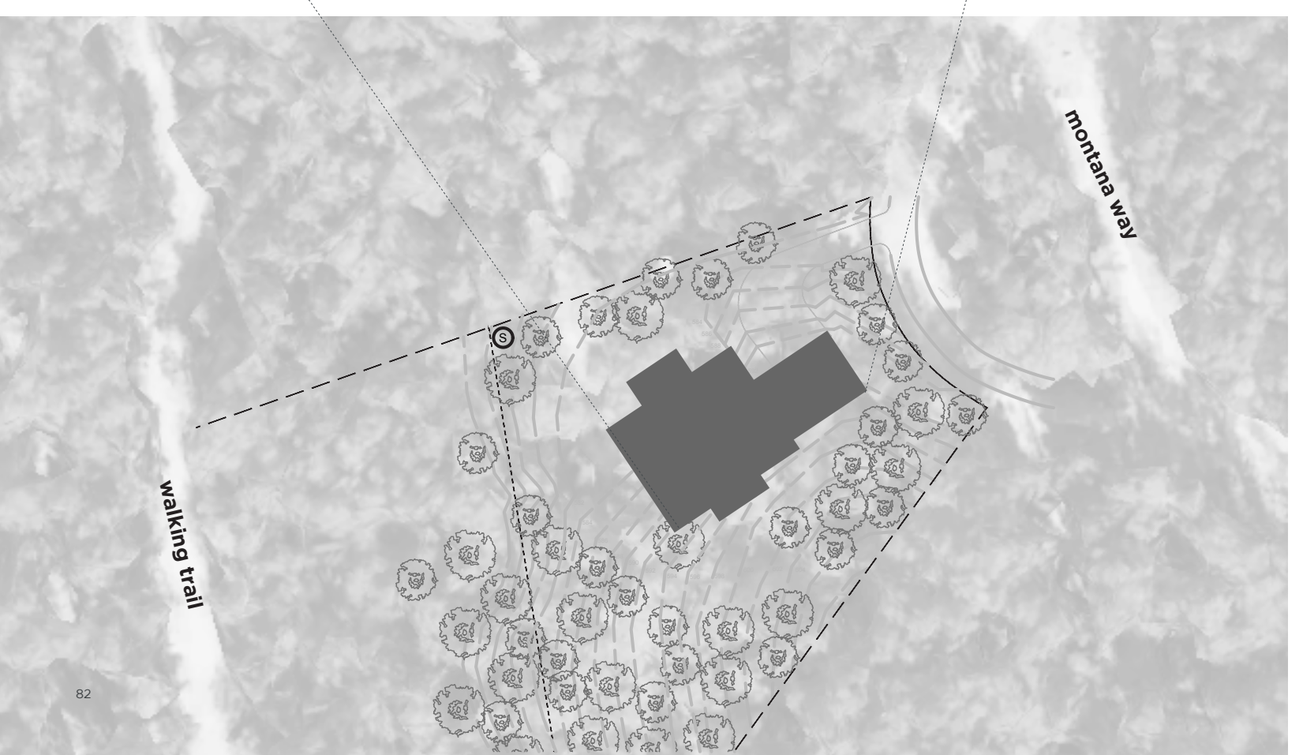
Smith created Assemble Design Group with the broad vision of future integration of various design disciplines as well as socially- and environmentally- conscious real estate development. Additionally, the firm prioritizes participatory design methods for equitable landscapes and distribution of agency.

This cabin is nestled on a wooded, gentle slopping site adjacent to a natural watershed and walking trail in The Dakota. The house is marked by its strong gable roof forms and interior trusses that create a rhythmic colonnade uniting the kitchen, dining, living, and exterior porch spaces. Ample glazing along with natural materials of stone, wood, and steel create a strong connection between interior and exterior spaces. The house is additionally connected to the landscape by wrapping the lower level in stone as it rises out of the carved earth and transitions to vertical wood members, mimicking the surrounding pines and oaks. Finally, the house makes use of passive sustainable strategies such as daylighting from the north, passive cross-ventilation, and high ceilings for capturing rising heat.

This represents Smith's first project through her own firm, Assemble Design Group.



main level plan



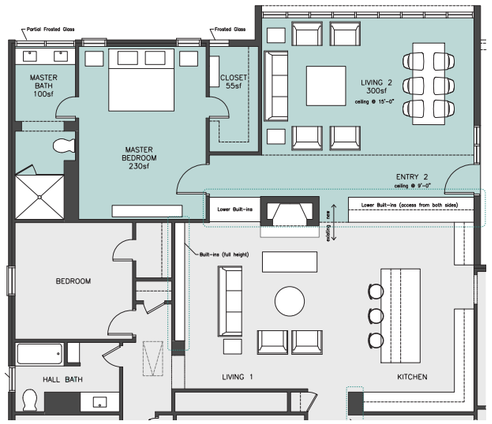
The clients desired a simple palette of materials, ample daylighting, and views of the surrounding wooded landscape. The traditional lodge is reinterpreted to provide modern amenities, sustainable strategies, and durability.

ASSEMBLE
willow creek addition

The contemporary addition provides higher ceilings as well as floor-to-ceiling windows offering ample light to the interior. While natural light and views to the wooded rear of the house were paramount, it was additionally necessary to shade harsh exposure to the western sun.

2022
AUBURN
ALABAMA

The renovation and addition seeks three practical goals: increase common family areas, organize circulation and spatial sequencing, and increase daylighting to the interior while limiting solar heat gain. The house is sited atop a wooded slope affording tranquil forested views to the west. The addition creates a contemporary vocabulary within the more traditional hipped roof lines and brick envelope.



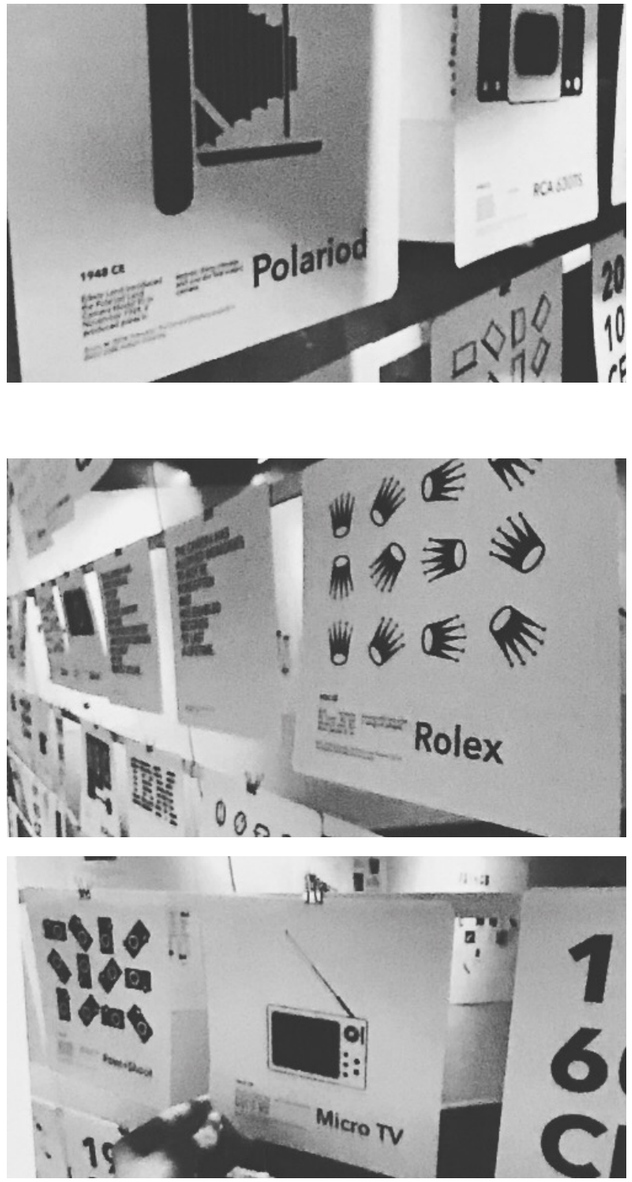
integration exhibit

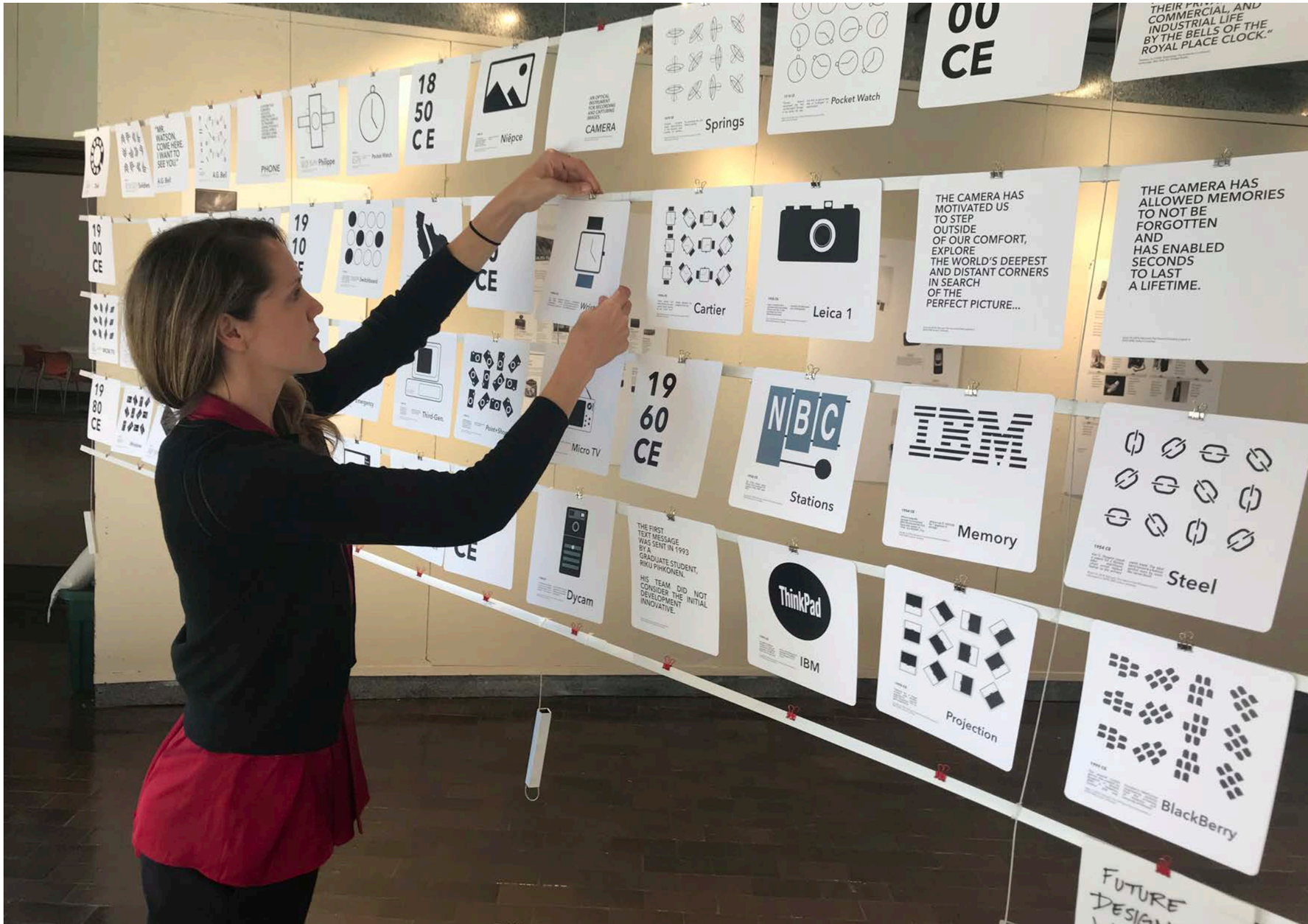
2019
AUBURN
ALABAMA

Smith created an exhibit and installation showcasing the integration of techonology through time. Starting with the earliest written accounts of human invention, the installation focuses on time keepers, computers, photography, and telecommunication, emphasizing how each form of technology influences another. Grids and geometric patterns interrogate the conventional linear timeline, to display how design and innovation emerge from complex networks.

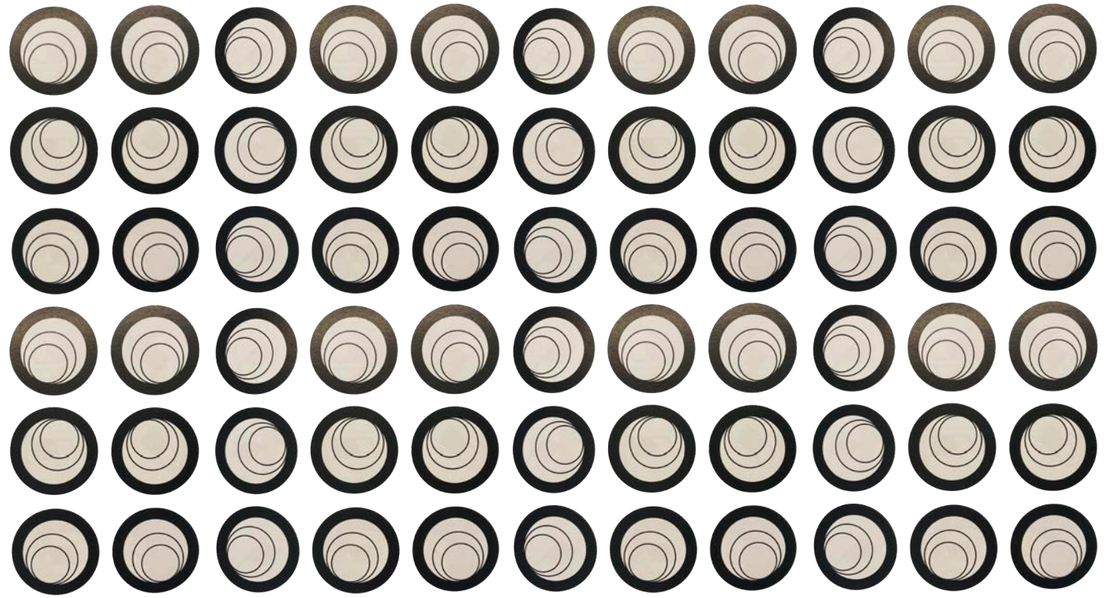
The entire exhibit includes two installations and a book. Smith is interested in taking the work and further developing it into a children's educational game.

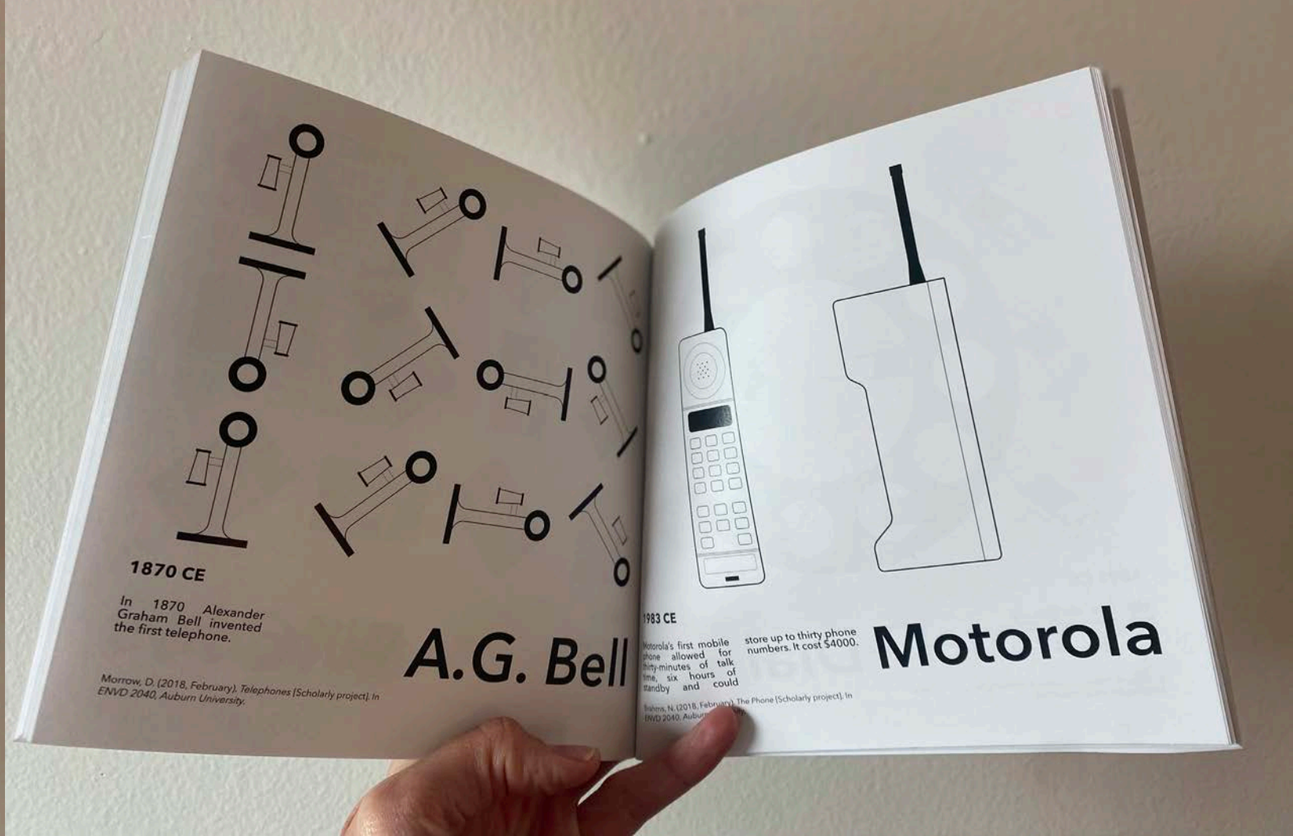
She created the installation and graphics. Research was provided through coursework.

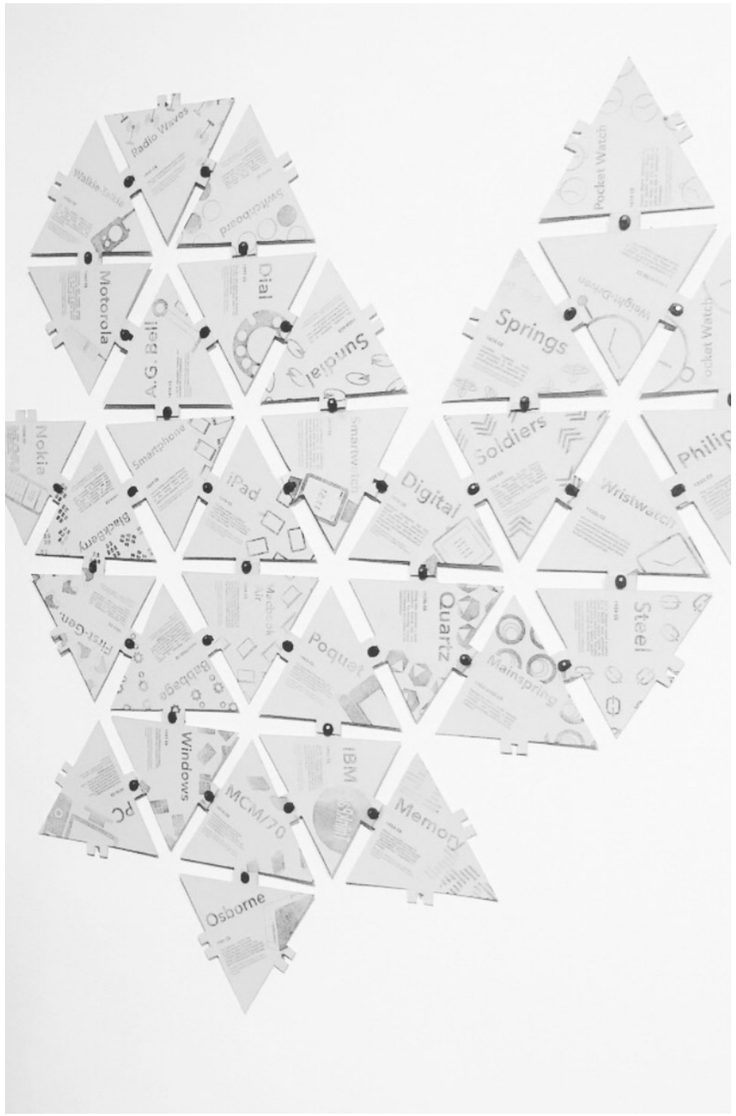




After creating the initial exhibit, Smith reformmated the work into a 10x10" graphic publication. The publication is reorganized in a linear manner through time, oscillating between various forms of technology and advancement.







Smith's second exhibit is an advancement of the grid as it applies geometric patterns to display the interconnected web of technological innovation. It is her aim to take this pattern and create folded orb-like structures that creatively integrate playful sculptures and child education.

TEACHING

“Without a level of integration throughout the development of the various building professions, these future team members greet one another as strangers for the first time the day they graduate from academia.”

teaching philosophy

INTRODUCTION : ENVIRONMENTAL DESIGN

Environmental Design has a history, albeit brief, of addressing the aggregate of artifacts, programs, systems, and deployments in the constructed landscape. In an excerpt from *Radical Pedagogies* titled, “The Methods of Environmental Design,” Joaquin Medina Warmburg explains that the emergence of “the term ‘environment’ in the 1960s brought with it the promise of a greater connection between traditionally distinct design disciplines such as industrial design, architecture, or even city planning.” He elaborates, “Since it was apparent that the sum of ‘good design objects’ did not in itself add up to a ‘good design environment,’ the focus of attention shifted from the design of individual artifacts to an open system of relations [...].”[1] Rather than a gesumptkunstwerk, design intergrates physical artifacts, systems, programs, and deployments to consider the range of interdependent relationships. The territory of my teaching resides here.

Three primary tenants of the Environmental Design curriculum include:

+ foundation design as translatable methods across diverse design disciplines
+ ideation of diverse typological responses (systems, programs, deployments, and artifacts) for a given site & brief
+ interdisciplinary design as a resilient response to increasing complexity

FOUNDATION DESIGN AS TRANSLATABLE

The program is comprised of a series of 3-credit hour hybrid lab-seminar courses centered on the tenants above in an effort to develop interdisciplinary designers whose projects integrate disciplines, scales, and interdependent systems. In early courses Smith focuses on foundation design skills as conceived at the Bauhaus and popularized through early architecture and design education. Students learn principles of craft, color theory, proportion, figure-ground relationships, and develop poetic concepts driving design decisions through limited-scope projects. Furthermore, the design thinking process, and more specifically, divergent thinking, is highlighted in Smith’s teaching as a cognitive means for generating ideas. Challenging K-12 education centered on convergent thinking and standardized tests, Smith encourages students to test a diversity of design proposals acknowledging that successful projects are rarely the designer’s first idea, nor the result of one individual, at one moment in time. Rather, design integrates robust ideation, collective efforts, and multiple phases over time. Foundation design theories and iteration through the application of divergent thinking are pivotal in nurturing the creative process for design (and non-design) disciplines.

DIVERSE TYPOLOGIES + INTERDISCIPLINARY DESIGN

Germane to contemporary design challenges focused on collaborative responses to real world complexities, interdisciplinary design methods embedded in a degree that does not suppose students later specify an area of study is essential. Design pedagogy centered on interdisciplinary design practice and methods are central to teaching. It is my position that in order to prepare graduates for an emerging future of professional practice, designers must engage in interdisciplinary design prior to graduation. Personal experience in practice and academia stand as testaments to our siloed design disciplines where territories, scopes of work, and risk management are delignated, rather than fostering collaboration and emergence. Resilient projects like the BIG U, Little Island, Benthemplein Water Square, and Olympic Sculpture Park illustrate our growing need for interdisciplinary design. To foster this, Smith encourges students to design for a set of conditions, rather than a desired artifact. Through iterative process, students are challenged to design physical and non-physical artifacts merging traditionally disparate disciplines in order to discover emergent fields.

As students mature in the Environmental Design program, Smith encourages them to develop confidence as designers with unique theories, methods, and processes. Students are asked to critically reflect on design projects and even post-rationalize decisions, as reflective thinking and cognative analysis allows one to dissect and express with specificity processes, even gutteral or intuitive responses. Additionally, synthesizing personal work allows students to delignate their design territory from the milieu. In the Capstone, students develop an introductory theoretical framework and design project based on a preselected urban site. Students are encouraged to bridge various scales and fields of study to generate emergent design theories grounded in research and a robust design argument. This is in an effort to illuminate their unique, interdisciplinary approach to design untethered to conventional disciplinary boundaries.

Present design challenges focused on collaborative responses to real world complexities, necessitate an interdisciplinary, undergraduate design degree. Smith’s teaching within the Environmental Design program finds its territory here.

1. Colomina, Beatriz, Galán Ignacio G., Evangelos Kotsioris, and Anna-Maria Meister. “The Methods of Environmental Design.” Essay. In *Radical Pedagogies*, 194. Cambridge, MA: The MIT Press, 2022.

FOUNDATION DESIGN

This section centers on the first of the three tenants organizing the Environmental Design program:

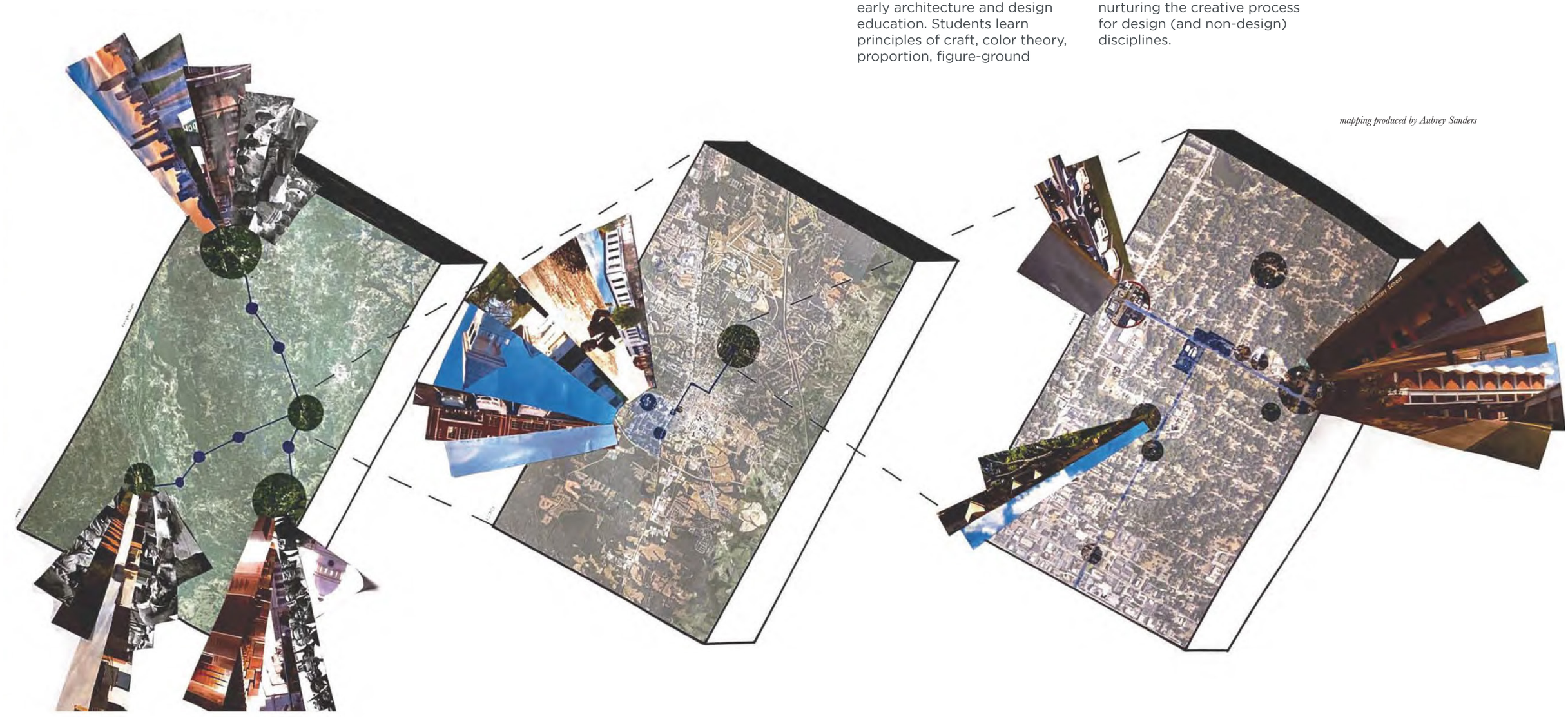
+ foundation design as translatable methods across diverse design disciplines
+ ideation of diverse typological responses (systems, programs, deployments, and artifacts) for a given site & brief
+ interdisciplinary design as a resilient response to increasing complexity

FOUNDATION DESIGN AS TRANSLATABLE

The program is comprised of a series of 3-credit hour hybrid lab-seminar courses centered on the tenants above in an effort to develop interdisciplinary designers whose projects integrate disciplines, scales, and interdependent systems. In early courses Smith focuses on foundation design skills as conceived at the Bauhaus and popularized through early architecture and design education. Students learn principles of craft, color theory, proportion, figure-ground relationships, and develop poetic concepts driving design decisions through limited-scope projects. Furthermore, the design thinking process, and more specifically, divergent thinking, is highlighted in Smith's teaching as a cognitive means for generating ideas. Foundation design theories and iteration through the application of divergent thinking are pivotal in nurturing the creative process for design (and non-design) disciplines.

On the following pages there are a series of courses and assignments applying foundation teaching to larger (40+ student enrollment) classes. Areas of study include visual note taking, mapping, mixed media visualizations, conceptual artifacts, and reading and responding to contextual conditions.

mapping produced by Aubrey Sanders



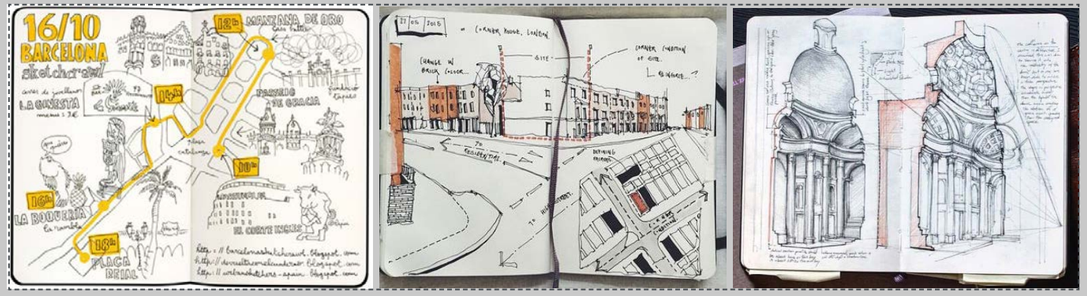
visual notes

The term “visual notes” is often used in lieu of “sketchbook” for the reason that we commonly engage in verbal note-taking. The only difference is that students practice nonverbal notes to document, analyze, and sythesize specific ideas in the built environment.

Visual notes may take the form of diagrams, maps, vignettes, drawings, exploded axonometric drawings, storyboards or cartoons, and/or a combination of these. Clear and compelling visual notes frequently overlay diverse types of drawings to communicate specific, layered information. In addition, they isolate ideas, and as such, can be more readily understood than text alone.

Maintaining visual notes helps students learn how to observe, document, and display information visually. Visual notes may be for an audience to view, or for the designer to help answer inquiries about a given project, site, or idea. The following pages displays a range of visual notes from early design courses.

Students document, analyze, and sythesize ideas about Seattle's redesigned Bell Street corridor.



You are required to maintain a sketchbook or visual notes book for this class. A significant tool for designers is the sketchbook for taking notes, analyzing design problems, critically thinking through patterns observed in the built environment, site analysis, and more. To successfully use a “visual notes” book you do NOT need to be an artist. In fact, many successful designers are terrible at drawing. ***Alternatively, you need to be an observer, listener, critical thinker, and someone searching for patterns and relationships.***

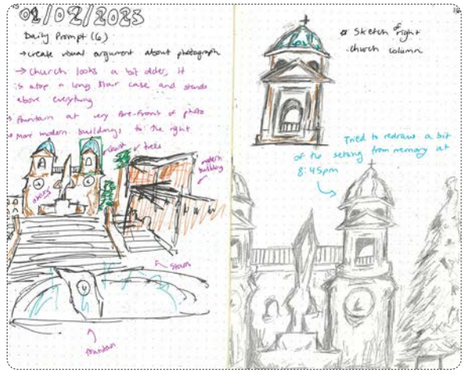
In this class we often use the term “visual notes” in lieu of “sketchbook” for the reason that we all take notes. The only difference is that you will practice nonverbal notes or visual notes in addition to verbal notation. Visual notes often take the form of diagrams, maps, vignettes, drawings, exploded axonometric drawings, storyboards or cartoons, and so forth. Good visual notes frequently overlay different types of drawings to communicate specific, layered information. In addition, they isolate ideas, and as such, can be more readily understood than text. Even if this is the only time in your life you maintain a sketchbook, learning how to observe, document, and display information visually will help in all career paths (e.g. Florence Nightingale’s visuals - not a designer but extremely influential, due, in part, to her ability to visualize data).

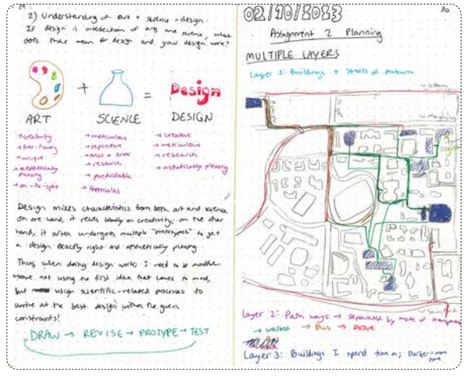
Your visual notes book must be:
- Moleskine Classic Notebook, Soft Cover, Large (5 x 8.25”) Plain/Blank or similar
- blank pages or gridded (no lines)
- when open, it should lay flat or nearly flat as a spread
- no spiral binding
- keep it simple (no fussy cover art, no large leather binding, no wrap closure, etc.)

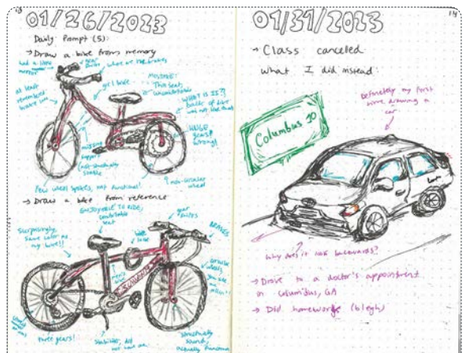
This book is only to be used for this class. However, it is recommended that you use it for documenting reflections and observations throughout the semester, even if unrelated to class assignments. Each assignment must be easy to find for grading – no exceptions.

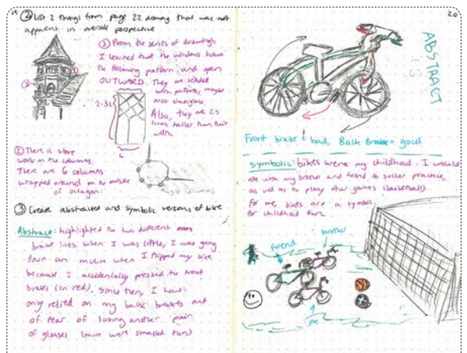
Evaluation based on:
- Completeness - *Assignments are locatable, thorough, and clearly noted.*
- Craft or execution - *You will not be graded for artistic quality, rather rigor is evident in the work.*
- Critical thinking - *It is evident the student applied reflective thinking to the assignment. Not only are responses informative, they show author conclusions (synthesis of information).*

At the end of the semester, you will have approximately 50 submissions.

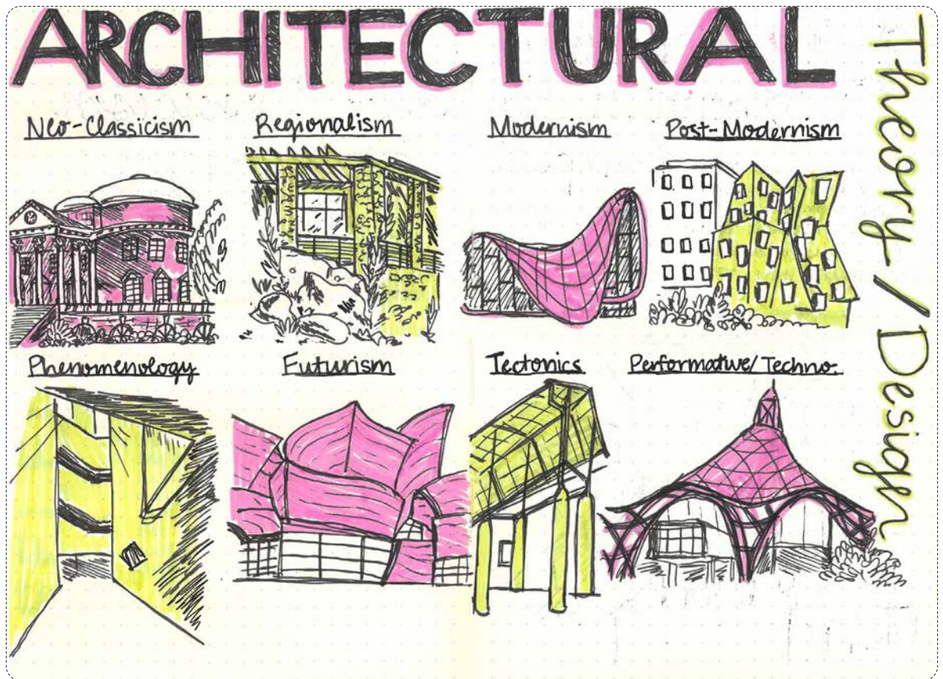




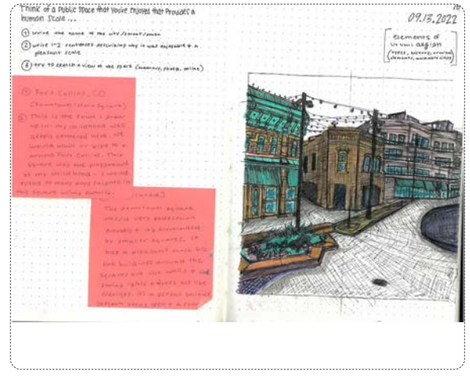


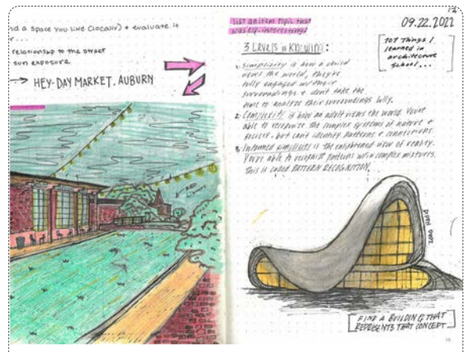


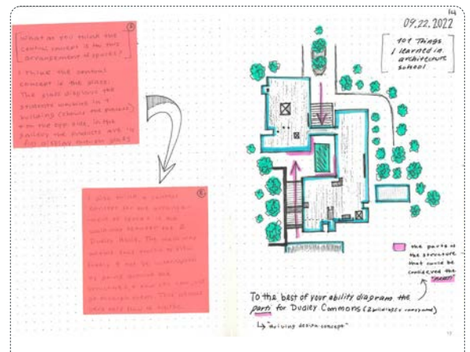
ARCHITECTURAL Theory / Design

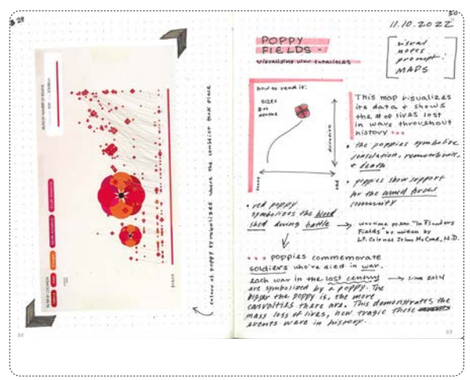


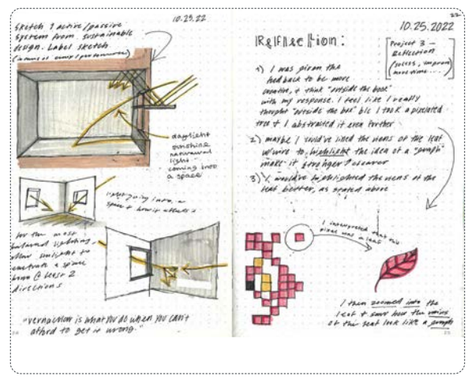
These visuals are gathered from a 150-student core fine arts class where students are required to maintain a visual notes book to reflect on projects, course concepts, and engage in brief design excerises. While design is primarily taught through studios or labs, Smith teaches some concepts in large lecture courses by encouraging reflective thinking through idea documentation, analysis, and synthesis.

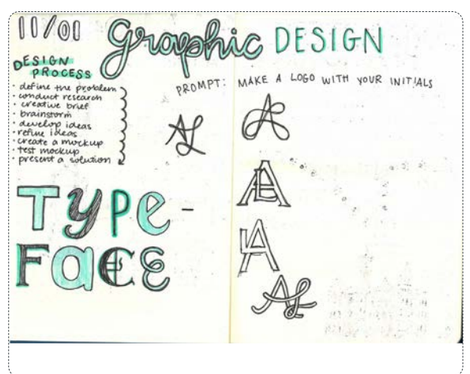


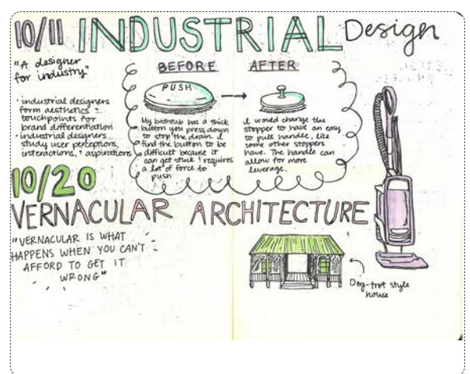




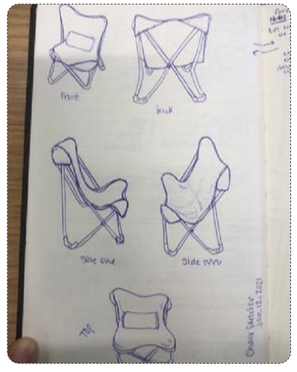


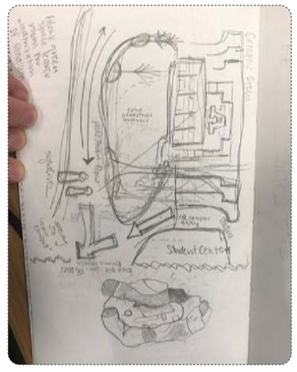


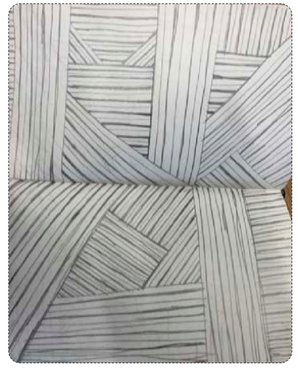


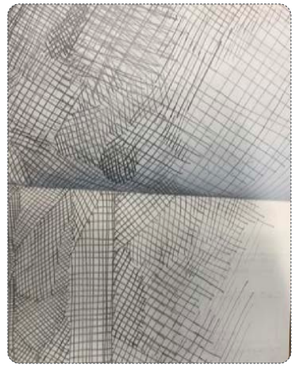


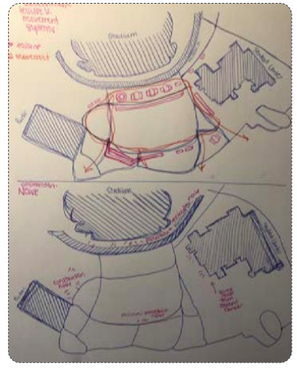

Leisure activities in my apartment.
Individuals in the apartment (throughout the day)
move from
Situations of
Productive rest
and
Leisure rest
To
Social-Active
leisure
Activities

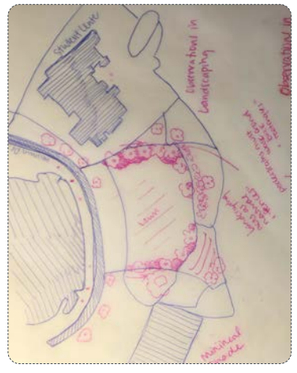

Front
back
Side one
Side two

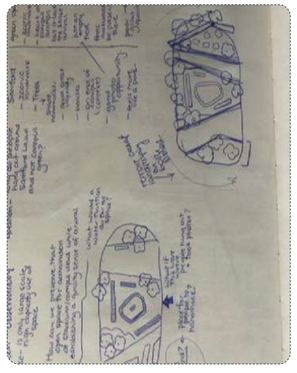

Student Center

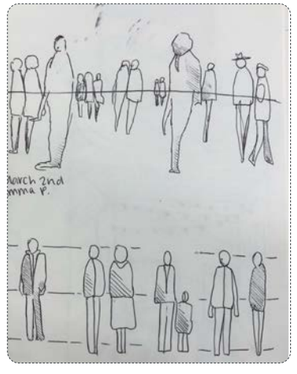


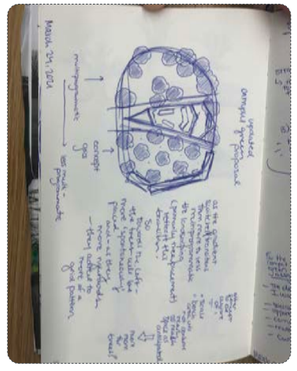


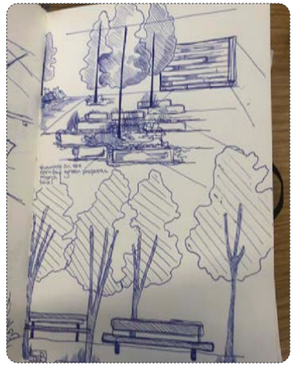

Stadium
Oakum


Connection
Nave
Crossing
Choir
Transept

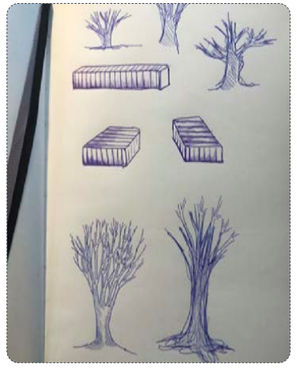


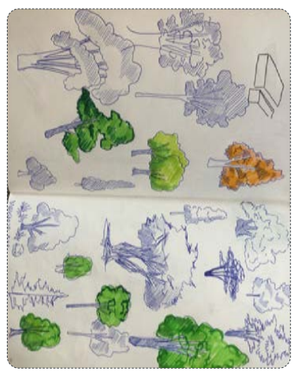

March 2nd

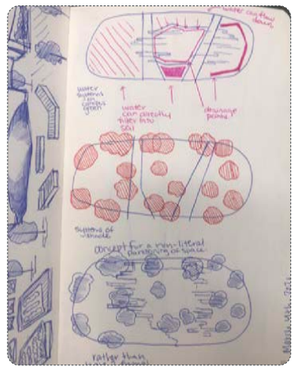


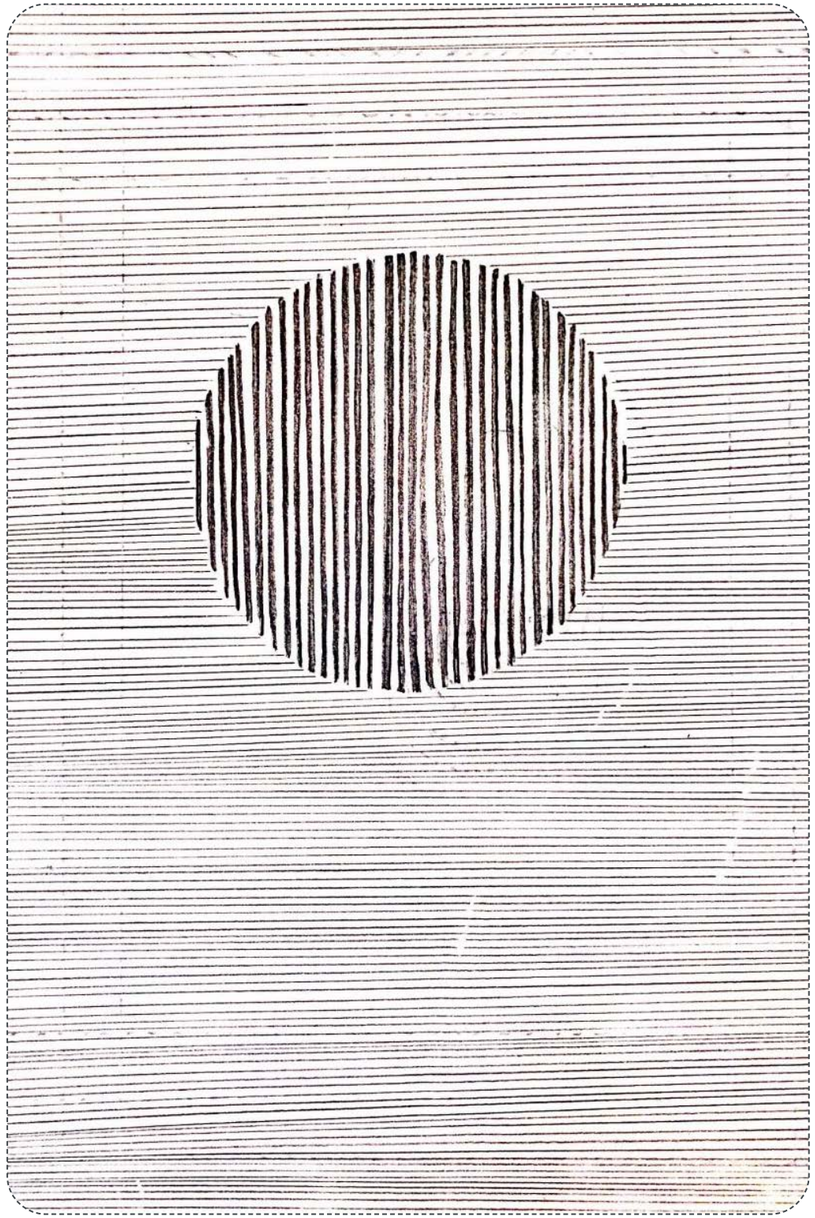


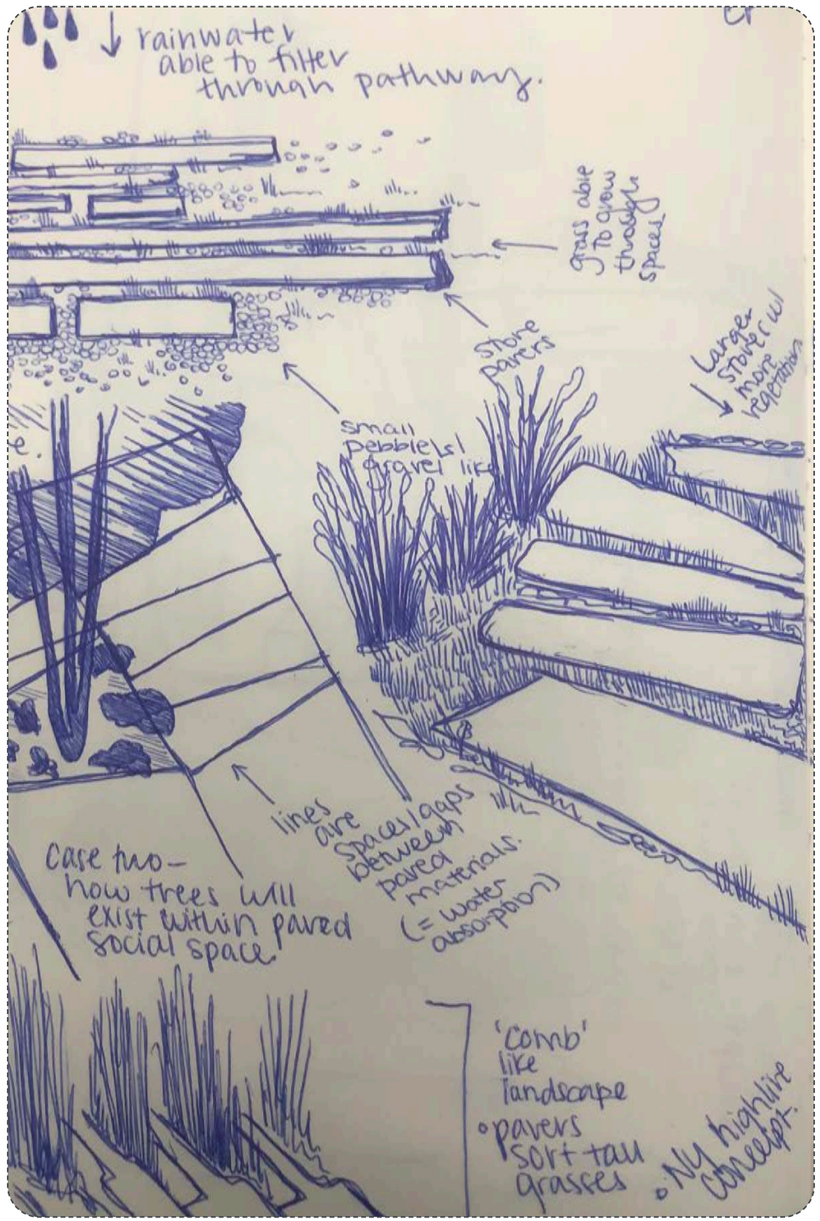

(Section ideas)



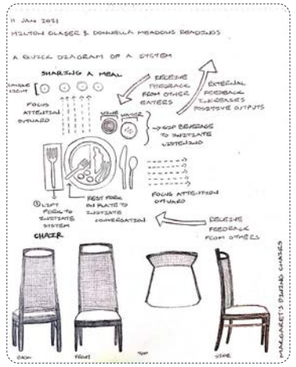
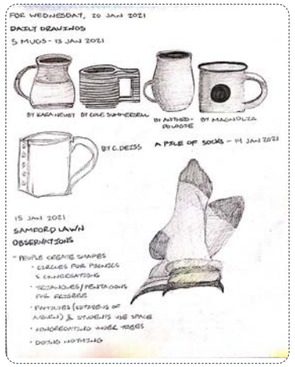
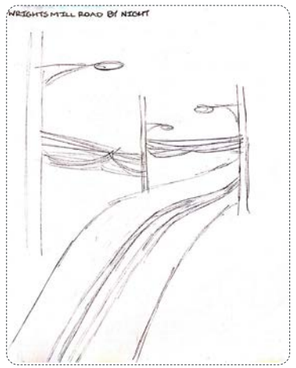
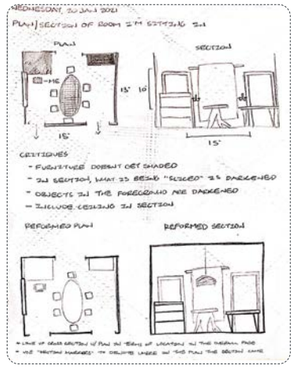
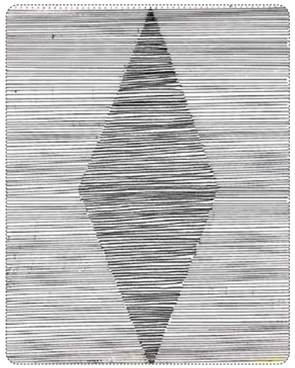
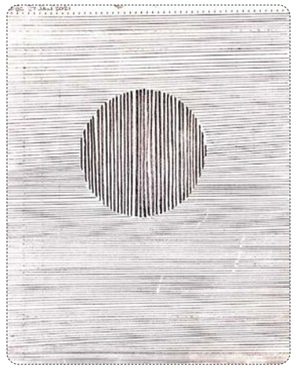
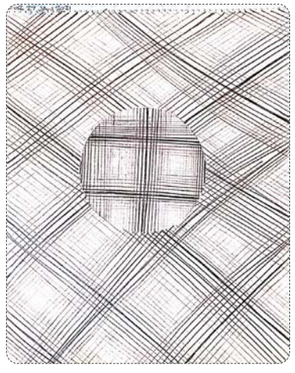
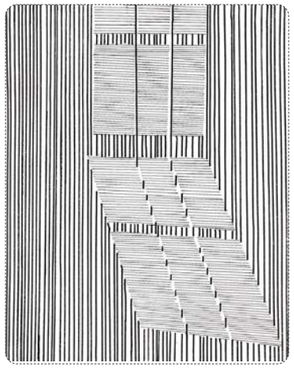
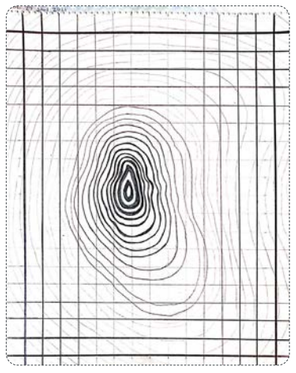
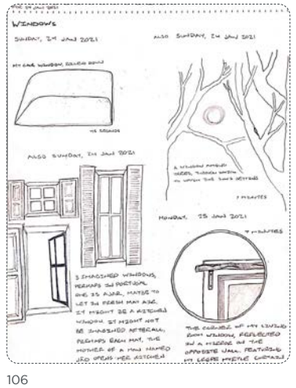
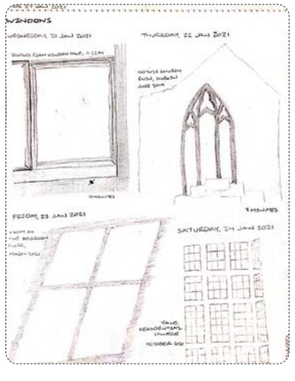




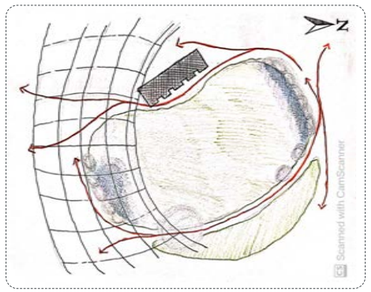
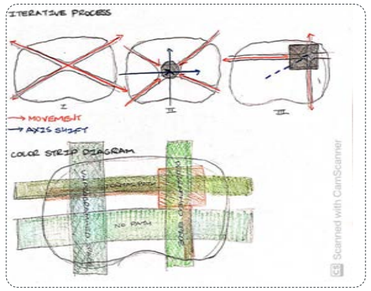
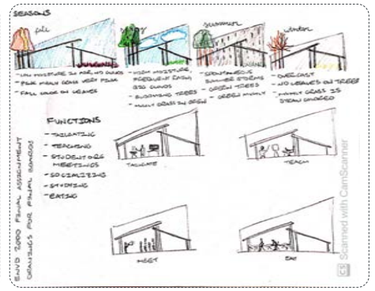
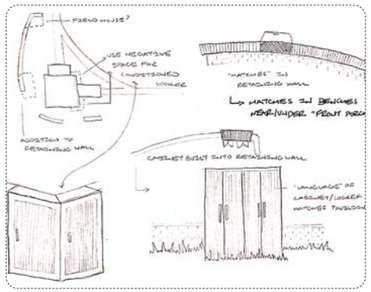
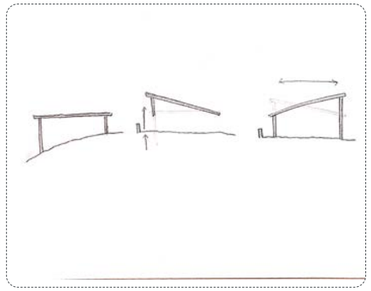
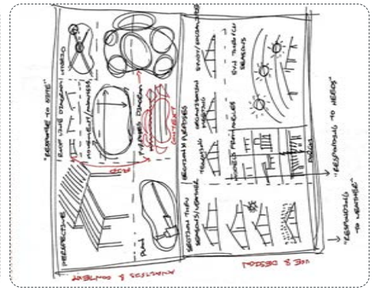
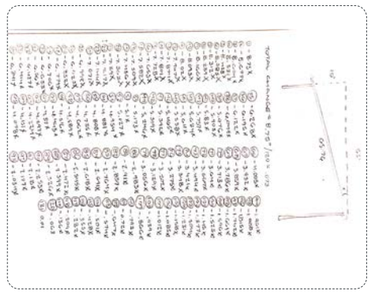
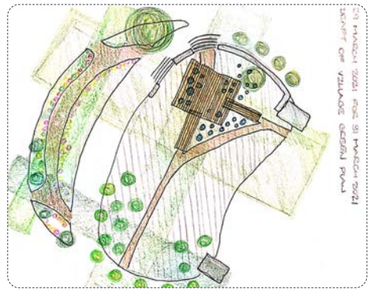
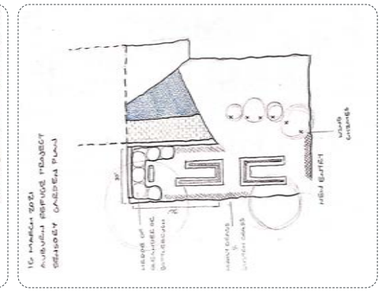
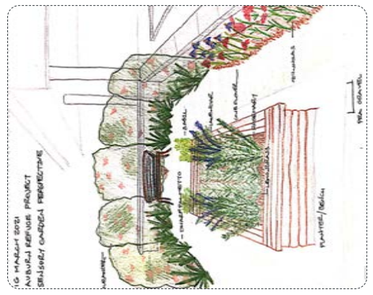
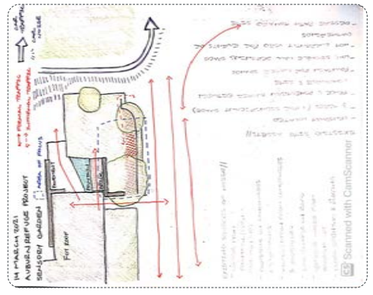
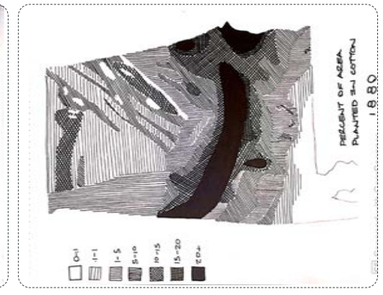
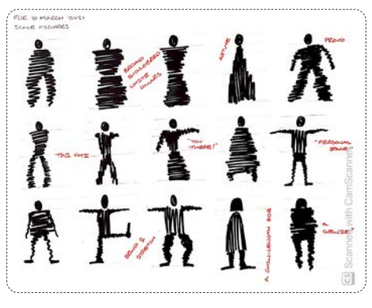


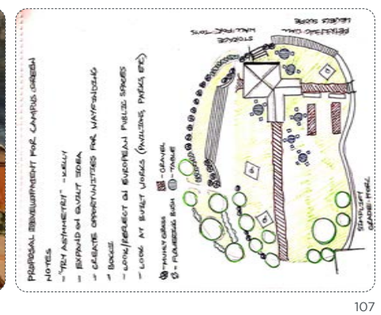


Pictured opposite: Hollen Terry
Pictured above: Emma Parrish
Assignments oscillate between crafted sketchbook drawings and analytical sketches.


Pictured: sketches by Hollen Terry and Emma Parrish. Students practice a range of drawing types to better understand how visuals display particular information. Drawings include vignettes, diagrams, plans, sections, exploded axons, timelines, storyboards, maps, and more.

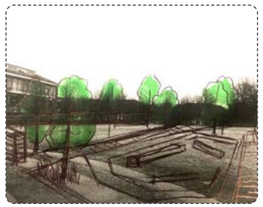
















mixed-media visualization

After students learn to sketch one- and two-point perspective and are introduced to programs like Photoshop, Smith finds it pertinent to work through mixed-media or collage visualizations. Interrogating the photo-realistic rendering, mixed-media renderings intentionally merge anolog and digital methods. As such, students have capacity to visualize work long before modeling and render software skills are harnessed. Additionally, mixed media renderings allow students to more acutely convey conceptual and thematic ideas about design work through aesthetic choices while simultaneously layering analytical information.

Below series of drawings by Emma Parrish




ENVD 2000 + 4010
mixed - media visualizations



perspective + rendered visuals
+ Read The Craftsman excerpt by Richard Sennett and be prepared to discuss.

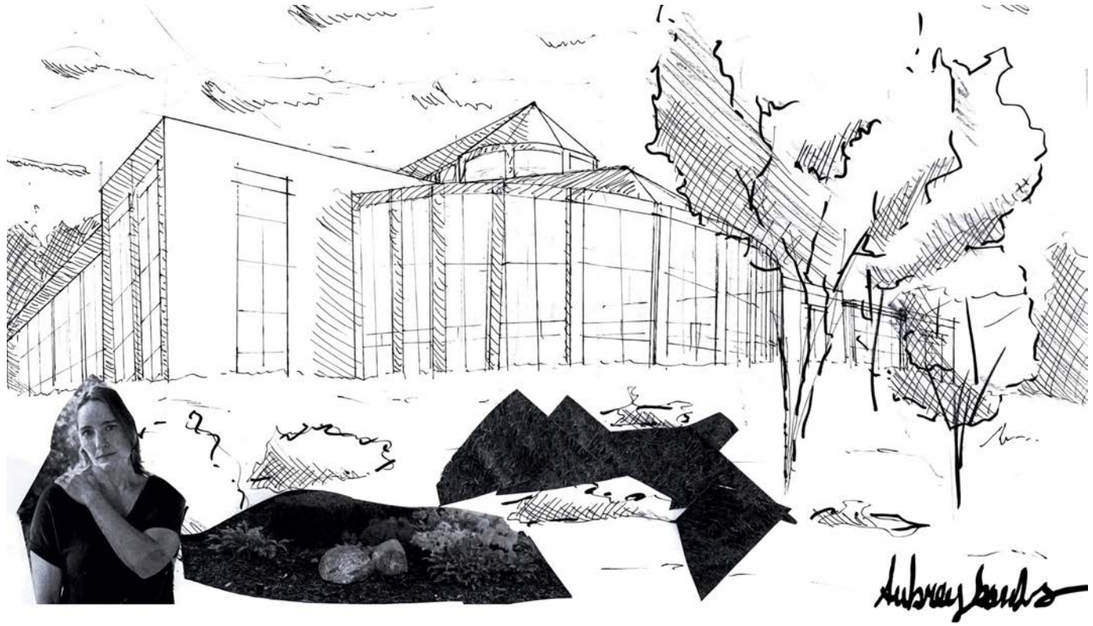
+ Create 2 well-crafted perspective drawings of existing conditions on site.
    1. one drawing is of the site and building and
    2. the other is another space/area you would consider redesigning (this one can be beyond the property line and could include the sidewalk, public library front yard, retaining wall, or streetscape; it may also be another part of the property)

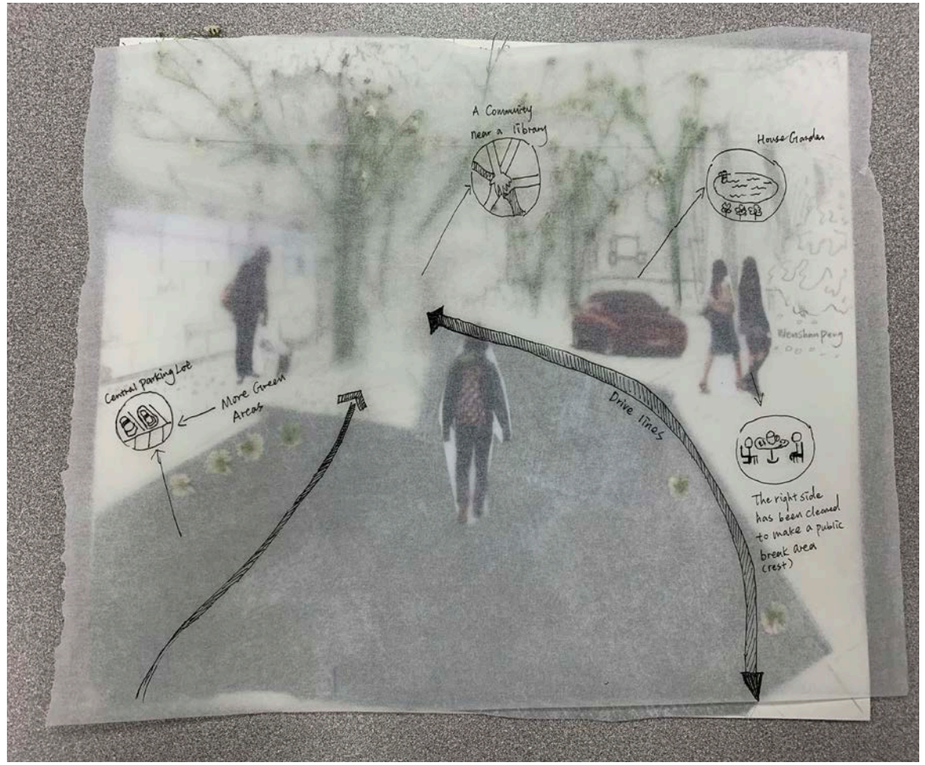
+ Collage on top of both drawings printed material, magazine clippings, vegetation, string, fabric, and/or otherwise to bring your rendering to life. Consider, what would Michelangelo do with this assignment..?

+ Finally, using vellum or similar transparent material, overlay your visual annotations indicating crucial design considerations from the existing site. Annotations should be primarily visual as you translate verbal notes (consider using drawings, vignettes, diagrams, markers, elements that denote movement or actions, etc.; Again, you may consider thoughtfully collaging printed material and otherwise.

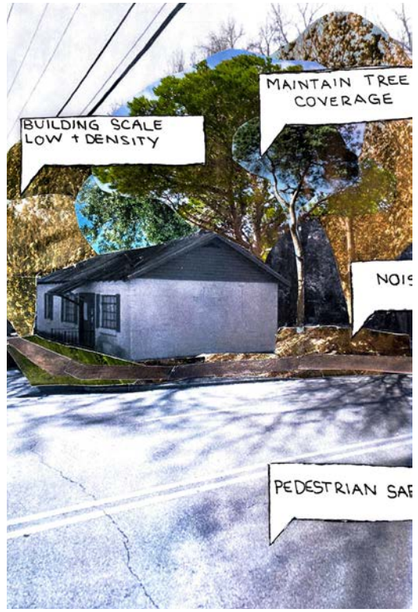
+ Be prepared to pin-up both analog renderings.

evaluation based on:
Craft.....10/20 points
Presentation is professional; clean and easy to read
Visuals are compelling and show skills harnessed with hand and digital media
Perspective is correct; items are in proportion; well-crafted drawing and visual annotations
Analysis and Conclusions.....10/20 points
Critique of space is evident, robust and thoughtful
Proposal clearly responds to issues present (it is appropriate)
Proposal is compelling and thoughtful
Iterative design-thinking process is logical and thoughtful

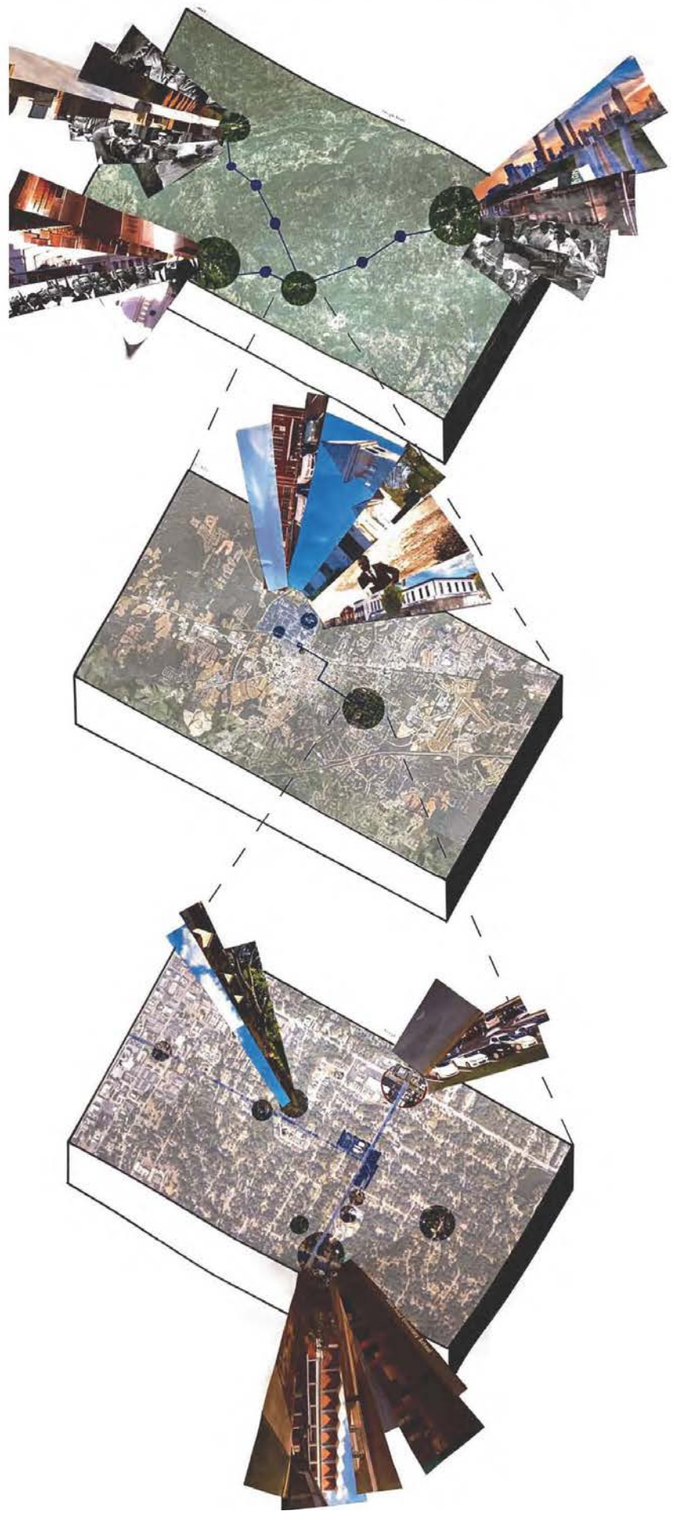




Opposite: Aubrey Sanders
Right: Wenshan Peng
These process visuals illustrate the layering of hand drawing, collage, and overlaid analytical information on vellum. It displays how one drawing can show robust information for the audience and help designers answer their own project inquiries.



Left: Jennifer Diaz-Ponce
Bottom: Mason Grady
Opposite: Aubrey Sanders



Above: Jennifer Diaz-Ponce Jennifer created a series of collage renderings for Baptist Hill Cemetery representatives to quickly illustrate project design ideas, scale, and scope of work. Students had three days to develop and refine visuals.

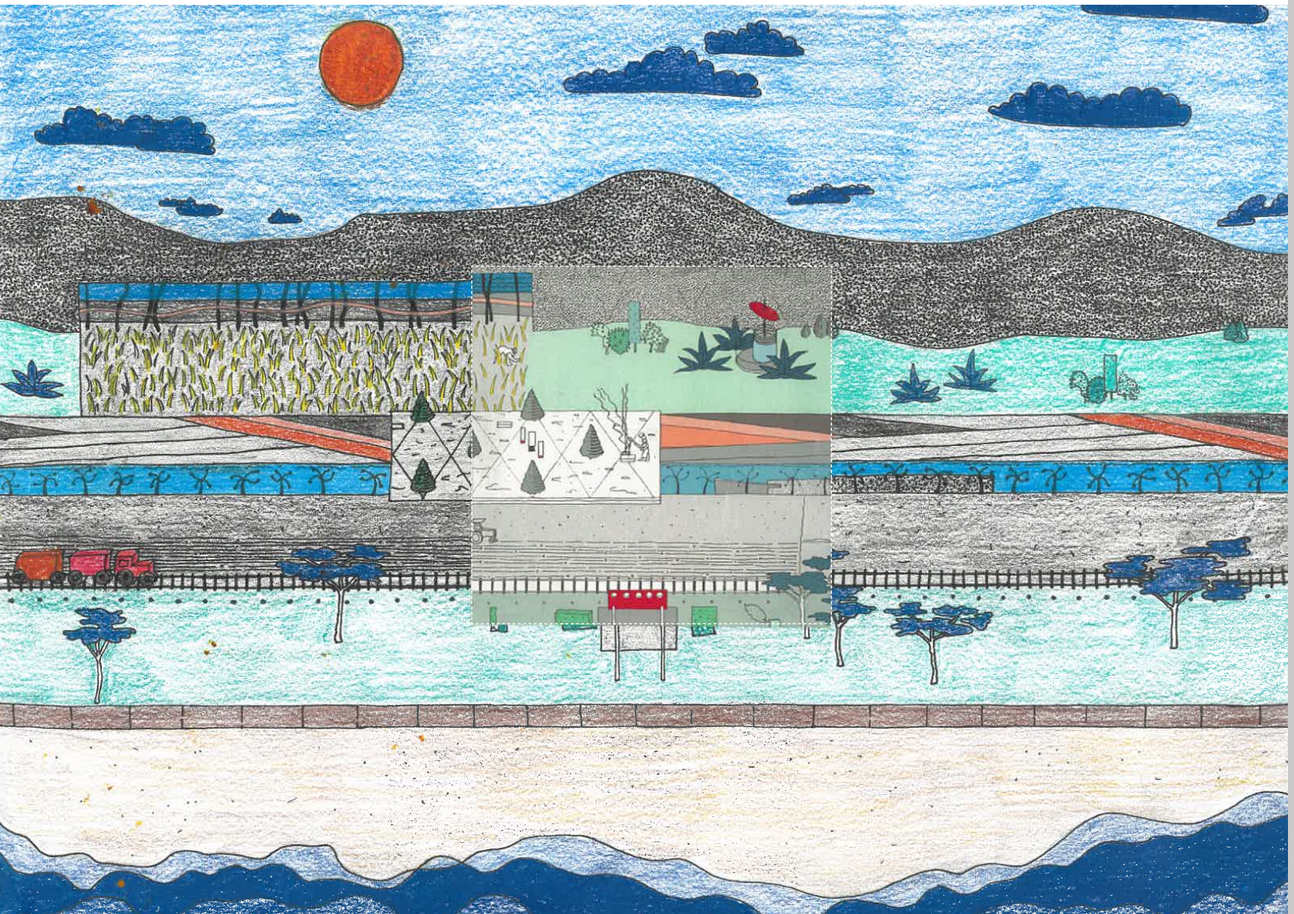
supporting pollinators + native plant species

encouraging learning through play

Emma Parrish developed a series of collage visuals for Windy Van Hooten Teaching Garden, an Alabama non-profit and Environmental Design program partner. The playful, analog visuals build off WVH's existing branding. Emma's work was widely accepted by the organization, and they later hired her to revise their website.

responding to the legible

“Responding to the Legible” project is a limited-scope exercise reinforcing that design is driven by an acute understanding of and response to contextual conditions. The project makes use of an 8.5x11” sheet of copy paper and asks students, after analyzing their pre-selected visual, to continue it across the page. Students are encouraged to analyze color, form, line weight, composition, conceptual ideas, and more to determine how they wish to expand the piece. Additionally, students must argue for design decisions through a written piece attached to the rear of the submission. Some students researched Daniel Libeskind’s interest in studying the relationship between music and architecture while others examined Zaha Hadid’s studies on abstraction and fragmentation. Successful projects understood conceptual ideas embedded in the visual, reinterpreted these concepts across the page, and did so to a high level of craft. This project is included in a large, 150-student fine arts class.



alex veall

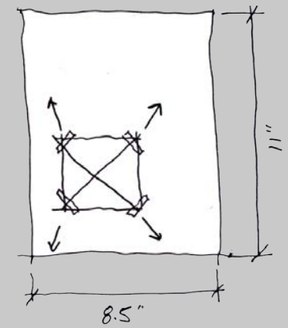
steven holl

danie libeskind

el lissitzky

zaha hadid

The student’s first project focuses on reading and interpreting a selected visual piece from the above options. They are asked to extend the 3”x3” samplle art piece originally developed by a reknown architect onto an 8.5”x11” sheet of paper based on constraints identified.



Constraints are:
1 embedded in the visual and must be analyzed and interpreted by the student
2 Constraints are design theories developed by the student

The first and second steps in the design thinking process are to: 1) empathize, observe, and research, and 2) interpret and define. Likewise, students conduct steps 1 and 2 through this limited scope visualization project, as all appropriate designs respond to existing conditions. Students are encouraged to thoughtfully plan where the 3”x3” square is placed in the field as they extend the visual across the page in a meaningful manner. Once the visual is adhered, students analyze attributes (watercolor, pencil, colors used and saturation levels, geometries, perspectives, composition, etc) to guide or define parameters for contextualized responses.

Consider:
+ *will you mimic existing characteristics & extend in a rational manner?*
+ *will you juxtapose existing conventions (e.g. if b&w, extend full color?; if flattened, extend perspectival?)*
+ *will you maintain or switch: materiality, scale, color, etc. and why?*

Evaluation Criteria:

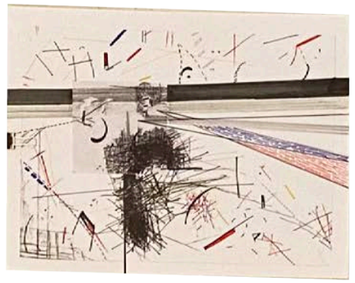
1 Idea (creativity)

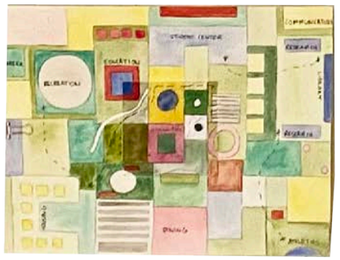
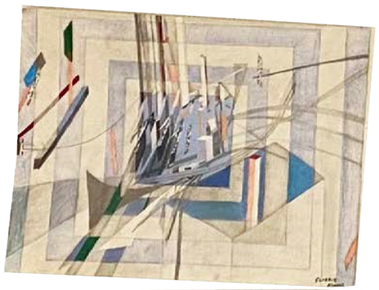
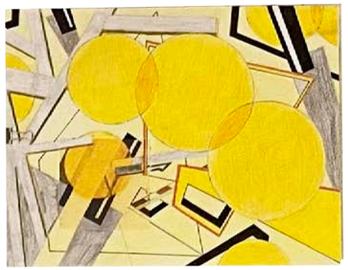
2 Composition (arrangement of visual elements on the board)

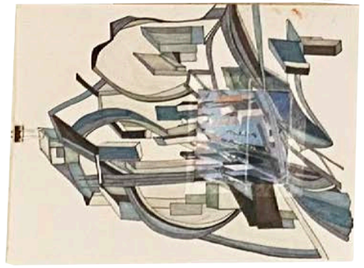
3 Craft (execution) – your understanding of quality

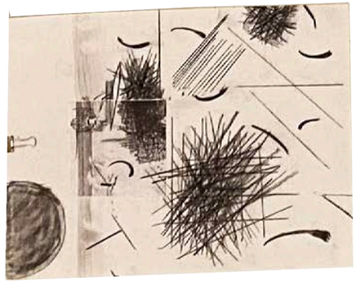
4 Clarity of concept (do we get it?)

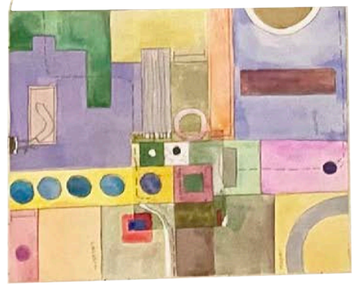
"The most important quality of architecture is the way it relates to, signifies and dignifies a place on earth. This is why the architecture we most admire [...] has been built with a sense of allegiance to the landscape."
-W.G. Clark

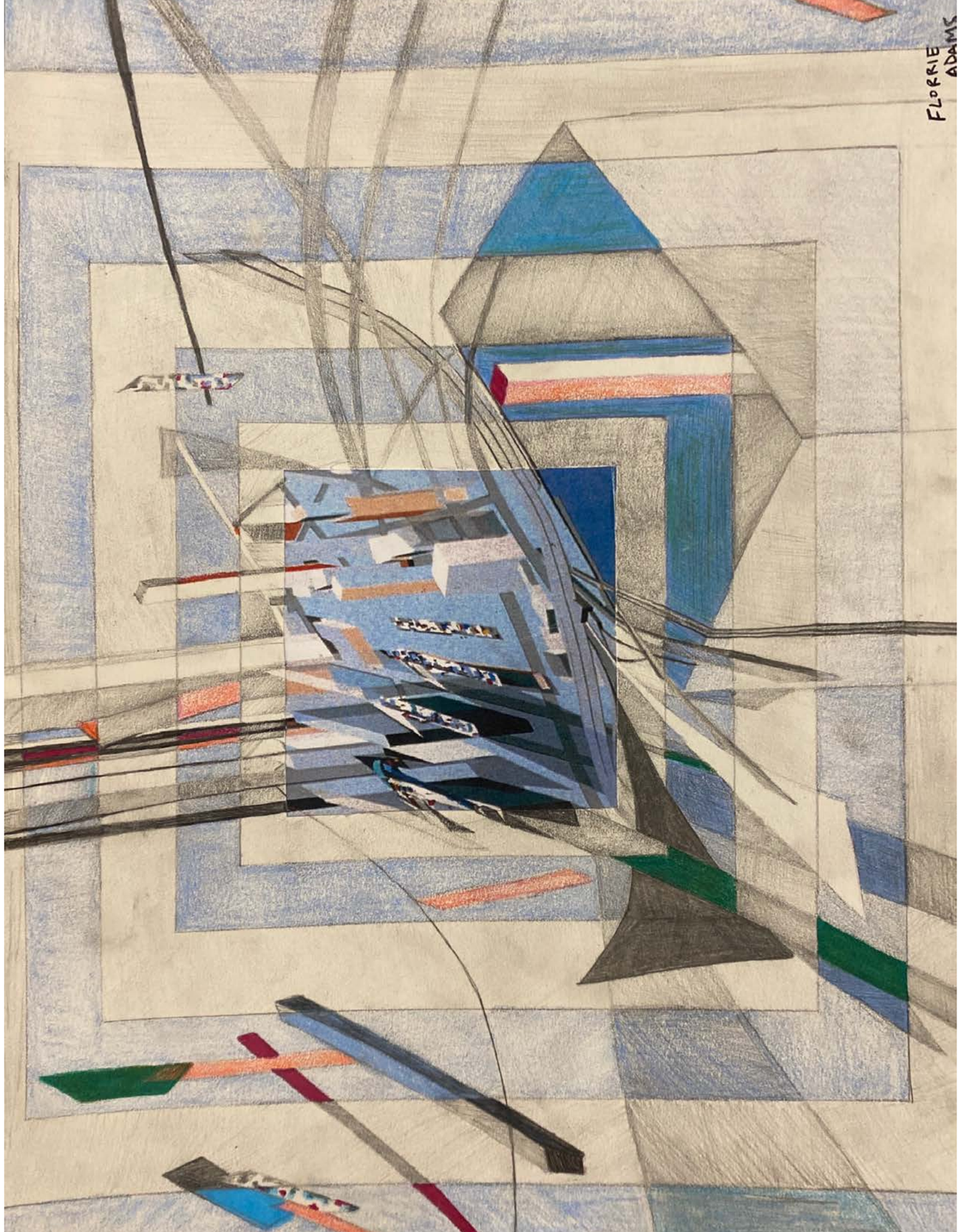











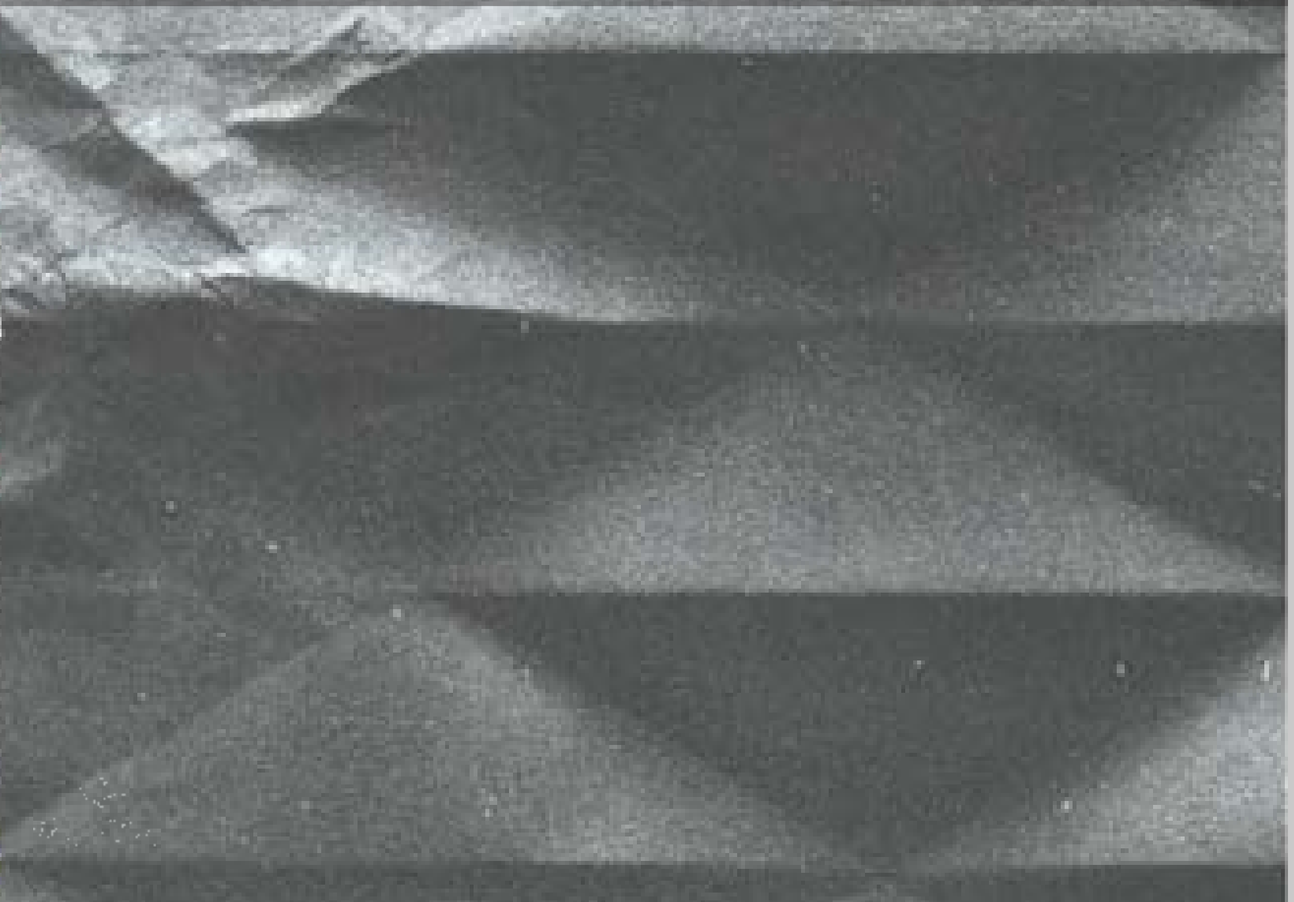
grid + context

This two-part assignment is conducted in a large, 150-student core fine arts class and is produced on 8.5x11" copy paper. It has three goals.

First, while grids are commonplace, graphic designers, artists, mathematicians, scientists, and urban planners recognize their capacity for layered complexity. In this project, students see how complex grids, mosaics, and patterns are omnipresent in the built environment.

Second, students are rewarded for abstracting ideas, rather than exact representation. For example, the image behind the text was created in response to a shoe. The student folded the paper, spray painted the resulting forms, and proceeded to step on the newly created folds. The behavior of a shoe is evident through the material properties of paper: memory.

Lastly, part II of the assignment asks students to respond to a colleague's grid. They practice, again, how to read context, interpret constraints, and respond appropriately through a crafted piece.



ENVD 2040
GRID + CONTEXT

***context** : most commonly refers to the environment or setting in which something (whether words or events) exists*
***constraint:** a limitation or restriction*
***grid :** a network of lines that cross each other to form a series of squares or rectangles*
***grid :** a framework of spaced bars that are parallel to or cross each other*

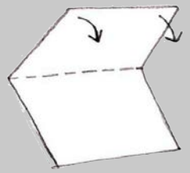
PART I
This assignment is a first part of a two-part project. Do this simple project well, and you will be well rewarded in the next step.

You are asked to design (create, draw, construct) a grid on a regular piece of paper.
You can use any material, or medium, or mix of materials (pencil, watercolor, ink, collage, stitching).
You can use color, or colors, or no colors at all. It must be an analog/hand submission (not digital). The required format is a regular sheet of paper (8 1/2" by 11"), BUT the grid has to be only on one half of the paper (so, the grid dimension is 5 1/2 " by 8 1/2"). No exceptions.

You can emphasize either grid, or resulting spaces (rectangles, or squares). There should be a minimum of 9 squares or rectangles in your proposal, or maximum of 900. You can use plain copy paper, or something sturdier, such as poster board – just make sure that the dimensions are as required. Glue your half on a piece of paper if needed. The thickness of the board should be maximum 0.2".

Include a brief statement explaining/arguing for the grid design on the back of the sheet.

PART II
This assignment is a second part of a two-part project. It is a reaction to context and constraints assignment that asks you to respond to an existing grid – the one by your classmate – with an appropriate, new grid of your own. Your new (response to existing) grid should complete the full sheet of paper by utilizing the second half of the original sheet of paper. You may need to recreate this condition by adding an extra sheet of paper (backing).

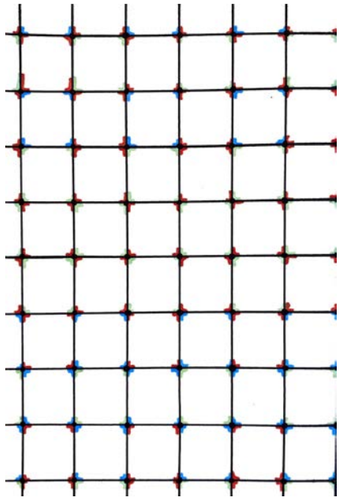
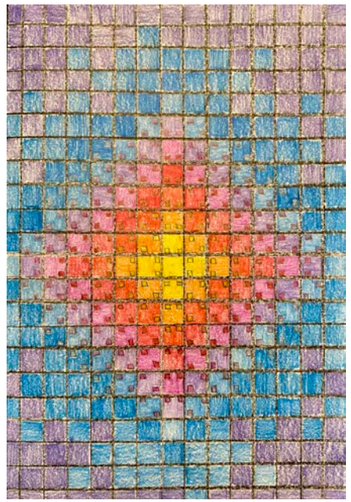
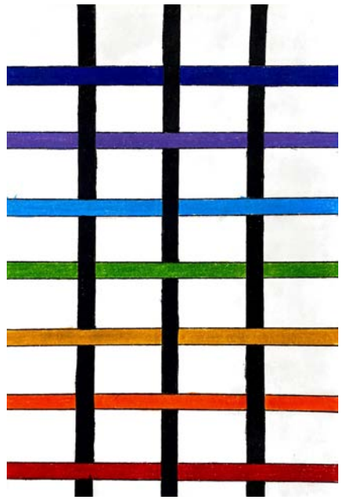
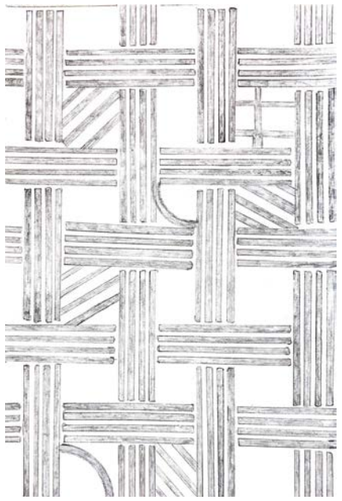
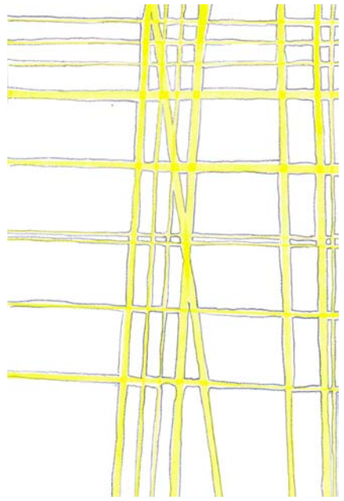


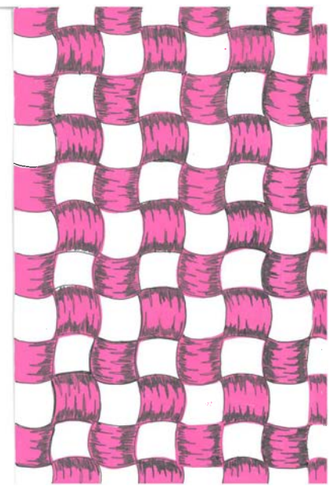
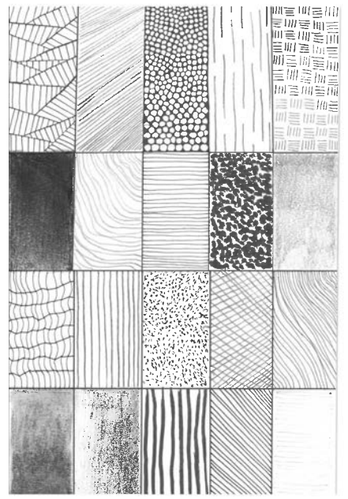
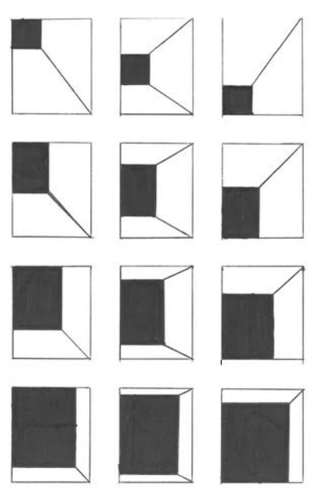
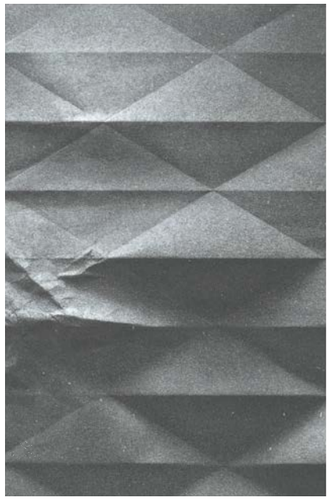
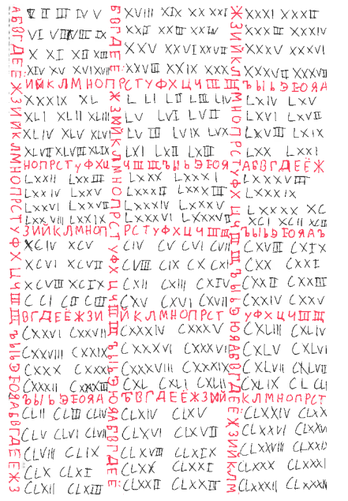
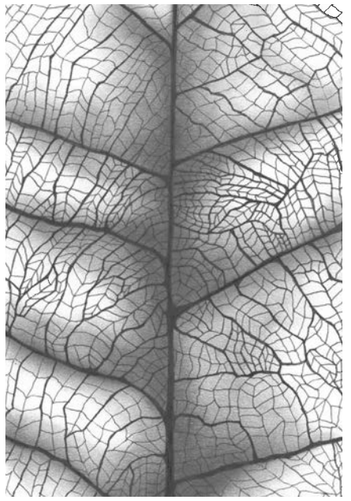
1 Idea (creativity)

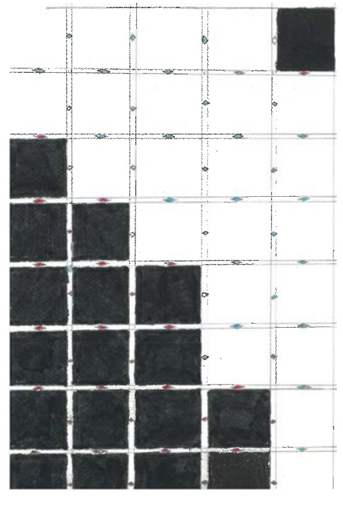
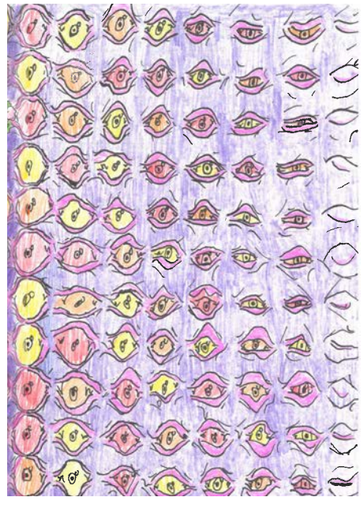
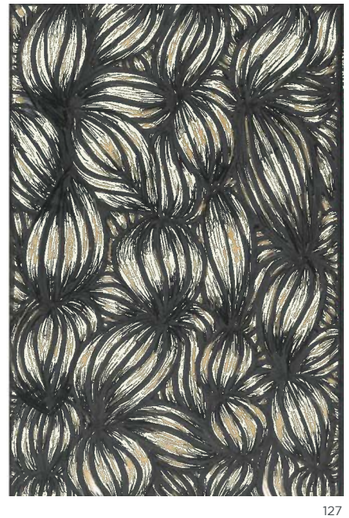
2 Composition (arrangement of visual elements on the board)

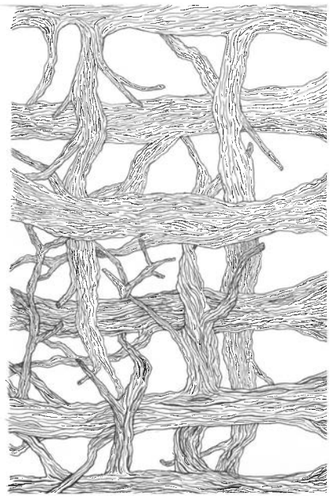
3 Craft (execution) – your understanding of quality

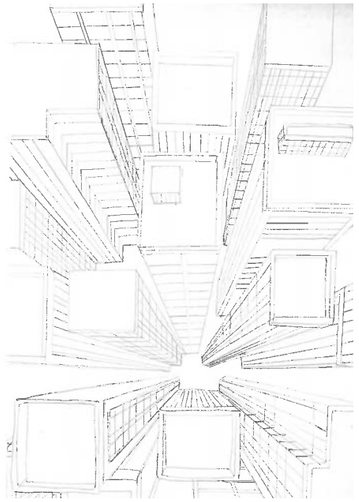
4 Clarity of concept (do we get it?)

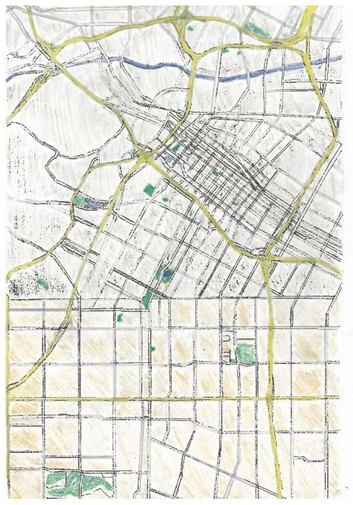








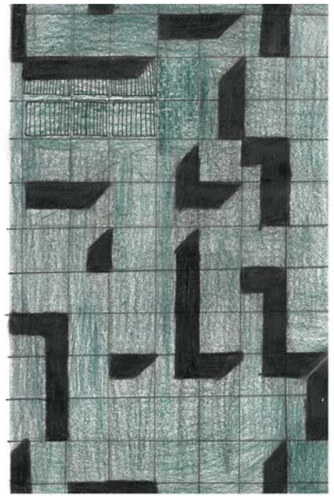




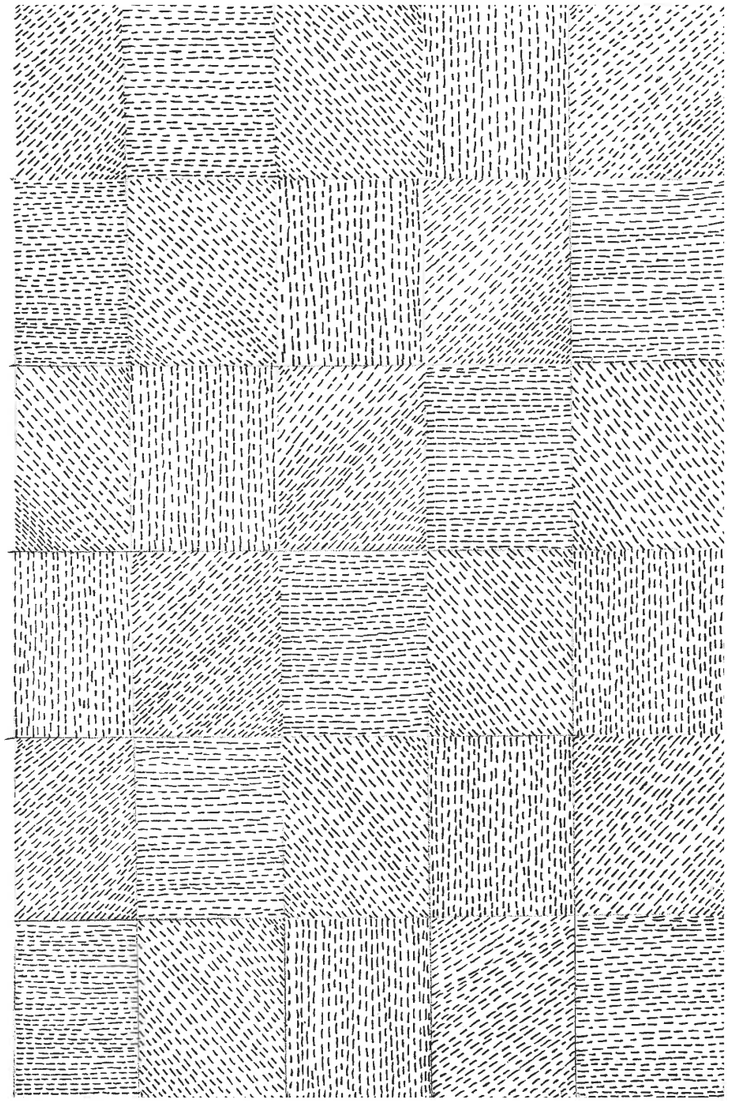


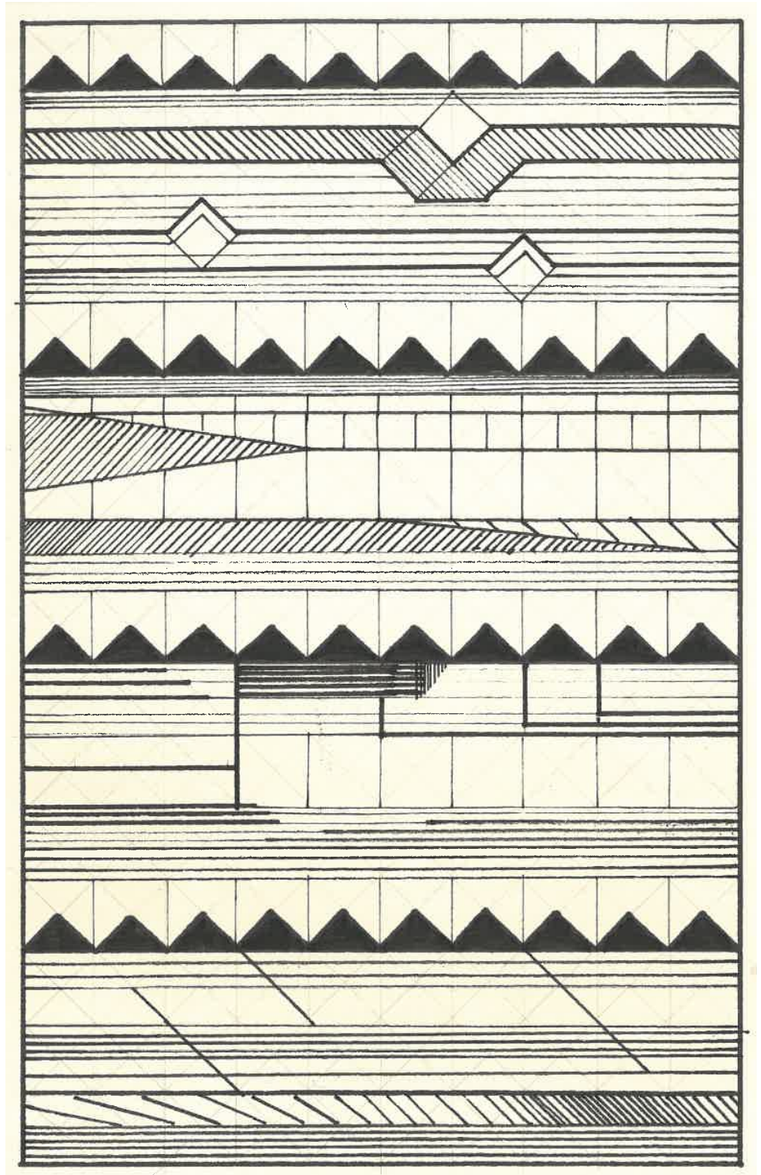


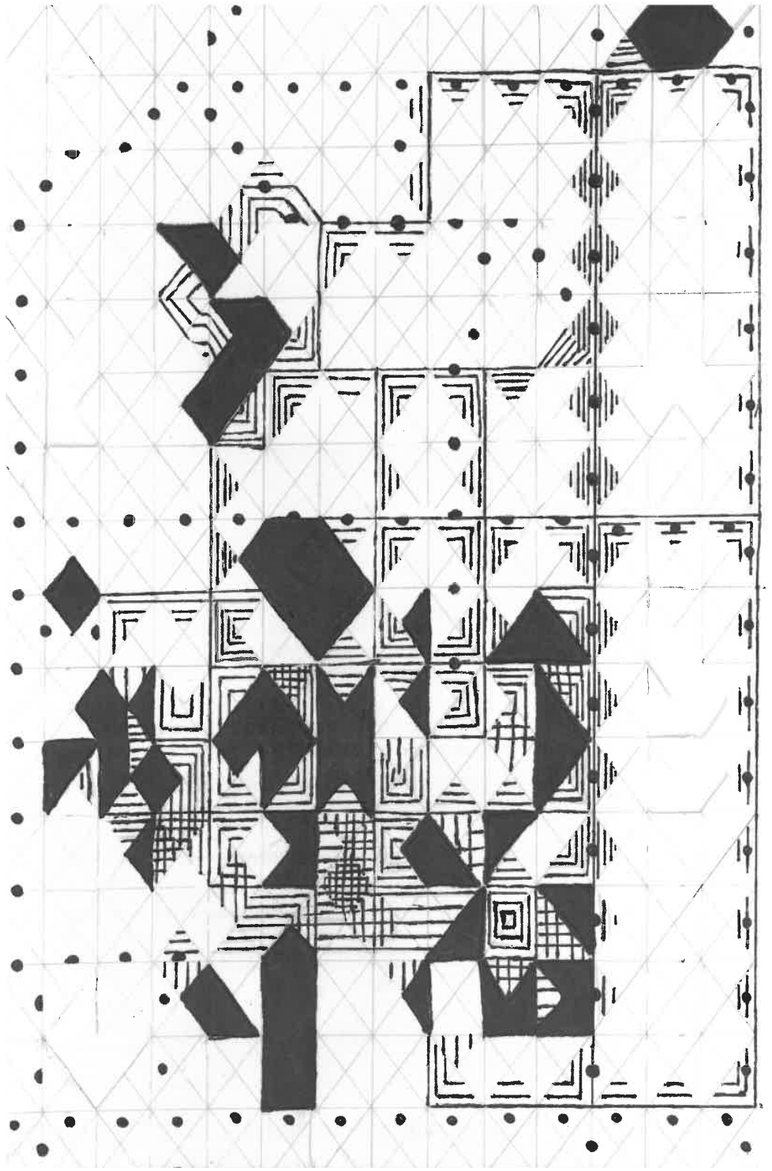

Autumn Fern
Dryopteris erythrosora
32.60020°N, 85.48956°W
Cleavers
Galium aparine
32.59916°N,
85.48637°W
White Clover
Trifolium repens
32.59887°N,
85.48926°W
Tulip Magnolia
Magnolia x soulangiana
32.59822°N,
85.48988°W
Eastern Redbud
Cercis canadensis
32.59578°N,
85.48229°W

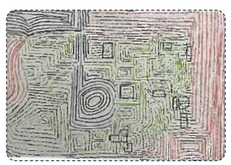


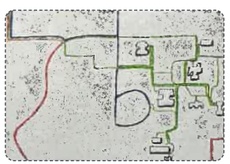




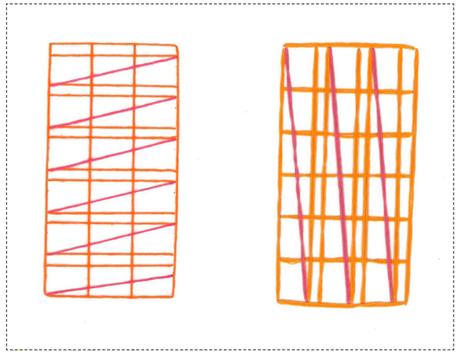


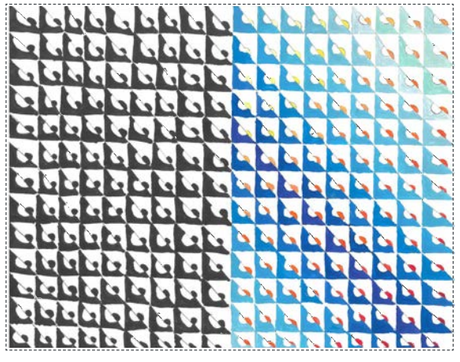


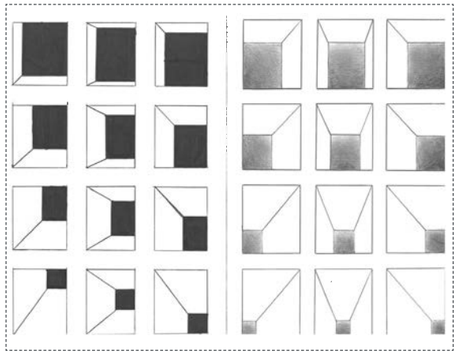


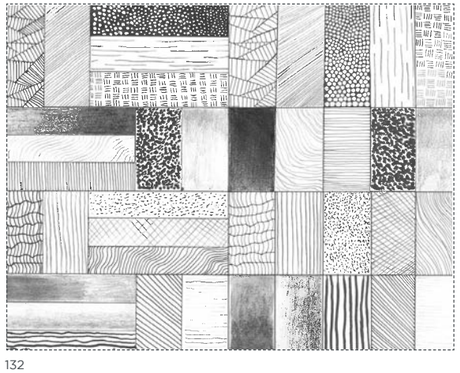


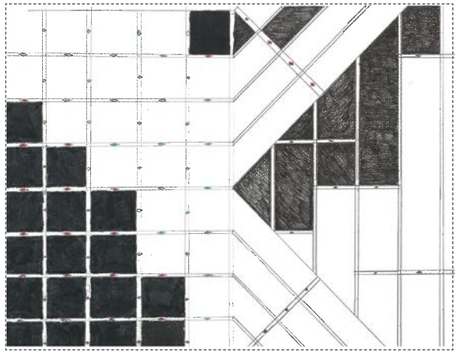
The above grid illustrates an abstracted layering ofsoil types. The opposite page is a reinterpretation of one student's path across Auburn's campus, highlighting areas where time is spent.

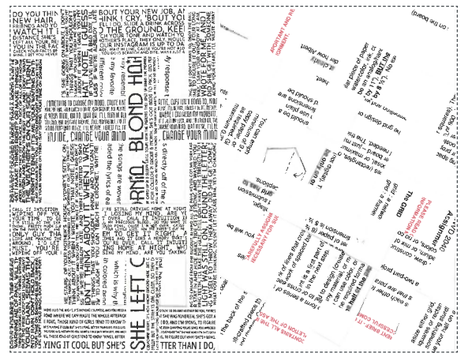


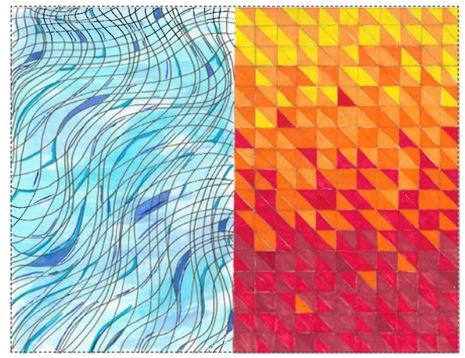


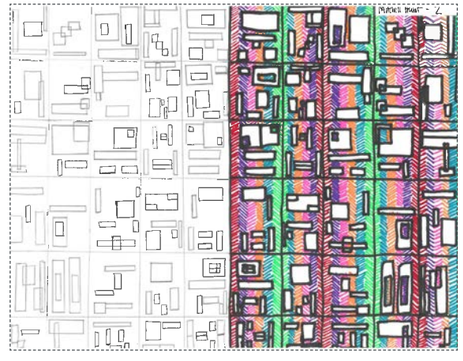


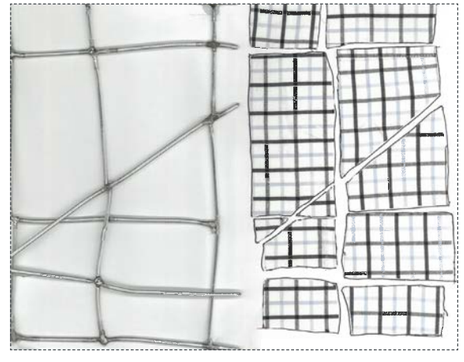


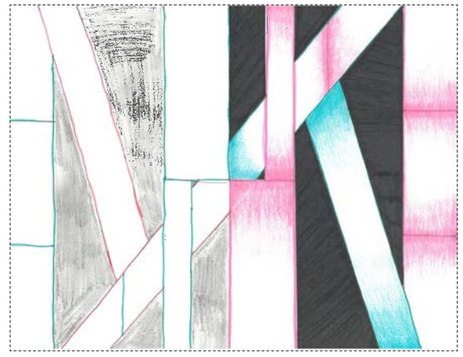


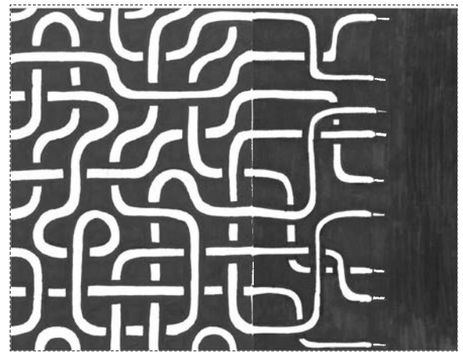

DO YOU THINK ABOUT YOUR NEW JOB, AT
NEW HAIR
WATCH IT
SHE LEFT C
YING IT COOL BUT SHE'S
TTER THAN I DO.

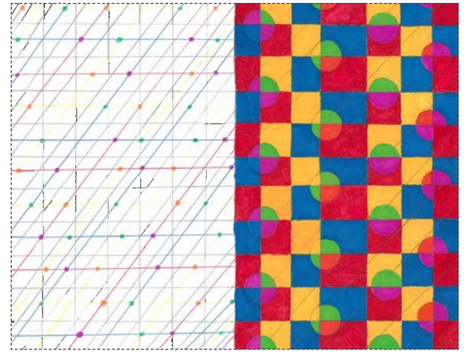


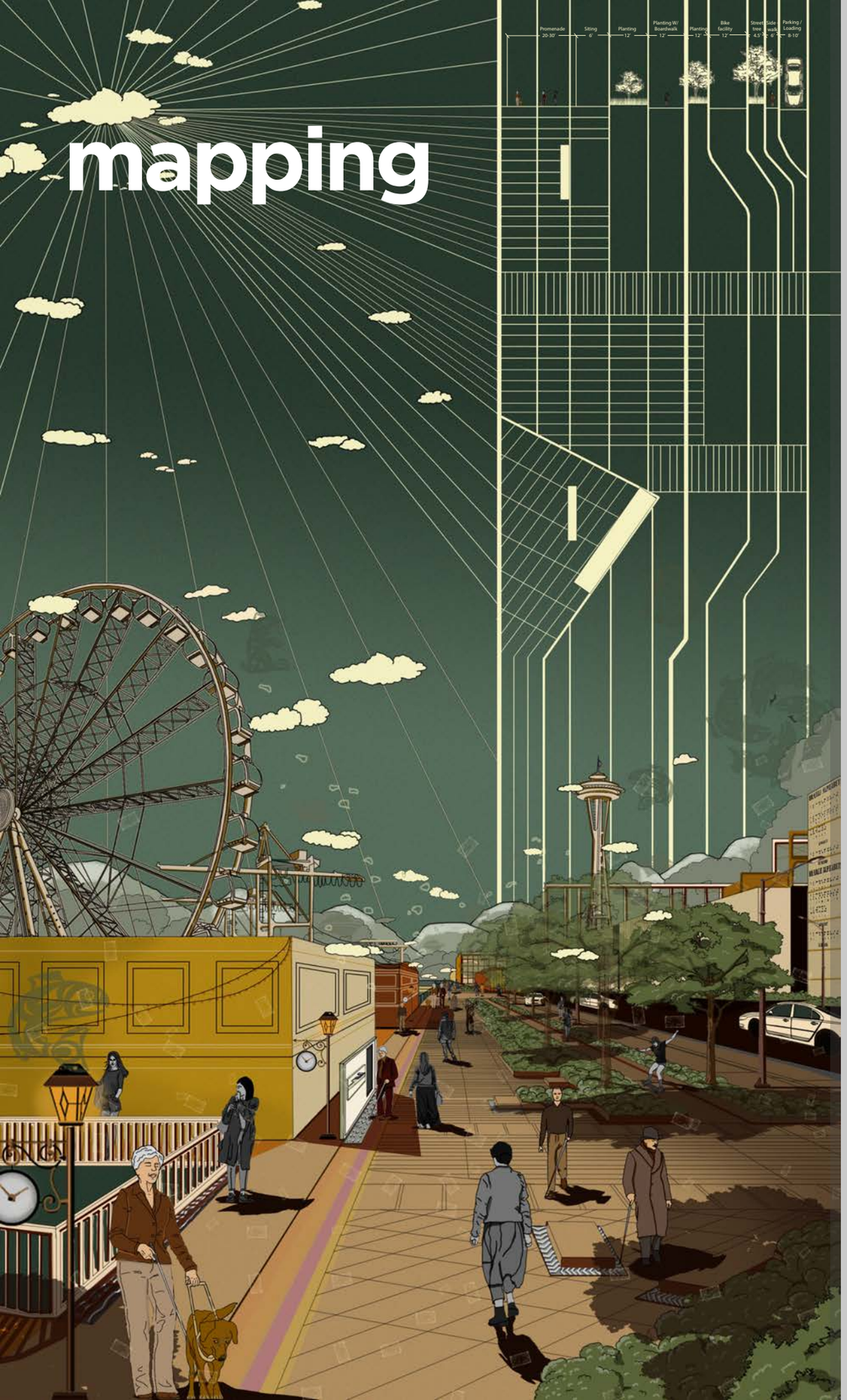












ENVD 2040 + 4100
THIS IS NOT A MAP; THIS IS A MAPPING
[FIELD + EXTRACTS + PLOTTING]

"the unfolding agency of mapping is most effective when its capacity for description also sets the conditions for new eidetic and physical worlds to emerge."
James Corner, The Agency of Mapping

This is not a map. Rather, this assignment is a mapping – an active inquiry and documentation of synthesized elements using schemata. Your mapping should show 3 distinct qualities:

1. you as the cartographer; how you display agency as the mapper;
2. erasure of noncritical elements & highlighting elements you determine especially valuable to the inquiry;
3. chemata to further communicate ideas and layered information (e.g. when I say dinner plate, 95% of us think of a white, round porcelain flat thing that is ~10" in diameter; this is schemata)
4. 'fields', 'extracts' and 'plottings'

Part I
Read James Corner's The Agency of Mapping chapter available on Canvas, and complete the following.

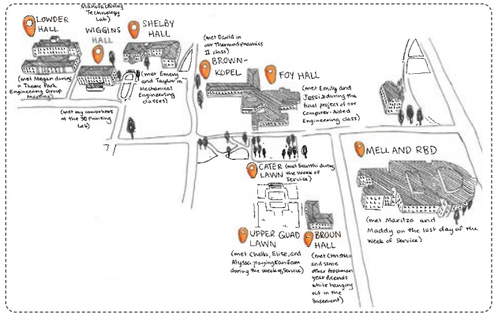
+ Explain what a "field" is as it relates to mapping.
+ Explain what "extracts" are as they relate to mapping.
+ Explain what "plottings" are as they relate to mapping.

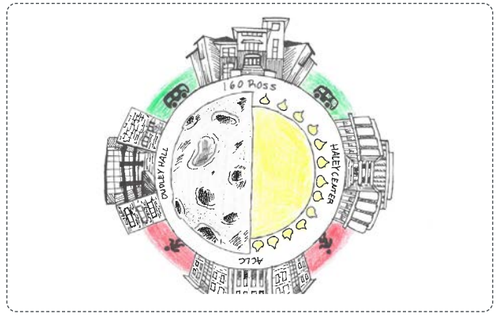
Part II
Find an EXPERIMENTAL map you find compelling, and add it to your submission.
Analyze/identify on top of the map: 1) its field; 2) extracts; 3) plottings; 4) schemata used

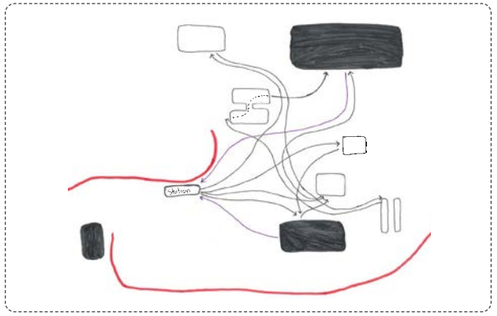
Part III
Create a mapping of Birmingham at the 5 x 5 city block scale with the site noted (the site does not necessarily need to be in center). The map should be created by you and will inform project design development. Additionally, plotting relevant systems should help answer questions you have related to your topic of investigation.
Requirements:

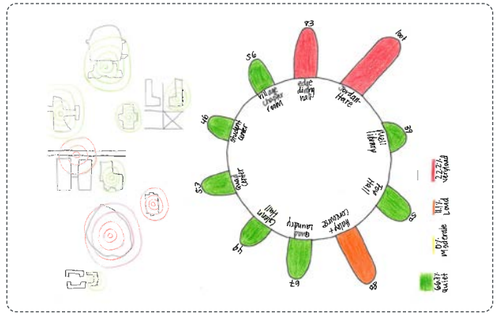
1. Context map of site at the required scale
2. Erasing unnecessary information in the "field" to more clearly communicate ideas
3. Highlighting information critical to your study
4. 2 relevant systems analyzed; systems should have a hierarchy (e.g. consider how you "plot" "extracts;" for example, if I'm plotting bus routes, some routes may be more populated, slower, faster, etc. – how might I show this change within a system visually?)
5. Change drawing type and scale within the map to show additional, layered information (e.g. consider what type of drawing you need to make to show specific information; section, axon, exploded axon)

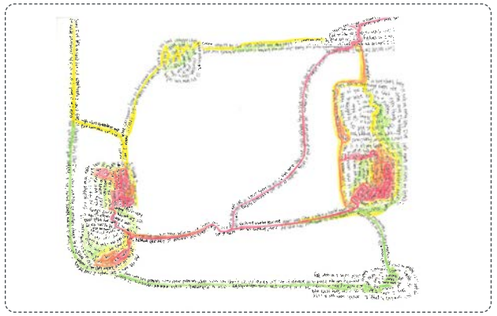
Criteria
Clear understanding of Corner's reading as translated to student map
Mapping is well-crafted
Overall map is creative, even experimental
Clarity of concepts (are your intentions clear?)

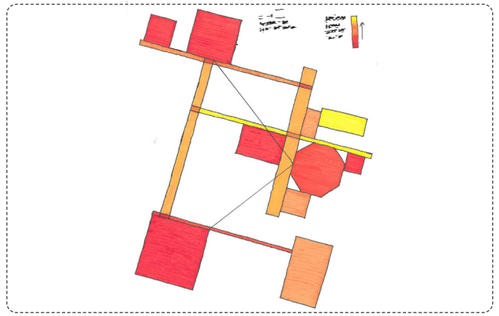


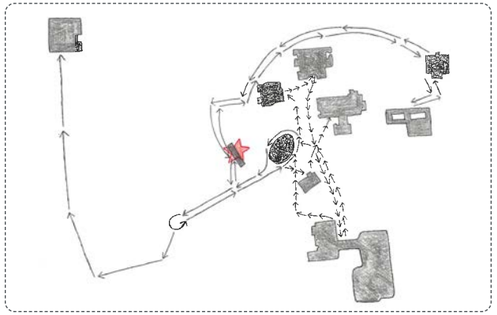


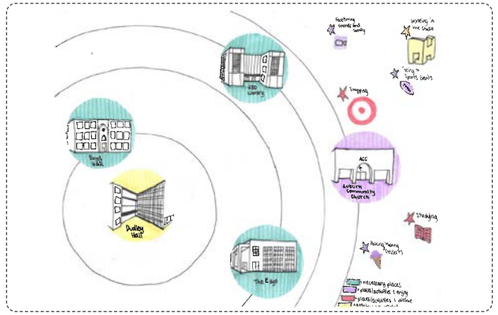




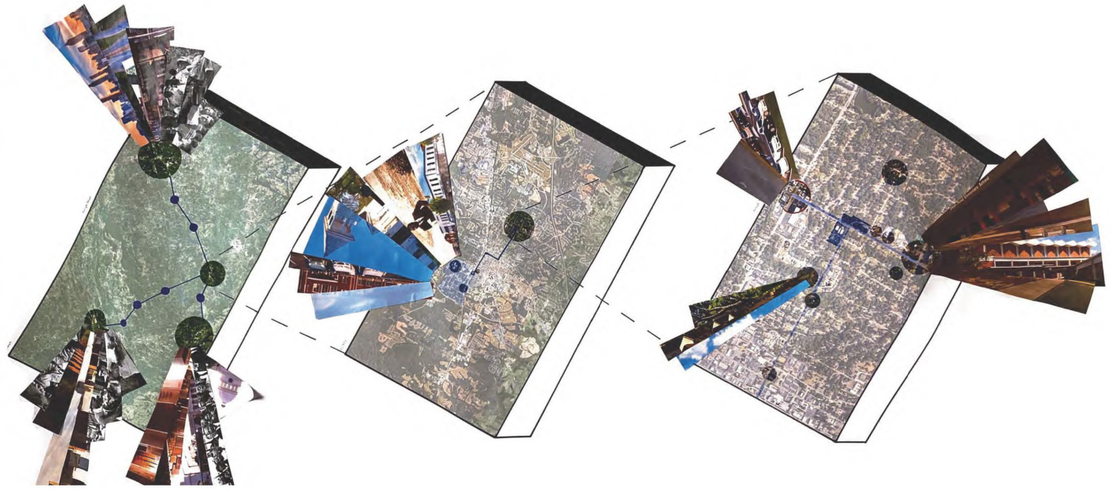


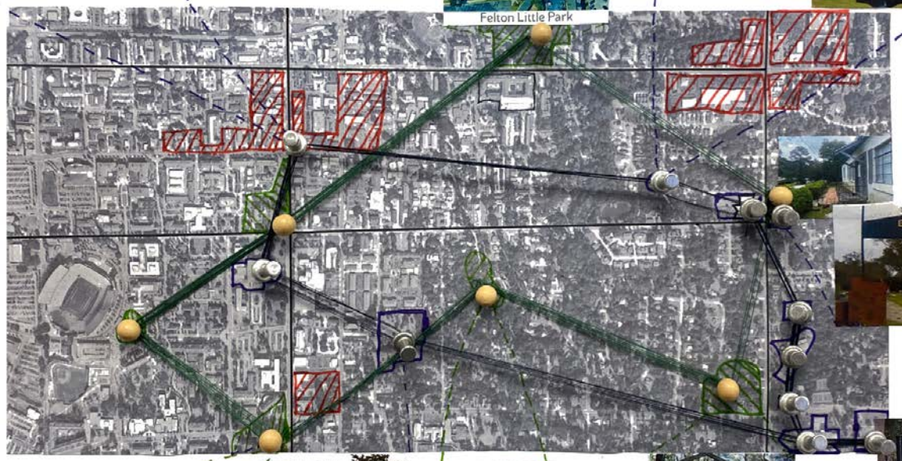






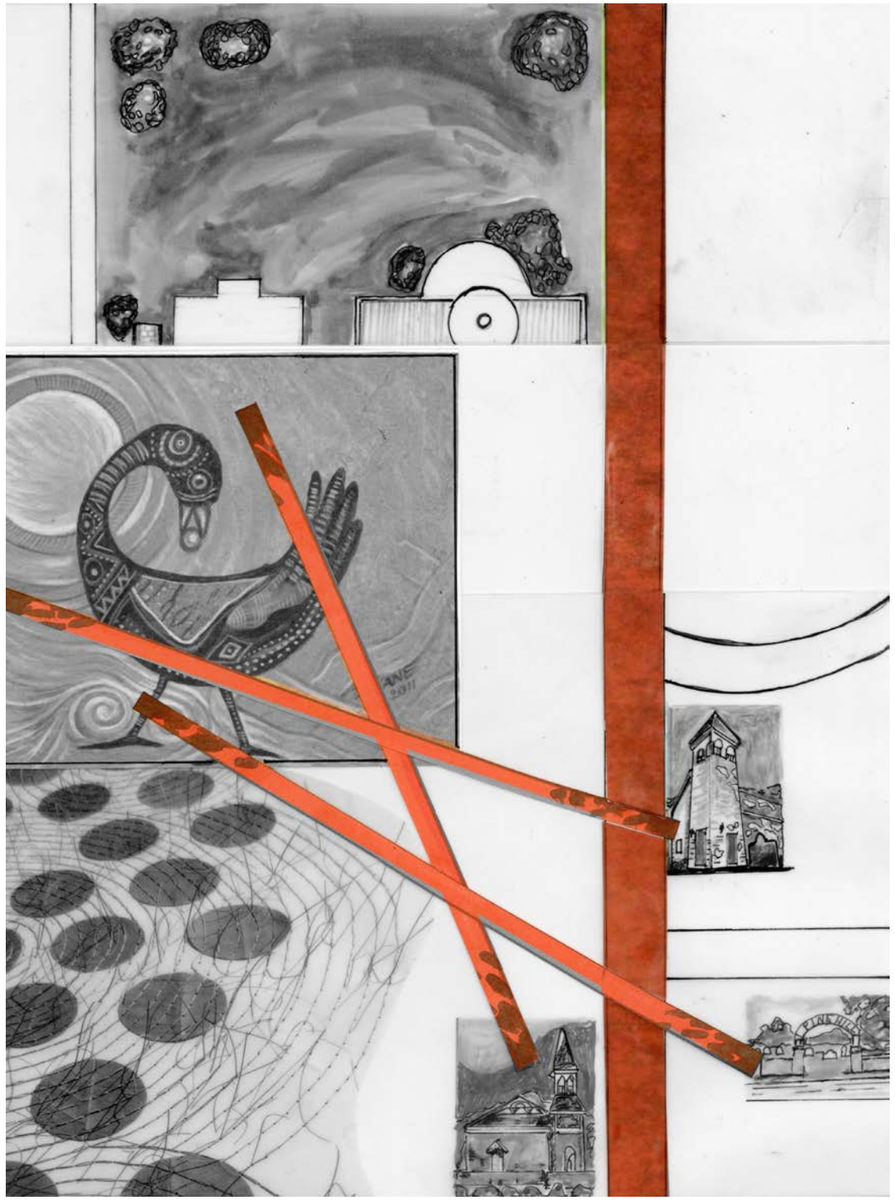
Students start with hand drawing and sketching to layout the field, extracts, and plottings. Students are encouraged to oscillate between various drawing types to show quantitative and qualitative information through a specific lens.



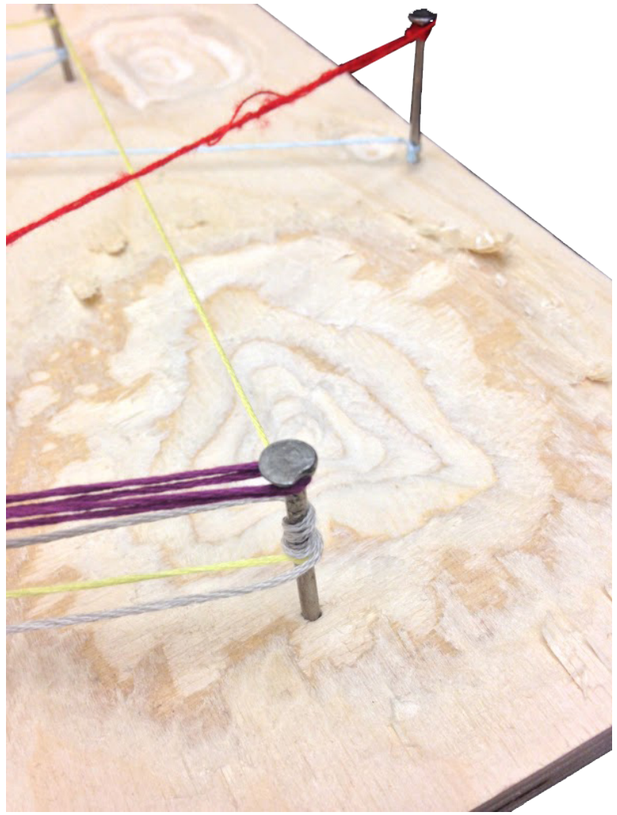


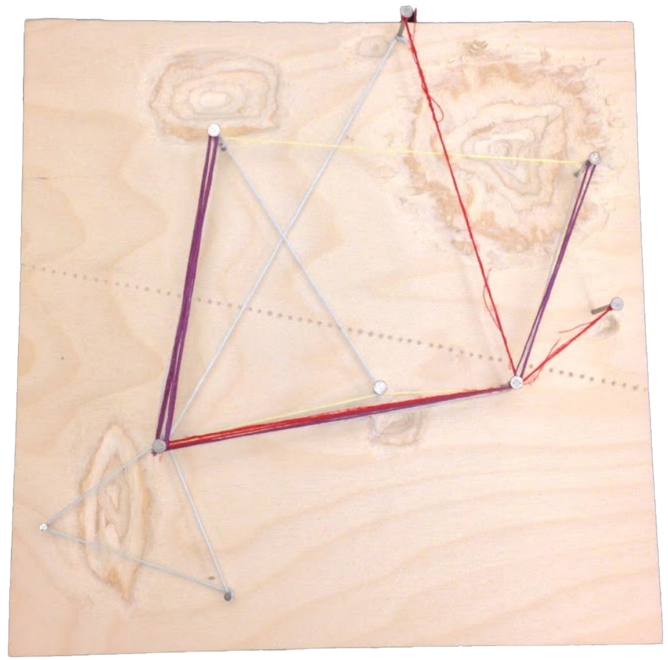
Memorial Park Cemetery

Bowden Park

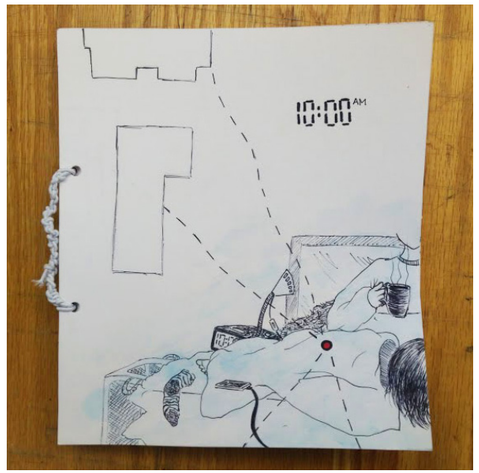


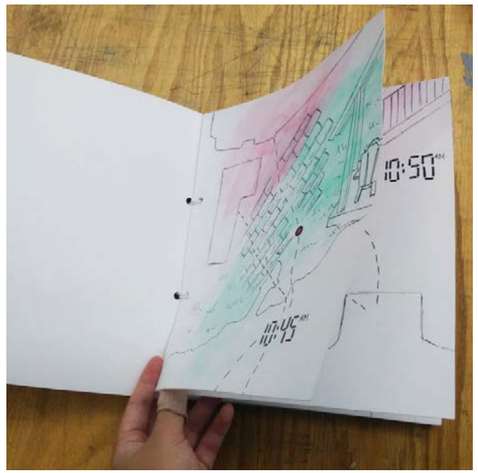
Mappings of Baptist Hill Cemetery.
Opposite: Audrey Sanders, Breck Bowen
Above: Jennifer Sherlock

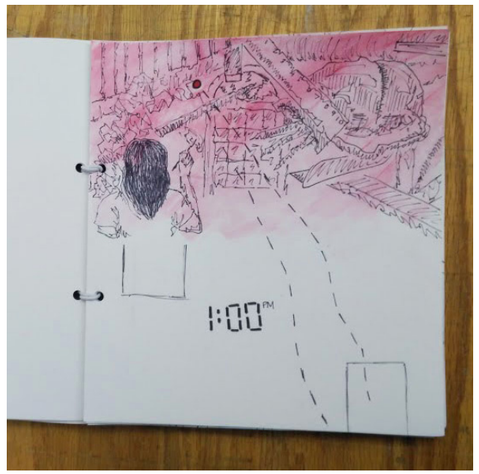


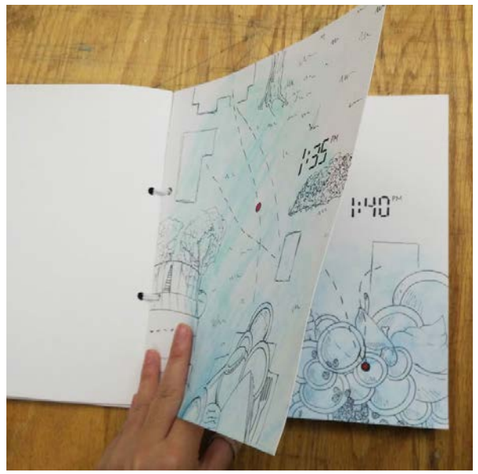


This three-day mapping exercise asked students to document their campus experience through a crafted artifact. They explored how to display field, extracts, and plottings through a range of means (paper, plywood, etc.).

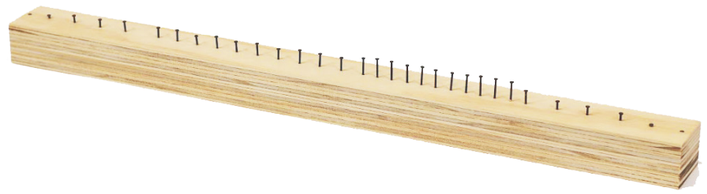


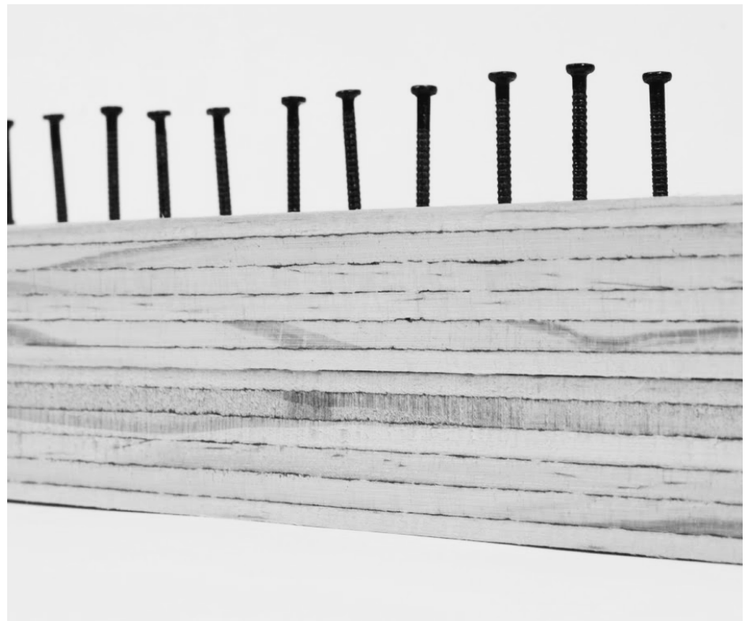


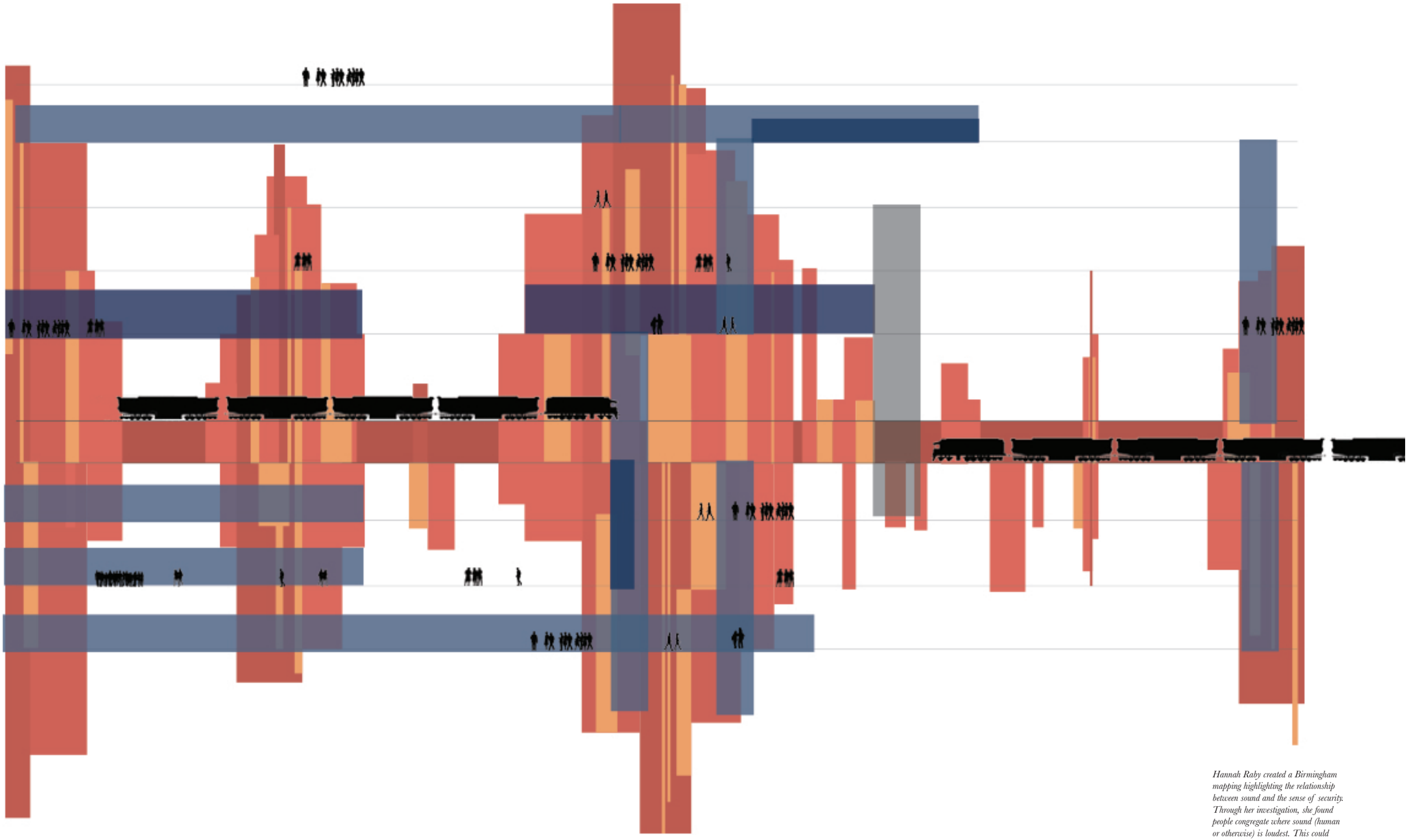




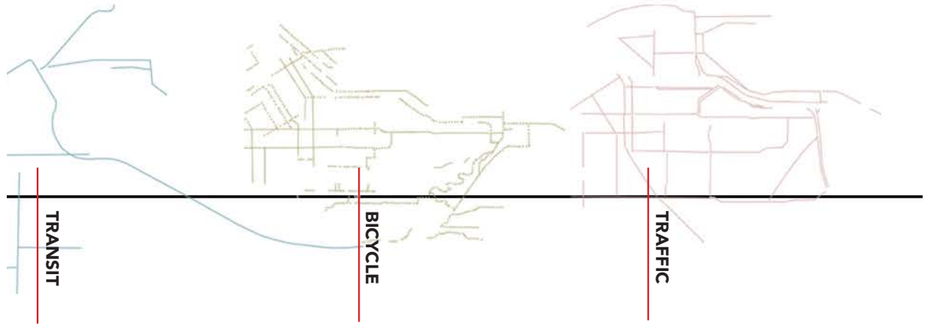
Smith reinforced that the common conception of "mapping"should be interrogated and redefined based on the mapper's lens through which they are examining information. Additionally, schemata should be analyzed to best represent ideas to the audience.

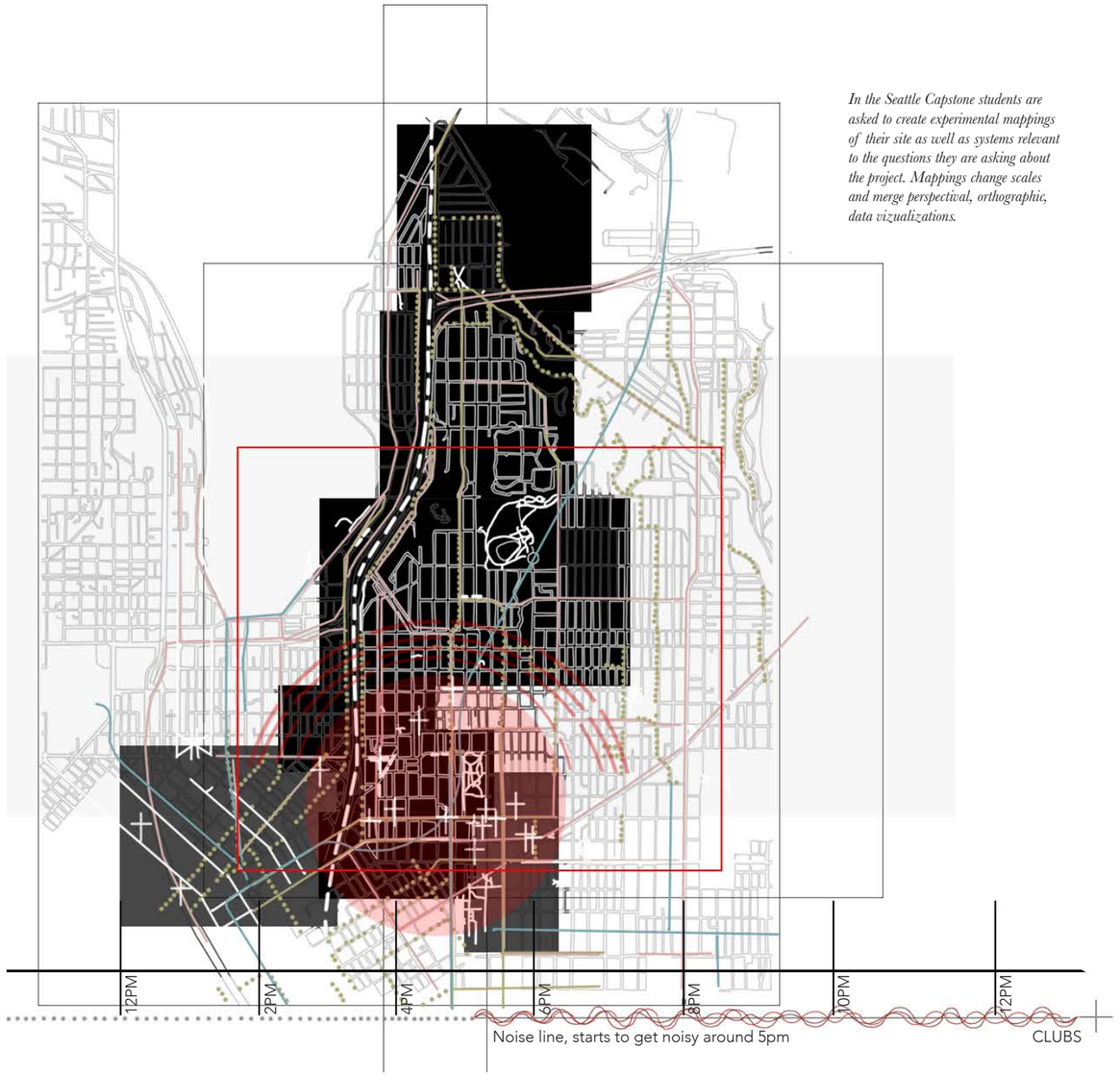




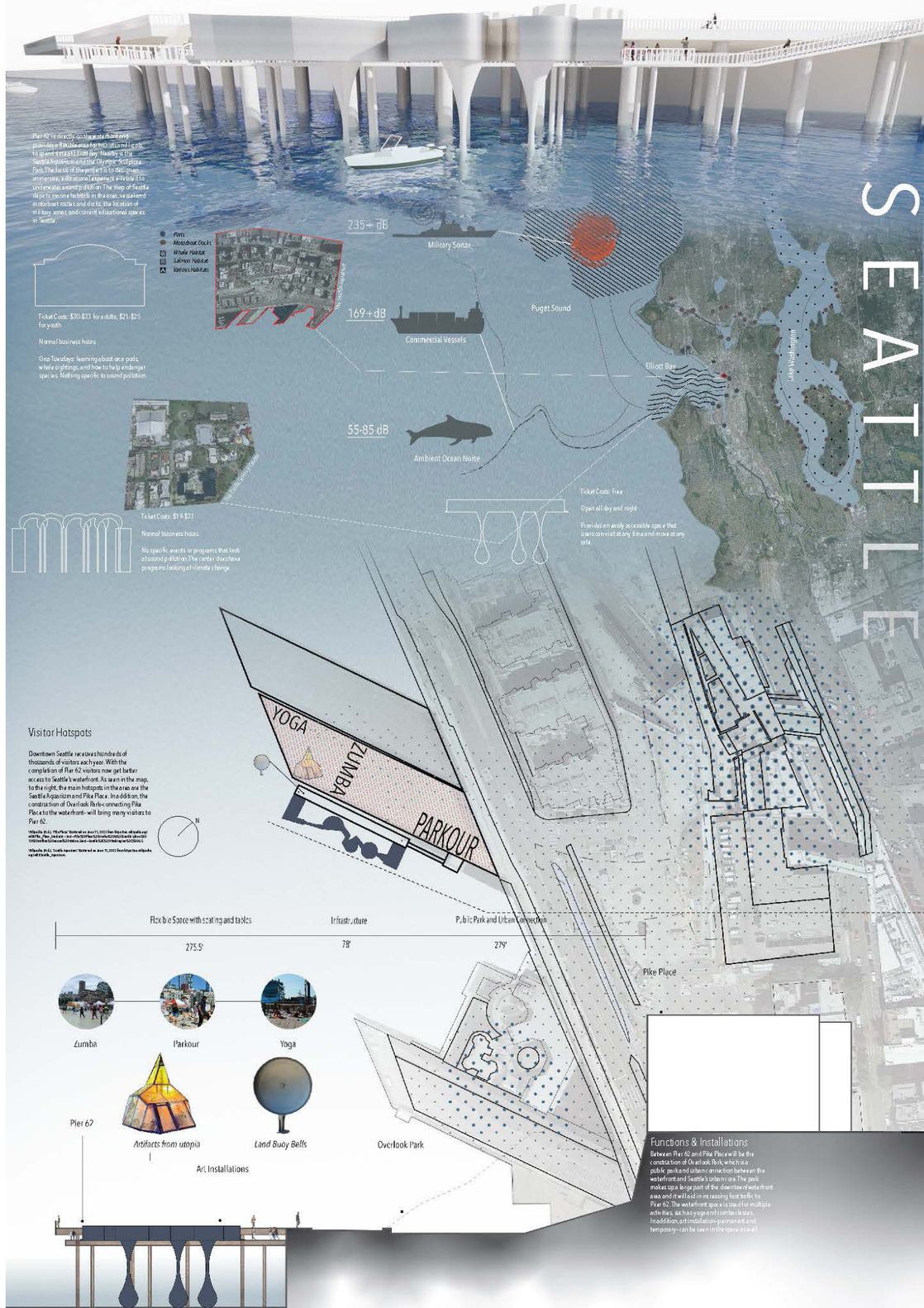


Hannah Raby created a Birmingham mapping highlighting the relationship between sound and the sense of security. Through her investigation, she found people congregate where sound (human or otherwise) is loudest. This could indicate a relationship between volume and perceived safety.

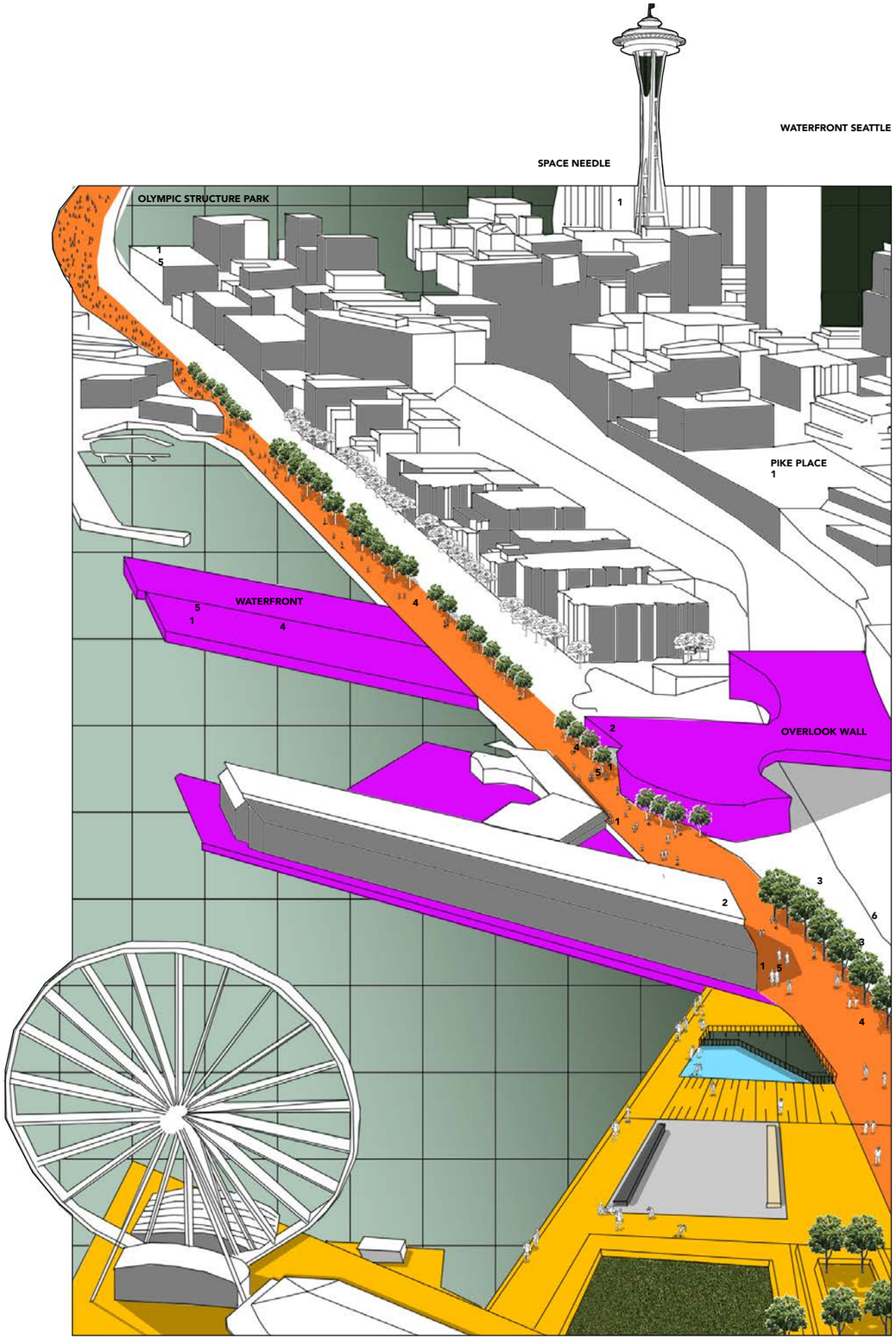


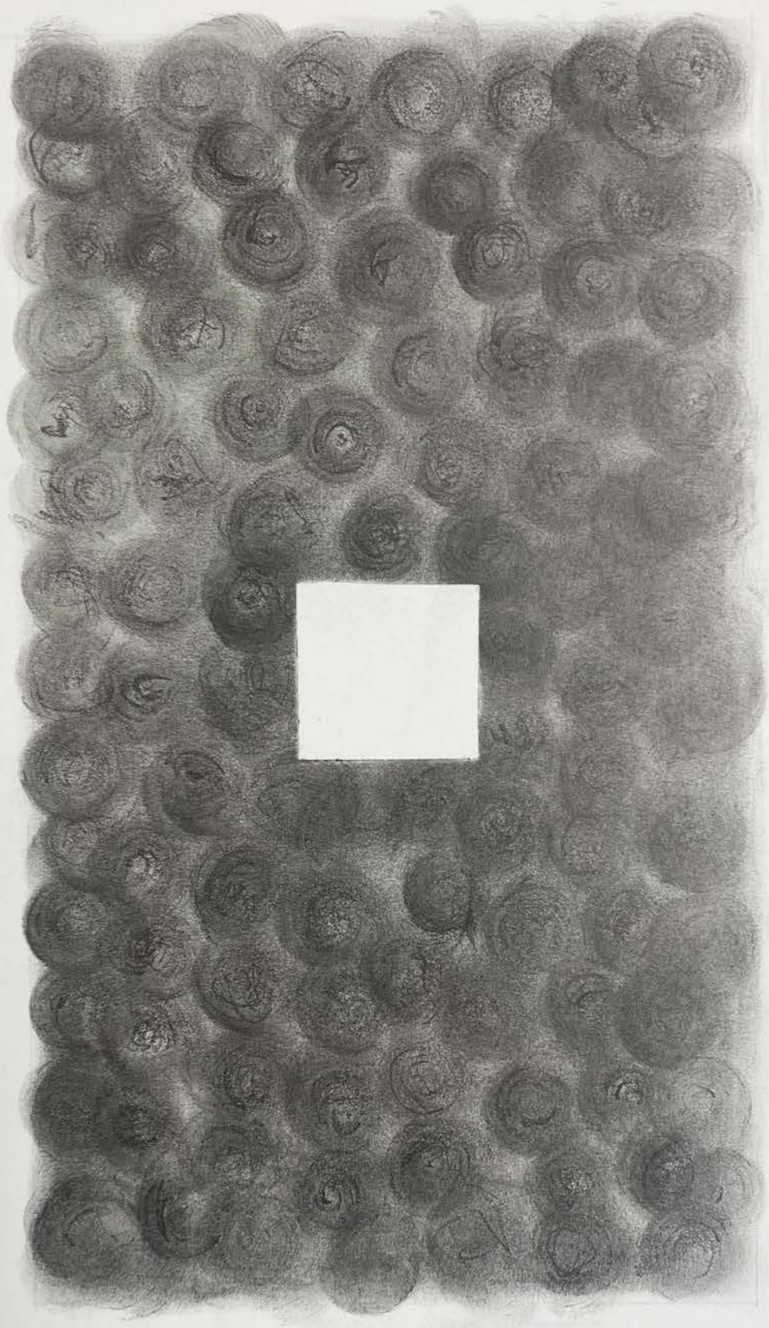


In the Seattle Capstone students are asked to create experimental mappings of their site as well as systems relevant to the questions they are asking about the project. Mappings change scales and merge perspectival, orthographic, data vizualizations.



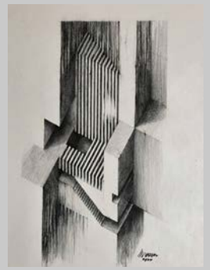

Promenade
20-30'
Siting
6'
Planting
12'
Planting W/ Boardwalk
12'
Planting
12'
Bike facility
12'
Street tree
4.5'
Side walk
6'
6'
Parking / Loading
8-10'

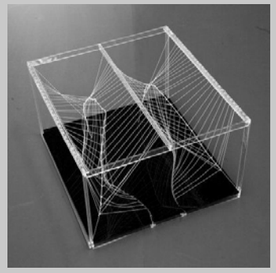

WATERFRONT SEATTLE
SPACE NEEDLE
OLYMPIC STRUCTURE PARK
PIKE PLACE
WATERFRONT
OVERLOOK WALL



Hannah Raby: Sanctuary

ENVD 4100
POETIC ARTIFACT
conceptual ideas anchor design decisions

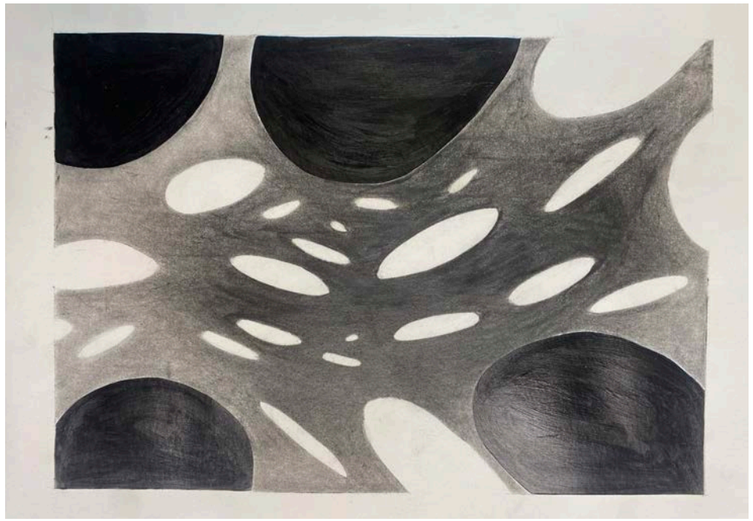
“At 8am I am a poet.
At 10am I am an engineer.
At noon I am a builder.”
Renzo Piano

It starts with poetry.

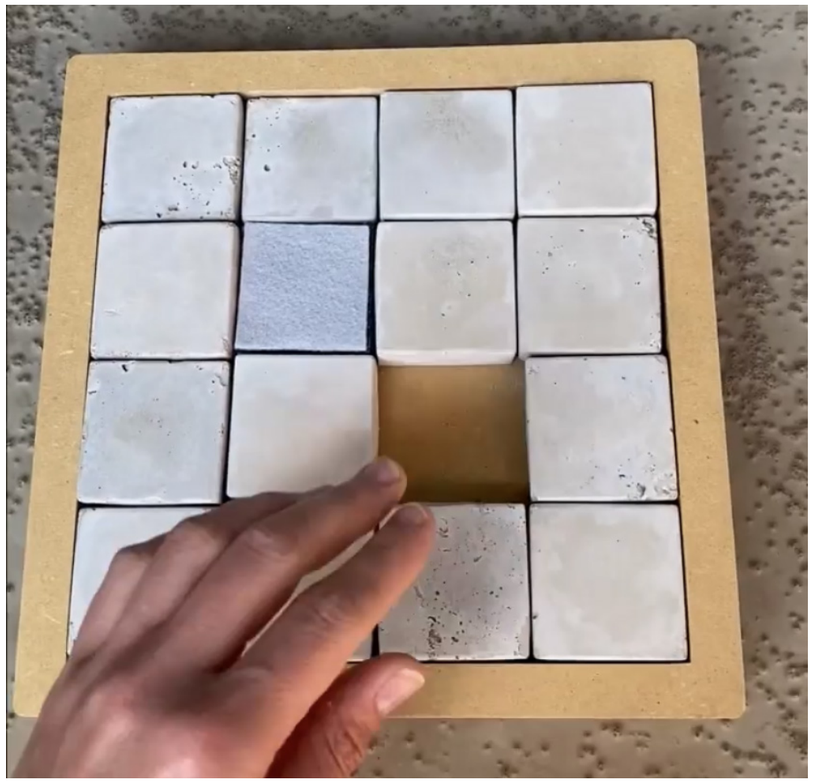
Develop a conceptual artifact embodying main, poetic idea(s) of your project. The artifact must be abstract (not representational), elemental, and well crafted. Note: this is NOT an analytical assignment, though it can be derived from analytical ideas and processes.

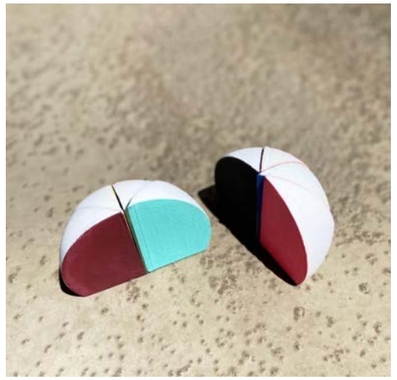
Conceptual artifacts communicate the “heartbeat” of design projects and early conceptual ideas should be evident in some manner in final design proposals. Even more, strong poetic ideas (concepts) drive design decisions throughout the develop of a project. Using select tools and materials, create a visual piece conveying core, poetic ideas about your site, project brief, project goals, etc. Again, these are abstract. It is best to limit yourself to a few strong terms, a phrase, etc.

Criteria
Completeness 10%
Creative approach to artifact and abstract representation of poetic ideas 40%
Craft - presentation and content (visuals) are highly crafted and well executed 50%



Opposite top: Addilyn Hill, "food emergence in a food desert"
Opposite bottom: Yue Hu, "web"
This page: Chris Yeung, "urban gallery"





Opposite: Anna Hanger,
"design as play"
Left: Evanthi Hettiaratchi
"geode as the sum of crystals"

interdisciplinary design + diverse typologies

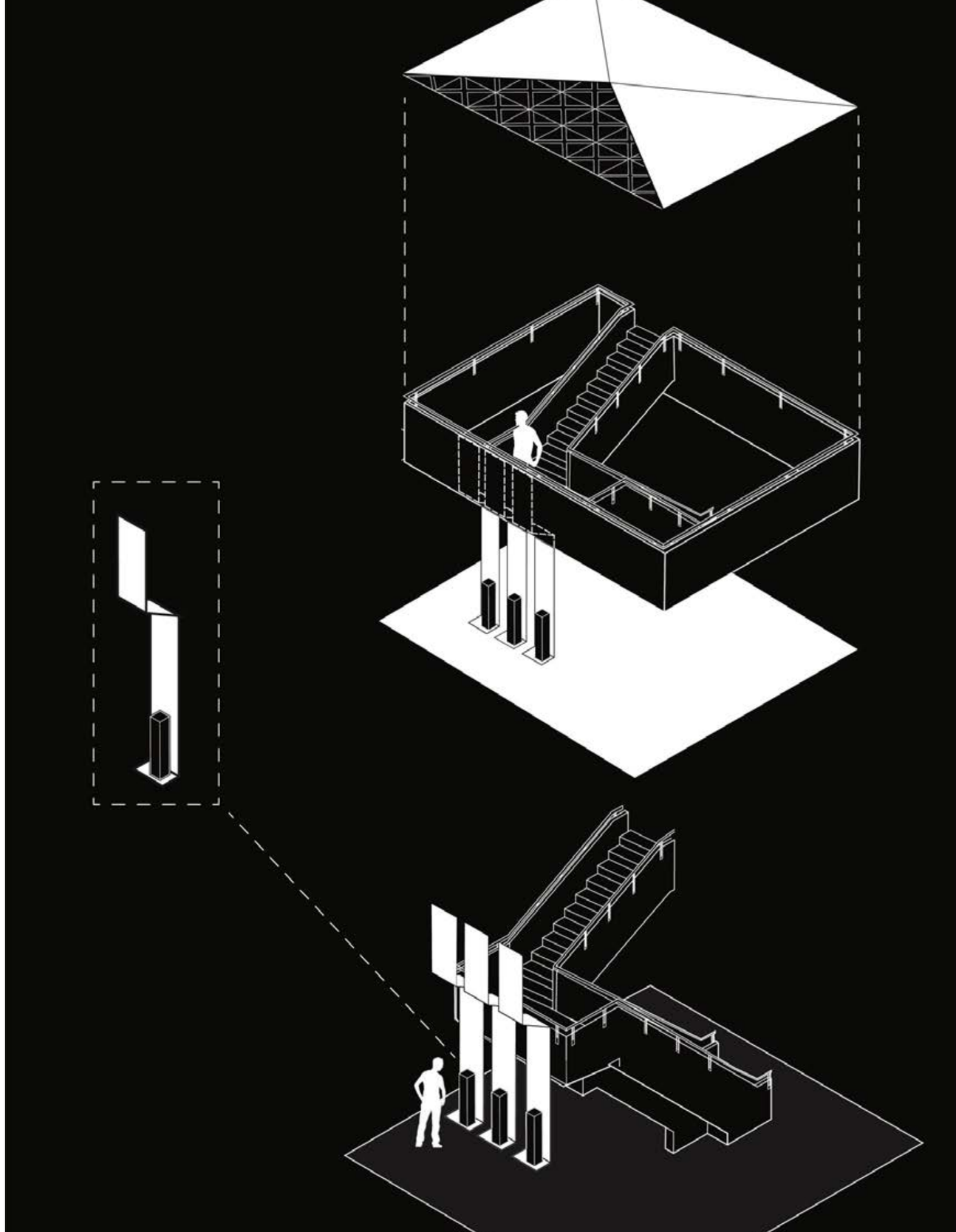
Three primary tenants of the Environmental Design curriculum include:

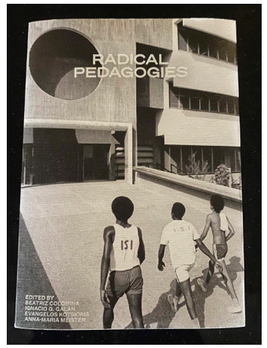
+ foundation design as translatable methods across diverse design disciplines
+ ideation of diverse typological responses (systems, programs, deployments, and artifacts) for a given site & brief
+ interdisciplinary design as a resilient response to increasing complexity

Germane to contemporary design challenges focused on collaborative responses to real world complexities, interdisciplinary design methods embedded in a degree that does not suppose students later specify an area of study is essential. Design pedagogy centered on interdisciplinary design practice and methods are central to teaching. It is my position that in order to prepare graduates for an emerging future of professional practice, designers must engage in interdisciplinary design prior to graduation. Personal experience in practice and academia stand as testaments to our siloed design disciplines where territories, scopes of work, and risk management are delignated, rather than fostering collaboration and emergence. Resilient projects like the BIG U, Little Island, Benthemplein Water Square, and Olympic Sculpture Park illustrate our growing need for interdisciplinary design. To foster this, Smith encourges students to design for a set of conditions, rather than a desired artifact. Through iterative process, students are challenged to design physical and non-physical artifacts merging traditionally disparate disciplines in order to discover emergent fields.

As students mature in the Environmental Design program, Smith encourages them to develop confidence as designers with unique theories, methods, and processes. Students are asked to critically reflect on design projects and even post-rationalize decisions, as reflective thinking and cognative analysis allows one to dissect and express with specificity processes, even gutteral or intuitive responses. Additionally, synthesizing personal work allows students to delignate their design territory from the milieu. In the Capstone studio, students develop an introductory theoretical framework and design project based on a preselected urban site. Students are encouraged to bridge various scales and fields of study to generate emergent design theories grounded in research and a robust design argument. This is in an effort to illuminate their unique, interdisciplinary approach to design untethered to conventional disciplinary boundaries.

Present design challenges focused on collaborative responses to real world complexities, necessitate an interdisciplinary, undergraduate design degree. Smith's teaching within the Environmental Design program finds its territory here.

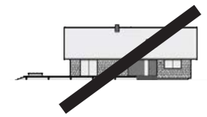




The Methods of Environmental Design
Ulm, Germany + Princeton, NJ

"The term 'environment' in the 1960s had brought with it the promise of ***a greater connection between traditionally distinct design disciplines*** *such as industrial design, architecture, or even city planning. Since it was apparent that the sum of 'good design objects' did not in itself add up to a 'good design environment,' the focus of attention* ***shifted from the design of individual artifacts to an open system of relations*** *that included behavioral environmental design."*

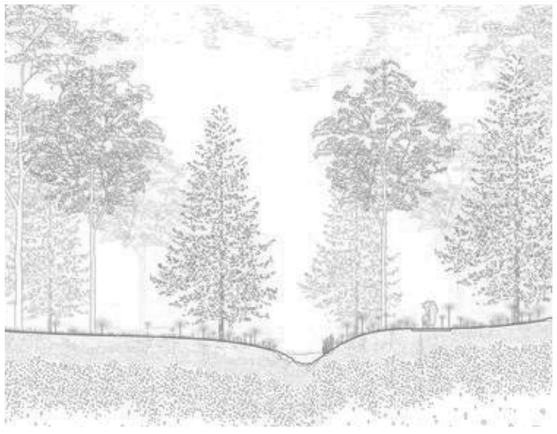
SITE + BRIEF =



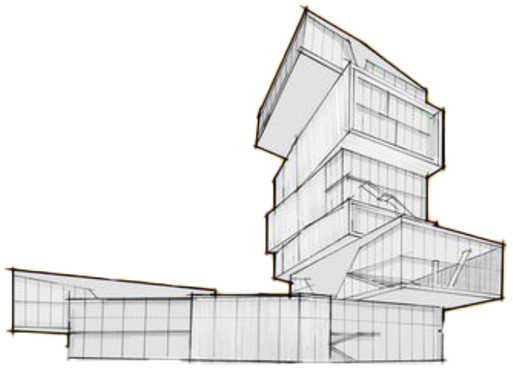
+ process over product through a rigorous design process & framing of a design arguement
+ faculty from a diversity of design disciplines
+ work operates at and integrates multiple scales
+ project briefs are untethered to specific artifacts & typologies
+ development of artifacts, deployments, systems, and programs
+ social entrepreneurship (systems & models responding to challenges)

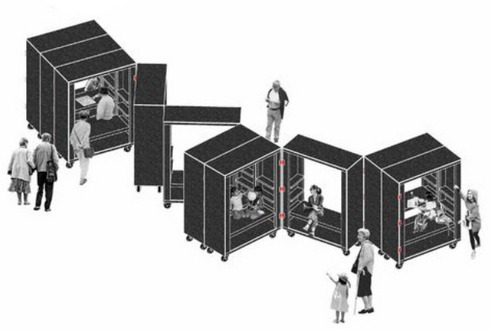
ARTIFACTS

SYSTEMS



PROGRAMS





DEPLOYMENTS

XL : urbanism miles

L : landscapes acres

M : buildings city block

S : installations feet + inches

XS : mini + micro pixel

ENVD 4010
MATERIALS RESEARCH + FABRICATION
UNFOLD



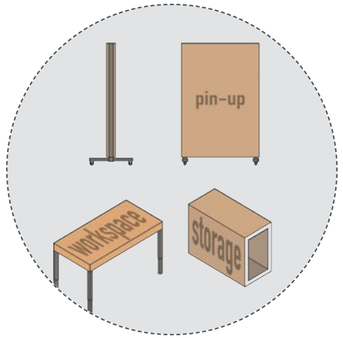

UNFOLD studio workspaces

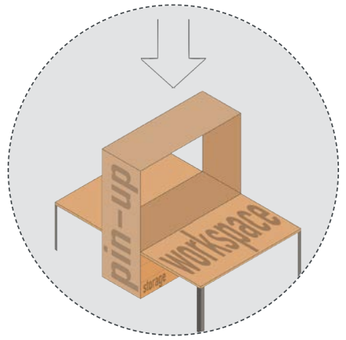
Students are tasked with researching, prototyping, and developing design proposals for a contemporary studio workspace based on Auburn University's Environmental Design curriculum, modern technologies, and spatial constraints. Though technologies and curriculum have evolved, the studio workspace has remained relatively unaltered since its conception at L'École des Beaux-Arts and the Bauhaus. The model of one studio desk per student does not foster adaptability, integration of multiple functions, and limits resourcefulness and affordability. Environmental design students are to propose a desk combining individual worksurfaces, pin-up space, storage, and group worksurfaces for discussions and larger projects. Additionally, work spaces are to be movable, integrate joinery minimizing fasteners, provide a cohesive design language, and allow for future storage as well as end-of-life recycling.

Design considerations include:
+ *fostering student work excellence*
+ *economical use of materials and assemblies*
+ *moveable and light weight assemblies*
+ *provide for multi-use functionality*
+ *efficient, compact design, where appropriate*
+ *disassembly for storage and recycling*

The interdisciplinary portion of the project centers on "scenography" through the creation of a cohesive end-of-semester presentation. Students are divided into four groups to:
1) further develop the design concept;
2) create a cohesive exhibit installation of the work;
3) design affiches and other 2d media describing project components; and
4) "market" the exhibit outside the Library of Architecture, Design and Construction (LADC).

Criteria
+ *design development is rigorous (students clearly gave it their all)*
+ *fabricated elements (prototypes, book, exhibit, affiches) are well crafted/executed*
+ *design idea is thoughtful and compelling (elegant and shows critical thinking)*
+ *all deliverables are unified (work between teams and as an entire class to make final work cohesive)*
+ *final presentation to reviewers at the opening is clear and professional*



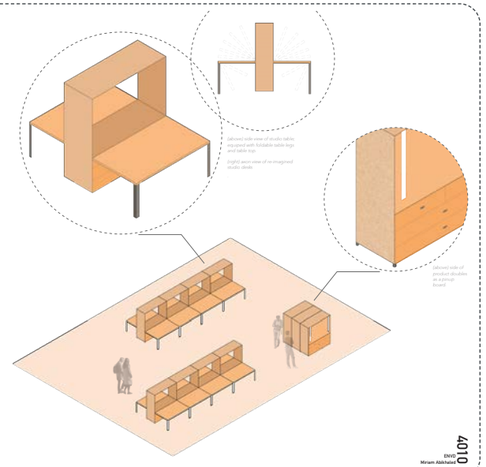


the bottega: reimagined

noun
: the studio or workshop of a major artist in which other artists may participate in the execution of the projects or commissions of the major artist

Studio workspace has been constant throughout many decades, and many turn to the Bauhaus for the initial studio inspiration. However, as time goes on and technology has advanced, the studio workspace has remained constant. The studio workspace does not necessarily need to be completely changed, but rather enhanced. Design education dates back to the times before technology was introduced. Therefore, that means physical and paper everything. Paper floor plans, physical models, and more. It was necessary at the time to give students and workers space to achieve their work in a comfortable environment.

With that being said, because technology has advanced and has allowed us to 3D render models, hold large amounts of data at a time, and digitally contain site plans/ sections, a large space is not much of a necessity anymore. Sure- a reimagined studio environment should still allow for students to have large desks, as physical model making is an essential part of the design process- but the option to sustain an inorganic workspace in a studio could be something beneficial. The following graphics entertain the idea of a versatile studio environment: one that synthesizes all the elements of **workspace**, **storage**, and **pin-up** into **one.**

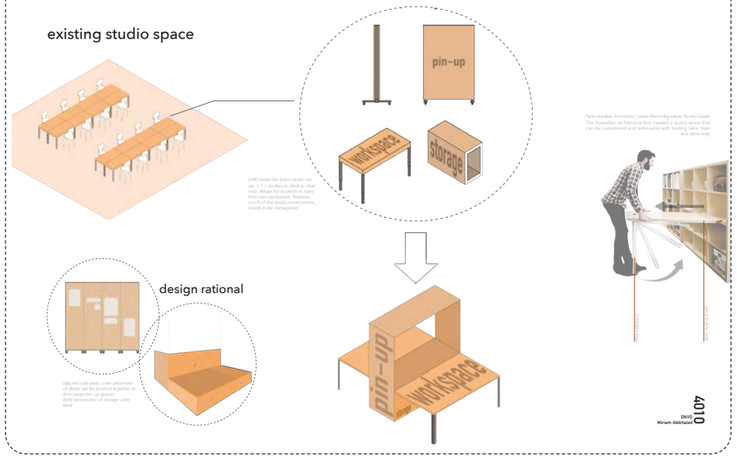


(above) side view of studio tables with folding, foldable table legs and table tops

(right) aeon view of re-imagined studio desks

(above) side of product studies as a group (front)

existing studio space



(left) shows the basic studio set up. 1-1-1 student to desk to chair ratio. Allows for students to have their own workspace, however, much of the studio environment needs to be reimagined

Particularable Architects Create Reconfigurable Studio Desks
The Australian architecture firm created a studio space that can be customized and remixable with folding table tops and table legs.

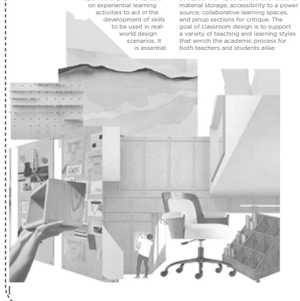
design rational

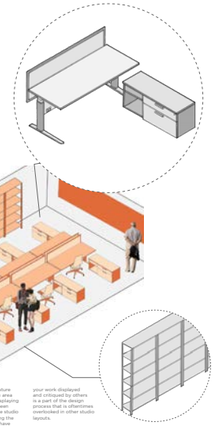
(above) side view, outer perimeter of desks can be pushed together to form large pin-up spaces. (below) perspective of storage cube desk

BAUHAUS 2.0

subtle changes

Studies show that an individual's physical environment directly impacts their mood, productivity, and creative thinking. Knowing this, it is crucial to understand that the design of educational spaces influences student engagement and interaction levels. Studio spaces in particular place emphasis on experiential learning activities to aid in the development of skills to be used in real-world design scenarios. It is essential that the environment allows users to feel comfortable and relaxed in their physical studio settings to produce their best work. Overall, there are many important aspects that are to be considered when designing a functional studio workspace. A few of these necessities include adequate workspace, areas dedicated to material storage, accessibility to a power source, collaborative learning spaces, and pinup sections for critique. The goal of classroom design is to support a variety of teaching and learning styles that enrich the academic process for both teachers and students alike.





the breakdown...

Temperature, lighting, and furnishings all play a role in creating an ideal studio space that is conducive to both instructors and students to be engaged in learning activities. Having a designated space for individual learning that is equipped with all necessary materials, supplies, and storage mechanisms has been scientifically proven to increase student engagement.

a closer look...

Another key feature of a studio is an area dedicated to displaying work that has been produced by the studio members. Having the opportunity to have your work displayed and critiqued by others is a part of the design process that is oftentimes overlooked in other studio layouts.

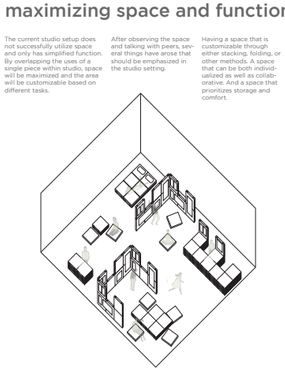
CUSTOMIZABLE STUDIO

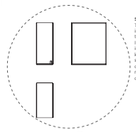
maximizing space and function

The current studio setup does not successfully utilize space and only has simplified function. By overlapping the uses of a single piece within studio, space will be maximized and the area will be customizable based on different tasks.

After observing the space and talking with peers, several things have arose that should be emphasized in the studio setting.

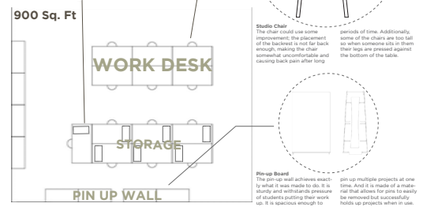
Having a space that is customizable through either stacking, folding, or other methods. A space that can be both individualized as well as collaborative. And a space that prioritizes storage and comfort.





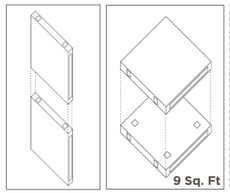
Storage Bin
There is room for improvement with the storage cabinet. While it does have the intended purpose of keeping materials and supplies safe and out of the way but it is not perfect. Because of its vertical nature, when using flimsy supplies like thin museum board or paper, they tend to after staying in the cabinet for extended periods. There is also no designated space for small materials so they easily get lost.

Studio Chair
The chair could use some improvement; the placement of the backrest is not far back enough, making the chair somewhat uncomfortable and causing back pain after long periods of time. Additionally, some of the chairs are too tall so when someone sits in them their legs are pressed against the bottom of the table.



Pin-up Board
The pin-up wall achieves exactly what it was made to do. It is sturdy and withstands pressure of students putting their work up. It is spacious enough to pin-up multiple projects at one time. And it is made of a material that allows for pins to easily be removed but successfully holds up projects when in use.

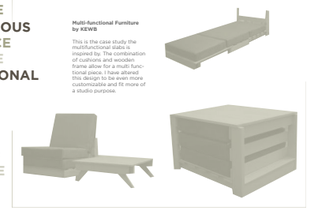
Multifunctional Slabs



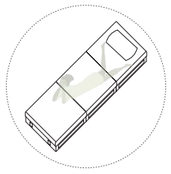
These slabs are attachable by stacking both vertically and horizontally. They are hollowed out to provide storage space, wide enough for large materials and flat so things do not get bent. This allows the slabs to be lighter and easier to move around. With the combination of cushions, they can make endless customizable arrangements including, as pictured below, a standing desk, standing desk, communal discussion area, and a pin-up board. These arrangements can be allowed to accommodate as many or as few users as needed. One of these slabs only takes up a maximum 9 square feet.

CUSTOMIZABLE
SPACE CONSCIOUS
WORK SURFACE
CONNECTABLE
MULTI-FUNCTIONAL
COMMUNAL
SEATING
LIGHTWEIGHT
PRIVATE
PIN UP BOARD
COMFORTABLE

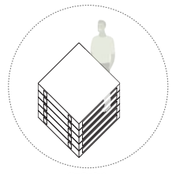
Multi-functional Furniture by KEWB
This is the case study the multifunctional slabs is inspired by. The combination of cushions and wooden frame allow for a multi-functional piece. I have altered this design to be even more customizable and fit more of a studio purpose.



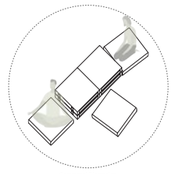
Different Uses



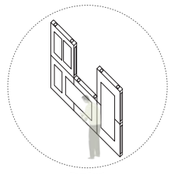
Sleeping Area



Standing Desk

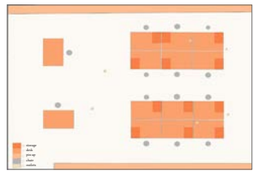


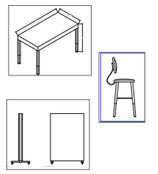
Communal Discussion



Pin-up Board

existing studio



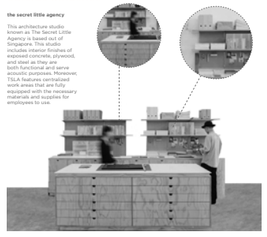


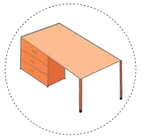
observed successes
The desks that are currently in the studio serve their purpose as they are an appropriate height for working and for standing. However, additional mechanisms are left out of the design of the desk. Additionally, the pinup boards are able to be moved around on wheels. This helps in saving space when they are not in use.

observed limitations
The current studio has many features that are not functional, this includes the overall layout of the studio, the design of the chair, and the design of the cubbies offered to students. While these designs may be affordable, students pay the price after working long hours on projects.

outside influence

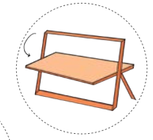
the secret little agency
This architecture studio designed by The Secret Little Agency is based out of Singapore. This studio includes interior finishes of exposed concrete, plywood, and steel as they are aesthetically pleasing and serve holistic purposes. Moreover, TSLA features centralized work areas that are fully equipped with the necessary materials and supplies for employees to use.





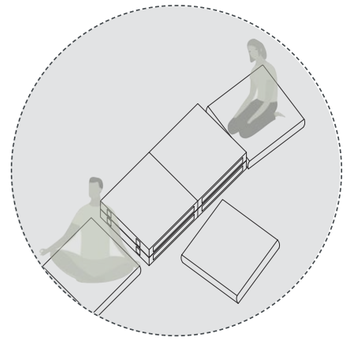
functional drawers
The current studio is equipped with cubbies, however, these do not offer functional storage space for paper materials and smaller materials that are easily lost or broken. Having a desk with drawers for students would allow users to be more organized and prevent materials from being left out on the desktops.

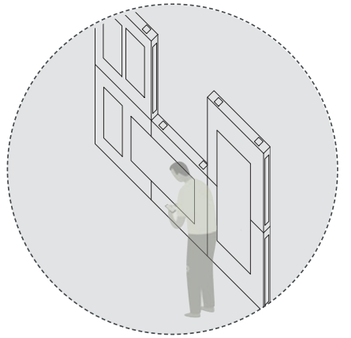
desk design
Desks come in varying shapes that support different functions. It is essential to explore all viable options including desks with storage, shelving, and ones that are collapsable. Each of these options offers something that the other does not.

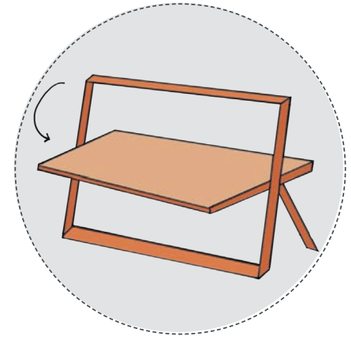


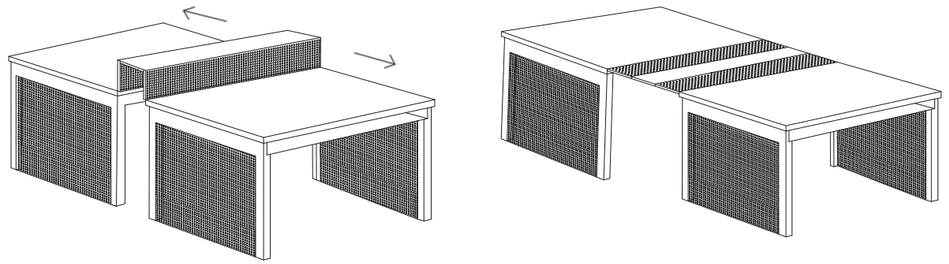
break it down
Oftentimes in a studio, extra space is needed when displaying models or working on large-scale projects, however, these extra tables are not always necessary to have out. Considering that space is limited, it would be helpful to have a desk that is able to fold away when it is not being used.

Opposite: Miriam Abikhaled
This page: Emory Morgan
These boards represent early research and design proposals for studio desks and adaptable furniture systems. Students were additionally tasked with learning axonometric drawings and a shop introduction for this 3-credit hour lab.

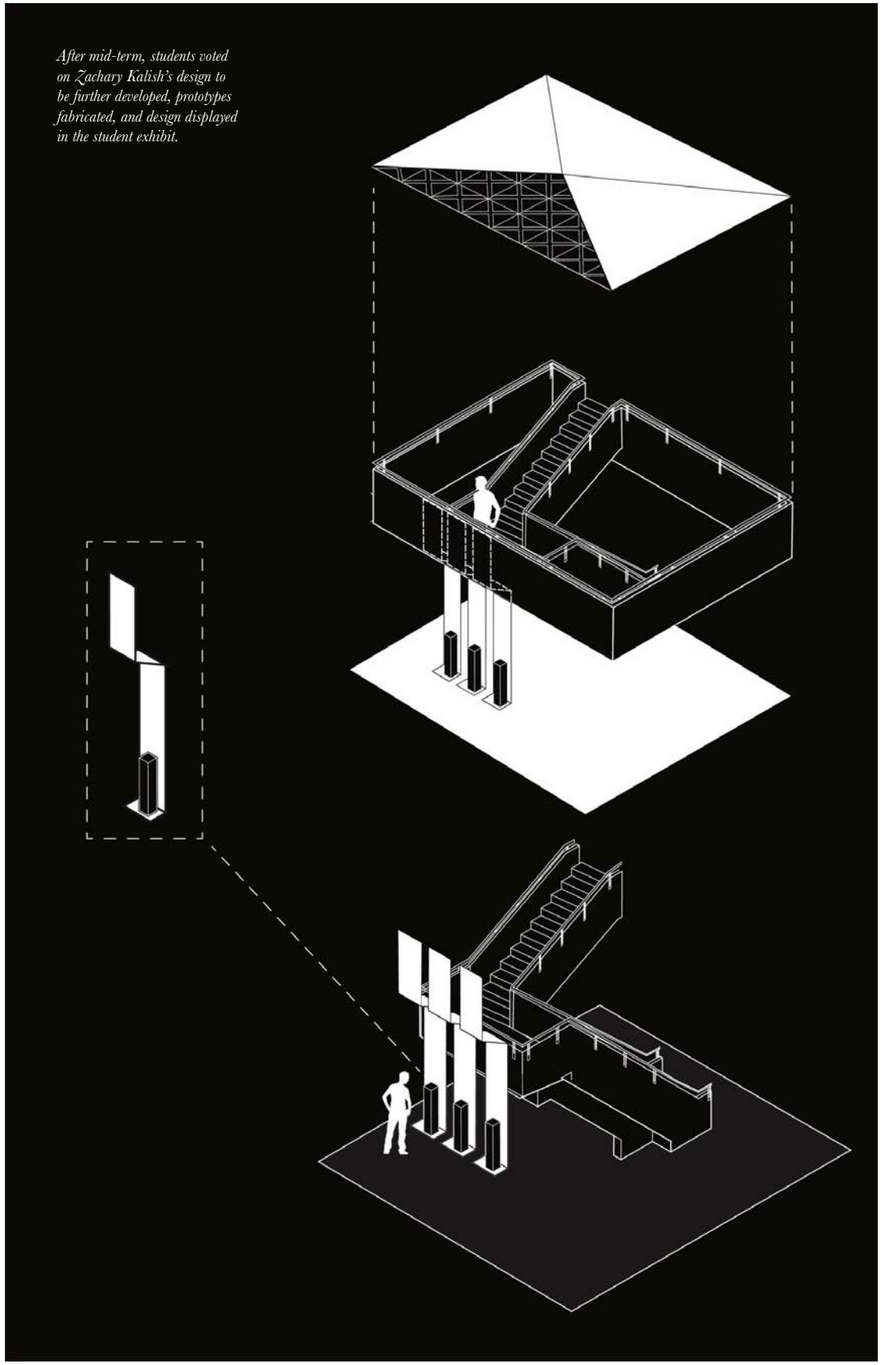


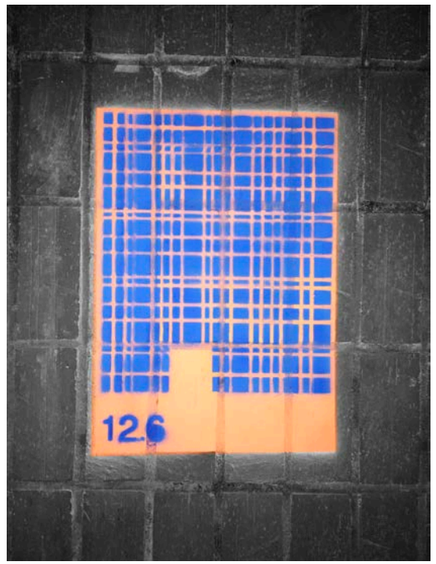


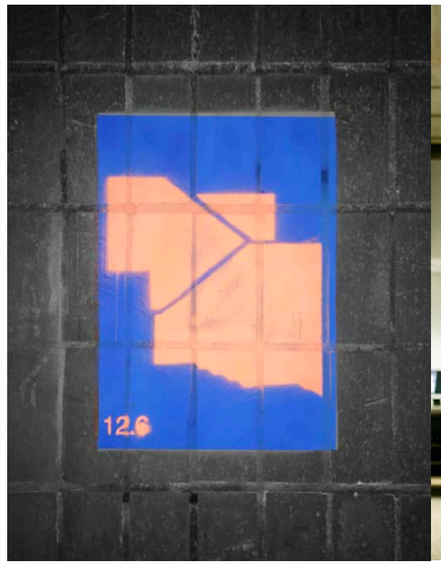




After mid-term, students voted on Zachary Kalish's design to be further developed, prototypes fabricated, and design displayed in the student exhibit.







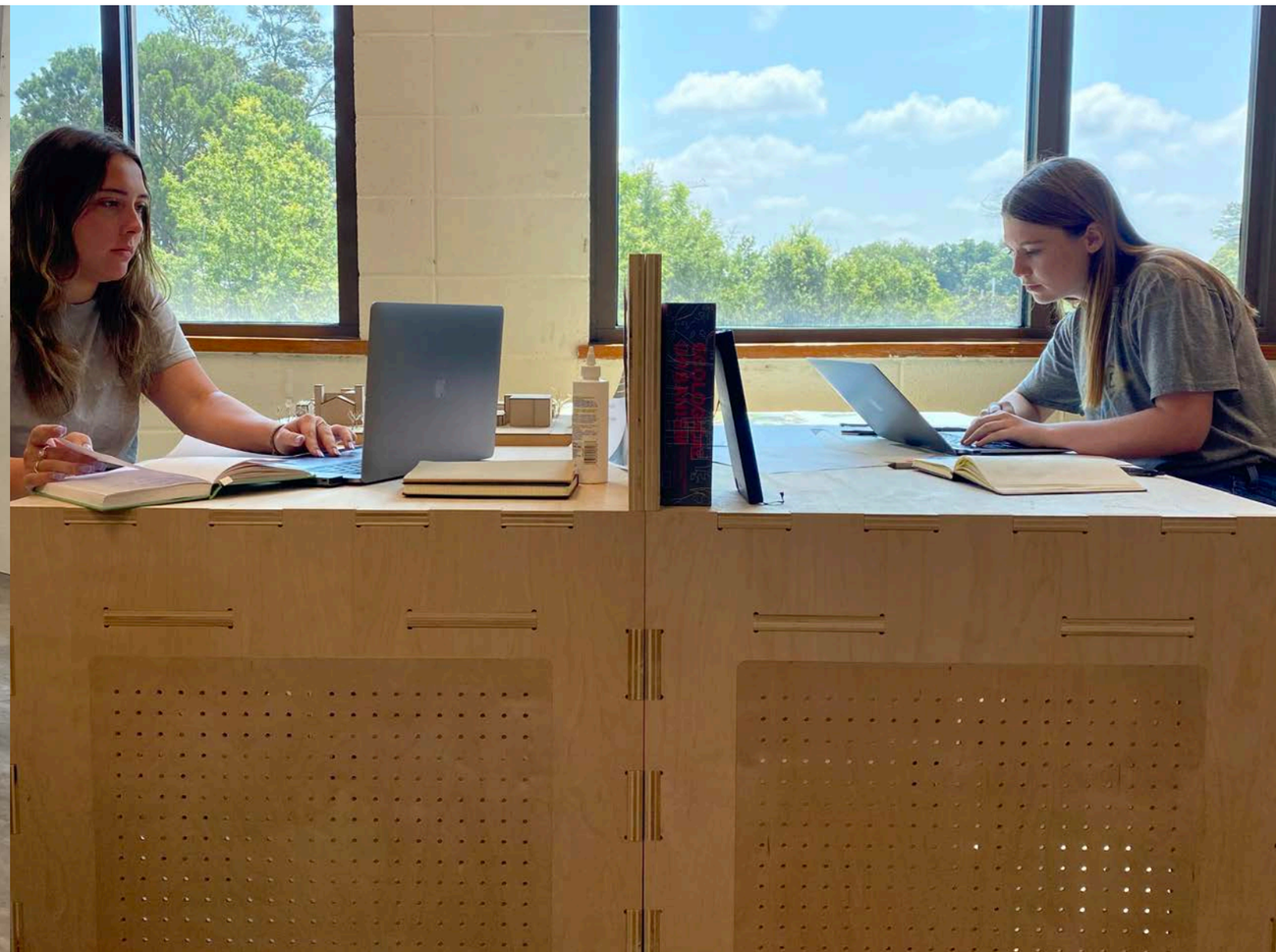
Students selected spray chalk to temporarily promote the exihibit to other design and studio-based majors across campus. Spray chalk panels are layered and elementally represent Dudley Hall's architecture. Students additionally designed the installation within the Library of Architecture, Design, and Construction using the affordable materials of paper and OSB.

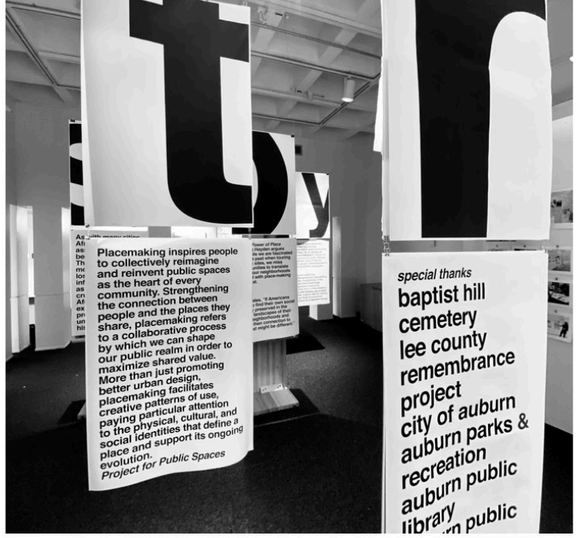

ONE SIZE FITS NONE
Students take a look at Dudley's current studios to see what could be improved upon
LOOKING AROUND
After observing existing conditions, students started to research case studies to find ideas and take inspiration from. Three of those case studies are explained Below.
ONE SIZE FITS US
After researching and looking at case studies the students then went under a process of creating their ideas and refining them.
Sketch
Refine
Render

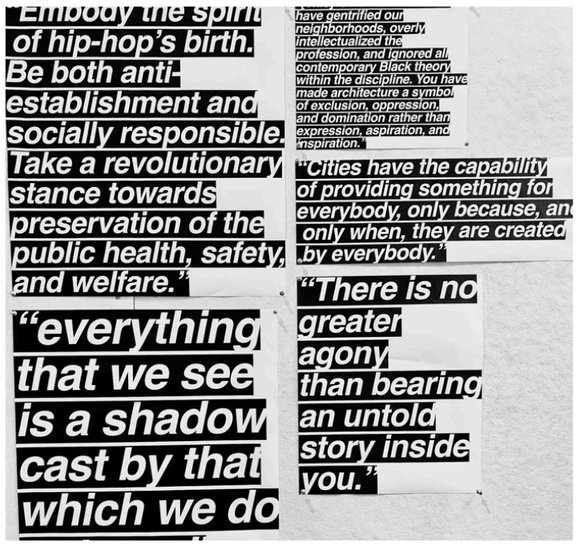

IDEAS FOR THOUGHT

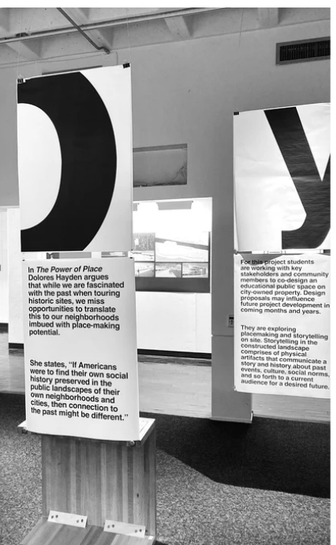
EXPANDED STORAGE
=
Dudley
BAUHAUS 2.0

Zachary Kalish and Miriam Abikhaled fabricated a full-scale prototype of the design using plywood and a CNC router. The design makes use of finger joints, hinges, caster wheels, storage areas, and plywood pegboards. It allows for individual work space or group collaboration.









ENVD 2000 + 4010
BAPTIST HILL

Placemaking through Storytelling

an initiative at 800 McKinley Avenue

AUBURN
ENVIRONMENTAL DESIGN

Introductory Design Seminar
Project Brief:

The project at 800 McKinley Avenue is an opportunity to participate in creating a public space for the neighborhood, share stories and histories sacred to our African-American community and provide educational opportunities regarding Baptist Hill Cemetery.

The site is located immediately north of Baptist Hill Cemetery, a historic African-American cemetery dating back to the 1870's. While a prominent landmark sited at the terminus of historic Thach Avenue and resting atop Baptist Hill, its past is scarcely known. The cemetery is one of a few remaining African-American landmarks in the city, and there is a movement to protect these assets and communicate their stories. Cemetery burial plots are owned by families dating back no less than six generations, and those buried were key figures in early city development. Moreover, the site, similar to Rosenwald Schools, lynching sites and segregated schools, are considered sacred due to their significance in the African-American and simply, *American* experience. In *The Power of Place* Dolores Hayden argues that while we are fascinated with the past when touring historic sites, we miss opportunities to translate this to our neighborhoods imbued with place-making potential. She states, "If Americans were to find their own social history preserved in the public landscapes of their own neighborhoods and cities, then connection to the past might be different."[1] This connection to place and history is evident for local African-American families and has potential to engage a collective city.

For this project students are working with stakeholders and community members to co-design this educational public space on city-owned property. Design proposals may influence actual project development in coming months and years. To do so, students explore placemaking and storytelling on the site. Storytelling in the constructed landscape comprises of physical artifacts that communicate a story and history about past events, culture, social norms, and so forth to a current audience for a desired future. This will be done through a number of design considerations:
1) physical markers in the landscape connecting this site to other Lee County sacred spaces and historic events;
2) connection to a digital database for on-site educational opportunities (i.e. QR codes);
3) constructed elements responding to social and environmental conditions such as vernacular building typologies, local materials, methods of construction and craft as well as local ecology.

It is not only crucial to program spaces to meet community needs, the site, itself, must be an honorary memorial to the cemetery, families, and the stories of buried individuals. Consider how the site and individual elements may communicate these painful and glorious histories. Without reading text, how might a passerby experientially feel: oppression?, freedom?, captivity?, light?, etc. These are abstract ideas that, when manifested in the built environment, make powerful spaces. Here are some examples:
1) walking under the hanging markers of lynched victims at Montgomery's Peace and Justice Memorial;
2) walking into the earth while reading names, looking at your reflection, the reflection of your neighbor and the Capital at the Vietnam Memorial;
3) walking along the Berlin wall etched into the ground that recalls a genocide and a fight for a new future. Not only is the history powerful, the experience of that history is overwhelmingly evident in the present.

As with many cities, African-American assets have largely been erased. This erasure is more than the loss of building infrastructure as sites are crucial to the African-American experience and provide a holistic understanding of history for all.

1. Hayden, Dolores. *The Power of Place: Urban Landscapes as Public History.* Cambridge, MA: The Mit Press, 2006.

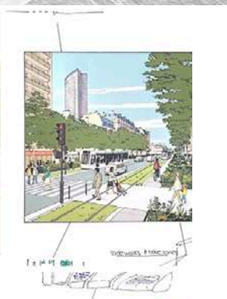


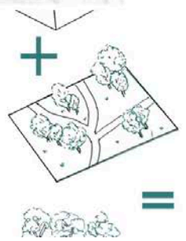


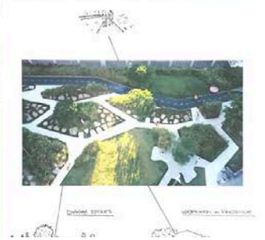


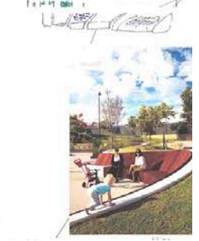


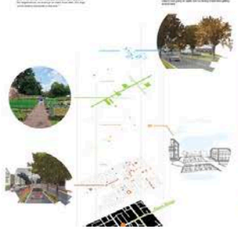

Mini-semester, 3-credit hour hybrid seminar-lab.
Students conducted participatory design sessions at the Auburn Public Library, adjacent to Baptist Hill Cemetery. Participants included cemetery representatives, historians, Lee County Remembrance Project presonnel, Auburn faculty, and students. Design sessions informed the diverse range of project typologies developed.

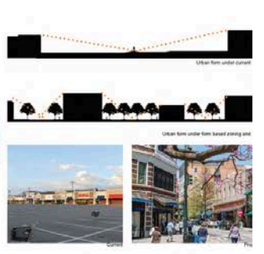




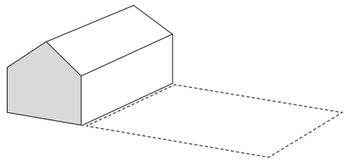


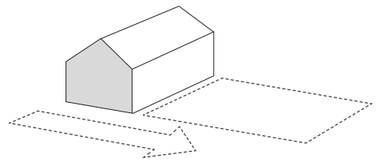






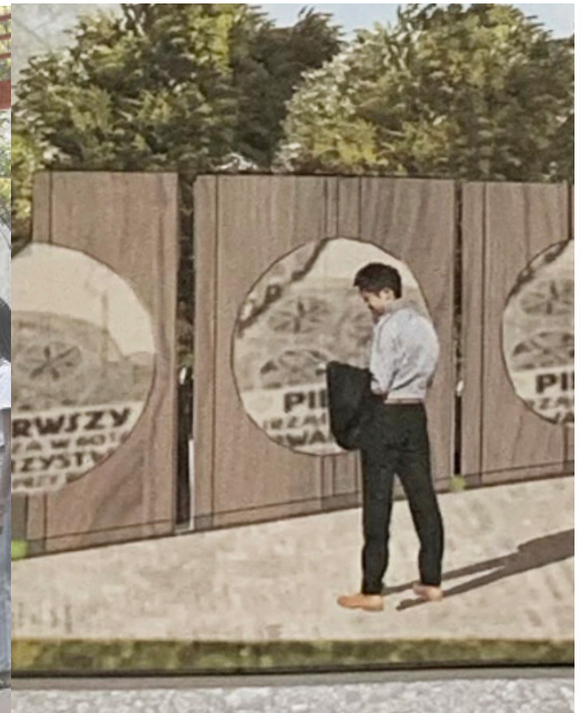
Below: Jennifer Diaz-Ponce focused on a landscape installation providing elevated views of Baptist Hill Cemetery for viewing, quiet reflection, and educational purposes.
Opposite: Aubrey Sanders
Aubrey's project focuses on the need for walkability around the site increasing public access to the Baptist Hill educational space and surrounding amenities.

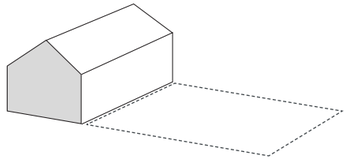


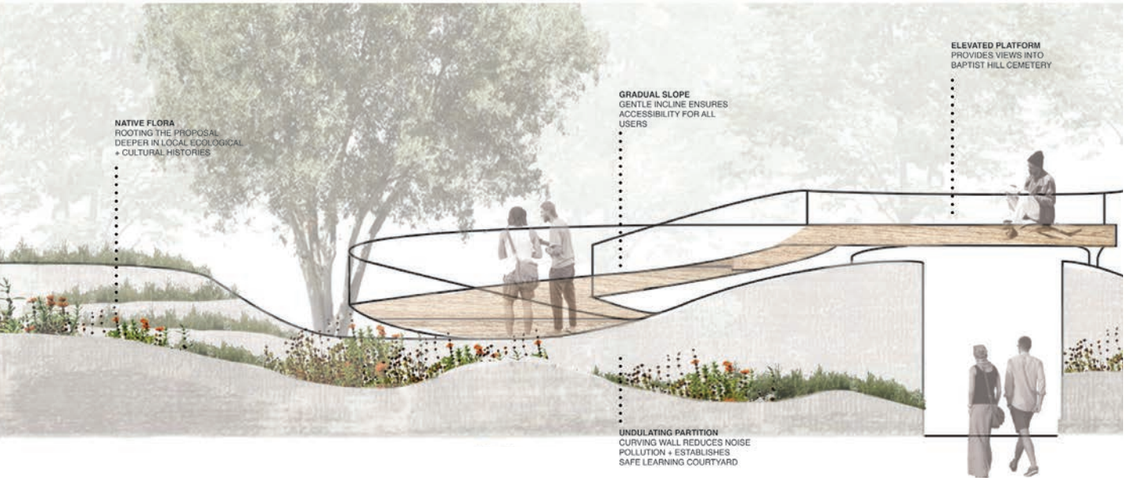


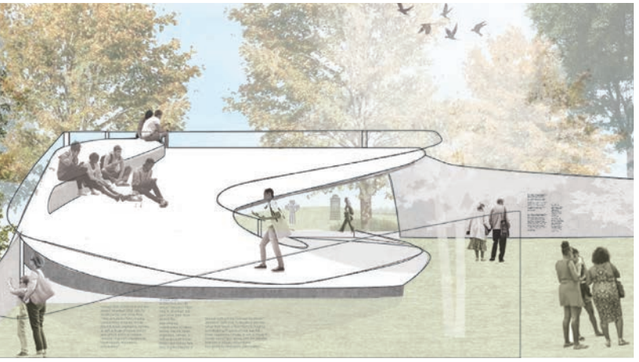

autonomous high speed lanes
general urban mixed use zoning
manual low speed side lanes with onstreet parking

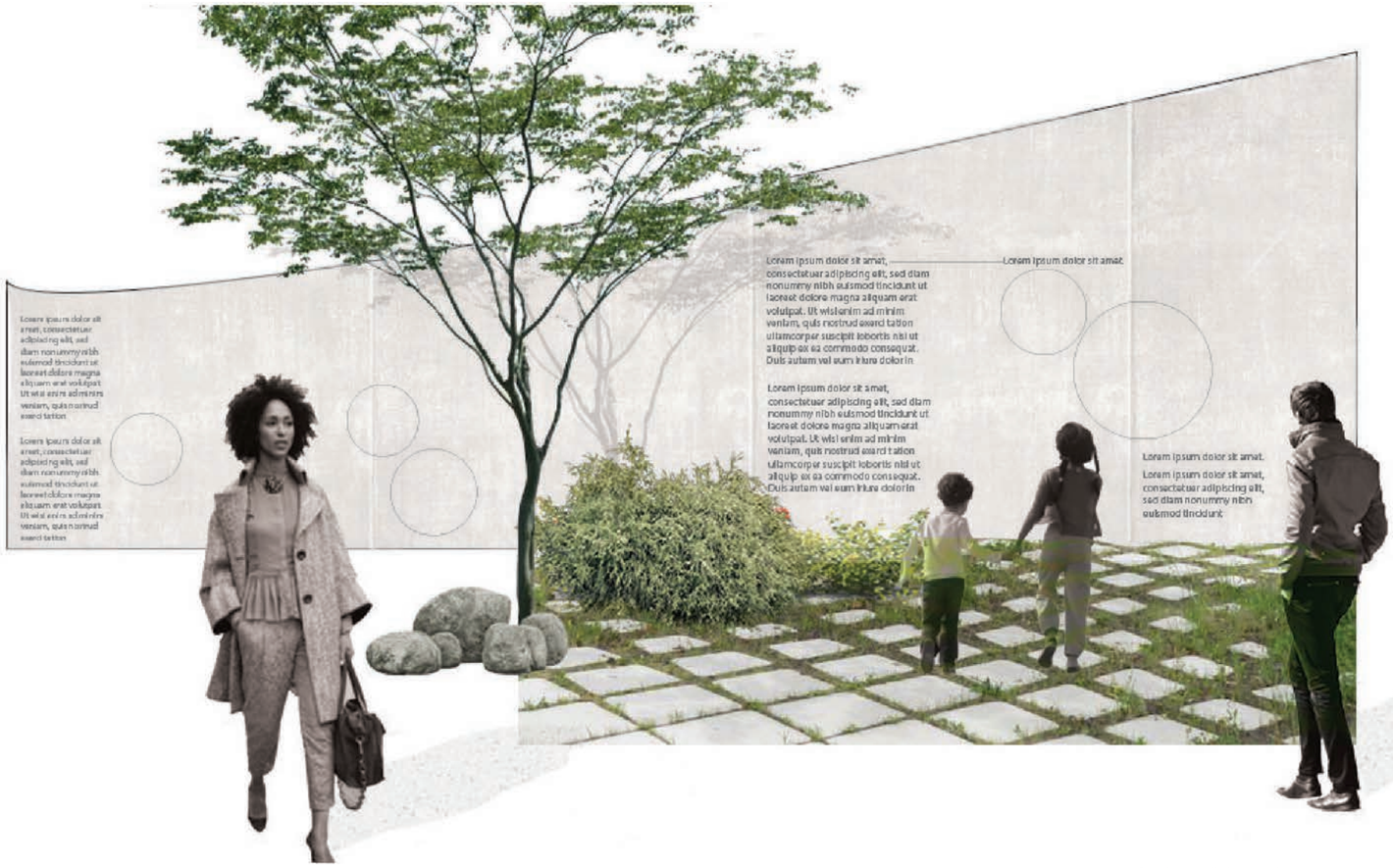

automated high speed lanes
manual low speed side lane with onstreet parking
general urban row home zoning



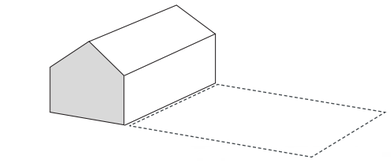








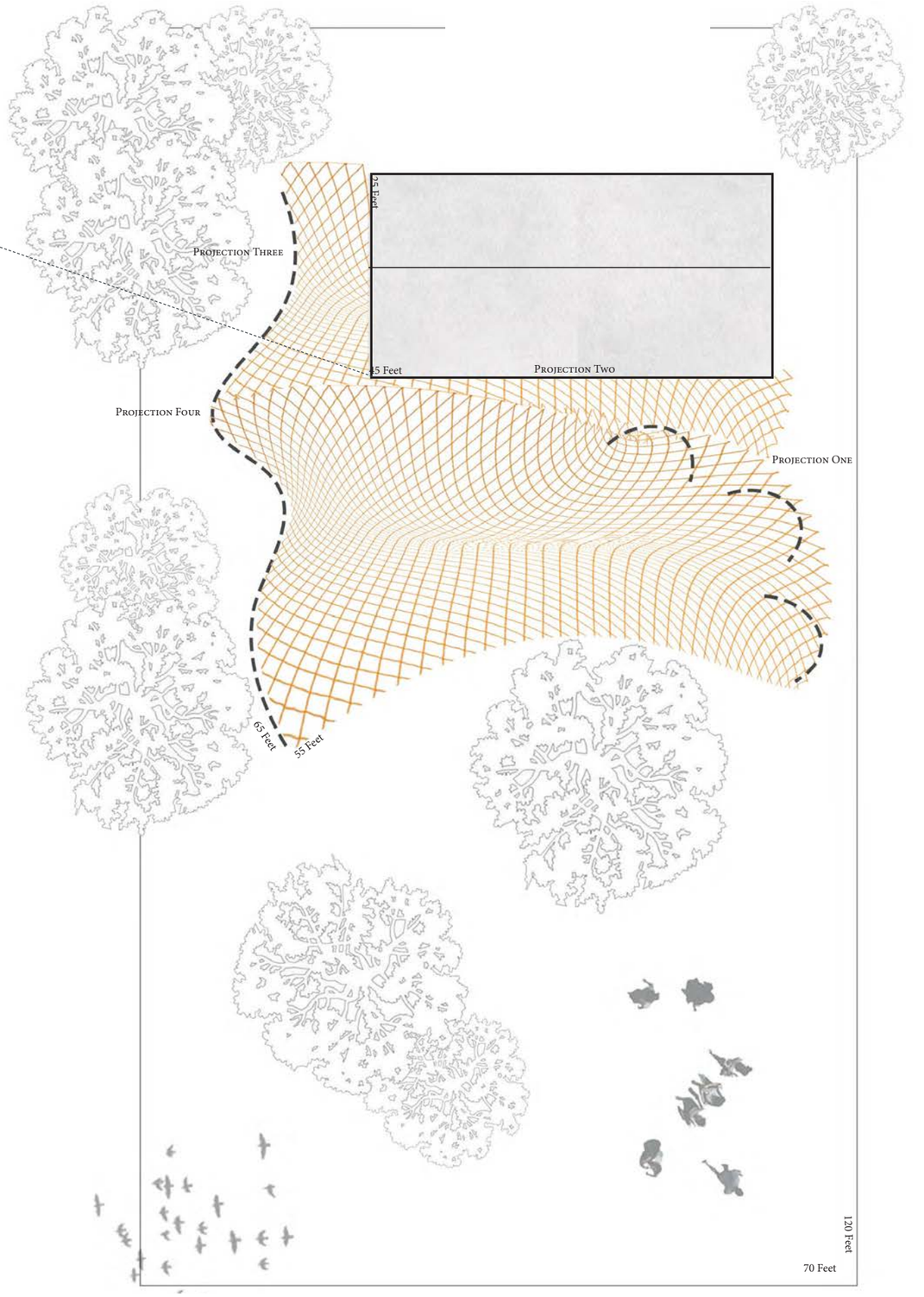
In this 3-credit hour seminar Emma Parrish focused on creating elevated platforms across the rear of the site to provide reflection, views, and educational opportunities for Baptist Hill Cemetery. The landscape is carved into while ramps and platforms delicately snake above the ground.

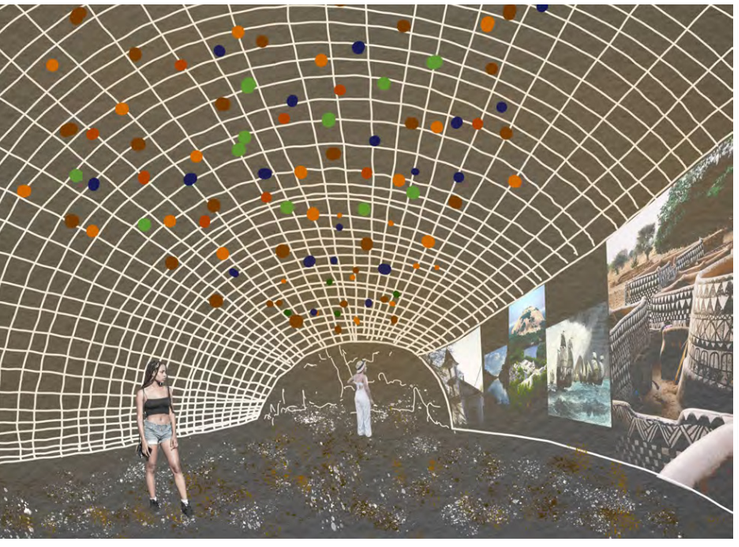


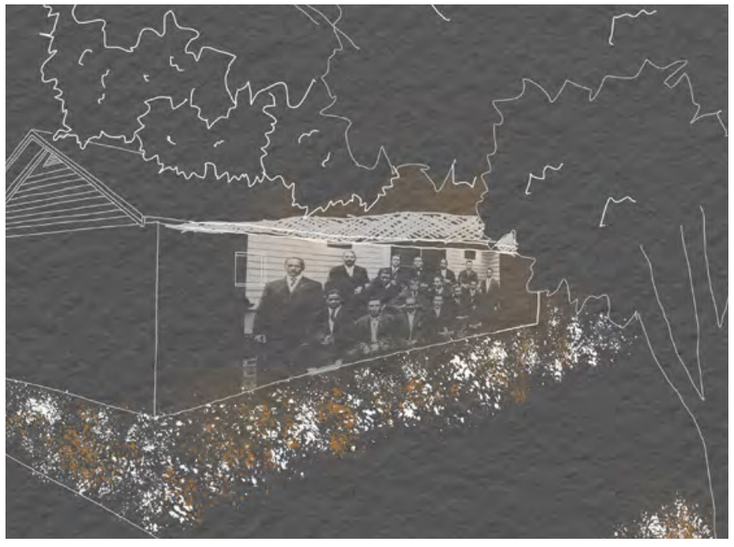
The Men of Auburn's
Ebeneezer Baptist Church

Auburn University's First Black
Student, Harold A. Franklin

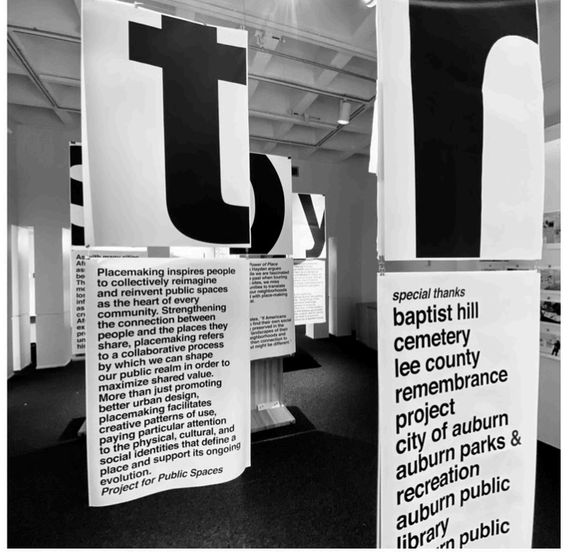
Auburn University's First Black
Student, Harold A. Franklin

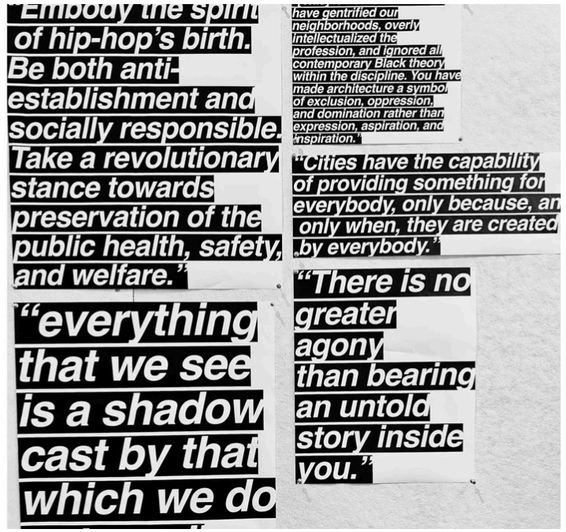


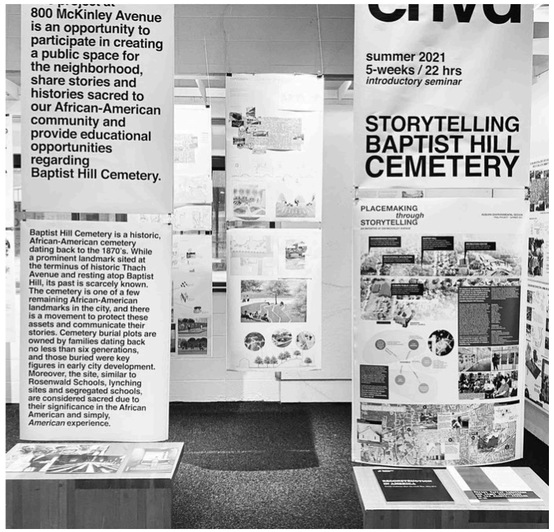




In this introductory, 3-credit hour mini-semester class, fifteen students presented final projects to community members. Guest partners included Baptist Hill representatives, the Auburn Mayor, the Parks and Recreation Director, City Council members, and more.







After participatory design sessions and final presentations to the community, the class designed an exhibit to display research, design work, and final conclusions about Auburn's African-American history and Baptist Hill Cemetery, specifically.

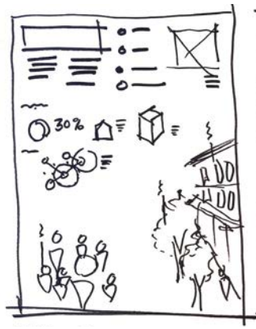
Class tour of BLOX's prefabrication warehouse and lines.

ENVD 5030
ENTREPRENEURSHIP STUDIES

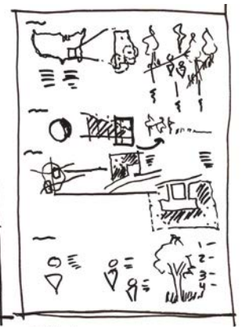
ENVD 5030 focuses on the entrepreneurial creative process as new ventures develop from the design-thinking process. **Before companies, organizations, and initiatives exist, entrepreneurs design new business models from observing gaps and opportunities in the economy, social institutions, and the environment.** These business models provide products and services uniquely designed to meet a particular audience's stubborn or previously unrecognized problems.

This course is included in the Environmental Design curriculum as graduates are especially positioned to investigate and design systems in the built environment. Because Environmental Design students come from and go into a range of fields including: landscape architecture, architecture, construction, engineering, industrial design, real estate development, graphic design and more, there is a foundation to start ventures within and between industries. This course will explore the design-thinking process, business models, case studies in venture development, business plans, marking, and funding strategies. Furthermore, we will hear from guest speakers who have started unique for-profit and not-for-profit ventures in the AEC (architecture, engineering, and construction) industry.

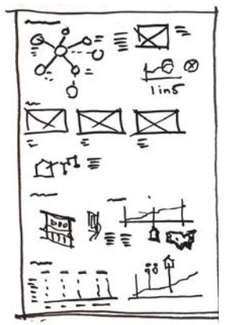
1 INTRO/ SUMMARY



2 OPPORTUNITY RESEARCH



3 MECHANICS



24x36" portrait-orientation boards

+ company name + logo
+ philosophy and/or mission
+ 4 core values
+ products, services + type of interdisciplinary practice (products, services, packages)
+ target audience + client types

+ original research into gap/opportunity
+ primary + secondary research showing obvious and/or latent societal needs
+ information on where you are located + why
+ how you will market to clients + end-users + why you employ these methods

+ business structure + organization
+ business case study
+ 3 competitors + how you differentiate
+ market analysis
+ beach head market + scaling up to other markets (phasing growth)
+ financial projections

4 BUSINESS PLAN

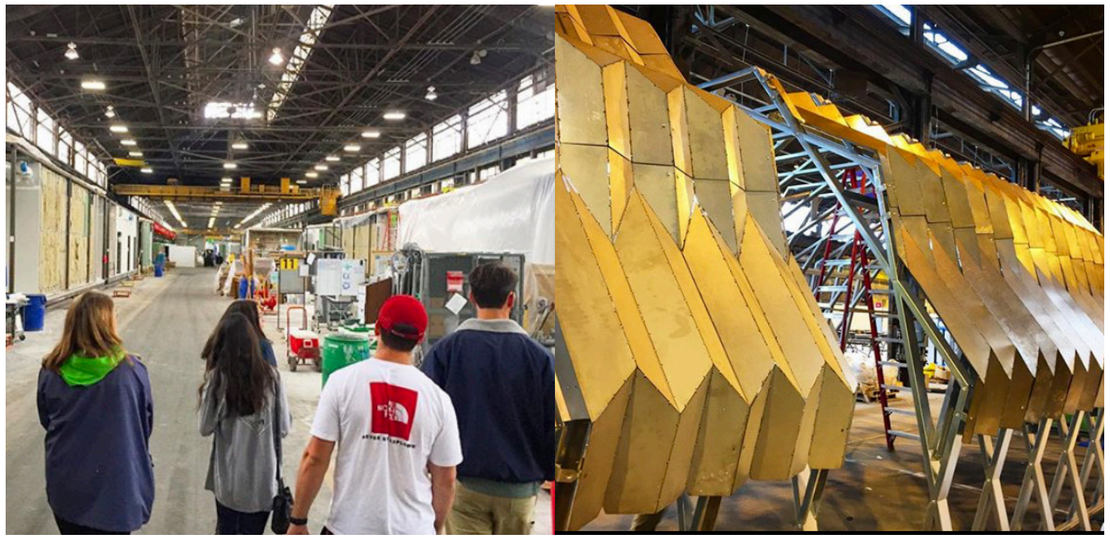
8.5x11" portrait-orientation + stapled

+ complete business plan
+ include visuals, as needed (5 min) - can be reused from presentation boards

5 BUSINESS CARD

2x3.5" business card (front + back)
30 copies

+ logo
+ business name (specific fonts)
+ your name + contact info
+ should reflect ethos



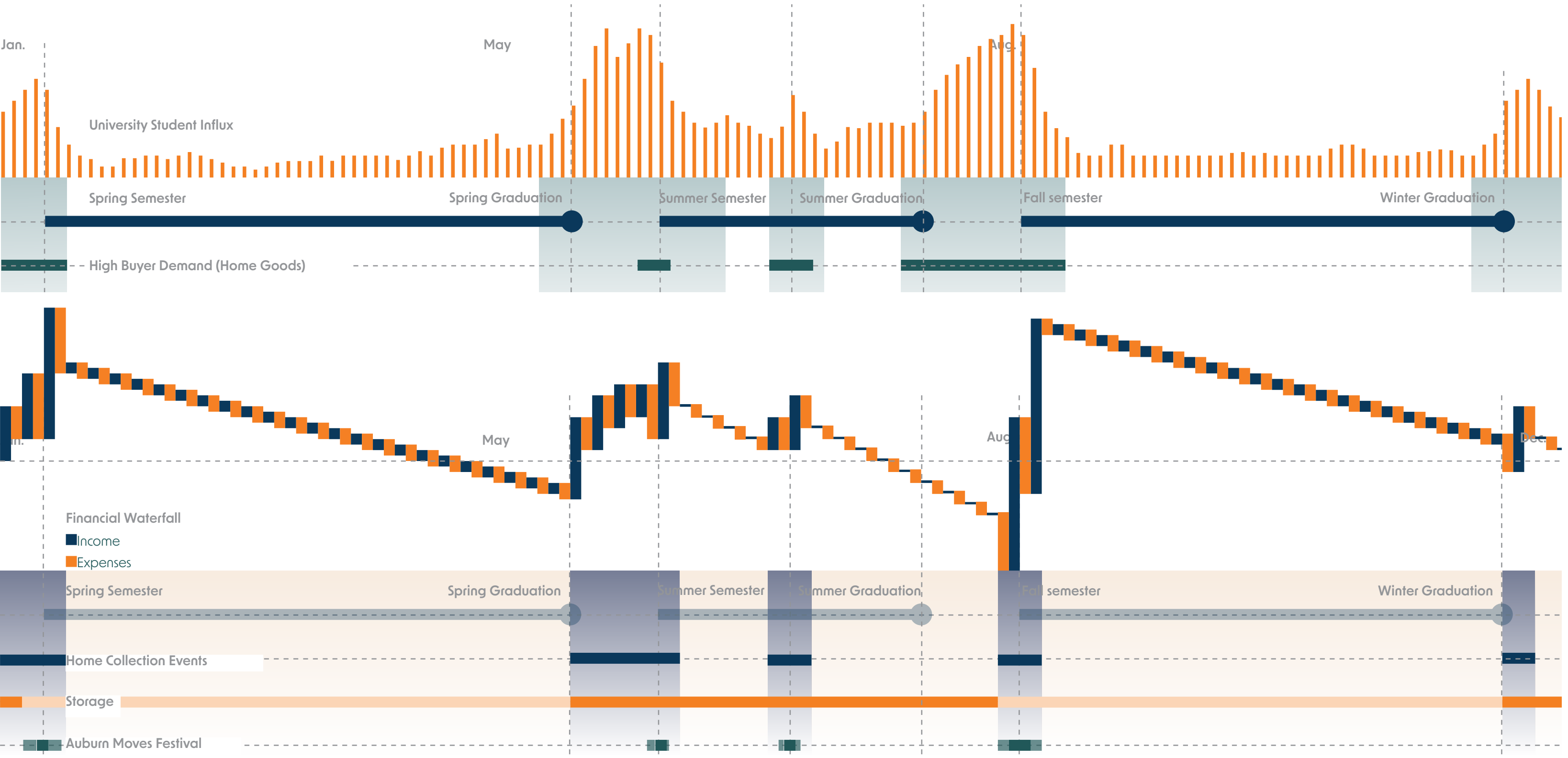
GUEST SPEAKERS + PARTNERS

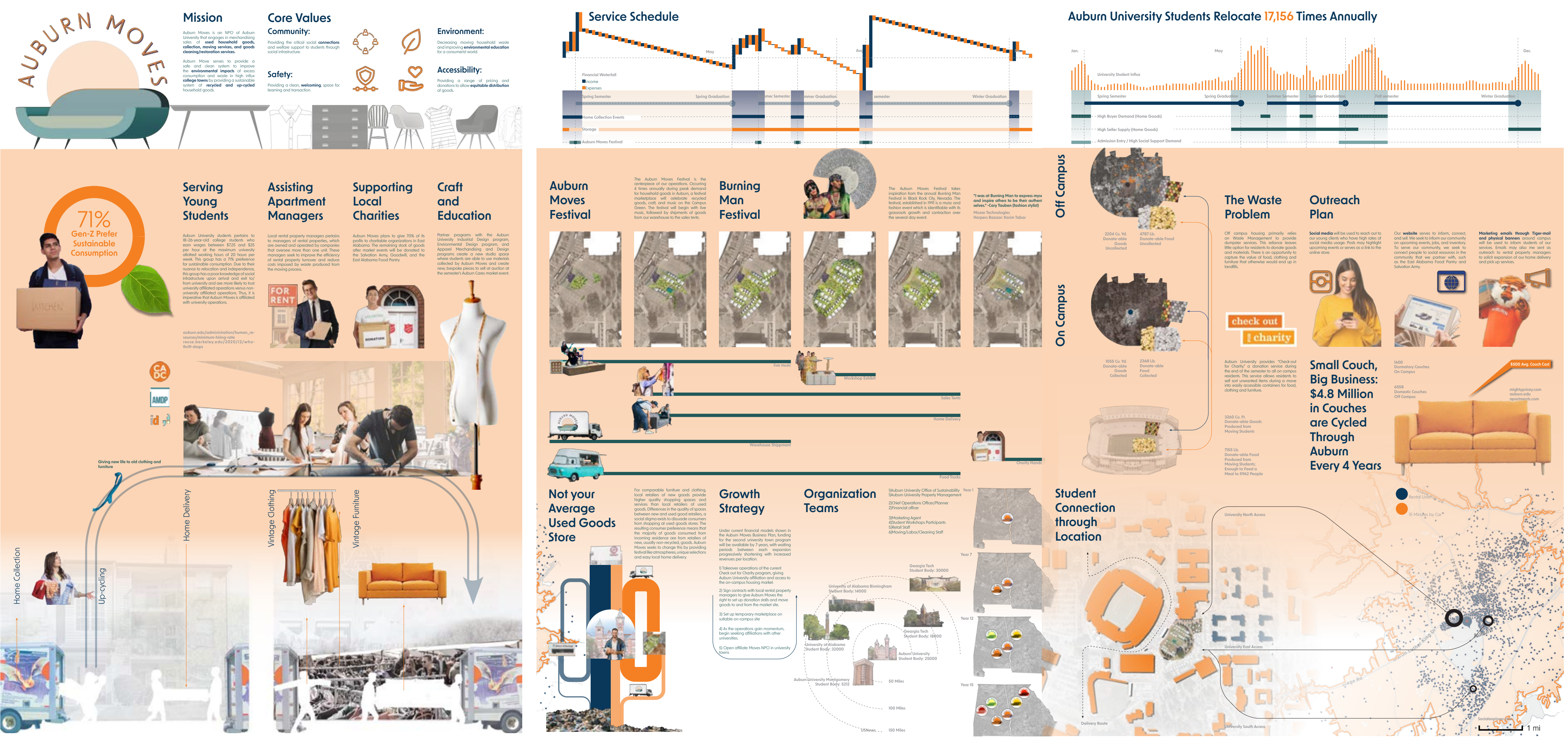
in situ studio
Partner Architects
BLOX
KRUMDIECK A+I
InTerra Design
BLACKSHOP
... and other works
HILLWORKS
Interface FLOR

Jule Collins Smith Museum
Windy Van Hooten Teaching Garden
Creekline Trails at Opelika
Baptist Hill Cemetery Representatives
Lee County Remembrance Project
Mary Ann Casey Art
Barbara Birdsong Designs
Cakeitecture Bakery
Module Housing

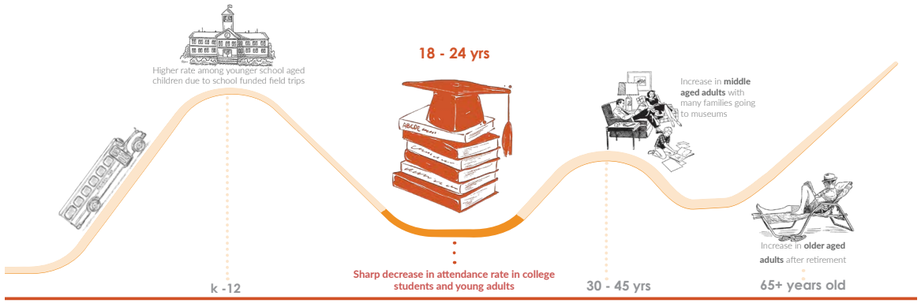
Epicenter
AU College of Business
Auburn Entrepreneurship Program
Auburn Center for Construction
Innovation and Collaboration
Front Porch Initiative
Obstructures + Superunison
EVOKE Studio
City of Auburn Economic Development

Because entrepreneurship and the design of non-physical artifacts (e.g. deployments, programs, business models, and more) are less familiar to students, ENVD 5030 partners with an array of design firms and nonprofits. The course specifically seeks entrepreneurs working in an interdisciplinary manner and those redefining the territory of design in the AEC industry.

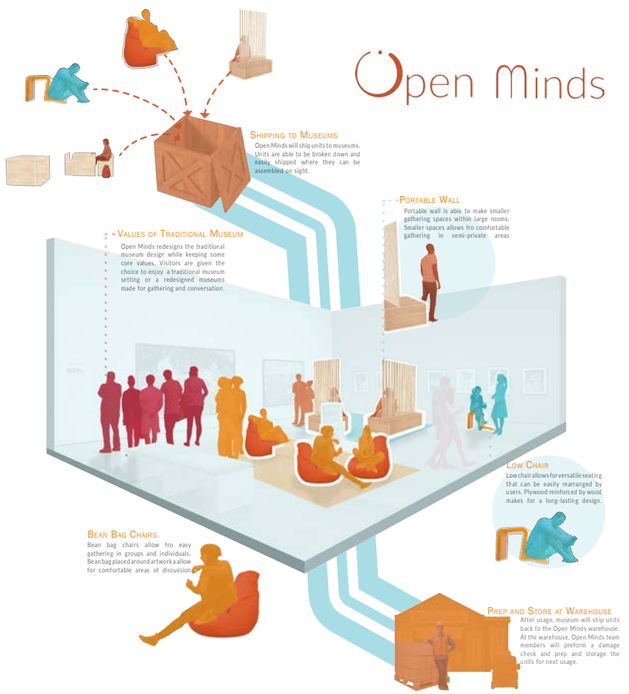




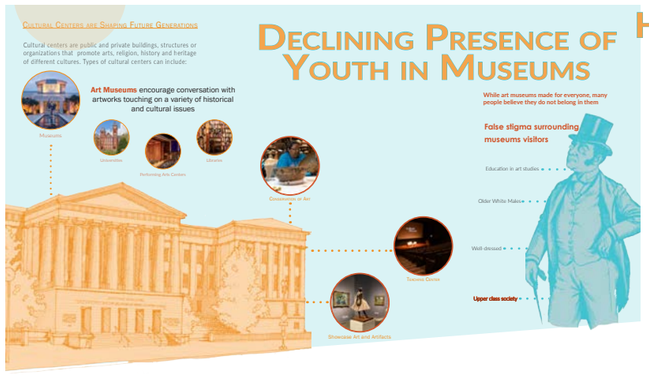
Aubrey Sanders created and branded a non-profit program for gathering and upcycling the mammoth quantity of waste that occurs annually on Auburn's campus synchronous with college moving days. The program integrates technology, industrial design of upcycled products, and festival days in tandem with Auburn's famous Hey Day.

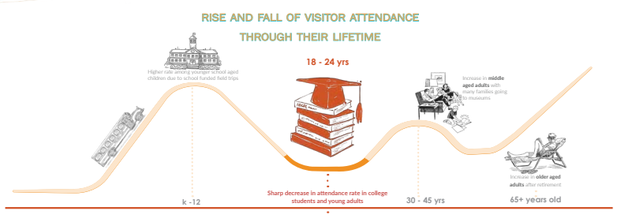


Tia Williams created and branded a non-profit program focused on increasing youth presence in white-box museum spaces. Her design firm partners with existing museums to create spaces and discussions relevant to young adults and college students.



Open Minds





Open Minds

Open Minds provides comfortable spaces for gathering and conversation within the museum setting. Open Minds works with existing museums, galleries and curators to create gathering spaces for younger audiences. Open Minds provides prefabricated portable units and furniture such as wall separators, desk and chairs, low seating options, high tables and much more. In addition to renting fixtures and furniture, Open Minds offers services of exhibition design and consulting, custom design units, educational lectures and internship.

Open Minds focuses on creating paces for gathering that promote a contentious cycle of conversing in the community.

- **Creating continuous of learning and teaching**
- **Establishing lasting relationship**
- **Adaptability in all settings**
- **Appreciation and understanding of diverse cultures**
- **To never leave anyone out.**

By Providing Museums with ...

- **Rent-able pre-fabricated** units which can be customized for the space
- **Internships** offered through Open Minds and partnered museums
- Exhibition Design and/or **consultants**
- **Input design seminars** with the process of exhibition design

Which Gives Communities ...

- **Comfortable gathering spaces** for captivate people to stay
- **Real world experience** in exhibition design for under represented groups
- **Unique** site-specific exhibitions
- **Insight** on the process of exhibition design

FEED THE FAMILY

a full life starts with being full...

Feed The Family is a non-profit, interdisciplinary development group focused on radically addressing the stigma behind food insecurity on Auburn's campus. Every year hundreds of students struggle to maintain a healthy diet and obtain the foods needed for a balanced lifestyle. The lack of a healthy and sustained diet can lead to several lasting probems academically, physically, and mentally. To combat this struggle that so many students face, Feed The Family aims to produce collapsable market-places specifically designed to accomodate the bustling environment of a full campus. Through the use of donations, graphic advertising, and educational programs, biannual marketplaces, mobile market food trucks, and a reimagined campus food pantry will offer the student body the ability to have access to nutrient-rich foods to fuel a life of substance. Through the interdisciplinary combination of architecture in creating portable structures, graphic design in the overall marketing behind the cause, and industrial design in the development of discrete food baskets and products for students, Feed The Family will provide a lasting change to the community of Auburn.

architecture + graphic design + industrial design

AUBURN, LET'S EAT.

WHO WE SERVE

2 in **5** college students battle food insecurity

WHAT WE DO

At Feed The Family, we offer a number of services to Auburn students and the community. The ongoing architectural design of new collapsable and transformable marketplaces has driven our mission of incporporating the built environment into the battle against food insecurity. Additionally, through the use of graphic design elements, the minds behind Feed The Family aim to incporporate a unique user experience to the overall concept of going to a traditional campus food pantry. By graphically designing a more welcoming space for students experiencing food insecurity, color choice of graphics, overall informational text, and branding is considered and specially accounted for.

Furthermore, through the discipline of industrial design, Feed The Family makes it a goal to produce lasting products for students to discretely shop for goods without the shame and embarassment some might feel while reaching out for help. A monthly marketplace will not only reach hundreds of students on campus, but also give students the ability to get involved in numerous different ways. Overall the organization of the marketplace will incporporate several educational graphics and programs that will help bring awareness to a cause that needs to be talked about.

WHERE IT'S WORKING

MOBILE GOOD FOOD MARKET

Mobile Good Food Market, Toronto, Canada (LGA Architectural Partners)

As an interdisciplinary firm, they recognize the interdependence of design decisions within the context of addressing global issues like the stigma arround food insecurity. Throught he creation of their pop-up markets through the use of specially designed market stands and mobile vending equiptment, LGA has transformed what it means to shop for food. As an interdisciplinary firm, they specialize in architecture, urban design, and industrial design--creating final prodicts that not only are aesthetically pleasing but practically changing the world through their response to global issues.

CENTRAL CITY KITCHEN PROJECT

Central City Kitchen Project, Sacramento, California

As a firm specializing in architecture, this group took the initiative to create a space designed specially to meet the needs of students battling food insecurity. Tailored to the needs of college students, HMC Architects developed the specific needs through the Central City Project. Using design to create a welcoming environment for students, the architects behind the project worked to create a space that eliminated the shame and embarassment some students feel when asking for help concerning their nutrional needs.

UNIVERSITY OF BRIGHTON COLLAPSABLE MARKET

London's East Street Market, London, United Kingdom

Students at the University of Brighton were given the assignment of designing a sort of collapsable marketstand for ease and access in creating a pop-up marketplace. The students found that the small-scale architecture project proved beneficial in the lives of the community and those who enjoyed the marketplace frequently. They stated that their findings were so impactful that they planned to utilize the marketplaces in other settings--on campus and for other organizations in need of their work.

A YEAR IN REVIEW

FEED THE FAMILY SEMESTERLY MARKET

AUG	SEPT	OCT	NOV	DEC
JAN	FEB	MAR	APR	MAY

DESIGNING FOR THE FOLLOWING YEAR

DESIGN/PREP	THE EVENT	RECRUITING

LET'S FEED THE FAMILY.

COLLECTION

For the week prior to the event, students organize collection drives throughout campus for the donation of products/food items to be distribute to the Auburn Family. This is an opportunity for local businesses to contact and get involved with the marketing aspect of the event through advertising and the inclusion of their own products.

THE EVENT

The event itself lasts a total of 2 days, and is held on Auburn's greenspace as well as on Samford Lawn. The designs of the collapsable marketplaces give the event a unique experience with each semesterly cycle. Music and lights will make it a welcoming environment that eliminates the shame of asking for help or seeking aid that make students face.

BREAKDOWN

The day after the event is the Breakdown day. The markets ae collapsed and then donated to the city of Auburn to be used for events and other experiences. This portion is an opportunity for students to volunteer even if they were not a part of the design or preparation process. Any leftover food products will be donated to the Campus Food Pantry.

Sarah Grace Price developed a program to be integrated into Auburn's existing food security initiatives. Her program researches student food insecurity, and makes access to food fun through festivals, centralized, bright "pantries," and providing means for those who are experiencing food insecurity to access food similarly to others (reducing shame and stigma).

THE FESTIVAL

WHY?

- live music and student driven creations strike the hearts of the Auburn involvement community
- largest scale project with graphic branding that promotes a celebration
- ability to participate/volunteer in several ways

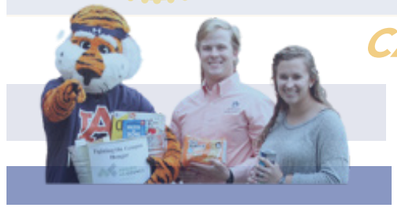
ADDRESSING THE PROBLEM

44% of college students cut the size of their diet because there wasn't enough money for food

15% of college students lost weight because there wasn't enough money for food

20% of college students skipped meals for a whole day because they couldn't afford to eat

46% of college students said they felt uncomfortable asking for help while battling food insecurity



CAMPUS RESOURCES

1 CAMPUS FOOD PANTRY

The Campus Food Pantry is a resource to students on campus who are battling food insecurity. They are run off of a odnation based non-perishable food system. They are located on the lower level of Lupton Hall in the Quad and are open very few hours during the week. While the location is optimal, the resource is not promoted well enough to create a lasting impact. In addition, students can only go and obtain goods once a week. There is no proof of legitamte food insecurity needed whoch makes it inclusive to all students, however, several changes can be made to improve the overall impact.

2 AUBURN CARES

Auburn Cares is an organization through Auburn that benefits students struggling mentslly, physically, and academically. They have seveeral services that they offer, but nameiy one that they implement is a fund for student battling food insecurity to have access to unlimited meal swipes at the campus dining halls. While this is a great resource, a student must g through a referal process from another person to even be considered for the benefits. in addition, a phone call interview is conducted to establish the level of need. in Short, without connections, it is more difficult to obtain.

FLAW IN THE SYSTEM: EXTENSIVE SOCIAL NETWORK NEEDED FOR CHANGE

As illustrated, an extensive social network and specific connections are needed to access the resources offered already by campus. While the resources are effective if known about, the majority of students have no idea that some of these even exist. Awareness and advtertizing has the opportunity to transform a food insecurity intitiative for college students into something more widely known and talked about.

BEING THE CHANGE *THE IMPACT OF SMALL SCALE RESPONSES*

MOBILE MARKET FOOD TRUCKS

The element of shame and embarrassment is a driving force behind the actions of those at Feed the Family. While the festival is a more large scale opportunity for publicity and involvement, smaller scale responses have the ability to make an impact year-round. For example, through the creation of student-designed mobile market food trucks, produce and goods can be made more available to students in a way that is inclusive and fun. The mibile market food trucks are displaced throughout campus once every 2 weeks as an opportunity for students to obtain goods in a way that is on-the-go.

Furthermore, as a source of revenue generation, the food trucks designed by students may also have the ability to be rented and used by local business for on-campus pop-ups-- to sell food that would not normally be offered. By involving the local businesses in this process, not only will Feed the Family be able to generate revenue and investment support, but also foster a greater relationship with the community outside of Auburn University. The potential for lasting pertnerships is one that will have lasting benefits both for the students and businesses that are investing.

FOR STUDENTS BY STUDENTS

SHAME

DISCOMFORT

EMBARRASSMENT

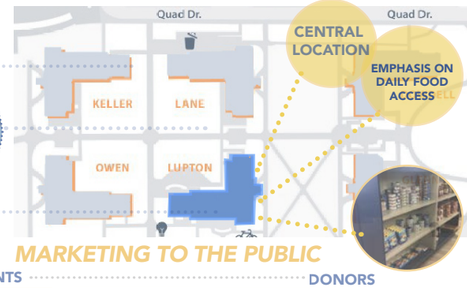
REIMAGINING THE CAMPUS FOOD PANTRY

A redesign of the Campus Food Pantry will solve several existing problems in one project. Designed by students, the location will be transformed into an open space that accomodates more of a "hang out" atmosphere as opposed to the simple food pantry atmosphere that is currently implemented. As it is in the lower level of Lupton, with dark walls, and basic shelves, the shame and embarrassment that most students attling food insecurity face is furthered. By redesiigning the space in a way that promotes companionship and fellowship, a unique opportunity for Auburn is created. There is so much potential in the existing location. By redesigning with light materials and color scheme, the concept of a food pantry itself is revolutionized into something new and effective.

product designed donation stations across campus

no proof needed to obtain goods, inclusive to all

open-door atmosphere to promote fellowship



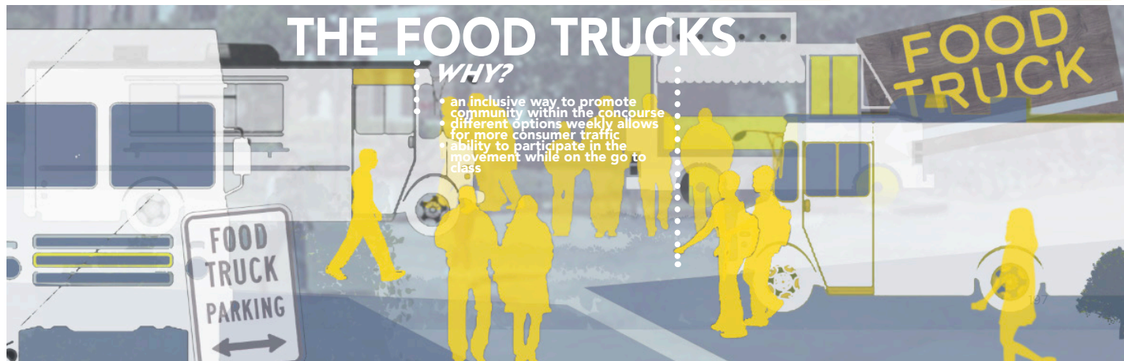
IDEA TO PRODUCT: 3 STAGE PROCESS

FUNDRAISE	DESIGN	BUILD
Fundraising through partnerships and grants	student-led design decisions	building with the support of the community

MARKETING TO THE PUBLIC

CLIENTS			DONORS	
student generated posters/ graphics--not marketed as a food pantry	emphasis on community--supported by local partnerships	university supported takeover days--partnerships with philanthropic groups	opportunity for advertisment on college campus	depicted as invaluable potential to impact students lives --good public image

THE FOOD TRUCKS



WHY?

- an inclusive way to promote community within the concourse
- different options weekly allows for more consumer traffic
- ability to participate in the movement while on the go to class

NON-PROFIT PRODUCT PRODUCTION

DESIGN

- project based decisions created based on constraints and scale of the end product
- emphasis on student-generated ideas with the guidance of the professional staff
- for larger scale (festival) the design process may be more complex as several parts are needed to create the desired end goal
- smaller scale projects designed with more freedom

BUILD/CREATE/PRODUCE

- building process and timeline to vary based on project scale
- students allowed to take part in the final creation of the end product, opportunities for shadowing building teams and profesional staff as they oversee site/final plans
- during the build process, advertisement begins for the end product's completion

ENGAGE

- campus-wide publicity to foster the Auburn family atmosphere and community aspect
- garnering support for the end product creates excitement that destroys the shame felt by students
- by engaing the community entirely, students don't feel singled out and rather are excited to be viewed with everyone else

3 MONTHS	2 MONTHS/ CONTINUOUS	3-4 MONTHS	2 MONTHS/ CONTINUOUS	3-4 MONTHS	CONTINUOUS AFTER PRODUCT

ENGAGING THE COMMUNITY

NEED-BASED PROJECT DECISIONS

timeline to adjust according to the needs of the community and the wishes of the students for which the products are designed

FUNDRAISE

- as a non-profit, fundraising is a year round process
- outreach team responsible for grant prposals and donor relationships
- private investment opportunities and natin wide donations may be opportunities for further outreach outside of Auburn
- emphasis on the mission at hand to promote partnerships with local businesses seeking investment opportnities

ADVERTISE

- emphasizinng the discipline of graphic design, advertisement opportunities will be offered to donors, investors, and local businesses
- creating graphic flyers, infographics, videos, posters, and so much more
- advrtizing the final end product is marketting to students, which is why student involvement is crucial

INSPIRE

- following the creation of the product, Feed the Family hopes to inpire further involvement from students
- greater involvement allows for greater publicity, and greater publicity and image allows for a growing program and the projects produced

BUSINESS STRUCTURE

- BOARD OF DRECTORS
- CEO
- DESIGN TEAM — PROFFESIONAL TEAM — STUDENT TEAM
- MARKETING TEAM — PROFFESIONAL TEAM — STUDENT TEAM
- OUTREACH TEAM — PROFFESIONAL TEAM — STUDENT TEAM

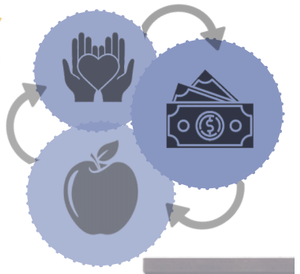
BACKED BY GRANTS/DONORS

HEALTHY FOOD FINANCING INITIATIVE (HFFI)

HFFI aims to build a more equitable food system that supports the health and economic vibrancy of all citizens. HFFI is administered by Reinvestment Fund, a Community Development Financial Institution, on behalf of USDA Rural Development. HFFI provides capacity building and financial resources to eligible healthy food retail projects and organizations with the mission of battling food inecurity nationwide.

FOOD INSECURITY NUTRITION INCENTIVE

The Food Insecurity Nutrition Incentives (FINI) Program provides grants on a competitive basis to projects that help low-income consumers) purchase more fresh fruits and vegetables through cash incentives that further the organizaions goals and mission. By funding organizations that aim to provide consumers with a healthy and accessible diet, FINI has the power to create change through their donor partnersnips.



INVOLVING LOCAL BUSINESSES

1. GRAPHIC ADVERTISEMENT — paid flyers and posters to be displayed
2. SPONSORSHIP — sponsorship to partner with resources in an end product
3. INVESTMENT/ DONOR — donor investment to back the mission fully

Advertizing is key in not only the generation of revenue, but also the relationships between Feed the Family and the surrounding community. by offering advertisement opportunities on all scales, greater relationships can be formed and lasting impacts can be made as further projects are completed. Moreover, the opportunity for students to create graphic advertisements--for the projects and for the businesses investing--allows for a student vision within design

IN THE BEGINNING

INVESTMENT TOTAL: $700,000

DONORS	GRANT FUNDING	OTHER	PRIVATE DONATION	LOCAL BUSINESSES/ PARTNERSHIPS
40%	30%	5%	20%	5%

Item	Estimates
Venue Rental	$20,000
Initial Materials	$130,000
Entertainment	$5,000
Advertising	$5,000
Employee Salary	$500,000
Permits	$10,000
Design Programs/Software	$30,000

1. INITAL DONATION
2. FURTHER INVESTMENT
3. EMPLOYMENT GROWTH FROM WITHIN
4. BEGINNING OF PROJECT DEVELOPMENT

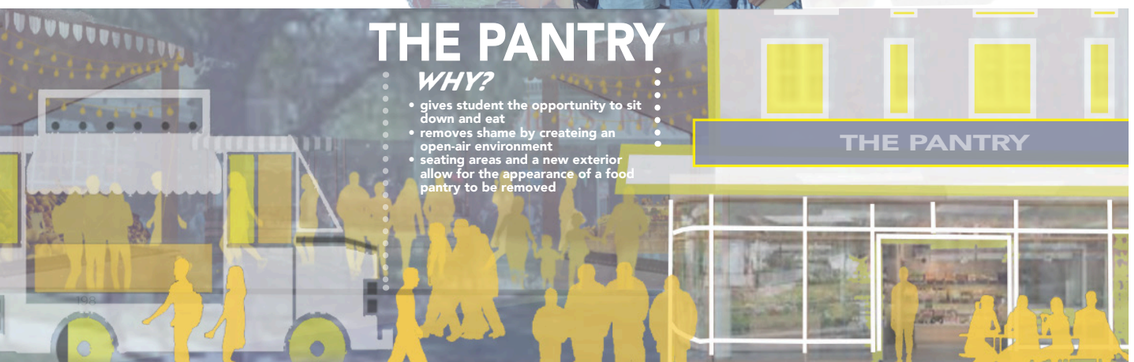
PROJECTED GROWTH

YEAR 1 - YEAR 10

THE PANTRY

WHY?

- gives student the opportunity to sit down and eat
- removes shame by createing an open-air environment
- seating areas and a new exterior allow for the appearance of a food pantry to be removed



Executive Summary

Product

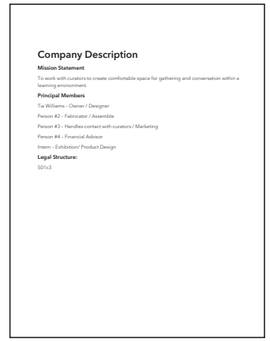
Open Minds provides easily portable and assemble-gallery furniture fixtures for universities and local museums. Every item is made from plywood to allow for light weight and inexpensive construction. All items can be disassembled and shipped easily in moving trucks. Open Minds will ship the products directly to the museums through truck delivery. Until the company expands further, we will work with museums within a 100-mile radius of our warehouse. Once the exhibition is done, Open Minds will pick up the products and preform an on-site inspection for damages. We will then take the products back to the warehouse and prep them to be shipped again.

Customers

The target Audience is to work with curators, specifically curators of universities and local museums. The company wants to provide furniture and fixtures for curators to use in their exhibitions to target college students and young adults.

Future of the Company

There is a decrease in museum attendance, especially art museums, in young adult visitors (18 - 24 years old). We believe there is a highly competitive market for attracting this audience because it increases overall museum attendance and engagement. Our goal is to bridge the gap of decrease in museum attendance by promoting spaces of gathering.



Company Description

Mission Statement

To work with curators to create comfortable space for gathering and conversation within a learning environment.

Principal Members

Tia Williams - Owner / Designer

Person #2 - Fabricator / Assembler

Person #3 - Handles contact with curators / Marketing

Person #4 - Financial Advisor

Intern - Exhibition/ Product Design

Legal Structure:

501c3

Market Research

Industry

Open Minds is a part of the museum and exhibition design industry. Typically, Open Minds will work with curators partnered with universities or local museums within the United States. Larger companies such as Grande Experience and Mecea-wall work on large scale immersive worlds in big tourist areas. Open Minds differs by allowing small scale local museums to use equipment not usually seen in the traditional museum setting.

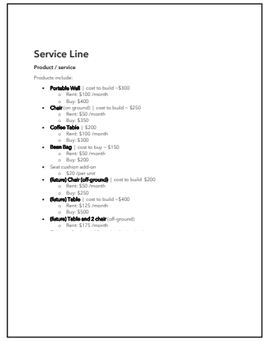
The Museum industry is currently on a recovering incline with a 7.8% market growth since the global COVID-19 outbreak in 2020, however, small scale local museums have experienced budget cuts and lower visitor rates. Around 16% of U.S. museums faced the risk of permanently closing their doors after the initial reopening of the United States in late 2020. By increasing the attendance rate, museums can provide statistics proving the community's need for them.

Detailed Description of Customers

The target customers for Open Minds are curators who work with universities or local museums. Our targeted customers will then create spaces which will appeal to college aged and young adult audience. The curators we work will value the importance of creating a space for the new generation and those after it. This will allow our customers to create gathering spaces outside of their typically projects.

Company Advantages

- Easily Portable Fixtures
- Easy to assemble parts
- Shipping to and pick up at the end
- Parts are fabricated and manufactured in America with high quality wood

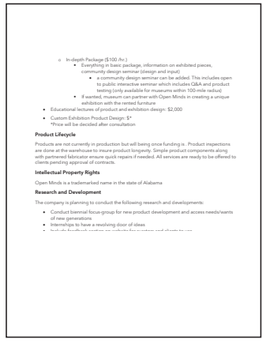


Service Line

Product / service

Products include:

- **Portable Wall** | cost to build ~$300
  - Rent: $100 /month
  - Buy: $400
- **Chair** (on ground) | cost to build ~ $250
  - Rent: $50 /month
  - Buy: $300
- **Coffee Table** | $200
  - Rent: $100 /month
  - Buy: $300
- **Item Peg** | cost to buy ~ $150
  - Rent: $50 /month
  - Buy: $200
- Seat cushion add-on
  - $20 /per unit
- **(future) Chair (off-ground)** | cost to build: $200
  - Rent: $80/month
  - Buy: $250
- **(future) Table** | cost to build ~$400
  - Rent: $125 /month
  - Buy: $500
- **(future) Couch and 2 chair** (off-ground)
  - Rent: $175 /month



- In-depth Package ($100 /hr.)
  - Everything in basic package, information on exhibited pieces, community discussion (designer and input)
    - a community design seminar can be added. This includes open to public interactive seminar which includes Q&A and product testing (only available for museums within 100-mile radius)
  - if wanted, museum can partner with Open Minds in creating a unique exhibition with the rented furniture
- Educational lectures of product and exhibition design: $2,000
- Custom Exhibition Product Design: $*
  *Price will be decided after consultation

Product Lifecycle

Products are not currently in production but will being once funding is . Product inspections are done at the warehouse to insure product longevity. Simple product components along with commonly fabricated screw quick repairs if needed. All services are ready to be offered to Covid preventing approval of contracts.

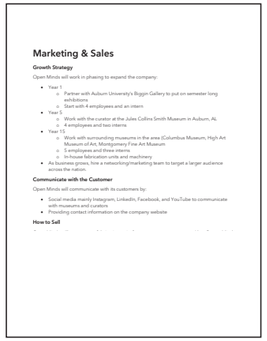
Intellectual Property Rights

Open Minds is a trademarked name in the state of Alabama

Research and Development

The company is planning to conduct the following research and developments:

- Conduct biennial focus-group for new product development and access needs/wants of new generations
- Internships to have a revolving door of ideas



Marketing & Sales

Growth Strategy

Open Minds will work in phasing to expand the company:

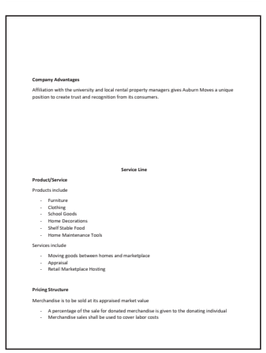
- Year 1
  - Partner with Auburn University's Biggin Gallery to put on semester long exhibition
  - Start with 4 employees and an intern.
- Year 5
  - Work with the curator at the Jules Collins Smith Museum in Auburn, AL
  - 4 employees and two interns
- Year 15
  - Work with surrounding museums in the area (Columbus Museum, High Art Museum of Art, Montgomery Fine Art Museum
  - 5 employees and three interns
  - In-house fabrication units and machinery
- As business grows, hire a networking/marketing team to target a larger audience across the nation.

Communicate with the Customer

Open Minds will communicate with its customers by:

- Social media mainly Instagram, LinkedIn, Facebook, and YouTube to communicate with museums and curators
- Providing contact information on the company website

How to Sell



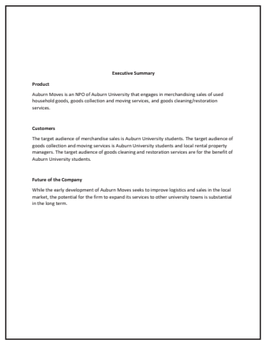
Auburn Moves

Business Plan

Aubrey Sanders, Partner

Created on October 13th, 2022

Edited November 16th, 2022



Executive Summary

Product

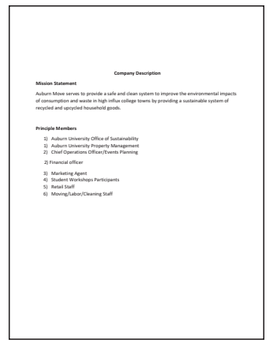
Auburn Moves is an NPO of Auburn University that engages in merchandising sales of used household goods, goods collection and moving services, and goods cleaning/restoration services.

Customers

The target audience of merchandise sales is Auburn University students. The target audience of goods collection and moving services is Auburn University students and local rental property managers. The target audience of goods cleaning and restoration services are for the benefit of Auburn University students.

Future of the Company

While the early development of Auburn Moves seeks to improve logistics and sales in the local market, the potential for the firm to expand its services to other university towns is substantial in the long term.



Company Description

Mission Statement

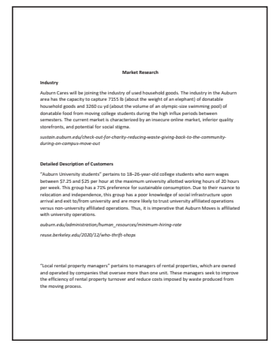
Auburn Move serves to provide a safe and clean system to improve the environmental impacts of consumption and waste in high influx college towns by providing a sustainable system of recycled and upcycled household goods.

Principle Members

1) Auburn University Office of Sustainability
1) Auburn University Property Management
2) Chief Operations Officer/Events Planning

2) Financial officer

3) Marketing Agent
4) Student Workhops Participants
5) Retail Staff
6) Moving/Labor/Cleaning Staff



Market Research

Industry

Auburn Cares will be joining the industry of used household goods. The industry in the Auburn area has the capacity to capture 7315 lb (about the weight of an elephant) of donatable household goods and 3300 cy of (about the volume of an olympic-size swimming pool) of donatable food from moving college students during the high influx periods between semesters. The current market is characterized by an insecure online market, inferior quality storefronts, and potential for social stigma.

custom.auburn.edu/check-out-for-charity-reducing-waste-giving-back-to-the-community-during-on-campus-move-out

Detailed Description of Customers

"Auburn University students" pertains to 18–26-year-old college students who earn wages between $7.25 and $25 per hour at the maximum-umum university allotted working hours of 20 hours per week. This group has a 72% preference for sustainable consumption. Due to their nuance to relocation and independence, this group has a poor knowledge of social infrastructure upon arrival and exit to/from university and are more likely to trust university affiliated operations versus non-university affiliated operations. Thus, it is imperative that Auburn Moves is affiliated with university operations.

auburn.edu/administration/human_resources/minimum-living-rate

movoe.berkeley.edu/2018/12/who-thrift-shops

"Local rental property managers" pertains to managers of rental properties, which are owned and operated by companies that oversee more than one unit. These managers seek to improve the efficiency of rental property turnover and reduce costs imposed by waste produced from the moving process.

Company Advantages

Affiliation with the university and local rental property managers gives Auburn Moves a unique position to create trust and recognition from its consumers.

Service Line

Product/Service

Products include

- Furniture
- Clothing
- School Goods
- Home Decorations
- Shelf Stable Food
- Home Maintenance Tools

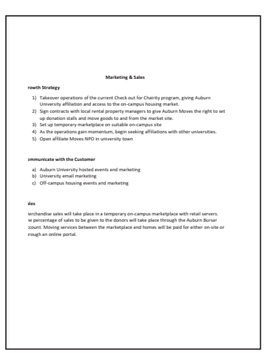
Services include

- Moving goods between homes and marketplace
- Appraisal
- Retail Marketplace Hosting

Pricing Structure

Merchandise is to be sold at its appraised market value

- A percentage of the sale for donated merchandise is given to the donating individual
- Merchandise sales shall be used to cover labor costs



Marketing & Sales

rowth Strategy

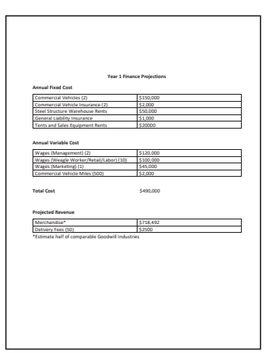
1) Takeover operations of the current Check out for Charity program, giving Auburn University affiliation and access to the on-campus housing market.
2) Sign contracts with local rental property managers to give Auburn Moves the right to set up donation stalls and move goods to and from the market site.
3) Set up temporary marketplace on suitable on-campus site
4) As the operations gain momentum, begin seeking affiliations with other universities.
5) Open affiliate Moves NPO in university town

ommunicate with the Customer

a) Auburn University hosted events and marketing
b) University email marketing
c) Off-campus housing events and marketing

ales

erchandise sales will take place in a temporary on-campus marketplace with retail servers. e percentage of sales to be given to the donors will take place through the Auburn Bursar count. Moving services between the marketplace and homes will be paid for either on-site or nough an online portal.



Year 1 Finance Projections

Annual Fixed Cost

Commercial Vehicles (2)	$150,000
Commercial Vehicle insurance (2)	$2,000
Steel Structure Warehouse Rents	$50,000
General Liability Insurance	$1,000
Tents and Sales Equipment Rents	$30000

Annual Variable Cost

Wages (Management) (2)	$120,000
Wages (Wreath Workers/Retail/Labor) (10)	$100,000
Wages (Marketing) (1)	$45,000
Commercial Vehicle Miles (500)	$2,000

Total Cost $490,000

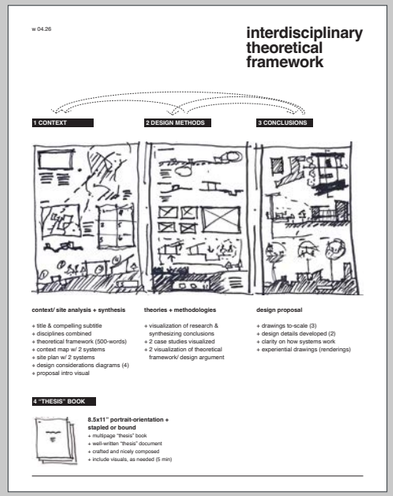
Projected Revenue

Merchandise*	$728,492
Delivery Fees (50)	$2500

*Estimate half of comparable Goodwill Industries

Students were required to develop presentation boards, business cards (branding), and business plans illustrating how the business model reinforces company, organization, system, deployment, and/or program goals. Students presented findings to a group of entrepreneurs from diverse design fields.

ENVD 3100
AUBURN TOWN CREEK PARK


w 04.26

interdisciplinary theoretical framework

1 CONTEXT | 2 DESIGN METHODS | 3 CONCLUSIONS

context/ site analysis + synthesis

+ title & compelling subtitle
+ disciplines combined
+ theoretical framework (500-words)
+ context map w/ 2 systems
+ site plan w/ 2 systems
+ design considerations diagrams (4)
+ proposal intro visual

theories + methodologies

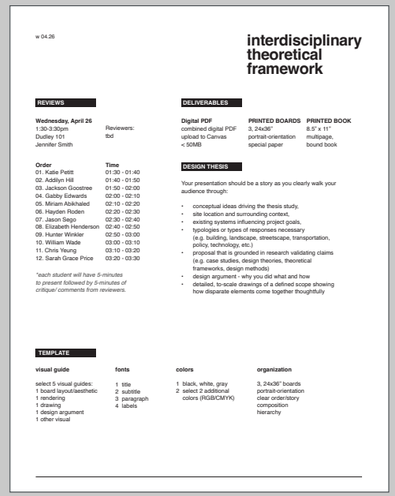
+ visualization of research & synthesizing conclusions
+ 2 case studies visualized
+ 2 visualization of theoretical framework/ design argument

design proposal

+ drawings to-scale (3)
+ design details developed (2)
+ clarity on how systems work
+ experiential drawings (renderings)

1 "THESIS" BOOK

8.5x11'' portrait-orientation + stapled or bound
+ multipage "thesis" book
+ well-written "thesis" document
+ crafted and nicely composed
+ include visuals, as needed (5 min)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interdisciplinary theoretical framework

REVIEWS

Wednesday, April 26
1.30-3.30pm
Dudley 101
Jennifer Smith

Reviewers:
tbd

Order	Time
01. Katie Pettit	01:30 - 01:40
02. Addilyn Hill	01:40 - 01:50
03. Jackson Goostree	01:50 - 02:00
04. Gabby Edwards	02:00 - 02:10
05. Miriam Abikhaled	02:10 - 02:20
06. Hayden Roden	02:20 - 02:30
07. Jason Seijo	02:30 - 02:40
08. Elizabeth Henderson	02:40 - 02:50
09. Hunter Winkler	02:50 - 03:00
10. William Wade	03:00 - 03:10
11. Chris Yeung	03:10 - 03:20
12. Sarah Grace Price	03:20 - 03:30

**each student will have 5-minutes to present followed by 5-minutes of critique/ comments from reviewers.*

DELIVERABLES

Digital PDF	PRINTED BOARDS	PRINTED BOOK
combined digital PDF upload to Canvas < 50MB	3, 24x36" portrait-orientation special paper	8.5" x 11" multipage, bound book

DESIGN THESIS

Your presentation should be a story as you clearly walk your audience through:

- conceptual ideas driving the thesis study,
- site location and surrounding context,
- existing systems influencing project goals,
- typologies or types of responses necessary (e.g. building, landscape, streetscape, transportation, policy, technology, etc.)
- proposal that is grounded in research validating claims (e.g. case studies, design theories, theoretical frameworks, design methods)
- design argument - why you did what and how
- detailed, to-scale drawings of a defined scope showing how disparate elements come together thoughtfully

TEMPLATE

visual guide

select 5 visual guides:
1 board layout/aesthetic
1 rendering
1 drawing
1 design argument
1 other visual

fonts

1 title
2 subtitle
3 paragraph
4 labels

colors

1 black, white, gray
2 select 2 additional colors (RGB/CMYK)

organization

3, 24x36" boards
portrait-orientation
clear order/story
composition
hierarchy

Resilience *The capacity to withstand or to recover quickly from difficulties; toughness. The ability of a substance or object to spring back into shape; elasticity. Community resilience is generally defined as the ability to adapt to, withstand, or rapidly recover from a disaster or catastrophic event.*

Your semester-long studio project focuses on increasing resilience for Town Creek Park sited locally in Auburn, Alabama. While the park offers a variety of amenities including: walking trails, fitness equipment, a seasonal farmer's market, an accessible playground, an educational arboretum, a dog park, restroom facilities, a pavilion, and picnic tables, it is missing more resilient, soft and hard infrastructure. The park floods after heavy rainfall, causing a majority of the site to be inaccessible. Additionally, the pond could be restored and cleaned for habitat and recreation. The expansive park also spans the heavily trafficked, Gay Street, causing the site to be fractured in its accessibility and continuity, and there is opportunity to connect the park to The Jule Collins Smith Museum, the front of Town Creek Cemetery, sounding residences, and Wrights Mill Road Elementary.

Increasing resilience in communities is a multi-faceted effort. It includes but is not limited to:
+ biodiversity, native species, and habitat preservation & restoration
+ sustainable building practices & systems (renewable energy, local materials & labor, etc.)
+ educational opportunities regarding sustainable practices
+ flood and other disaster mitigation efforts through soft and hard infrastructure
+ co-designing with stakeholders and end-users to increase buy-in and meet user needs
+ social equity concerns (affordable housing, quality public space, educational resources, etc.)
+ community centers, amenities, and usable interior and exterior public space
+ creating beautiful, usable, and accessible spaces
+ sustainable, local and effective leadership and management system
+ economic system that is sustainable and benefits the locals

First, decide how you wish to increase resilience at and possibly surrounding Town Creek Park. This requires:
1) a clear "thesis" question that is interdisciplinary by examining 2-3 disciplines simultaneously
2) theoretical framework
3) analysis and conclusions gathered from existing site conditions
4) analysis and conclusions gathered regarding user needs (not just your own interests)

STUDENTS IN ENVD 3100 DEVELOPED LIMITED-SCOPE DESIGN PROJECTS FOR TOWN CREEK PARK, AND PRESENTED WORK TO GUEST REVIEWERS. 3100 IS A 3-CREDIT HOUR HYBRID SEMINAR-LAB.

Sarah Grace Price investigated and designed playscapes integrating wood prefabricated and laminated assemblies, elevated platforms, and existing vegetation. She developed a sculptural dome mega-structure and platforms inspired by the rainforest section: forest floor, understory, and canopy.

MAPPING IT OUT

As displayed in the map to the left thecommon walkways, and zones of children activity have been marked. The white lines signify a common walking trail, and the green zones and dots represent the frequency of children per area. Moreover, the green zones indicate areas of more activity. Pictured in the circles above are two key contrasting areas of the park. As shown to the left, the most public areas are depicted--the renovated traditional playground and the large recreational pavillion for events. In thinking behind the proposed addition to the park's infrastructure, a combination of both public and private atmospheres will be combined.

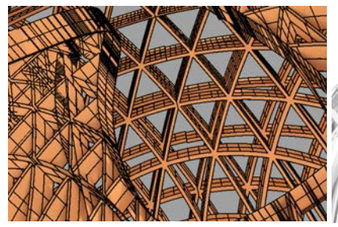
The selected site has the potential to bring children back into nature in a unique way. Because it is located among walking trails, it will have the ability to bring children back into the forested areas of the park. As the finished product will have the ability to transform into two different atmospheres depending on the time of day, two completely unique eperiences will be offered within the same space. In addition, as it is planned to be located alongside one of the forested ponds, several measures will be taken to incorporate elements that will work with the surrounding landscape or an immersive experience unique to Town Creek Park.

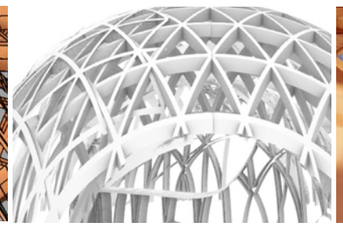
KEY

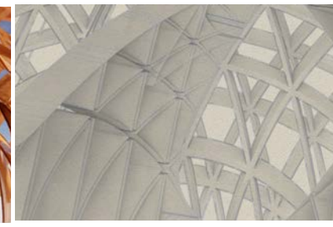
common zones of activity for children

density of activity per area

common trailways



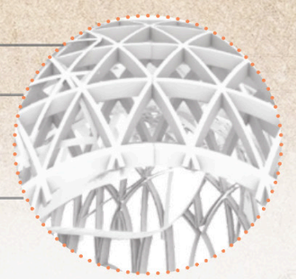




vegetation growth through openings in shells

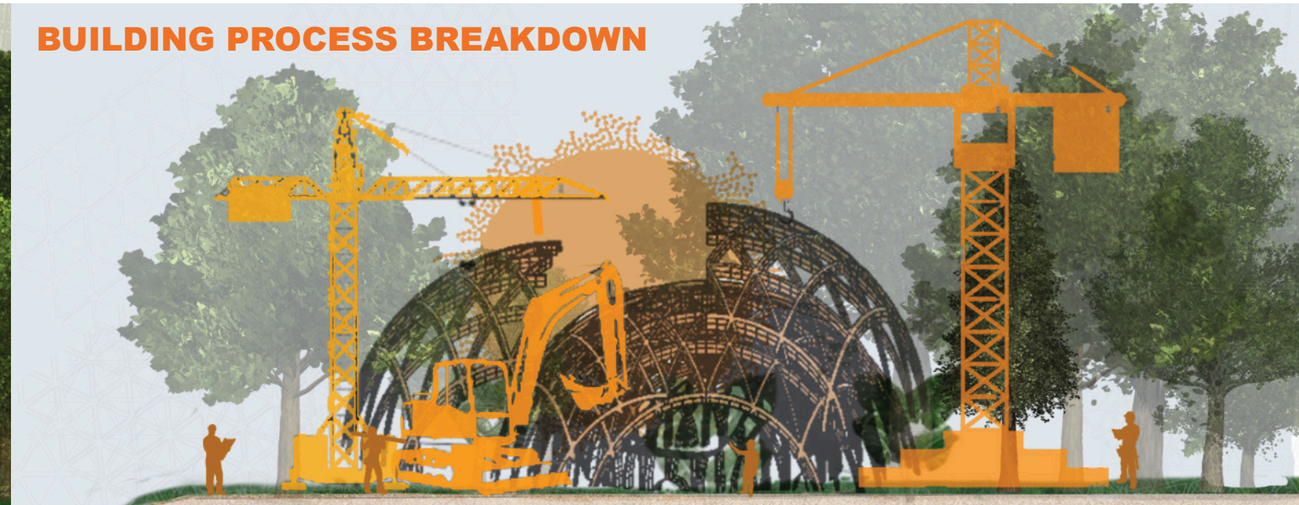
triangular lattice pattern repeated throughout

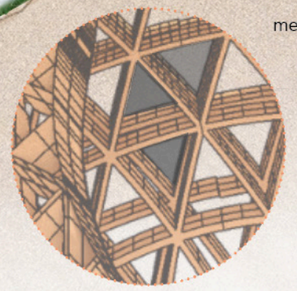
existing and new vegetation woven throughout the shells



SIMPLIFIED SECTION CUT

BUILDING PROCESS BREAKDOWN





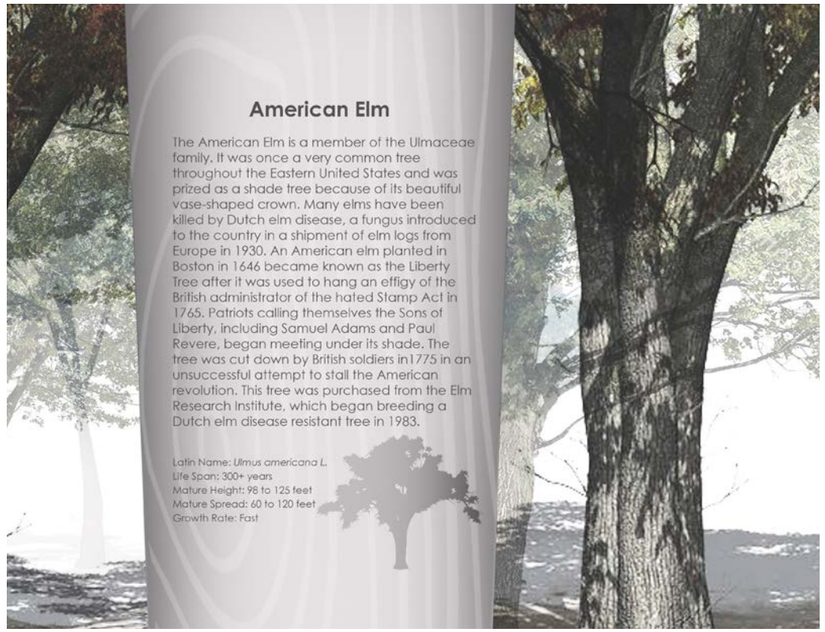
mesh covering in higher elevations

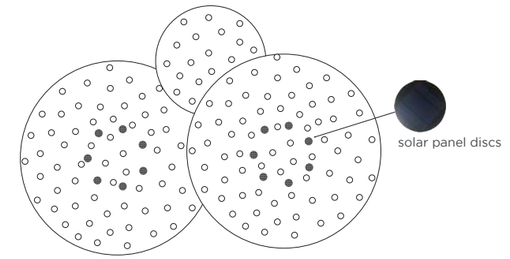
-on both outer and inner shell used for shade if canopy is light and for safety from potential falls

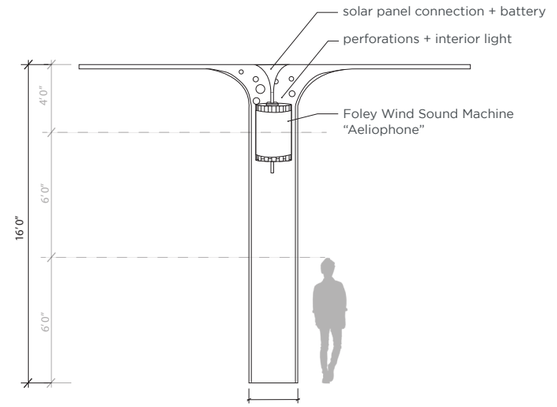
sections of Glulam outer/inner shell structure

2 shells, 8 1/4 sections total

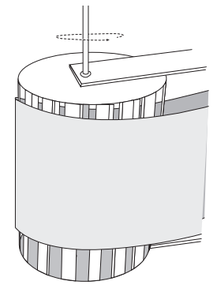
Katie Petitt developed a public art installation highlighting existing landscape qualities at Town Creek Park. This piece showcases the forested landscape, tree canopy, and history of native tree species.

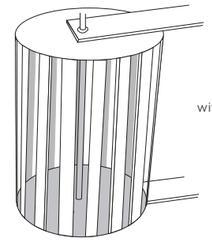




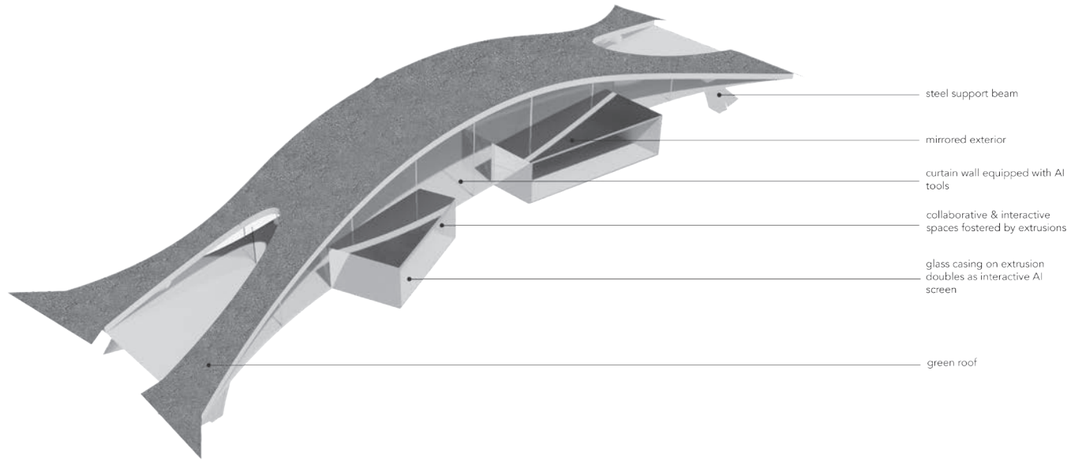


Aeliophone details





Miriam Abikhaled's project for Town Creek Park merges an ecological library with artificial intelligence. This acts as a passive research center for residents and Auburn's land-grant institution.


steel support beam
mirrored exterior
curtain wall equipped with AI tools
collaborative & interactive spaces fostered by extrusions
glass casing on extrusion doubles as interactive AI screen
green roof


N

PROJECT BRIEFS
UNTETHERED TO
PARTICULAR ARTIFACTS

UNFAMIL IAR ASSE MBLAGES

seattle
capstone '22

UNFAMILIAR ASSEMBLAGES in the constructed landscape

unfamiliar :
+ that you do not know or recognize
+ not having any knowledge or experience of something

assemblage :
+ a collection of things; a group of people
+ "…a building or a place is neither object nor a collection of parts—rather it is an assemblage of socio-spatial flows and intersections." - Dovey
+ "the concept of 'assemblage' is translated from the French 'agencement' meaning 'layout', 'arrangement' or 'alignment' – both a dynamic process and a socio-spatial formation." -Dovey

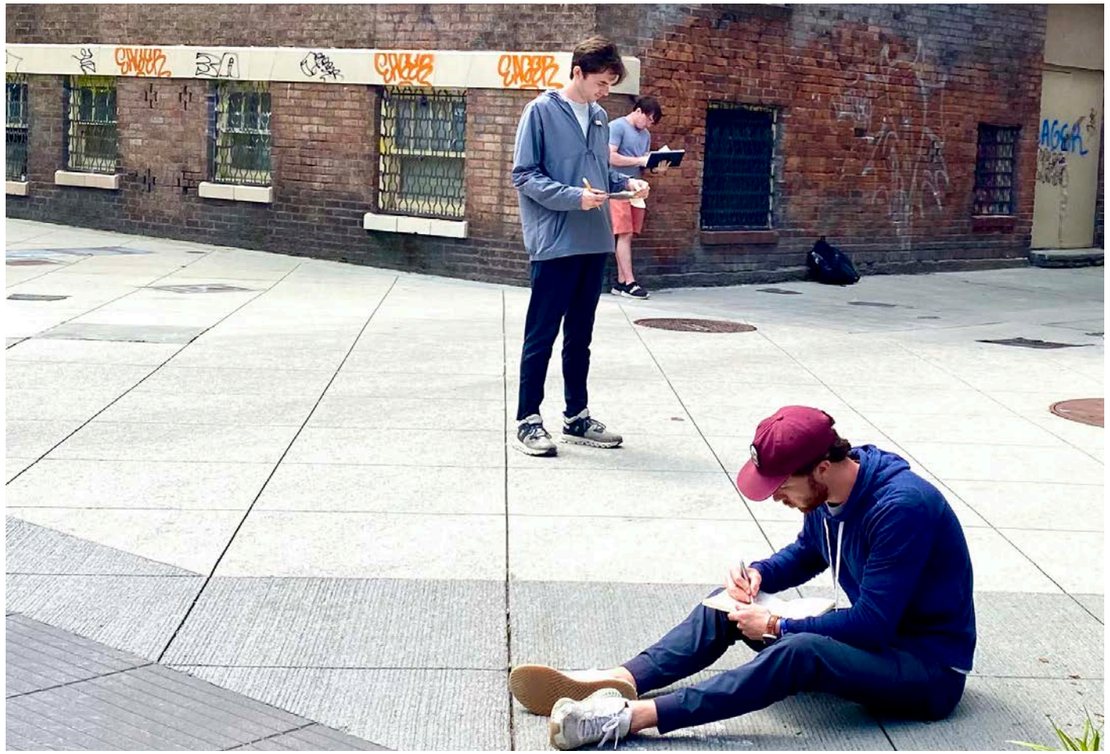
UNFAMILIAR ASSEMBLAGES is the underpinning theme of the 2022 Seattle Capstone. It focuses on the strange-beautiful-productive assemblages within our constructed landscape. No design project is strange in an effort for individual "uniqueness," rather unfamiliar responses are crucial for today's complex challenges as status quo initiatives are interrogated and rethought to provide more successful outcomes. Furthermore, projects must be productive and inspiring at multiple levels if they are to provide catalytic change reshaping eroded lands. 'Assemblage' in this context denotes layering and integration of multiple systems that are reactive and proactive to endemic challenges in the built environment. Successful and sustainable projects respond to identified social, environmental, economic, and political concerns. Project proposals should be unfamiliar as a result of innovative critical thinking. Assemblages are to build-upon and integrate history, ecology, economics, tectonics, human movement/pathways, habitats, programming, and more.

Your site location is in response to Seattle Olympic Sculpture Park by Weiss Manfredi. You must identify an exact site or area that is located on, in or beneath the park, adjacent to it, or at an identified satellite location relating to the existing project. The infrastructure park is our guide for the semester as it is an unfamiliar assemblage of architectural spaces, ecological zones, art installations, soil remediation processes, transportation infrastructure, and equitable public space. It has behaved as a catalyst for rethinking access to the waterfront, remediating post-industrial landscapes, and providing valuable public life in the city-center. To the north it has sparked a green infrastructure corridor along the shoreline. This unfamiliar assemblage has opportunity to transform sites and corridors in-land. Consider how you might extend the site's project goals via: 1. street corridor(s), 2. satellite site(s), 3. within Seattle's topographic section, 4. integrating additional needs within the site footprint. We will study Seattle's Olympic Sculpture Park in-depth and translate ideas beyond the existing project.

For five weeks in ENVD 4100 / Seattle: UNFAMILIAR ASSEMBLAGES you will develop a thesis investigation and design proposal responding to site themes present at Seattle Olympic Sculpture Park by Weiss Manfredi. To do so, you must:

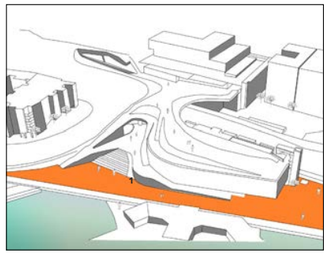
+ develop an investigative thesis study that poses a thematic inquiry and lens to explore that topic in depth in the built environment
+ study the greater Seattle area and Pacific Northwest region
+ conduct site analysis at and surrounding Olympic Sculpture Park and synthesize findings
+ create a theoretical framework for your work and methods for design research
+ present a compelling design proposal responding to identified challenges and design values

Shop at Olsen Kundig

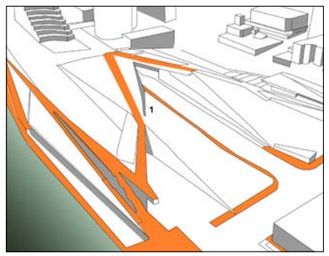


Kiran Bhaley examined the Seattle Waterfront project and proposed integration of wayfinding systems for the visually impaired. Braille, textured pavers, auditory assistance, and more aid navigation in Seattle's tourist district.

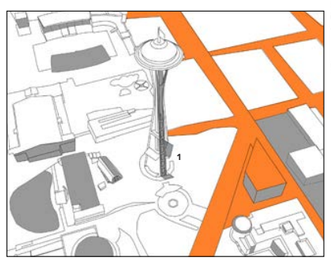
OVERLOOK WALL

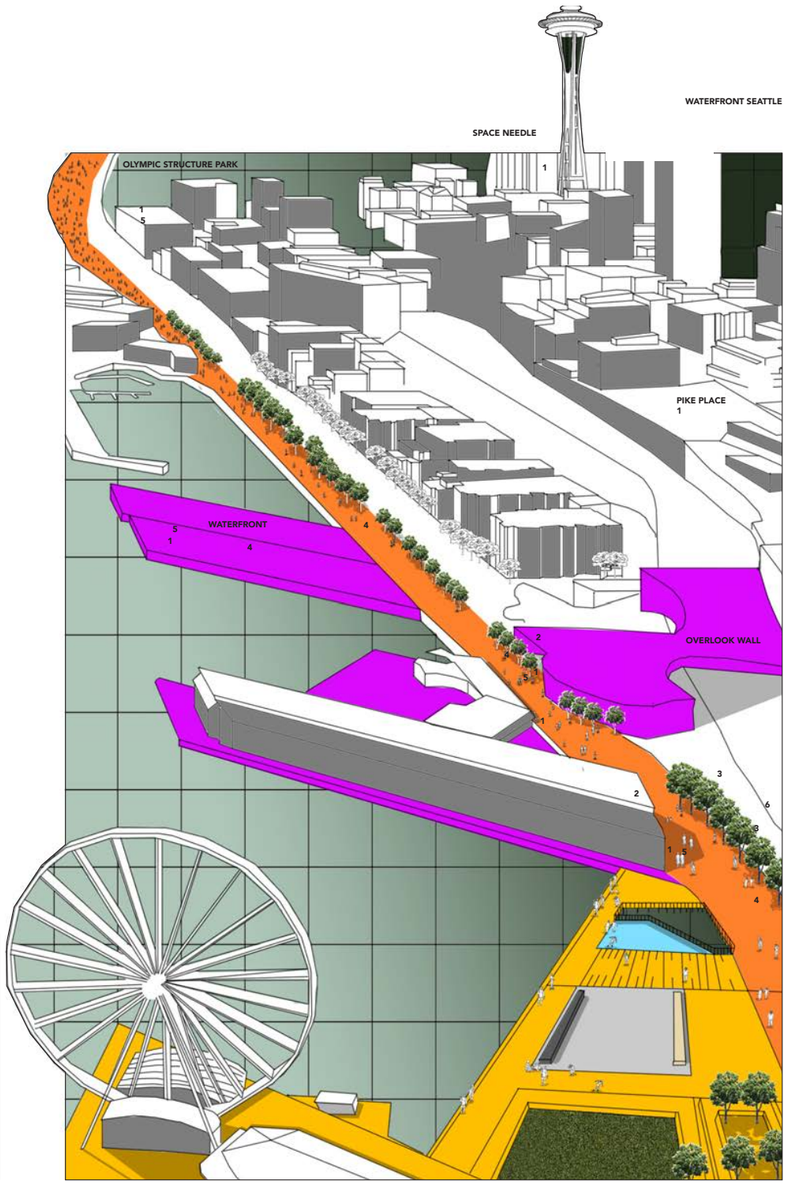


OLYMPIC STRUCTURE PARK



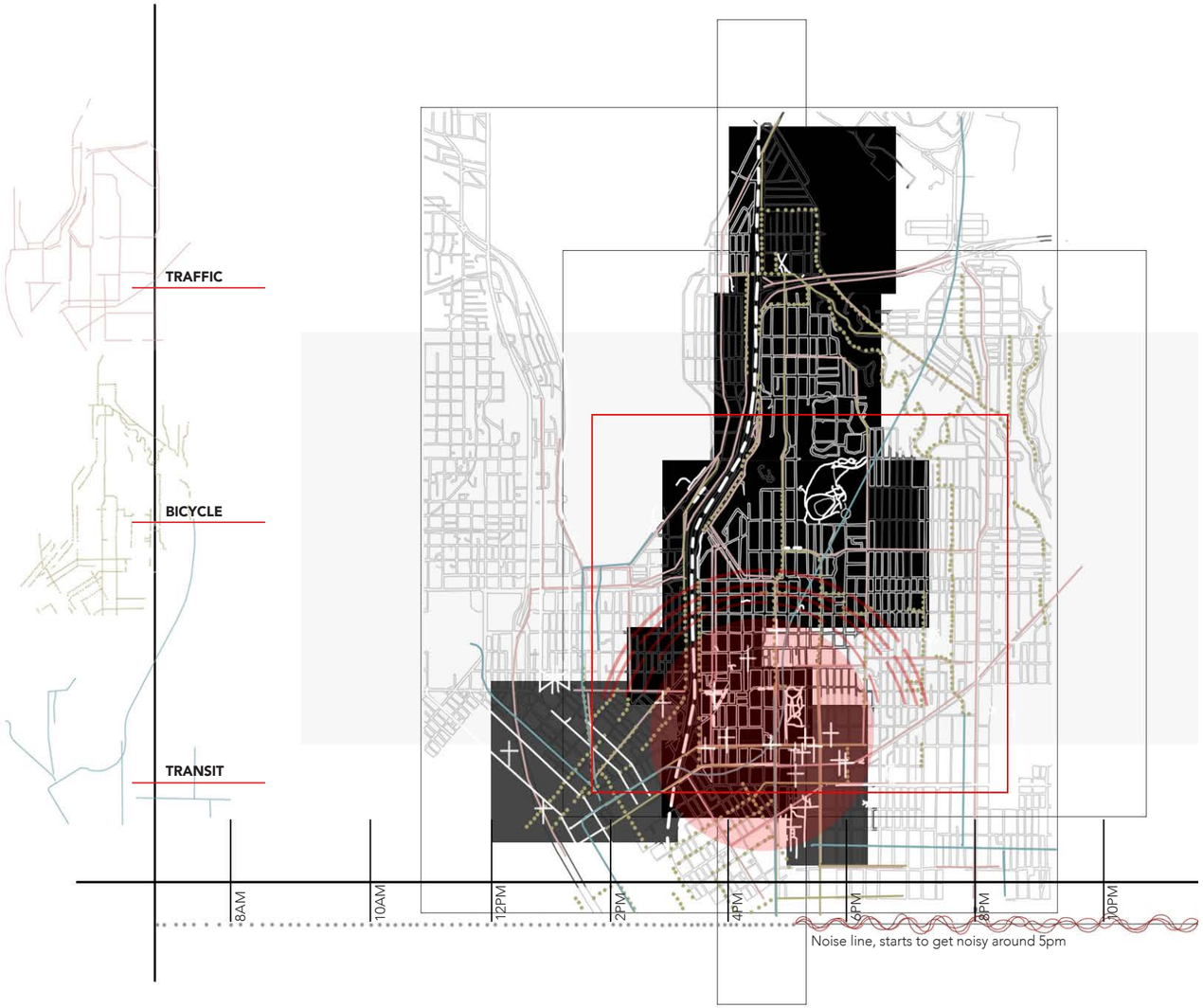
OLYMPIC STRUCTURE PARK

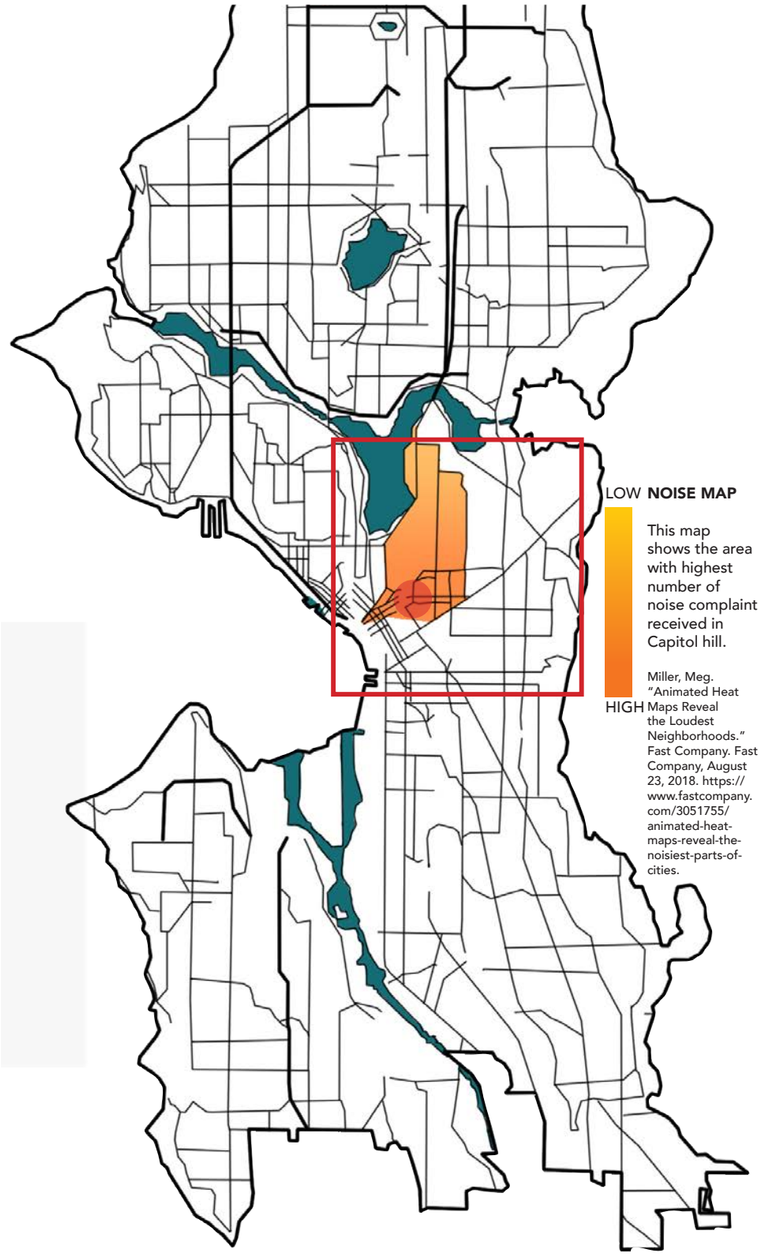




XL : urbanism miles

AUBURN UNIVERSITY





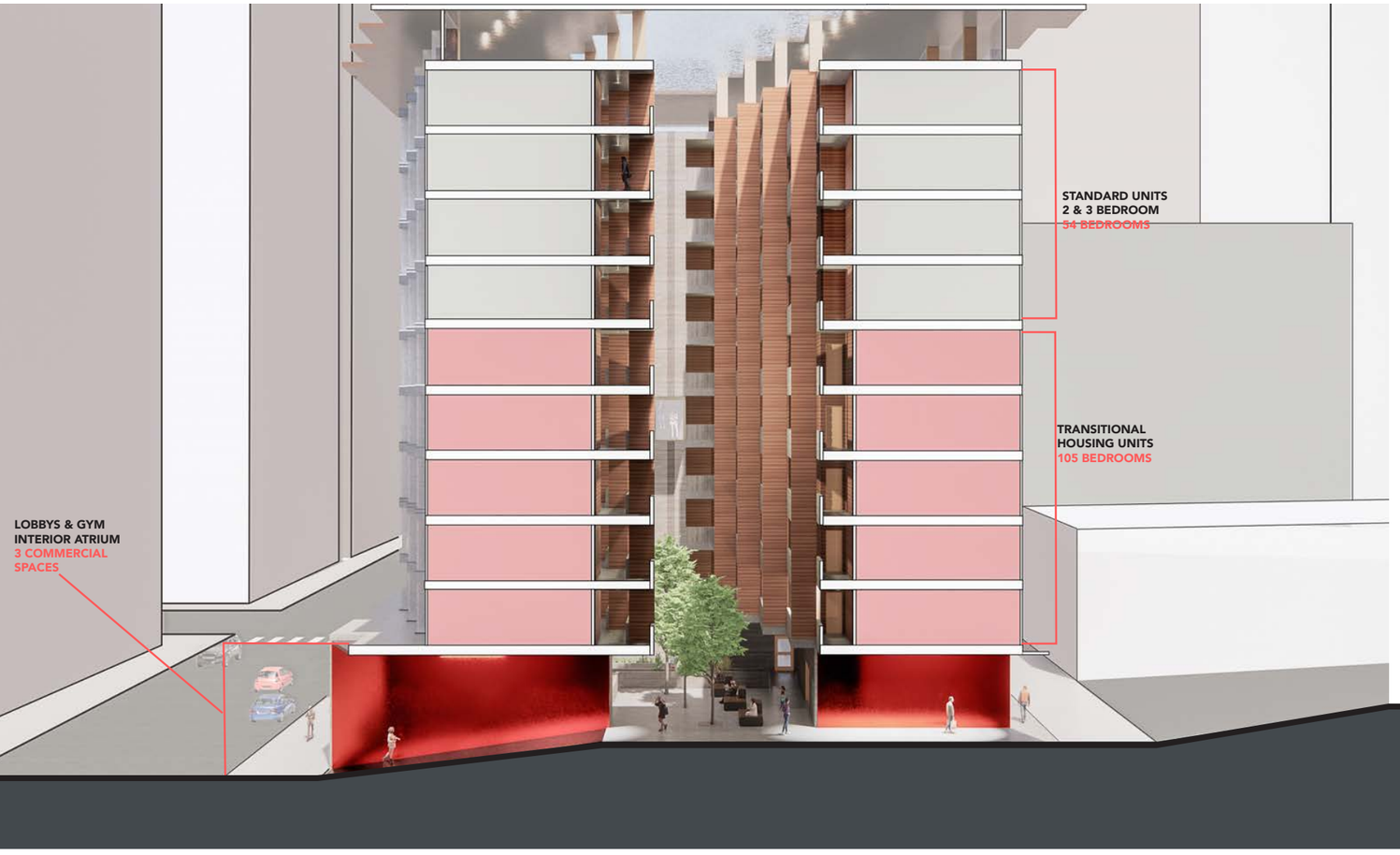
NOISE MAP

This map shows the area with highest number of noise complaint received in Capitol hill.

Miller, Meg. "Animated Heat Maps Reveal the Loudest Neighborhoods." Fast Company. Fast Company, August 23, 2018. https://www.fastcompany.com/3051755/animated-heat-maps-reveal-the-noisiest-parts-of-cities.

Levi Minton investigated homelessness in Seattle, and developed one proposal for mitigating displacement in a north Seattle park. The housing shelter, located where a large tent community exists, is embedded in the landscape offering privacy for occupants as well as park visitors.

Charlie Raulet studied homelessness and lack of affordable housing in Seattle. In response, he proposed a multi-initiative building that provides housing through micro-apartments, a counseling center, and similar services, and offers exceptional views of the surrounding Seattle landscape.



3,707 Emergencies

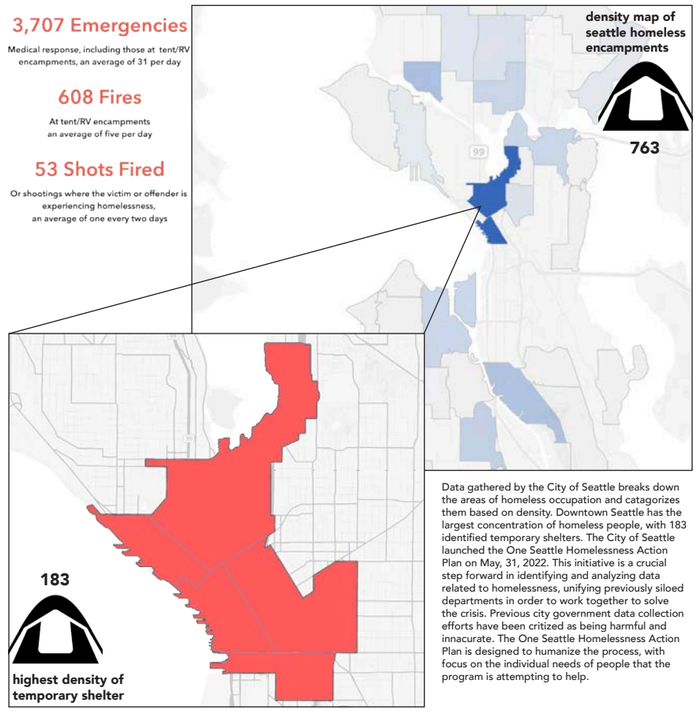
Medical response, including those at tent/RV encampments, an average of 31 per day

608 Fires

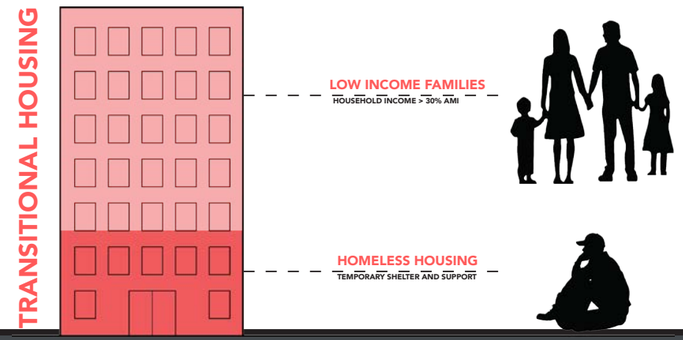
At tent/RV encampments
an average of five per day

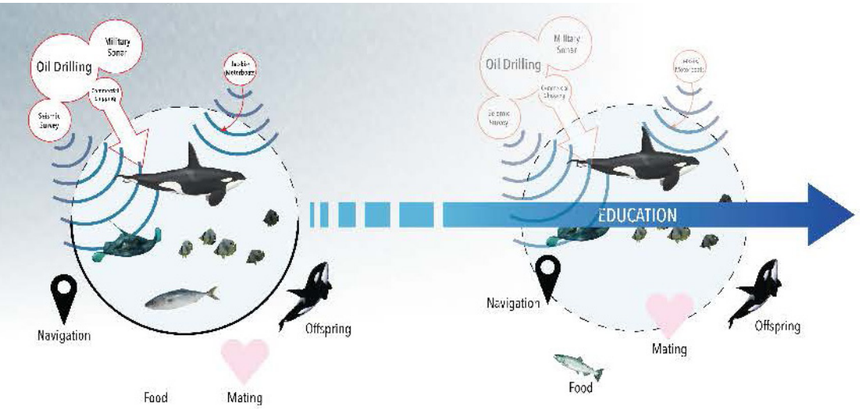
53 Shots Fired

Or shootings where the victim or offender is experiencing homelessness,
an average of one every two days



Data gathered by the City of Seattle breaks down the areas of homeless occupation and catagorizes them based on density. Downtown Seattle has the largest concentration of homeless people, with 183 identified temporary shelters. The City of Seattle launched the One Seattle Homelessness Action Plan on May, 31, 2022. This initiative is a crucial step forward in identifying and analyzing data related to homelessness, unifying previously siloed departments in order to work together to solve the crisis. Previous city government data collection efforts have been critized as being harmful and innacurate. The One Seattle Homelessness Action Plan is designed to humanize the process, with focus on the individual needs of people that the program is attempting to help.





Alexandra Toney examined Elliott Bay marine life, and discovered that vessel noise disrupts breeding and migratory patterns. In response, she developed a sound installation adjacent to an existing pier and in partnership with local museum programs. Forms are driven by sound reverberation.

S : installation feet

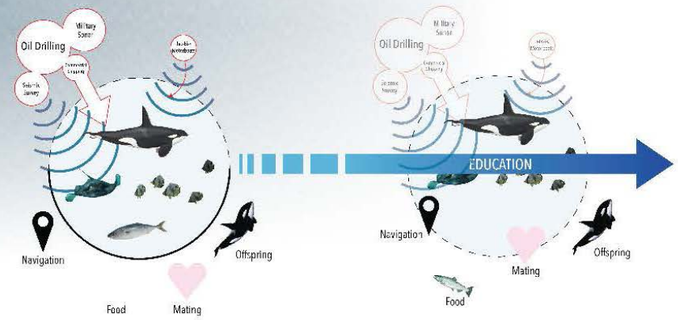
IMMERSING IN SOUND POLLUTION

An Exhibition Space for Experiencing Underwater Sound Pollution

Alexandra Toney | ENVD 4190

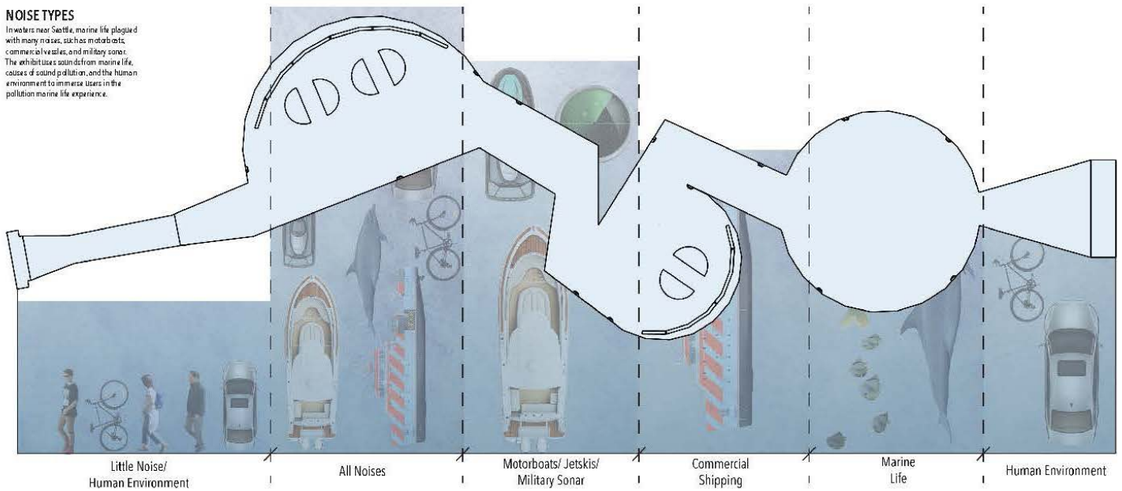
Seattle's waterfront is highly sought after with about 8 million visitors a year but the effects of underwater sound pollution has become an issue(Friends of Waterfront Seattle, 2019). Sound pollution in the ocean is a type of pollution that many waterfront users do not think about because there is little research about it, thus not known to the public. It is any disturbing noise that prevents marine life from mating, eating, navigating, and locating mates and offspring and is caused by seismic survey, oil drilling, military sonar, and commercial shipping. Most solutions are reducing major causes, such as commercial shipping. There are minor causes like motorboats that provide an opportunity for a design intervention(Southern Resident Orca Task Force, 2019). The project looks at creating an immersive sound exhibit on the waterfront. It is free to experience and the lack of operating hours provides many opportunities for users to immerse in the space.

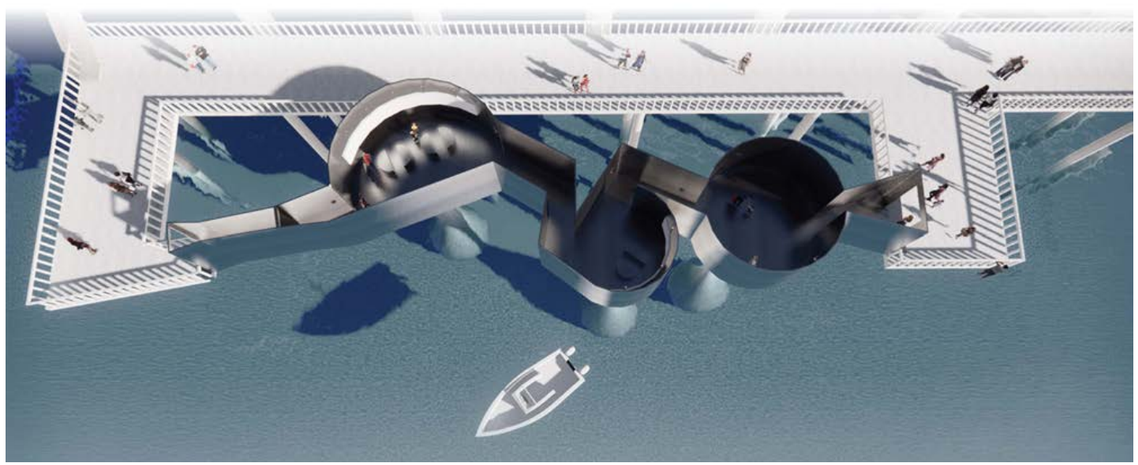
The project site will specifically focus on a structure for Pier 62. Pier 62 is located next to the Seattle Aquarium and down hill from Pike Place. It has an open view of the waterfront and holds different activities, such as yoga and zumba classes. Pier 62 was chosen as a site because it is on the waterfront, next to the Seattle Aquarium, on the path of the recently constructed pedestrian promenade for the Elliott Bay Seawall, and is in line with the upcoming Overlook Park. The structure will take up part of the lower pier of Pier 62 so that it will still retain its waterfront views. The experience looks at allowing the user to "step into the shoes" of local marine life and telling their story. Censored speaker amplifiers are the main part of the exhibit as it is the mode for which users experience sound pollution. Noises will be layered as users move through the space. Aluminum is used for all parts of the structure in order to make use of its highly reflective nature for sound. In addition, light reflecting off the structure provides a disorienting experience to help aid in the impact of the exhibit. Visitors should be curious, uneasy, and hopeful as the experience will provide a story and opportunity for practicing better ways to reduce sound pollution. The exhibit fits well into current educational space in downtown Seattle, such as the Seattle Aquarium and the Pacific Science Center. Both have a ticket price and are limited in programs relating to sound pollution. This project provides an exhibit that can be incorporated with the Seattle Aquarium's Orca Tuesday, where they learn about the endangered orca whale also affected by sound pollution. Overall, the integration of the sound exhibit can be an extension of the aquarium or a stand space for understanding sound pollution.

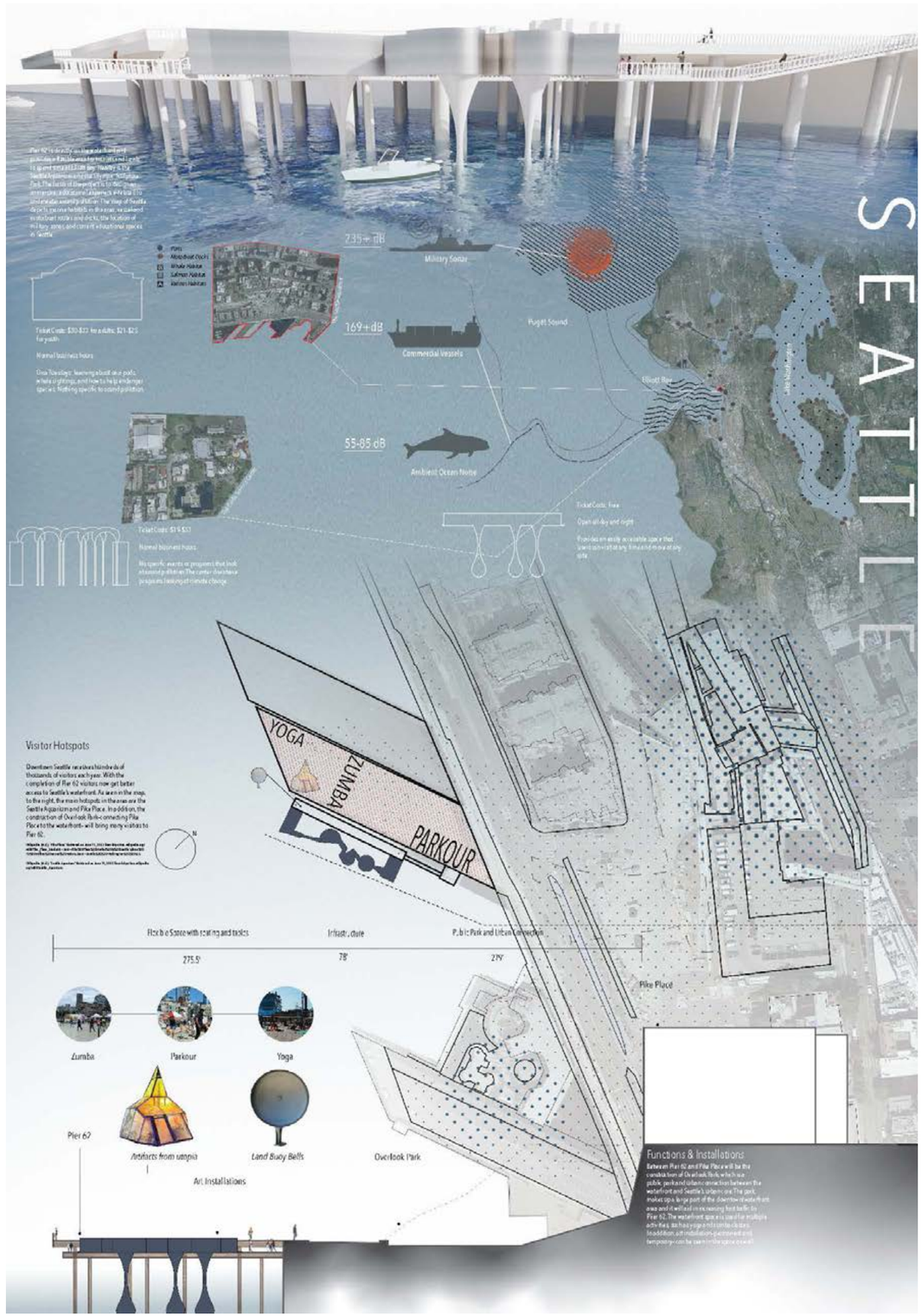


NOISE TYPES

In waters near Seattle, marine life plagued with many noises, such as motorboats, commercial vessles, and military sonar. The exhibit uses sounds from marine life, causes of sound pollution, and the human environment to immerse users in the pollution marine life experience.







resilient response to complexity

Global temperatures have increased by 0.14°F since 1880, and the rate of warming has been exponential over the most recent forty-years. In fact, 2021 was the sixth-warmest year on record based on NOAA's temperature data.[1] Increasing global temperatures can be catastrophic as they cause volatile and longer-lasting weather conditions and can be catalytic for climate "tipping points" – the earth systems' capacity to perpetuate higher temperatures. Volatile and longer-lasting weather conditions are the result of changes in jet stream currents or strong winds above the earth. Larger and longer-lasting hooks in the jet stream develop unstable weather in an area, and as a result, heat waves and droughts are longer while heavy rainfall flooding and storms are more intense. For example, in 2012 a large hook in the jet stream pulled Superstorm Sandy ashore in New Jersey causing record destruction. Additionally, the 2016 Paris Agreement identified multiple tipping points that range from global warming of 1.5- <2°C, and several more tipping points likely to occur at the projected 2-3°C warming. Climate tipping points occur when change in part of the climate system becomes self-perpetuating beyond a thermal threshold, leading to substantial earth system impacts and collapses. It is widely accepted that a temperature threshold is irreversible for approximate 1,000 years. We have already crossed nine tipping points, some of which include increased fires in the Boreal Forest, frequent droughts in the Amazon Rainforest, increased and accelerated loss of Arctic sea ice, and mass die-off of coral reefs. All have significant implications on the livability of the planet.

Arctic sea ice, the Greenland Ice Sheet, and the West Antarctic Ice Sheet are melting at accelerated rates. In fact, the Arctic sea ice is warming twice as fast as anywhere else globally, loosing 10% of ice coverage every 10-years.[2] As ice melts and enters the ocean, sea levels rise impacting coastal cities, in-land waterways, and low-laying regions. Rising seas mean more climate refugees, greater rainfall flooding, habit loss, and higher storm surge. Because the majority of our major cosmopolitan areas are coastal, it is expected that large populations will be directly impacted by sea level rise. Urban populations projected to experience the greatest impacts at 2°C warming include: 40% of Shanghai, 31% of Hong Kong, 39% of Mumbai, 24% of Calcutta, and 13% of New York City, to name a few.[3]

Climate change, unstable weather patterns, rising seas, and unsustainable land-use development practices influence the increasing frequency, intensity, and damage of natural disasters. The challenges in front of us are complex and layered with wicked problems – problems are extremely difficult to solve due to incomplete, contradictory, and changing requirements, some of which may additionally be challenging to observe and measure. There are no single solutions to these problems, and they require systematic and interdependent efforts at various scales and over time.

The following elective courses focus on Smith's research areas regarding resilience and post-disaster housing. In courses focused on disaster housing, students examine housing case studies, administrative strategies for deploying housing types (and vouchers), weather patterns leading to increasing volatility, and they develop a limited-scope housing proposal for a specific site (understanding a paricular environment and culture). Other courses explore urban resilience broadly in terms of climate adaptation, mitigation, and efforts toward social equity. Students research national and international cities and develop layered mappings of social and environmental existing and projected conditions.

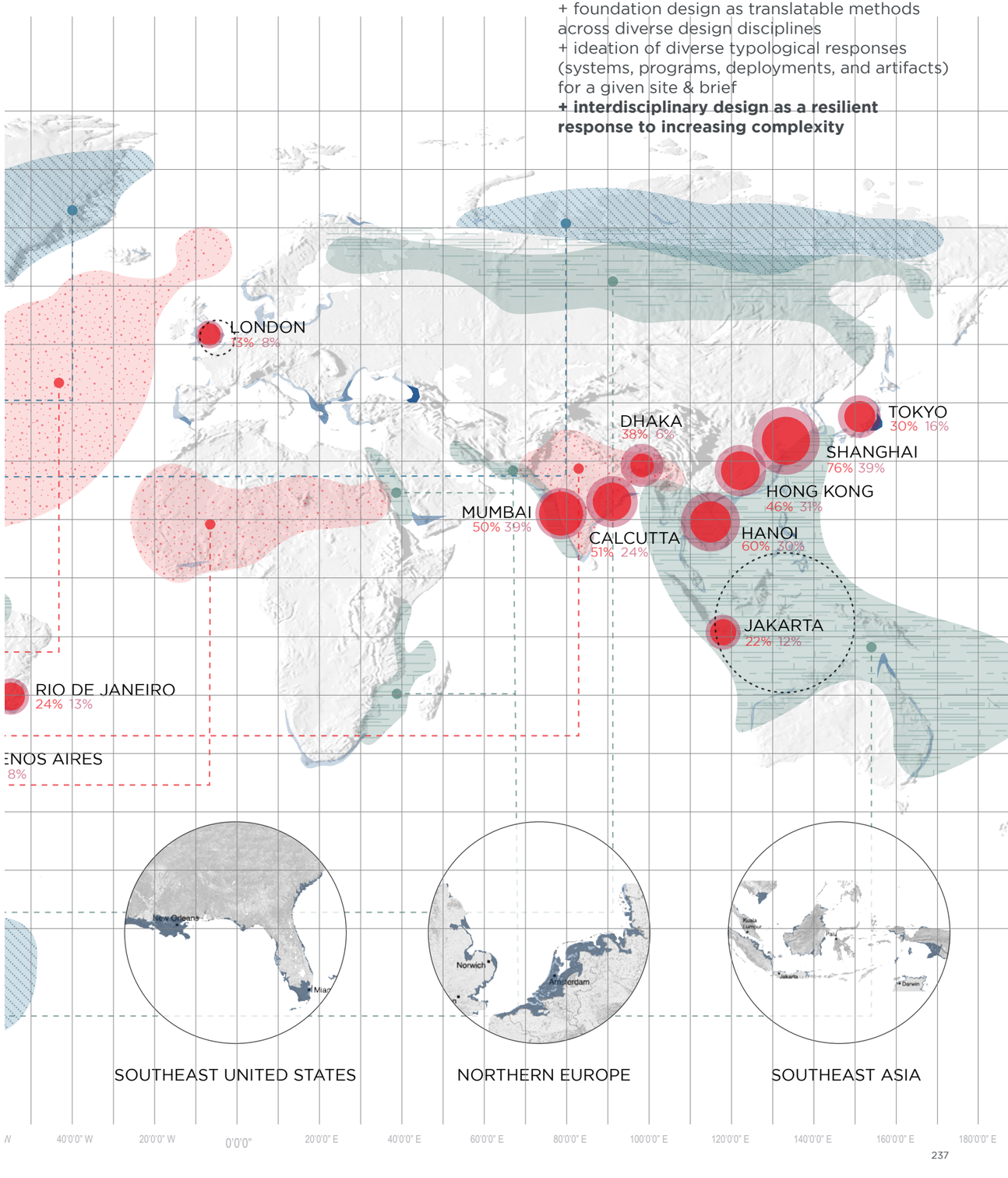
1 "2022 Was World's 6th-Warmest Year on Record." National Oceanic and Atmospheric Administration. Accessed June 17, 2023. https://www.noaa.gov/news/2022-was-worlds-6th-warmest-year-on-record#:~:text=The%20planet%20continued%20its%20warming,for%20Environmental%20Information%20(NCEI).

2 "Why Are Glaciers and Sea Ice Melting?" WWF. Accessed June 17, 2023. https://www.worldwildlife.org/pages/why-are-glaciers-and-sea-ice-melting.

3 Strauss, Benjamin. "Mapping Choices - Carbon, Climate, and Rising Seas Our Global Legacy." Mapping Choices, November 2015. sealevel.climatecentral.org.

Three primary tenants of the Environmental Design curriculum include:

+ foundation design as translatable methods across diverse design disciplines
+ ideation of diverse typological responses (systems, programs, deployments, and artifacts) for a given site & brief
+ interdisciplinary design as a resilient response to increasing complexity



boston

boston is strong. boston is resilient.

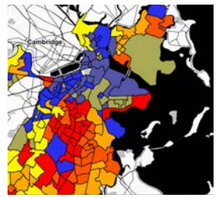
boston is strong. boston is resilient.

subway transit line map: note vast areas with poor access to public transit lines

bike path map: paths oriented toward recreation along the coast rather than alternative commute

supermarket locations: note the large distance between markets and areas with poor access

vacant parcel value: deeper red indicates higher land value

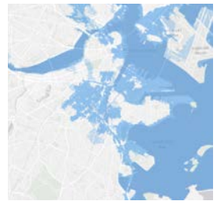


neighborhood effect on property value: blue indicates extreme positive effect, red negative

social vulnerability: people of color

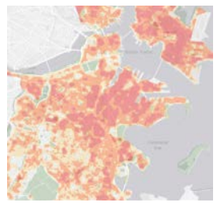
social vulnerability: low income

2050: 10% and 1% annual coastal flood risk



2070: 10% and 1% annual coastal flood risk

stormwater flooding: medium and long term



heat: daytime land surface temperature

the city of boston is facing many shocks and stresses, both chronic and acute, and both social and climatological.

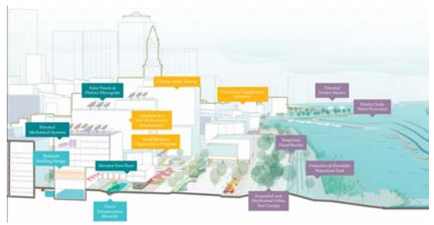
social and systemic:
economic and racial inequality
neighborhood connectivity
aging and inadequate infrastructure

climatological:
coastal and riverline flooding
storwater flooding
extreme heat

One of the most critical issues impacting boston is the isolation of lower income and non-white communities. large portions of the city lack convenient access to public transit, super markets, bike paths, and more. as a result, these communities struggle to cope with acute shocks due to the lack of redundancy. people are forced to depend upon one transit line, one super market, etc. improved infrastructure could potentially address this issue.

right: this map depicts boston's growth since its establishment in 1630. the original land mass of the boston harbor as of 1630 can be seen in grey, while the black outline shows the current shores of the city. marshes, salt flats, and open water were gradually filled to make additional space for the city.

below: boston is known for brick. brick townhouses and apartment blocks stretch for miles throughout the city. the typical urban bostonian home is a brick townhouse sitting on a 25 foot wide lot, with the first floor raised 5 feet from the ground and a basement sitting below. brick has been the material of choice in boston for many reasons, including its excellent resistance to severe weather, insulative properties, and fire resistance. additionally, the densely packed homes limit wintertime heat loss by having only two exterior walls, while large windows bring in sunlight and can provide ventilation. this is valuable in a climate which has a 100 degree seasonal difference.



right: the hedwige prosper-project is a case study in which land was cleared of development and set aside as a tidal flood plain. the levy that once followed the edge of the river now forms inland of the water. this has allowed a large expanse of land to return to marshland, while also increasing the length of the levy. water slowly fills the tidal flood plain before reaching the levy, providing protection for the city of antwerp.
left: strategic resiliency plan for boston which addresses several of the climatic factors threatening the city. the plan follows a similar strategy to hedwige prosper-project, setting aside land that is closest to the water as a boundary area for the city. this allows water to soak in to the ground before reaching infrastructure. historically, the city has enacted this before with the construction of the charles river esplanade, which serves as a buffer for the back bay neighborhood.

ENVD 4970
RESILIENCE MAPPING

PROJECT 1 – CITY RESILIENCE

Brief:
For your initial project you will investigate challenges and opportunities that face various U.S. cities regarding resilience to disasters, climate change and/or sea level rise. Resilience represents the capacity to bounce back socially, economically, environmentally and politically, and a city can only do so by successfully preparing for and responding to acute shocks and chronic stresses. After selecting a U.S. city from the list below, research the city in regard to:

1. Types of human and/or natural disasters (i.e. earthquakes, terrorism, hurricanes, etc.)
2. Types of chronic stresses (i.e. lack of affordable housing, food deserts, unreliable transportation, etc.)
3. Topographic map noting possible flooding, seismic concerns and/or landslides
4. Climate zone map with conclusions about how the region effects the built environment (i.e. untreated wood in hot, humid climates is prone to mold; thermal mass in hot, arid climates increases thermal comfort, etc.)
5. Map of typical wind speeds and seismic zones, if relevant
6. Historic urban form from initial settlement and land-use development patterns noting relevance
7. Types of vernacular architecture
8. Demographics including wealth/income distribution, ethnicity and other relevant subjects.

This list is a minimum, and you may find additional information that is pertinent to your city. For instance, it may be helpful to note native ecology, available energy resources (i.e. PVs and annual days of sunlight, geothermal, wind speeds and types of turbines, etc.) habitat and species migration patterns, locally available materials, and so forth. All information should be represented visually with *supplemental* verbal information. Be consistent with scale of maps, diagrams and drawings for effective comparison between types of information. If national maps are used, maintain size and consistency between maps. If city-scale maps are used, maintain size and consistency between maps. Finally, include one case study of best practice in mitigating disasters and/or increasing resilience that is relevant for your city. The case study may be within your city or a relevant national or international example.

Cities: (select one from list below)

1.	Boston,	MA	6.	Minneapolis,	MN	11.	San Francisco,	CA
2.	Denver,	CO	7.	Norfolk,	VA	12.	Seattle,	WA
3.	Houston,	TX	8.	New Orleans,	LA	13.	Wichita,	KS
4.	Los Angeles,	CA	9.	New York City,	NY			
5.	Miami,	FL	10.	Omaha,	NE			

Work should be compelling and well-organized on a *printed* 20"x30" poster, oriented portrait.

Evaluation Criteria: (20% of overall grade)

Thorough research……..30%
Research is robust and relevant
Proper citation used
Credible sources used

Visual communication……30%
Layout and graphics are legible and compelling
Minimal images used in preference for maps, graphs and diagrams

Thoughtful Synthesis of information……30%
Interesting conclusions formulated from research gathered and overlaying information

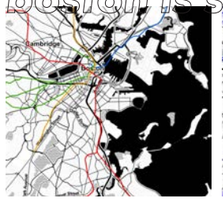
Verbal presentation……10%
Presentation is clear and easy to follow
Presenter engages audience

100%

boston

boston is strong. boston is resilient.

boston is strong. boston is resilient.

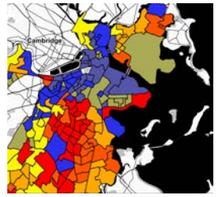


subway transit line map: note vast areas with poor access to public transit lines

bike path map: paths oriented toward recreation along the coast rather than alternative commute

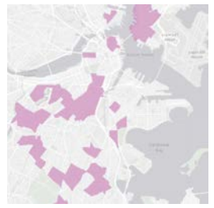
supermarket locations: note the large distance between markets and areas with poor access

vacant parcel value: deeper red indicates higher land value



neighborhood effect on property value: blue indicates extreme positive effect, red negative

social vulnerability: people of color



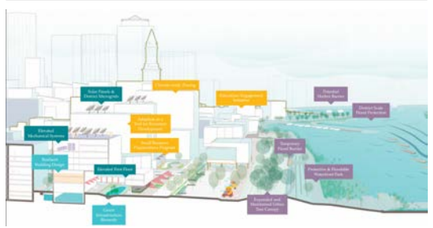
social vulnerability: low income

2050: 10% and 1% annual coastal flood risk

2070: 10% and 1% annual coastal flood risk

stormwater flooding: medium and long term

heat: daytime land surface temperature



the city of boston is facing many shocks and stresses, both chronic and acute, and both social and climatological.

social and systemic:
economic and racial inequality
neighborhood connectivity
aging and inadequate infrastructure

climatological:
coastal and riverline flooding
storwater flooding
extreme heat

One of the most critical issues impacting boston is the isolation of lower income and non-white communities. large portions of the city lack convenient access to public transit, super markets, bike paths, and more. as a result, these communities struggle to cope with acute shocks due to the lack of redundancy. people are forced to depend upon one transit line, one super market, etc. improved infrastructure could potentially address this issue.

right: this map depicts boston's growth since its establishment in 1630. the original land mass of the boston harbor as of 1630 can be seen in grey, while the black outline shows the current shores of the city. marshes, salt flats, and open water were gradually filled to make additional space for the city.

below: boston is known for brick. brick townhouses and apartment blocks stretch for miles throughout the city. the typical urban bostonian home is a brick townhouse sitting on a 25 foot wide lot, with the first floor raised 5 feet from the ground and a basement sitting below. brick has been the material of choice in boston for many reasons, including its excellent resistance to severe weather, insulative properties, and fire resistance. additionally, the densely packed homes limit wintertime heat loss by having only two exterior walls, while large windows bring in sunlight and can provide ventilation. this is valuable in a climate which has a 100 degree seasonal difference.

right: the hedwige prosper-project is a case study in which land was cleared of development and set aside as a tidal flood plain. the levy that once followed the edge of the river now forms inland of the water. this has allowed a large expanse of land to return to marshland, while also increasing the length of the levy. water slowly fills the tidal flood plain before reaching the levy, providing protection for the city of antwerp.
left: strategic resiliency plan for boston which addresses several of the climatic factors threatening the city. the plan follows a similar strategy to hedwige prosper-project, setting aside land that is closest to the water as a boundary area for the city. this allows water to soak in to the ground before reaching infrastructure. historically, the city has enacted this before with the construction of the charles river esplanade, which serves as a buffer for the back bay neighborhood.

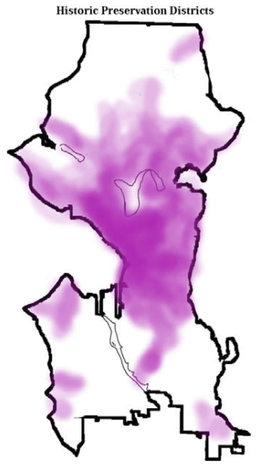
Seattle Washington

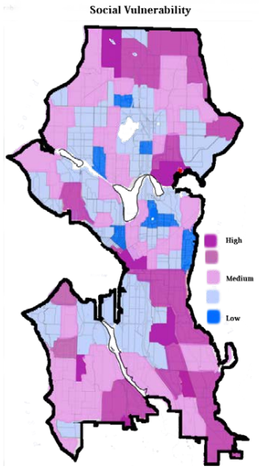
HELEN KATHERINE SCHANBACHER

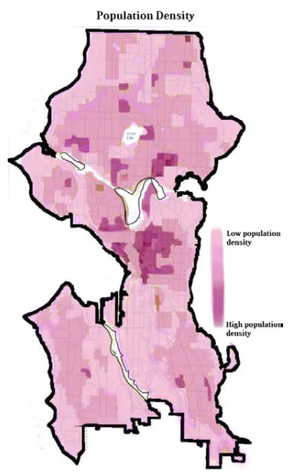
Opposite: Benjamin Luebkemann

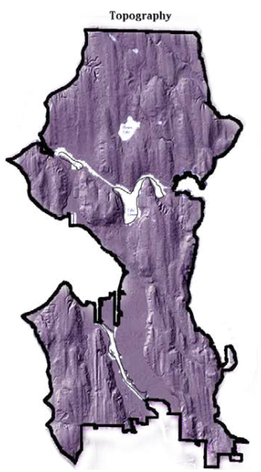
Primary Hazard	Earthquakes	Landslides	Volcano Hazards	Tsunamis and Seichs	Disease Outbreaks	Civil Disorder	Attacks	Cyber Security	Transportation Incident	Fires	Haz-Mat Incidents	Infrastructure Failure	Power Outages	Excessive Heat	Flooding	Snow and Ice	Water Shortages	Windstorms
Earthquakes																		
Extreme Heat																		
Fires																		
Flooding																		
Landslides																		
Extreme Cold																		
Tsunamis and Seiches																		
Volcanoes and Ahars																		
Windstorms																		

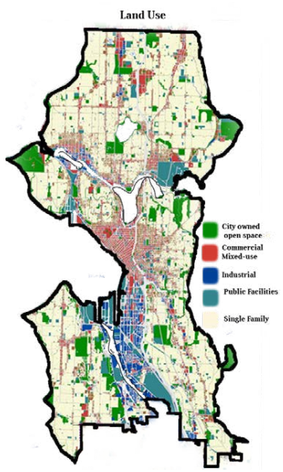
UNDERSTANDING THE MAJOR THREATS:

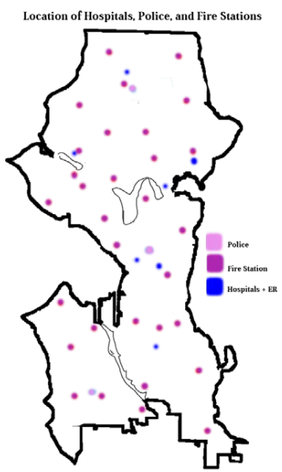






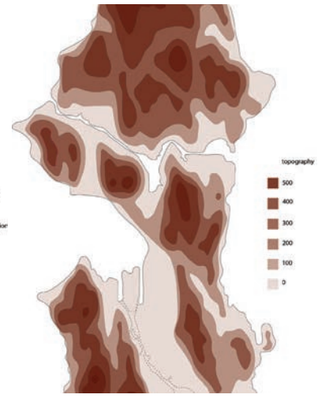




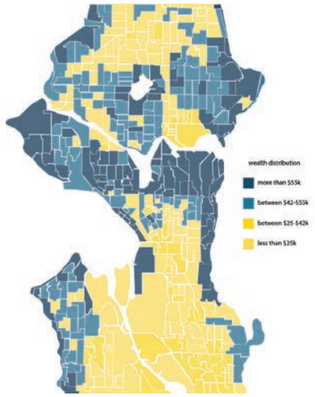


LANDSLIDES

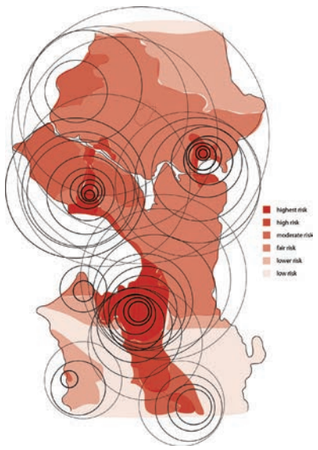
TOPOGRAPHY



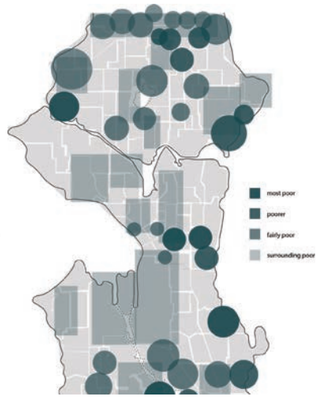
WEALTH



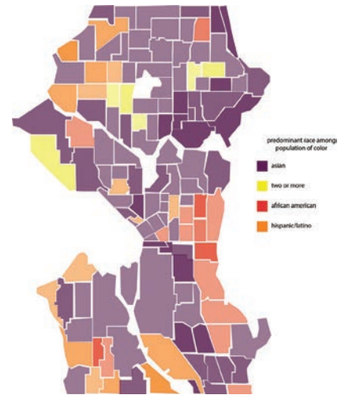
EARTHQUAKES



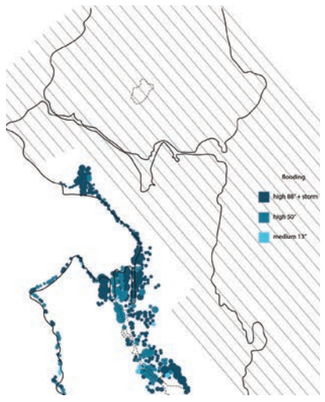
POVERTY



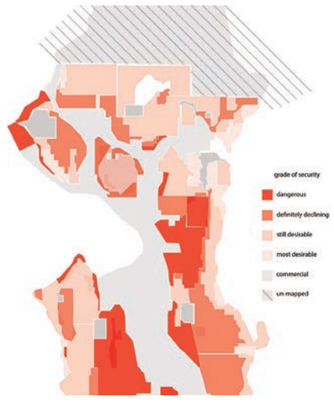
DEMOGRAPHICS



FLOODING

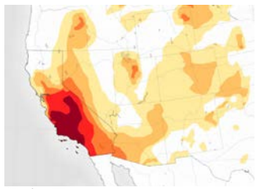


SECURITY

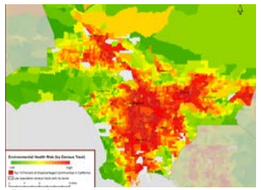


This page: Ferrell Sullivan
Opposite Page: Hayley Hendrick
In a three-credit hour seminar, students developed layered mappings for various national and internationnal cities investigating relationships between vulnerability (poverty, education, race, gender, etc.) and environmental hazards.

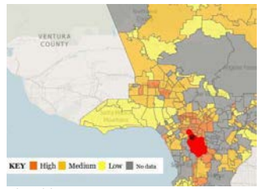
Los Angeles, California



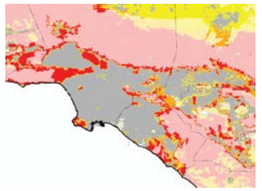
Drought



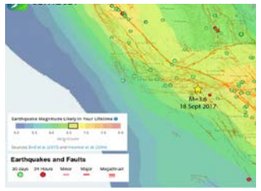
Climate Change



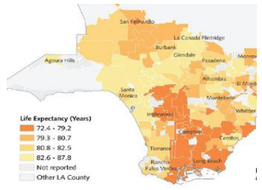
Crime/Violence



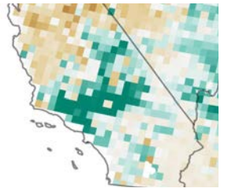
Fire



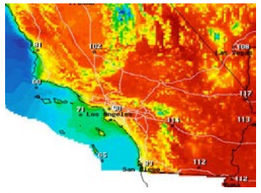
Earthquake



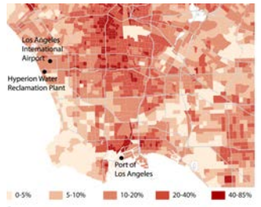
Life Expectancy



Rainfall Flooding

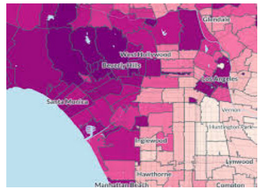


Extreme Heat

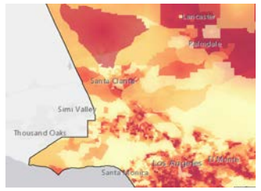


Poverty

Aging Infrastructure
(Water Pipes)



Economic Inequality
(Student Loan Debt)



Lack of Affordable Housing

SURI SYSTEMS

Natalie Hamlin

The Story:
Suri Systems was created to serve as an **disaster relief shelter** and isnow being used as a low cost **modular architcture** system, significantly serving refugees

DURABILITY & ENVIRONMENTAL AWARENESS

DURABILITY

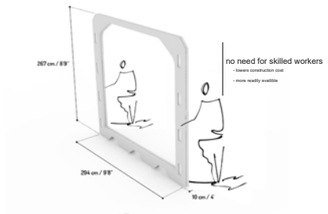
ENVIRONMENTALLY APPROPRIATE

Natalie Hamlin's case study analysis

EASE OF DEPLOYMENT

EASE+ COST OF CONSTRUCTION

1



2

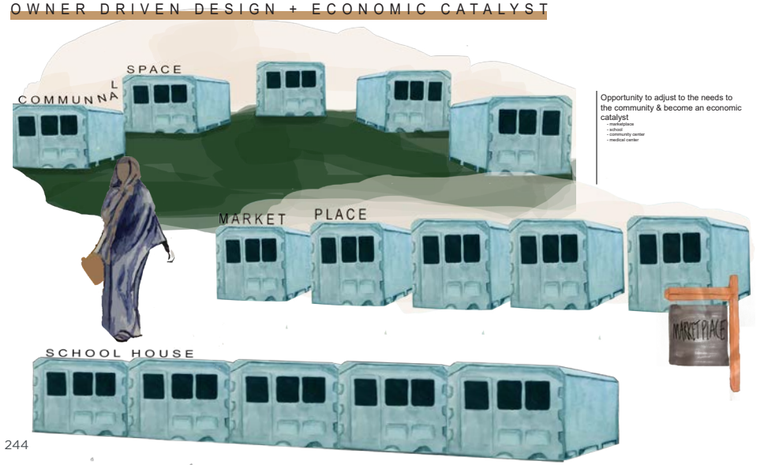
3

4

5

6

OWNER DRIVEN DESIGN + ECONOMIC CATALYST



EFFECTIVENESS

- ease of deployment
- ease of construction
- cost of construction
- timeline to occupancy
- durability
- owner driven design
- compact dwelling
- expandability
- environmentally appropriate
- economic catalyst
- connection to grid + utilites
- off the grid
- resilient to accute shocks

ENVD 4970
HOUSING CASE STUDIES

PROJECT 2 – DISASTER-RELIEF AND RECOVERY HOUSING
This project will shift from the macroscale of analyzing a city's resilience in terms of chronic stresses, acute shocks and vernacular architecture, to disaster-relief and recovery housing case studies. You will select a disaster-relief housing precedent, and evaluate its effectiveness based on a series of principles. Answer questions such as: What geographic locations are most appropriate for the housing?, Are materials locally available and does it require skilled labor? Is skilled labor available?, What types of acute shocks and hazards does the housing respond to and mitigate – earthquakes, high winds, flooding? Etc. The goal of this project is to survey current best practice in disaster-relief and recovery housing and evaluate strengths and weaknesses in various projects based on a series of relevant principles.

Deliverables:
20"x30" poster, oriented portrait

- Evaluate case study for all of the following principles – note *if* and *how* the project excels, partially meets or does not meet each criteria:

  - **Ease of Deployment:** use of a truck and trailer, stackable, decentralized to reduced travel distance, can travel through debris zones (i.e. cranes and 18-wheelers are challenging), multiple transit options are available
  - **Ease of Construction:** can be lifted into place by a. small team, utilizes unskilled or moderately skilled labor, utilizes repetitive details, limits site work, as appropriate (exposure to weather conditions)
  - **Owner-Driven/Participatory Design:** owner has participation in the design process. This is a range from traditional residential design with a designer and client, selection of housing forms/products from a pre-identified list, and/or material finish options. This is especially critical in recovery housing and is helpful in relief housing when PTSD and other psychological concerns are heightened.
  - **Compact Dwelling:** dwelling size is minimal for ease of deployment and construction, dwelling size is appropriate for occupancy count or family size, dwelling square footage is relative to local area (i.e. a typical New York resident will expect smaller square footage compared to a Birmingham resident), spaces are multi-use, as appropriate, minimum dimensions used while accommodating for accessibility (ADA), as appropriate
  - **Environmentally Appropriate:** building envelope meets and possibly exceeds local energy code (IBC, IECC or similar), structure utilizes passive systems for thermal comfort, consideration is given to orientation for solar gain and daylighting, consideration is given to local nuisance issues such as chronic flooding, termites, and material weathering
  - **Economic Catalyst:** utilizes local labor and materials, responds to local construction norms, provides space for community use and possible business operations
  - **Connection to the Grid/Utilities:** hook-ups provided for immediate or future utility connection, provides services for most appropriate (i.e. economic) energy sources
  - **Off-the-Grid/Decentralized Opportunity:** provides for active systems such as PVs, micro-wind, geothermal, water harvesting, solar water heating, etc., provides a battery for back-up storage and/or connection to the grid for reverse metering
  - **Resilience to Acute Shocks:** (applies more to recovery housing), structure can absorb shocks that frequent the region, i.e. if high winds – tie-downs are provided where appropriate and building form reduces number of corners; if storm surge, building is elevated above flood waters with robust foundations; if earthquakes, shear walls are incorporated and loads are evenly distributed, etc.

Evaluation Criteria: (20% of overall grade)

Thorough research *Research is robust and relevant* *Proper citation used* *Credible sources used*	30%
Visual communication *Layout and graphics are legible and compelling* *Minimal images used in preference for maps, graphs, drawings and diagrams*	30%
Thoughtful Synthesis of information *Interesting conclusions formulated from research gathered and overlaying information*	30%
Verbal presentation *Presentation is clear and easy to follow* *Presenter engages audience*	10%
	100%

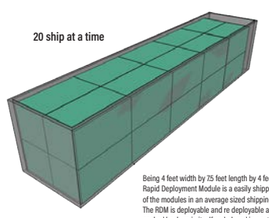
RAPID DEPLOYMENT MODULE

01 DEPLOYMENT

Rapid Deployment Module ships is 130 square foot and requires no tools to assemble it. If a natural disaster or emergency situation should occur and shelter is needed, the RDM can be delivered as a self-contained unit. The shipping crate is utilized as the base for the shelter.

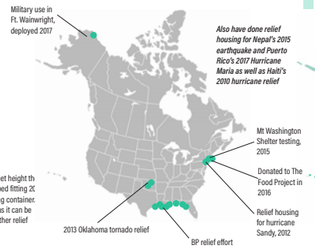
This portable emergency shelter has already been used in the field. BP purchased 26 RDMs for its ongoing cleanup operation of the Deep Water Horizon oil spill in the Gulf of Mexico. The U.S. Army has also given Visible Good a research and development grant to create an "extreme" RDM that would be suitable for more challenging weather conditions.

20 ship at a time



Being 4 feet width by 7.5 feet length by 4 feet height th Rapid Deployment Module is a easily shipped fitting 2(of the modules in an average sized shipping container. The RDM is deployable and re deployable as it can be packed back up in itself and placed in another relief area.

Where is this housing already?



Where is this housing appropriate?

02 CONSTRUCTION

This unit is comprised of about parts that can be shipped and assembled very quickly. It is made to be constructed without high construction knowledge of special skills. Two average adult humans could assemble this structure in about 30 minutes. This means even victims of a disaster could help **assemble their own relief housing.** This module does not require any tools or hardware which makes construction even faster due to community aid in the set up of the relief.

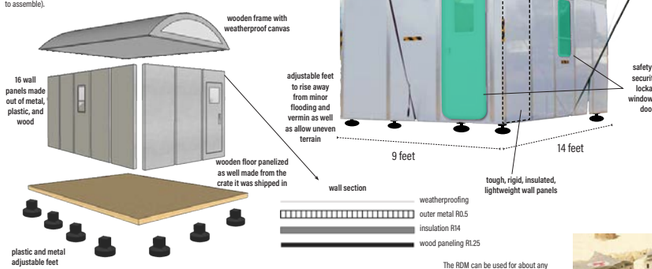
Universal Design: Flexibility is written into the DNA of the RDM. Because the system is based upon a series of universally sized interlocking parts, multiple configurations are possible by simply substituting parts for one another. In this way, smaller units can be made larger by simply clicking them together.

Are materials locally available? | Does it require skilled labor? | prefabricated pieces | redeployable

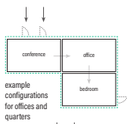
INITIAL DISASTER | 2-4 WEEKS SHIPPING TIME | 2 unskilled laborers | panelized set up | 30 MINUTE SET UP | modular design | 10 YEAR DURABILITY

03 DESIGN

The RDM offer a floor shelter with security, durability, and weather appropriateness. It is made to relief for tornados, hurricanes, flooding, tsunamis, etc. Hard walls, locking doors, and windows provide that security and safety. The unit sits on adjustable feet, keeping the floor off the ground and away from insects, vermin and minor flooding. RDM has a lightweight roof that is vented and a shade fly that provides passive-cooling and heating. Lightweight wall and floor system produces a comfortable, well insulated interior that can be configured in many different designs. Multiple configurations include the base unit, showers, latrine, and complete living unit (none of these require any tools to assemble).



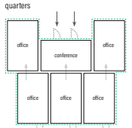
bedroom



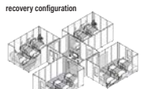
example configurations for offices and quarters

surgical configuration

conference



recovery configuration



office

The RDM can be used for about any disaster relief as well as looked at through the idea of base camps for the military. Currently the military has awarded a grant to Visible Good to research and implement a RDM suitable for harsher conditions. The culture of the military encourages the **expandability** of the RDM. As seen to the right, here is an idea of what a base camp would look like with modularconfigurations. Also looking at the inside the military might need some alterations for a medic RDM or a arterilary storage RDM. Single Units generally sell for $15,000-$18,000 depending on the customization's. Multi Units utilize a connector device which can be purchased either separately or as part on the larger system – Prices start at approximately $28,000 for a multi-plex unit.

Implementation in a military setting

04 SOURCES

"Shelter: The RDM." Visible. Accessed March 20, 2019. http://visible-good.com/shelters/.
"Tag: Rapid Deployment Module." Portable Building Store. Accessed March 20, 2019. http://www.portablebuildingstore.com/tag/rapid-deployment-module/.

This page: Ferrell Sullivan
Opposite Page: Hadley Bunch

BETTER SHELTER

REFUGEE HOUSING

The Better Shelter is a cost effective and scalable shelter solution designed to meet the needs for the activities of basic living, for privacy, security, and familiarity. The shelter's modular design allows for altering and adaptation to different areas of use, making it a versatile and scalable shelter option for humanitarian organizations operating in different contexts worldwide where implementation of local solutions is not possible.

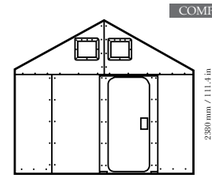
"Better Shelter." Better Shelter. Accessed March 26, 2019. http://bettershelter.org/.

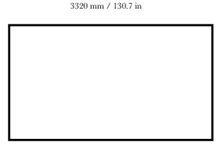
TEST SITE: UGANDA

Uganda borders two of the world's largest humanitarian crises: those in South Sudan and in the Democratic Republic of the Congo. Both are consequences of large-scale violence, long-term civil wars, famine and epidemics, and have forced over 1.19 million refugees to leave their homes and seek safety in Uganda. Many settlements in Uganda lack medical staff and the resources required to meet the needs of refugees.

"Indiainmaps.com." Indiainmaps.com Map Of Africa Countries Black And White Inspirational Africa Map Template Pano Ecolier Co Pivoting Blank Africa Co Of Map Of Africa Countries Black And White 760994 Black And White Africa Map Commerce. Accessed March 26, 2019. http://indiainmaps.com/?attachment_id=36628.

COMPACT DESIGN

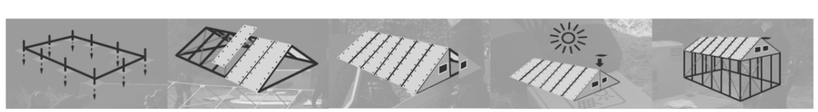




"Better Shelter." Better Shelter. Accessed March 26, 2019. http://bettershelter.org/.

The Better Shelter is a 17.5 m2 modular post-emergency shelter for up to five persons, developed according to Sphere standards for humanitarian use. The structure's steel frame is securely anchored to the ground and clad with tough yet lightweight roof and wall panels. It includes four windows, four ventilation openings and a lockable door. A solar panel on the roof generates power to illuminate a built-in lamp, as well as power for the charging of electronic devices.

EASE OF CONSTRUCTION



1 2 3 4 5

6 7 8 9 10

The shelter is delivered in two flat packs including all components and necessary tools, and can be assembled by four people in five to six hours without the need for electricity.

MODULAR COMPONENTS:
Frame and foundation: lightweight galvanized steel
Roof and walls: polyolefin foam panels treated with UV protection
Door and door frame: UV stabalized polymer plastic
Window and ventilation frames: UV and heat resistant polymer plastic
Floor sheet: woven high-density polyethylene fibers
Assembly tools: steel

Modular design means sections can be added and removed to create different structures. Within a phased response context, the unit can be upgraded using local materials. It is easily maintained, and components can easily be replaced in the event of damage. It can be dismantled, moved and remounted.

RESILIENCE

COST EFFECTIVE

One shelter is delivered in two boxes, which together weigh 160 kg (352 lbs). These flat packed boxes are a low cost structure and optimized for transportation. 48 units (48 shelters) fit into a container 40 feet HC, and 36 units fit into a container 40 feet DC. 52 to 100 units can be deployed by aircraft, and up to 14,000 containers can be deployed by ship. Low transportation costs paired with no assembly costs make the $1,150 per unit worth the price.

The frame is the unit's load bearing structure. It is made of galvanized, high strength steel and is modular, self-supported and intended to be used with the unit's panels. The frame can withstand strong wind, rain, snow, and heavy impact.

The polyolefin foam panels are treated with UV protection. The panels are wind resistant (up to 28 m/s or 101 km/h), rain resistant (passes artificial rain test with no leakage), and fire and flammability resistant (allows for minimum 2 minute escape time).

EASE OF DEPLOYMENT

Time of disaster/need for refugee housing

Time zero

Order is processed and units are loaded for shipping

2 - 4 weeks

Units are shipped via truck or plane depending on size of order

< 2 months

Units arive and are assembled in five to six hours by four people

2 months + 5 - 6 hours

POST-TSUNAMI KIRINDA PROJECT

SRI LANKA | SHIGERU BAN

THE CIRCUMSTANCE

This project came about as apart of the relief efforts following the tsunami that struck Sri Lanka in December of 2004. This tsunami, the result of an earthquake in the Indian Ocean, is responsible for 30,000+ deaths recorded by Sri Lankan authorities, and displaced nearly 1.5 million people from their homes.

THE COMMISSION

Developer Phillip Bay asked Architect Shigeru Ban to design a prototype house that could be built cheaply using local materials and would be suitable for the tropical climate. The house was to form a template for the construction of 100 replacement homes in Kirinda.

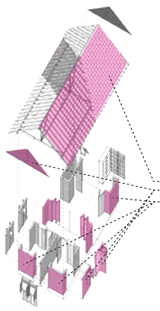
"This was not going to be a traditional disaster relief effort where we go in and make homes really fast and leave," said Bay. "I wanted to treat this like a **development project**."

01. OWNER-DRIVEN DESIGN

Wooden screens divide the rooms, providing separate male & female bedrooms to suit a Muslim lifestyle
Kitchens and bathrooms separated per government regulations
Recipients were allowed to rebuild on their existing plots of land rather than relocate farther from the shore, helping to maintain the social fabric of Kirinda

02.ENVIRONMENTALLY APPROPRIATE

Climate played a significant role in conditioning the design, with ensuring ventilation a prominent consideration.



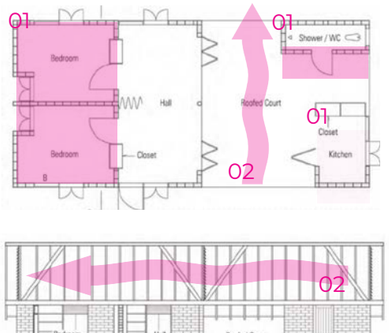
03. EASE OF CONSTRUCTION

The simple construction technology that was utilized allowed villagers to be directly involved in the workforce & thereby gain valuable skills

04. UTILIZATION OF LOCAL MATERIALS

One of the main goals of Ban's design was the incorporation of local materials. This was achieved via:

- CLAY ROOF TILES
- RUBBER TREE TIMBER
- COMPRESSED EARTH BLOCKS

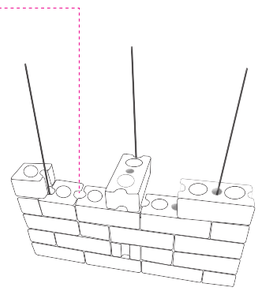


This page: Sadie Gurkin
Opposite: Cole Summersell
Case study projects were selected from a compiled list bridging temporary, temporary-to-permanent, and permanent housing

EXTERIOR + INTERIOR VIEWS

02. Slatted upper walls at the gable end allow for maximum cross ventilation.

04. The principle material was compressed earth blocks, a compressed mixture of sunbaked clay and cement available in Sri Lanka at a low cost.
Parts of the walls were also composed of prefabricated furniture units made from rubber tree timber



DESIGN SHORTCOMINGS

While this project is effective in many ways, there are also valuable lessons to be learned from its less successful components.

- Prefabrication of furniture units off site robs the community of a chance to participate in the construction process, where they could possibly have learned a new skill which would contribute to livelihood growth.
- Vulnerability of the wooden partitions resulting in a lack of effectiveness over time.
- A single housing model is not sufficient to satisfy the unique needs of each recipient family.
- Relative to other projects on the island, this Kirinda houses were not successful in delivering a quick and inexpensive housing solution

RAPIDO

Rapido is a prototype disaster relief housing system designed by Building Community Workshop, a Texas-based nonprofit. They take a holistic approach to disaster relief, enagaging emergency responders, local nonprofits, contractors, and residents to streamline the recovery process. Their goal is to have residents back in their homes in 12-20 weeks.

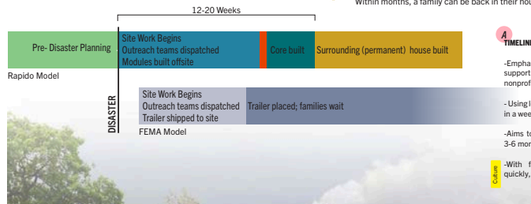
1. **PHASE 1: Pre-Disaster Planning**
Local nonprofits establish support networks and disaster plan fraemworks in advance of a catastrophe.

2. **PHASE 2: Relief, Site Work, Module Construction**
Support teams identify households in need of relief housing; home sites begin to receive clearing; and, at a local impromptu assembly line, local construction professionals start constructing Rapido modules.

3. **PHASE 3: Foundations & Delivery**
Concrete pier foundations are poured; all the materials for a Rapido core module can fit on a gooseneck flatbed trailer, towable by a pickup truck.

4. **PHASE 4: Construction**
Local contractors can erect the prefabricated panels in no time. A temporary roof is erected to protect the core; the design can withstand aftershock events and provide shelter for several months.

5. **PHASE 5: Expansion**
The core serves as the backbone of a larger, more permanent structure. Within months, a family can be back in their house on their existing lot.



4 **TIMELINE TO OCCUPANCY**

-Emphasizes pre-disaster planning and creating support networks through local social service nonprofits

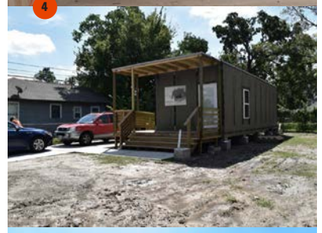
- Using local labor, it can be deployed and erected in a week

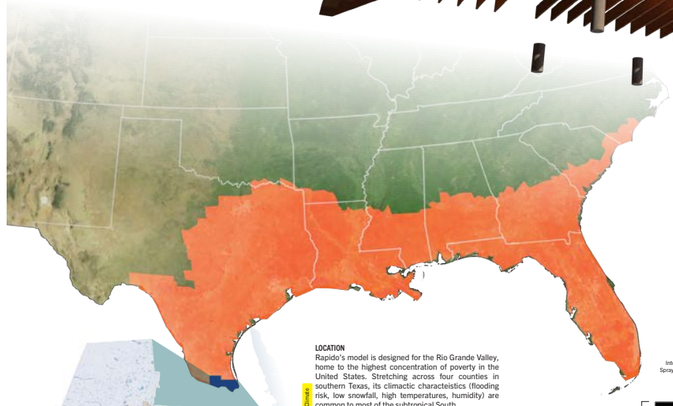
-Aims to provide replacement housing onsite in 3-6 months

-With families back in their neighborhoods quickly, social and community ties remain intact.

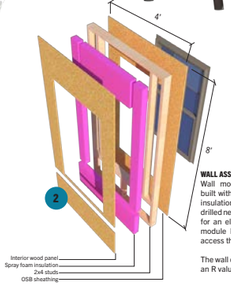
Context

A rendering of a Rapido module used as an Accessory Dwelling Unit. BCW is experimenting with using modules as pre-disaster aid for moving families out of unsafe mobile homes.





LOCATION
Rapido's model is designed for the Rio Grande Valley, home to the highest concentration of poverty in the United States. Stretching across four counties in southern Texas, its climactic characteistics (flooding risk, low snowfall, high temperatures, humidity) are common to most of the subtropical South.



WALL ASSEMBLY
Wall modules are 4' x 8' panels built with 2x4 studs and spray-foam insulation. Each stud has a hole drilled near the bass as a passthrough for an electrical conduit, and each module has a removable panel to access the wiring.

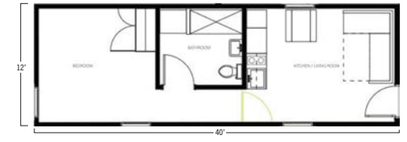
The wall construction should provide an R value of about 13.

C **EASE OF SITING / FOUNDATIONS**

Designed to be built quickly on site of destroyed/damaged home

Uses concrete pier construction, which is much easier than pouring a slab and protects against after-shock flooding

Resilience



Map & images courtesy of Community Building Workshop

PROJECT 3 DISASTER-RELIEF + RECOVERY HOUSING

BREIF

The final project will be the design of a proposed disaster-relief *and* recovery housing prototype. Focusing on the city studied in project 1, assume an acute shock has impacted the area. Your goal is to develop a relief and recovery housing solution that is scaleable for future utilization in various locations *and* contains nuances of site, culture, chronic stresses, and environmental conditions. It is required that the proposal incorporate a minimum of 5 of the following design considerations:

1. Efficient schedule from fabrication to occupancy
2. Ease of deployment
3. Ease of assembly
4. Ease of disassembly
5. Durability
6. Efficient cost of construction
7. Participatory/owner-driven design
8. Compact dwelling solutions
9. Environmentally-appropriate
10. Economic catalyst via local materials and labor
11. Off-the-grid energy sources
12. Ability to connect to the grid/utilities
13. Resilience to future acute shocks & chronic stresses

Your solution must be urban in nature and fit within a 40'W x 130'L site. Proposed housing must be occupiable within 12-weeks and have a minimum lifespan of 10-years. Further program requirements will be defined below.

PROGRAM REQUIREMENTS

SITE

34'W x 130'L

Assume the existing residence has been demolished and debris removed.

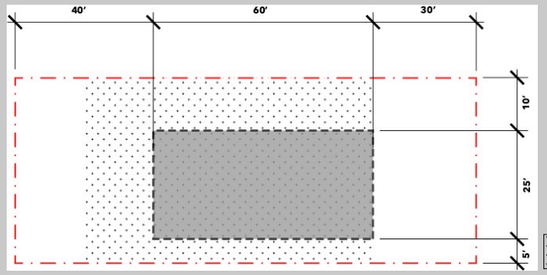
Zoning requires permanent structures to maintain a 30' setback from the street and a 20' setback for the rear yard. You may use the entire 40' width, if needed.

Exterior spaces, such as porches, courtyards, and exterior egress (ramps and stairs) may infringe upon the setback requirement.

Height is limited to 50'-0" or 4-stories.

Zoning is low- to medium-density residential.

Assume the property is nearly flat with a slight grade for drainage.



buildable area = 80'x40' or 3200sf

There are no single solutions to these problems, and they require systematic and interdependent efforts at various scales and over time.

PROGRAM

Initial residence to provide sleeping for 2 persons.

Expanded residence to provide sleeping for 2 persons + an office/accessory space OR sleeping for 4-persons.

Residence to provide 1 kitchen with sink, fridge, stove, oven, storage/cabinetry and eating area (appliances do NOT need be full-size).

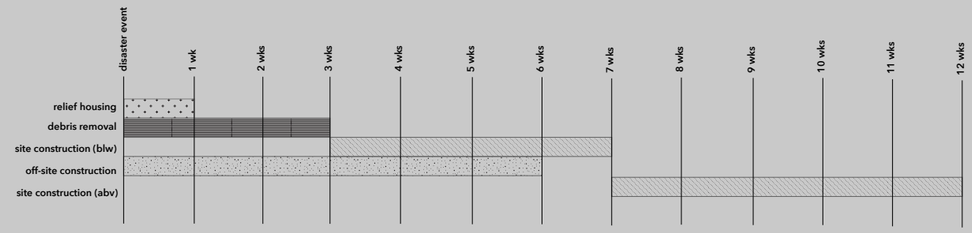
Provide 1 bathroom with sink, toilet and shower facilities.

Entire unit to be ADA accessible (if a loft space is incorporated, all necessary uses should be available on the main floor; if unit stacks into multi-family residential housing, 30% of units to be ADA accessible).

Accessible interior spaces have a minimum height of 6'-8". Typical heights are 8'-9'.

Exterior envelope to minimize heat loss and gain. Wall assemblies to have an overall r-value of 25 or greater.

Passive heating and cooling strategies to be incorporated, as appropriate.



DELIVERABLES

Location Map

1 city/regional map visualizing relevant acute and chronic stresses

Site Drawing

1 site drawing visualizing proposal on an existing urban site within project 1 city

Diagrams (3)

1 diagram visualizing ADA components (3'-0" doorways & corridor widths; 60" turn diameter at bathroom, etc.)

1 diagram visualizing method(s) for future expansion

1 diagram visualizing a critical design consideration

Plans (2)

1 plan of initial unit layout

1 plan of expanded unit layout

Provide dimensions, square footages and label spaces; include any exterior spaces such as porches

Section

Provide at least 1 section of initial or expanded unit (select whichever is most critical to the proposal)

Wall Section

1 wall section through a critical point in the exterior envelop

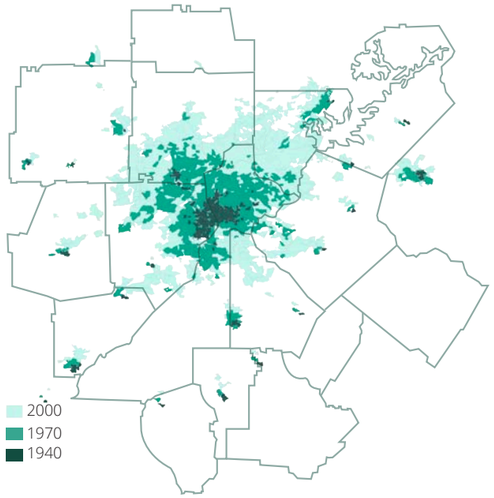
Indicate wall assembly r-value, dimensions, and materials

Perspective/Rendering

Rendering showing overall design solution (may be initial or expanded solution, whichever is most critical to the proposal)

Note at rendering a minimum of 5 design considerations that are critical to the proposal. Design considerations to be evident in the perspective

ATLANTA EXPANSION 1940-2000 [5]

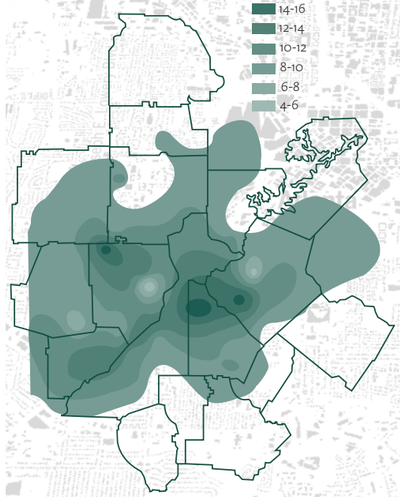


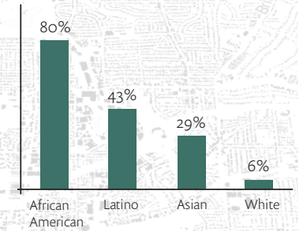
WATER: TOO MUCH & A LACK OF

Atlanta has historically experienced large amounts of rainfall that are typically spread evenly throughout the year. This being said, Atlanta is one of the few U.S. metropolitan areas not built around a major local body of water. This makes the city is particularly vulnerable to drought. Exceptionally low amounts of rainfall in the region since 2007 have put increasing pressure on the city's water supply and recently caused Georgia's Environmental Protection Division to declare a Level 2 drought. In addition to drought, Atlanta faces substantial risk from rainfall flooding. In September 2009, Atlanta experienced historic flash flooding, which resulted in hundreds of millions of dollars in damages and the loss of at least ten lives. The severity of this flooding was, in part, attributed to increased concrete surfaces, overfilled sewers, and blocked storm drains. Today, the city and region continue to face periods of intense flooding.[1]

Drought Percent Area for Georgia [4]

Rainfall in inches, measured at USGS gages, Sept. 11-22, 2009 [3]

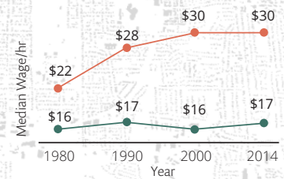




% Children Living in High Poverty Communities by Race [1]

COMMUNITY INEQUALITIES

It is estimated that 25.5 percent of people in the city have incomes below the Federal poverty level. Tackling economic inequality is paramount to creating a resilient, stronger Atlanta. Persistent poverty has intergenerational impacts as it limits the ability of young people to successfully achieve upward social mobility and break the cycle of poverty for the next generation. Has seen the in figures to the left and below, this issue of poverty is one that disproportionately effects the African American community in Atlanta. [1]



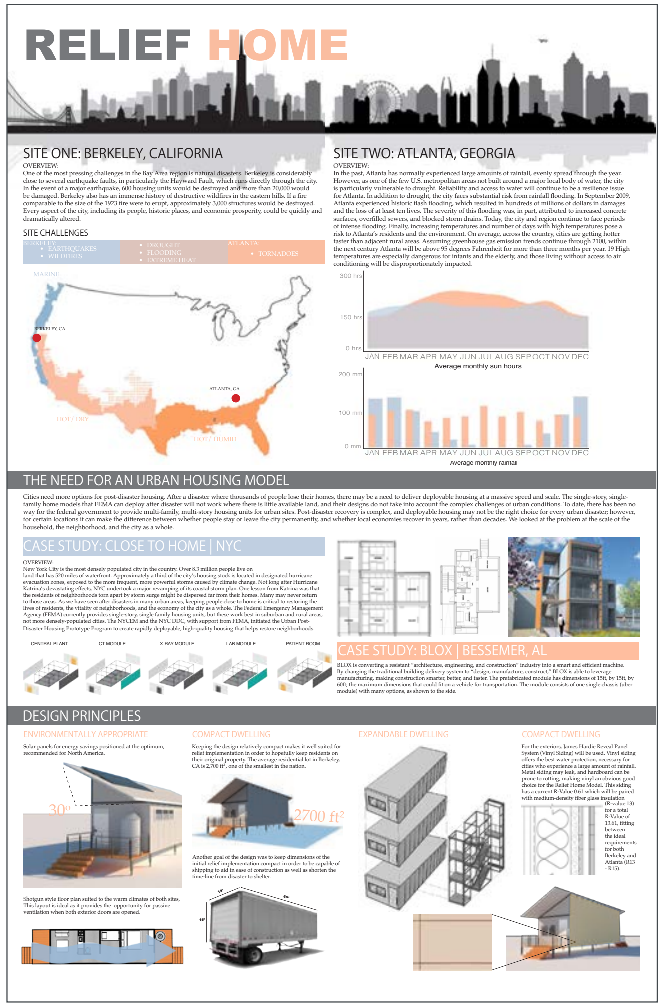
Wage Gap Between White Workers and Workers of Color [1]

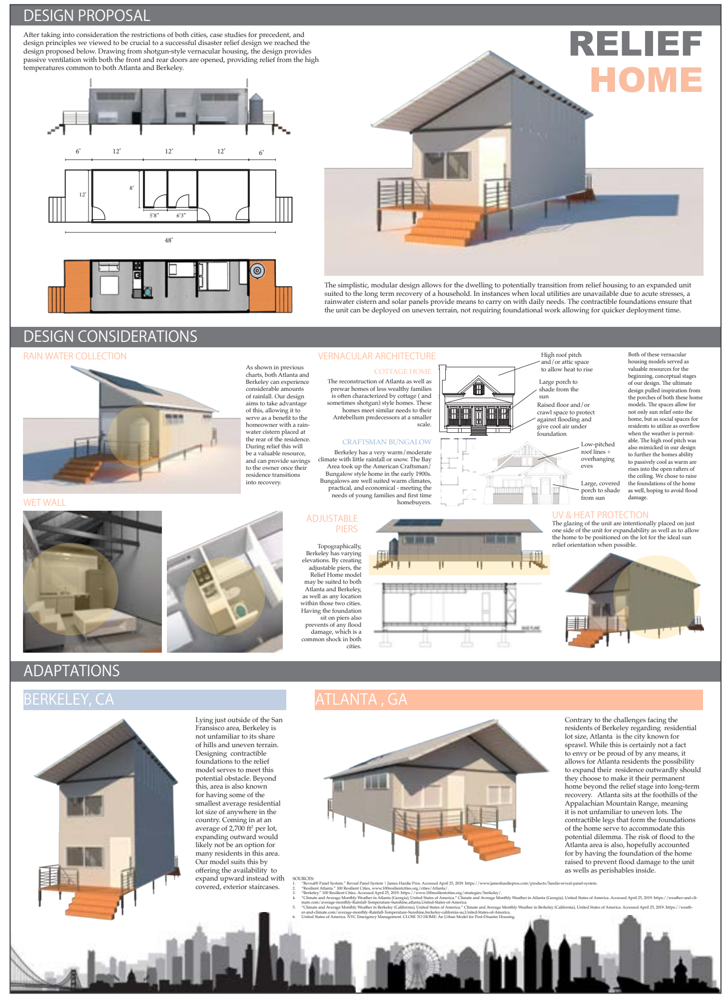
31% of GA population identify as Black

% of Black Youth admissions for criminal offenses

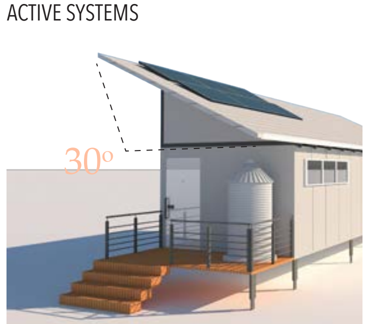
DISASTER-RELIEF HOUSING

2019 | ENVD4970 | 3-CREDIT HOUR COURSE
HADLEY BUNCH + SADIE GURKIN

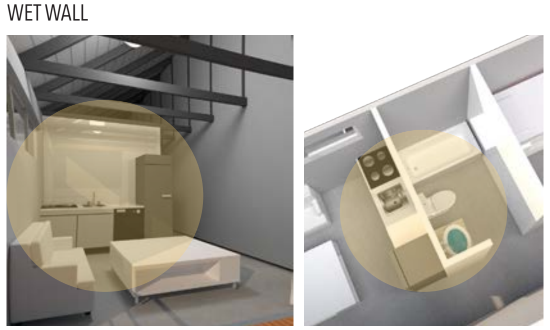




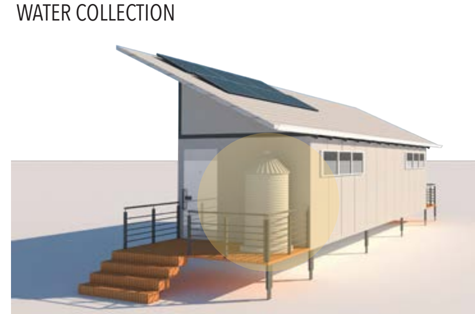
ACTIVE SYSTEMS

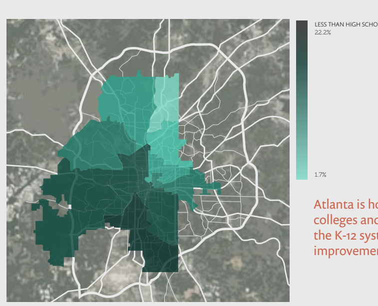


WET WALL

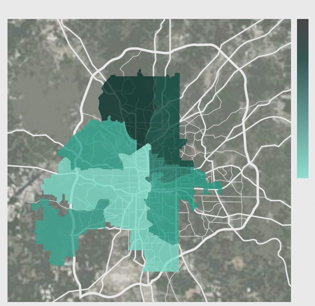


WATER COLLECTION

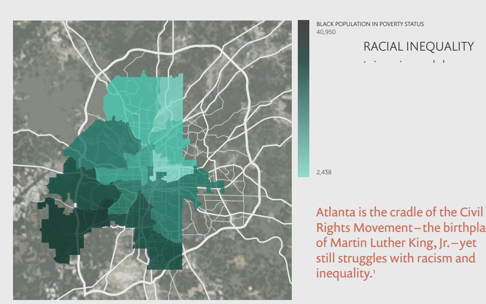




Atlanta is home to world-class colleges and universities, yet the K-12 system needs dire improvement.[1]



Atlanta is home to some of the largest corporations in the world and some of the most progressive philanthropic institutions, yet ranks among the top cities for income disparities.[1]



Atlanta is the cradle of the Civil Rights Movement—the birthplace of Martin Luther King, Jr.—yet still struggles with racism and inequality.[1]

EDUCATION INEQUALITY

Atlanta's school system today struggles to meet the needs of K-12 students. According to Learn4Life, only 40 percent of children were proficient in reading by the end of third grade, and only 38 percent of children were proficient in math by the end of eighth grade in 2014-2015.[1]

INCOME DISPARITY

Despite Atlanta's array of economic assets and recent economic growth, Atlanta has the highest income inequality of any city in the U.S. and has continued to grow more unequal over the past decade.[1]

RACIAL INEQUALITY

It is estimated that 25.5 percent of people in the city have incomes below the Federal poverty level. Like most cities, Atlanta's poverty is disproportionately experienced by the city's Black residents with 85 percent of Atlanta's Black children living in high poverty communities (where the poverty rate is higher than 20 percent), compared with 29 percent of Asian and six percent of White residents.13 Poverty and income inequality are also divided along geographic lines with the southern and western areas of the city particularly vulnerable.[1]

endure

designed for life with water

low income households + 10% annual coastal flood risk in 2070

low income households + long-term storm-water flood risk

neighborhood within the city selected for study due to high risk population

view of dense apartment blocks of the neighborhood and surrounding city

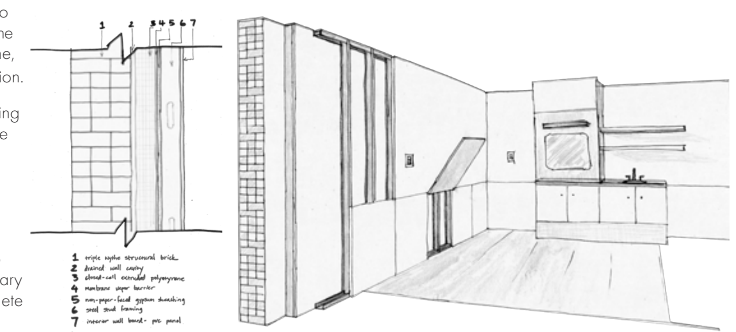
typical entrance condition: upper door leads to main residence, lower door leads to garden level apartment, which is at high risk of flooding

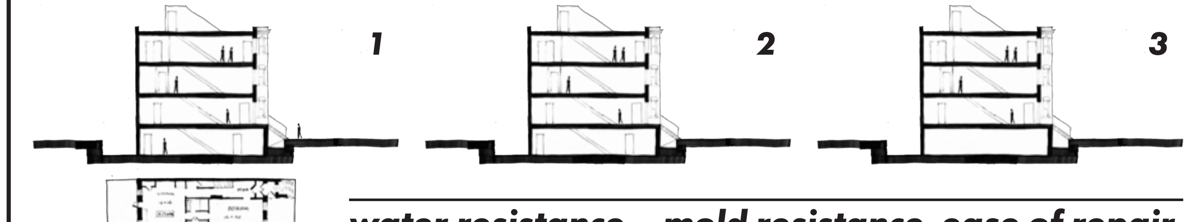
Traditional building materials do not respond well to damp conditions brought by flooding. Water damage and mold growth destroy wall assemblies, requiring full demolition and replacement.

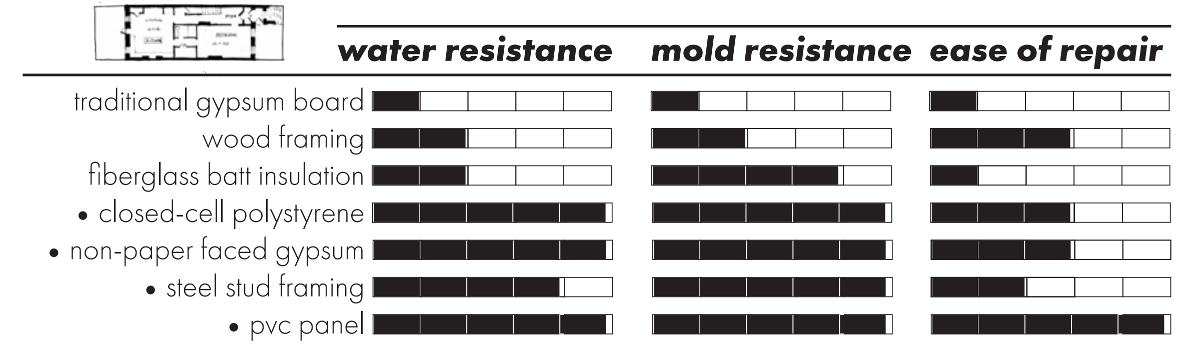
Endure is a disaster planning project which focuses on the risk of flooding to garden level apartments within Boston. As our climate changes, cities face new and heightened stresses that need foresight and adequate planning. The current methods of construction will no longer be sufficient in flood prone areas, and will only lead to continual gutting and renovating of the garden level. Many of the most at-risk populations to flooding are also areas of low-income, which has placed an increased financial burden on this population.

As a result, I have developed a three phase proposal for planning the future of the garden level. Phase One involves enacting code that requires all future renovations of the lower level to be water resistant. By using materials that can survive a flood event and that do not foster mold, buildings will be better suited to outlast occasional flooding with minimal uninhabited time. Phase Two becomes necessary once flooding becomes more frequent. As the frequency of flooding increases, inhabitants will be forced to move out of the garden level, which will be converted to temporary storage or other flexible space. Finally, Phase Three is the complete vacancy of the space, into which water may enter freely.

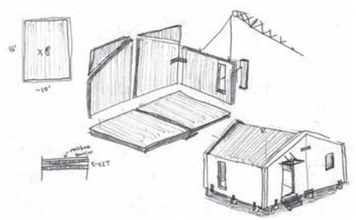
design considerations:
-wall assembly provides an approx. 27 R-value
-galvanized steel studs, closed-cell polystyrene, non-paper-faced gypsum, and alternative inner finishes
-wall shelving provides storage above flood-levels
-outlets are raised high above the ground to prevent electrical damage
-when possible, appliances are raised off of the floor
-lower wall is comprised of hinged panels that can be easily propped open to allow quick drying

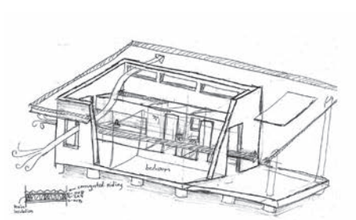


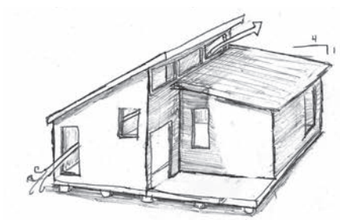




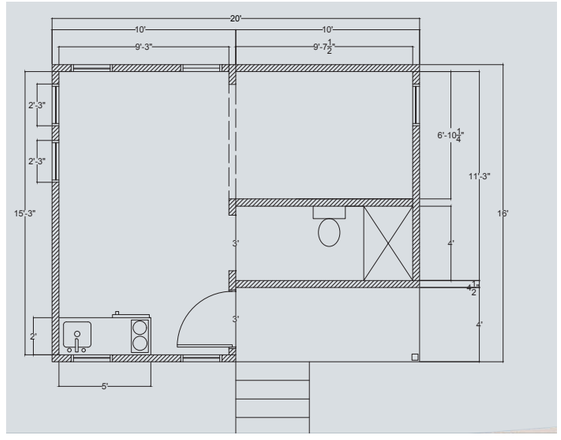
Benjamin Luebkemann

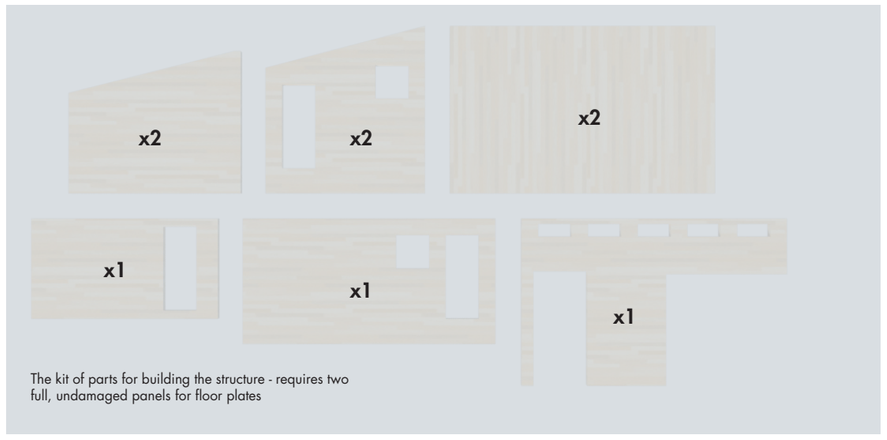






Cole Summersell's mass timber kit-of-parts housing providing a temp-to-perm option.





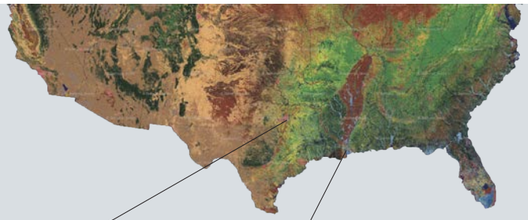
The kit of parts for building the structure - requires two full, undamaged panels for floor plates

MASS TIMBER RELIEF HOUSING

Cross-Laminated Timber is a building material gaining popularity for its sustainability, strength, and ease of assembly. CLT, or mass timber, buildings have been popular in Europe for close to 25 years; in America, these panels tend to be used not for buildings, but for heavy equipment.

Timber matting is a major industry, allowing vehicles to access areas that the terrain would normally render inaccessible. Power companies, construction companies, and disaster clean-up crews place miles of sturdy wooden platforms down through mud, over sand, and on washed-out roads. Some are even used as temporary bridges.

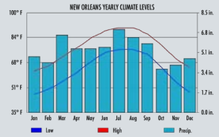
Once these panels meet the end of their useful life, they are thrown away; the embedded carbon in them is, as the wood rots, released back into the atmosphere. The cracked and otherwiase damaged panels that are discarded, however, could be used as construction material. These panels are stronger, pound for pound, than concrete or steel; for people looking for temporary shelter in the wake of a disaster, upcycling these panels is a no-brainer.

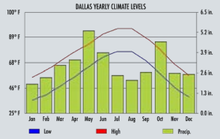


Dallas, Texas:
-Climate zone 3
- Warm, humid, moist

-Shocks and stresses
- Climate change
- Drought
- Flooding
- Water insecurity
- Poverty

New Orleans, Louisiana
- Climate zone 2
  - Warm, humid, moist
- Shocks and stresses
  - Food deserts
  - Hurricanes
  - Flooding
  - Land mass loss / sea levels rising
  - Poverty





Benefits of CLT
-Stronger pound-for-pound than concrete and steel construction

-The future of sustainable building - concrete and steel have huge amounts of embedded energy, and concrete production releases tons of CO_2

-Timber construction acts as a carbon sink, sequestering carbon

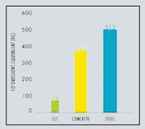
-Doesn't require specialized equipment to prepare; just a large saw and a crane

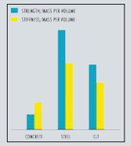
-Robust; doesn't expand or contract during temperature fluctuation

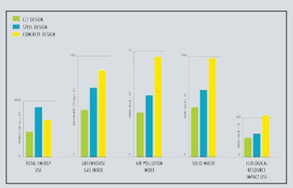
-Inherent insulatory value

-Dramatically lower construction time than stick-built structures

-Fire-resistant







Manufacturing:

-Benefits of prefabrication
- Eco friendly
  - No extra materials on site
  - Results in less waste
  - Extra materials can be recycled in in-house
- More accurate construction
  - Tighter joints
  - Better air filtration
  - Better wall insulation
  - Increase in energy efficiency
- Financial savings
  - Prefab manufacturers often receive bulk discounts from material suppliers
  - Sidesteps possibility of unreliable contractors or unproductive staff
  - Savings on time related construction costs
- Safety
  - Less risk for problems associated with moisture, environmental hazards and dirt
  - Fewer accidents and other liabilities
- Flexibility
  - Easily disassembled and relocated / versatility
  - Decreases demand for raw materials
  - Minimizes expended energy
  - Decreases overall time
- Consistent quality
  - No weather or labor skill restraints
  - Multiple in-house checks (faster and convenient)
- Reduced site disruptions
- Shortened construction times

This CLT sample survived almost 100 minutes of exposure in a standardized test reaching nearly 1000° C

Drawdown:

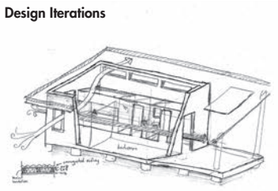
-Electricity Generation: Solar Water
Water heating is a major energy use. Hot water for showers, laundry, and washing dishes consumes a quarter of residential energy use worldwide; in commercial buildings, that number is roughly 12 percent. Solar water heating—exposing water to the sun to warm it—can reduce that fuel consumption by 50 to 70 percent.

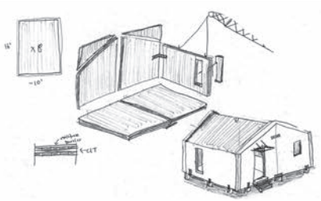
-Materials: Industrial Recycling
At least half of waste is industrial and commercial. Sources range from manufacturing, construction, and mines to restaurants, office buildings, and schools. The stream of waste they produce is diverse; not all of it can find a second life, but much can. Industrial and commercial recycling reduces emissions when new products are made from recovered materials, rather than virgin resources.

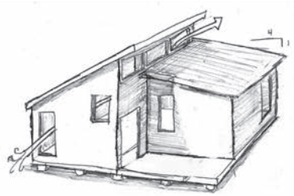
Recycling needs to be one piece of an integrated approach, that also includes making more efficient use of materials and extending product life. Together, they can reduce emissions from extracting, transporting, and processing raw materials. Because society currently uses far more of these materials far more quickly than the earth can regenerate, such practices address parallel challenges of resource scarcity.

Odds are, these people don't need to be provided with relief housing; however, they might find themselves living so comfortably in 288 ft² that they decide not to rebuild such a huge house.

Design Iterations



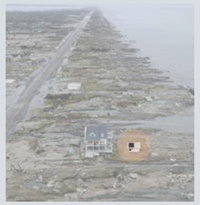


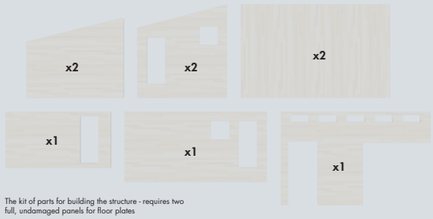


MASS TIMBER RELIEF HOUSING

The design uses passive house principles and takes cues from vernacular housing to offer a compact, livable, and attractive unit. Multiple units can be attached to accomodate larger families; the structures can be built to meet ADA guidelines.

By employing rainwater collection, solar power, composting toilets, upcycling, passive thermal management, and the carbon characteristics of timber construction, the Mass Timber relief module is nearly as sustainable as possible. By using unwanted materials, these units could also significantly undercut the price of FEMA trailers.





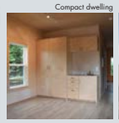
The kit of parts for building the structure - requires two full, undamaged panels for floor plates

Design Principles

Cost of construction

Ease of construction

Compact dwelling



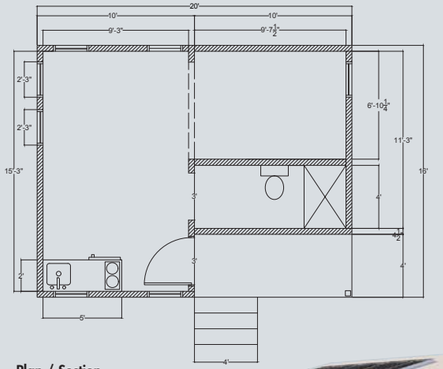
Environmentally Appropriate

Design Elements

Cracked or damaged panels can be cut down into usable components

Clerestory windows bring daylight into the living area and allow for passive cooling

Deep eaves aid in passive solar cooling and help keep rain away from the walls

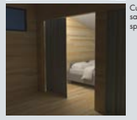


Plan / Section

Clever Cost Cutting

Compact kitchen unit; sink serves both kitchen and bathroom to save space and minimize plumbing

Composting toilet minimizes water usage; creates compsost to use in garden



Curtains instead of doors save money and make the space feel larger

Panels are fastened simply with large brackets and bolts, making assembly easy

The structure rests on poured concrete pilings that protect it from flooding and encourage ventilation

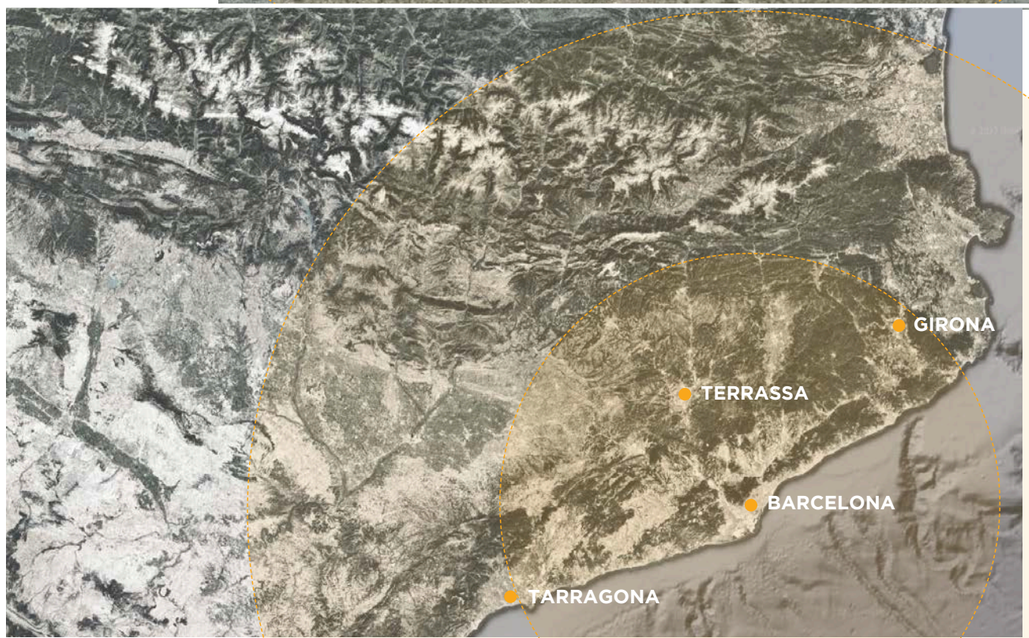
resilient infrastructure abroad

Smith is leading the redevelopment of the Environmental Design study abroad program to center on issues of resilience, climate adaptation, and sustainable urban infrastructure to better prepare graduates for an emerging future of professional practice. There are increasing pressures on current and future designers to meet complex environmental and social challenges of sea level rise, chronic flooding, informal housing, and social inequities, to name a few. Auburn University's Environmental Design program, due to its focus on interdisciplinary design and development of introductory theoretical frameworks, is well suited to focus on these challenges through a reimagined study abroad program.

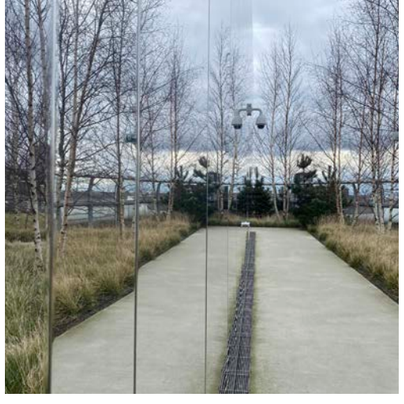
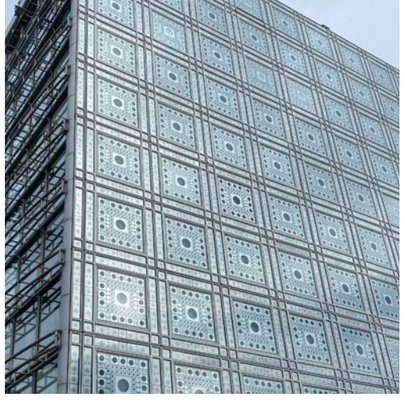
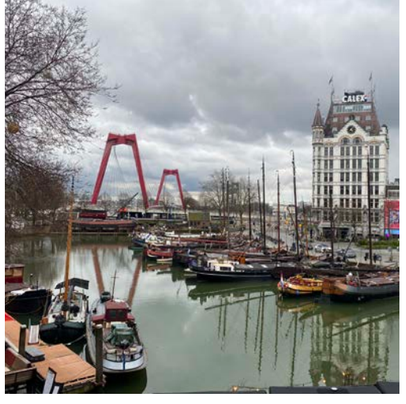
Smith spent the last twelve months examining the existing study abroad program and researching alternative locations to better align student learning outcomes with overall program goals related to resilience. After rigorous study, she developed a pilot program to Barcelona, Paris, and Rotterdam centering on historic and contemporary projects bridging scales and traditionally disparate disciplines in an effort to meet wicked problems. Projects include floating farms, experimental floating houses, robust, integrated public transportation, hard and soft infrastructure mitigating sea level rise and chronic flooding, and the world's largest roof garden and productive landscape. Contemporary challenges in the built environment require students to have exposure to and an acute understanding of resilient design methods. This type of work is already prominent in leading firms like Heatherwick Studio, Weiss/ Manfredi, James Corner Field Operations, and Bjarke Ingels Group, to name a few. While many discipline-specific academic programs do not have capacity to study and integrate interdisciplinary studio projects due to specific accreditation and licensure requirements, Environmental Design majors and minors are uniquely positioned to take these on. Germane to contemporary practice focused on collaborative responses to real world complexities, an interdisciplinary study abroad program is requisite.

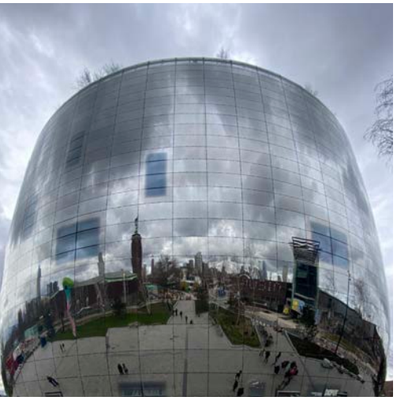
While the newly proposed program will not commence until Summer 2024, Smith found it prudent to conduct a pilot trip in Spring 2023. In doing so, she was able to explore potential sites and begin forming partnerships with like-minded universities such as Rotterdam's preeminent TU Delft. The present study abroad experience has students beginning explorations in Barcelona, as the city offers a palimpsest of history from Roman ruins to the Superilla or Superblock. Additionally, Barcelona's integration of place-based, Catalan architecture, is a promising example of contemporary work celebrating specifics of land, people, and culture. After three weeks, students embark on the high-speed rail, another form of resilient infrastructure, to Paris, and it is here that students explore the extensive metro system, Baroque urban form typology, and have an introduction to the city's vast array of climate adaptive infrastructure. These include, but are not limited to: bike infrastructure, Halle Pajol (an expansive photovoltaic power system), and schoolyard cooling zones mitigating fatal Parisian heatwaves. Finally, the abroad experience is completed in Rotterdam, for this city is at the forefront of climate adaptation. Students spend two weeks examining radical resilient initiatives such as the famous Benthemplein Watersquare – a public storm water park, floating farms, and experimental floating houses. In total, the study abroad experience spans six-weeks during the summer term and allows students to see a diversity of climate adaptive projects while simultaneously applying concepts through an interdisciplinary studio.

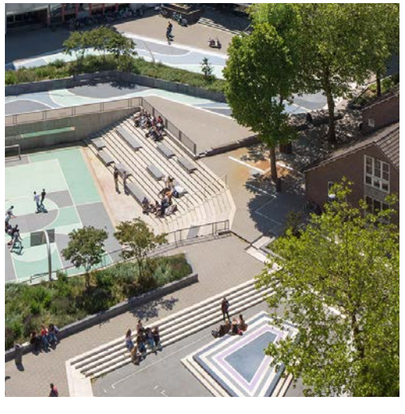
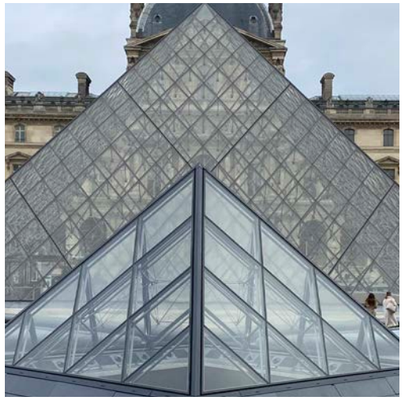
The ENVD study abroad focuses on interdisciplinary design as a response to complexity in the built environment. Students envision future realities & emergent fields of study.

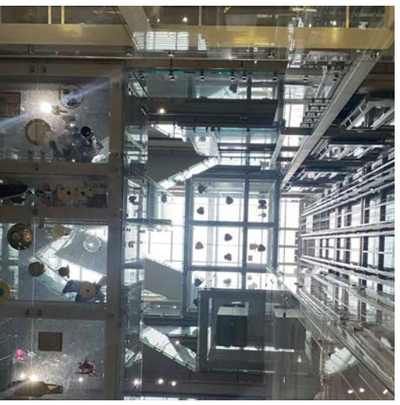


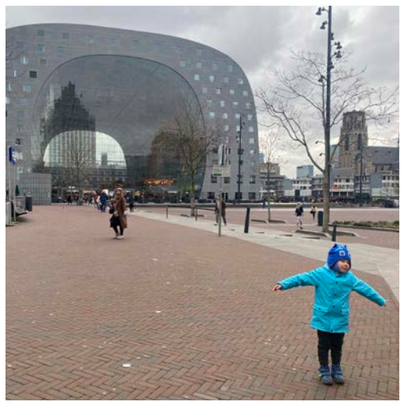










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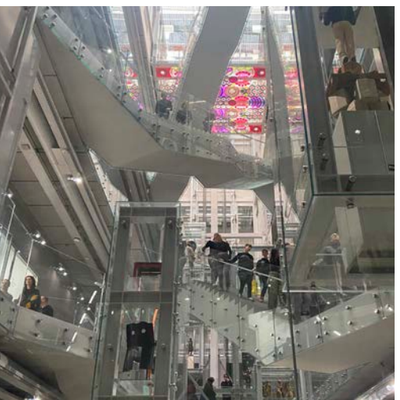
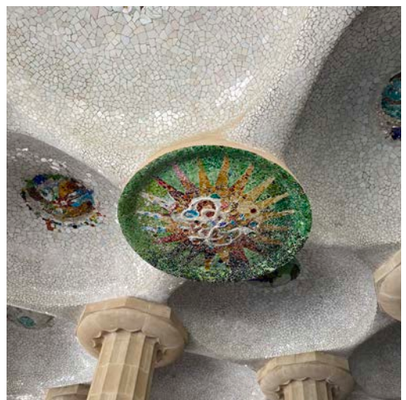
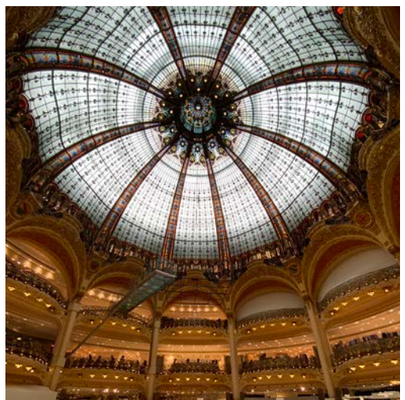




POST-DISASTER HOUSING

design for ***dis****placement*

Jennifer Smith
Hailey Osborne

RESEARCH

place + displacement

INTERDISCIPLINARY DESIGN PEDAGODY

Teaching scholarship through an interdisciplinary undergraduate design education is briefly discussed in the previous section. Smith recognizes that there is an increasing trend internationally for higher-education interdisciplinary design degrees. Scholars and students, alike, acknowledge the global challenges of siloed industries and increasingly complex, wicked problems, and they are interested in programs centered on responding to interdependence. While we require professionals with a depth of knowledge and expertise in specific fields, there is an additional need for those working between industries through interdisciplinary and transdisciplinary design methods. These programs are uniquely positioned to include transformations in career development as we require design practitioners who are prepared to strengthen collaboration across industries. Untethered to disciplinary boundaries, design professionals work as collaborative project managers amid complexity, fostering holistic design responses to stubborn problems.

PLACE + (DIS)PLACEMENT

Scholarship focused on resilience, equitable landscapes, and post-disaster housing are additionally paramount as these challenges frame present and future design work in the built environment. Smith's commitment to post-disaster housing and mitigation through resilient infrastructure emerges out of a deep interest in place and displacement. Smith has taught courses on natural disasters and post-disaster housing, presented conference papers, and she is presently developing a book manuscript for Routledge, a subsidiary of Taylor & Francis Publishing. The 250-page publication is under contract and is due September 2023. A few pages from the third section on international case studies and best practice have been included for your review. Housing responses are a substantial contributor to displacement, reconstruction success or lack thereof, and have the capacity to provide future mitigation. While major disaster-relief entities such as FEMA, UNHCR, and the American Red Cross provide housing strategies for top-down operations aiming to reduce complexity, it is widely understood that the needs of survivors should underpin policies and plans for maintaining social equity and promoting sustainable development. Existing strategies, despite best efforts, exacerbate displacement, weaken recovering economies, and mitigate future resilience efforts. As outlined by Wagemann, post-disaster housing frequently fails to meet family needs, despite ongoing efforts of diverse disciplines (Wagemann, 2017).

Lastly, the Deep South is in continual tension with its racial history. Erasing, forgetting, and displacing are common threads in our complicated narrative, and as a result, our constructed landscapes remain hollow. Smith's research aims to unearth local Black and African American stories as design has the capacity to make them manifest through a myriad of physical and non-physical means.

The intersection of design education and resiliency has been the focus of Smith's scholarship. Specifically, her investigations probe interdisciplinary design pedagody and teaching methods as well as the oscillation between place and displacement.

BOOK PUBLICATION

FROM THE AUTHOR

While standing on the cracked, sun baked earth, I wipe my brow. Between the unrelenting sun and humidity, Southeast Asia promises a tropical – oasis – that even this Southern American finds... sweaty. The ground rumbles as trucks caravan one after the other unloading soil as hills construct the newly elevated landscape. Dirt mounds rise a few meters high across this thirteen-hectare site. Increasing the elevation is an effort to keep the site dry and free from flooding when monsoon season returns and as sprawling development transforms rice fields into “buildable” land. I stand on a future university campus, and it is one of a hundred projects chasing a water-free plateau. Inevitably, the water must go somewhere, and I fear the soil will not forget its wetland origins.

Later the same day, I discover where the infinite amount of dirt originates. Beyond the city limits, massive earth carvings are visible as strange ponds speckling the horizon. It is an alien landscape - uninhabitable and solely for the benefit of encroaching development. This cut and fill process is typical in Cambodia as rural-to-urban migration and increasing population pressures rapidly developing economies to densify and swell overall footprints. There are few, if any, architects guiding the process.

This memory is from 2013 when I was an intern architect working internationally. In many ways it was a dream job – working in developing economies where there are few, if any, architects partnering with local constituents on building projects. Nevertheless, what I witnessed was confusing, if not altogether disturbing. Architects are trained to protect the health, safety, and welfare of the public for present and future generations, and what I witnessed did not seem to instill this for Khmer people. I was becoming acutely aware of the interdependence of design decisions in the constructed landscape across systems, scales, and time. I was additionally becoming aware of the architect’s limited scope - the owner’s property line. As such, I felt deficient in advocating for larger urban policies and building regulation to instill resilience in communities. Since then, I have advocated for architects – those trained to respond to complexity – to expand their scope and involvement to all influential fields in the built environment from from city planning to real estate development to public policy.

Standing on the cracked earth witnessing one of the fastest growing economies develop in the same, unsustainable manner that the United States propagated over the past century, it became clear how designers are altogether absent. We live in a world hemorrhaging with wicked, complex problems, and architects need to be at the table adding to these urgent discussions. Alas, the plateaued land, when examined across environmental systems and through the lens climate change, is high risk.

HOW TO USE THE BOOK

This book is neither commentary on land-use development practices, nor a pubilcation centered on the science of climate change. While it touches on these topics, the following pages focus on disaster events and post-disaster housing - an area paramount for architectural discourse and engagement. It is commonly acknowledged that disaster events are increasing in frequency and damage, and severe weather is a part of our global future. If we wish to mitigate the damage caused, and if we wish to instill health, safety, and welfare for clients and end-users, how we plan for and respond to disaster events are crucial.

Fortunately, this is an area within architecture that has been gaining international attention, and we have witnessed a number of reknown architects engaging in this complex challenge. Additionally, academic programs are aligning pedagogical goals with changes in practice through the creation of courses and studio projects centered on disaster events, housing, and climate adaptation. In tandem with these shifts, this book is intended for architecture professionals, scholars, and students. The book draws knowledge from public adminstration, science, manufacturing, industrial design, and construction and as such, it may be usesful for these fields. As an architect, I have done my best to learn from these professionals as many are already deeply engaged and experienced in disaster planning, relief, and reconstruction.

The publication may be used as a textbook for temporary, temporary-to-permanent, and permanent post-disaster housing. Alternatively, it is my recommendation to use it as a reference guide for post-disaster housing best practice. The publication attempts to make visual the most successful and compelling attributes of each case study as drawings are the language of designers. It is my hope that the following visuals bring to life the thoughtfulness and intelligence instilled in each project.

It is worth nothing that rhe following pages are not conclusive. The research is ongoing, and there are numberous contemporary and historic case studies for which this book does not have capacity to address. The following pages are organized into three sections:

01 unresilient futures
02 design considerations
03 best practice

First, there is a brief overview of types of natural disasters, the science behind their increasing frequency and impact, and the methods organizations use in response to post-disaster housing needs. The second section dives into a series of design considerations that should be considered for relief and recovery housing. There are fourteen considerations outlined in this book, and based on specific project goals, certain design considerations should be prioritized. Lastly, there are a series of international case studies for temporary, temporary-to-permanent, and permanent housing. Each are evaluated based on the fourteen design considerations established and explained through drawings and other visuals.

Architects, Designers, and Thinkers - we have much to offer within the umbrella of post-disaster housing and climate adaptation. Let us learn from those already engaging in the work and offer our design skills as we problem solve across systems, scales and time. Let us find our way back to the table, and work on the wicked problems for which we are trained. This is as much a reminder to myself as it is to our talented profession.

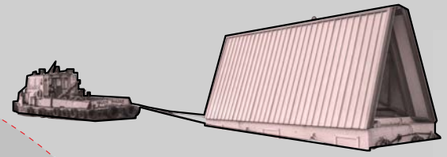
Sincerely,

Jennifer Smith, AIA

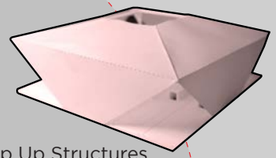
Battambang 2013

Photo credit: Page Ledbetter
Author working at construction site in Battambang, Cambodia - a previous rice field and future university campus.

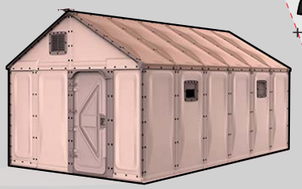
DISASTER EVENT ● **sheltering**



+ The Fold & Float



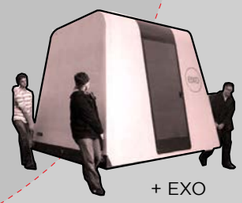
+ Pop Up Structures



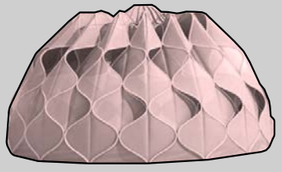
+ IKEA Better Shelter

+ FEMA Park Trailer

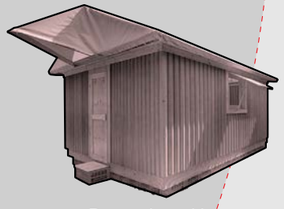
+ Shigeru Ban, Onagawa
Container Temporary Housing



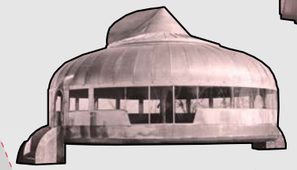
+ EXO



+ Weaving A Home



+ Paper Log House



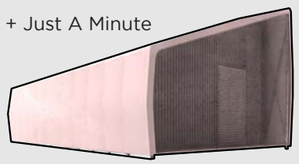
+ Dymaxion House

+ Wiki Structures

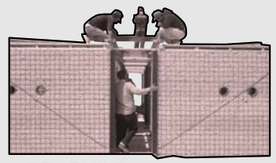
+ Demountable House

+ Rapido

+ The Grid



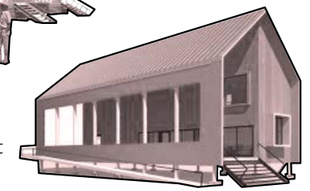
+ Just A Minute



+ RE : BUILD

+ NYCEM
Prototype

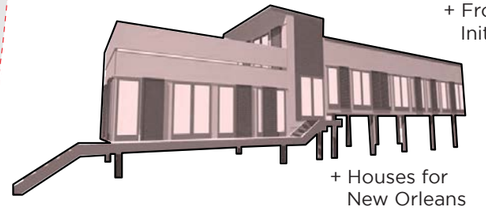
+ BNIM
Make it Right



+ Elemental
Make it Right

+ Kirinda Project

+ Front Porch
Initiative



+ Houses for
New Orleans

temporary housing

+ EXO
+ IKEA Better Shelter
+ FEMA Trailers
+ Weaving a Home
+ Yale Pop-Up Buildings
+ Paper Log Houses
+ Floating Emergency Shelter

temp-to-perm housing

+ The Grid
+ Jean Prouve Demountable House
+ Rapido
+ Dymaxion House
+ Onagawa Container Housing
+ NYCEM Prototype
+ Just-A-Minute

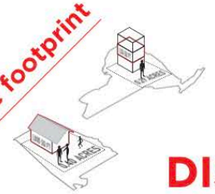
permanent housing

+ Elemental
+ Kirinda Project
+ Make-It-Right
+ Front Porch Initiative
+ Houses for New Orleans

Jennifer Smith and Hailey Osborne are co-authors as they produce text and visuals as a team. The following are the publication's list of case studies organized by temporary, temporary-to-permanent (temp-to-perm), and permanent housing.

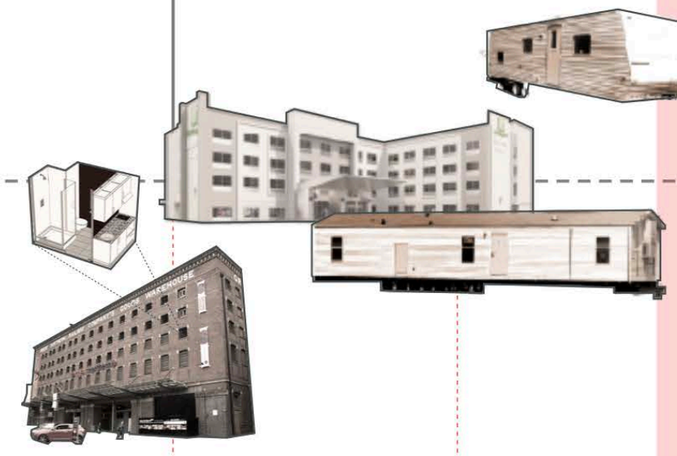
The following is a general timeline of housing activities that occur before, during, and after a natural disaster (activities and processes change based on a myriad of disaster conditions). Layered on this timeline are the fourteen design considerations that are evaluationed and given a strategic hierarchy based on project goals.

strategic footprint

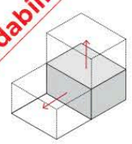


DISASTER EVENT

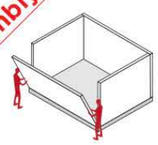
STORAGE + EXISTING ASSETS
This pre-disaster phase includes storage of housing components and assets. This may include storage of housing trailers, assemblies, equipment, and valuable building stock for relief and recovery housing. Building stock may include rental properties, apartments, hotel room availability, and so forth.



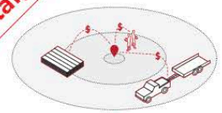
expandability



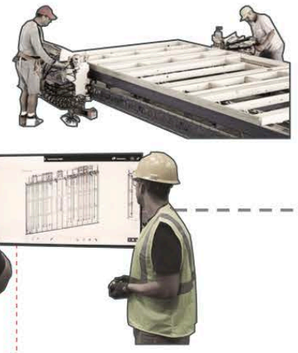
disassembly



economic catalyst

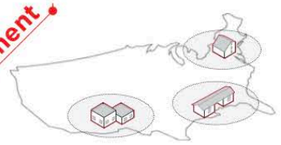


cost of construction

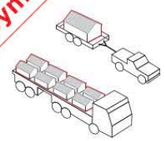


MANUFACTURING
Following a disaster event, manufacturing and construction of sheltering structures begins. This may start off-site in a facility and on-site following rescue efforts and debris removal.

environment

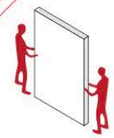


ease of deployment

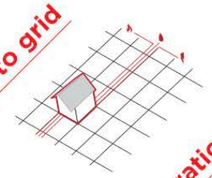


DEPLOYMENT
Housing deployment typically occurs within a few days to a few weeks following a disaster event. This activity follows rescue missions, debris removal, and approval for FEMA assistance. Deployed relief housing may be temporary or a temporary-to-permanent strategy.

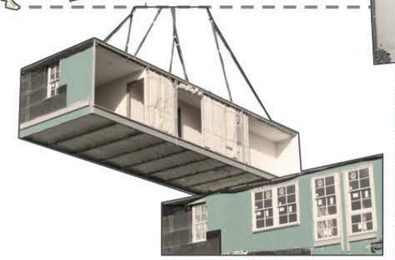
ease of construction



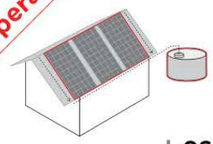
connection to grid



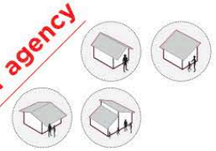
CONSTRUCTION
Construction may require hours or weeks dependeing on the methods, scope, and goals of the housing project. Relief housing often takes between hours and days to construct, where recovery, or long-term housing, may require months. This can be expedited by overlapping on-site and off-site construction as well as designing for incremental growth.



off grid operation



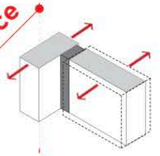
owner agency



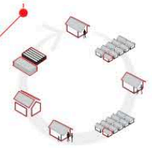
OCCUPANCY + USE
Once construction is complete, the housing unit will be used by survivors. Relief housing is typically used anywhere from a few weeks to 18 months. In some instances, relief housing accidentally becomes permanent, though it is rarley designed to perform in this manner. When possible, temporary housing should have the option of becoming permanent.

timeline to occupancy

resilience



durability



This mapping illustrates the nine tipping points presently experienced by the global community. While the map is included in section 01: Unresilient Futures, it seemed pertinent to also include here as a framing for disaster events and the need for resilient housing artifacts, programs, and systems.

80°0'0" N
60°0'0" N
40°0'0" N
20°0'0" N
0°0'0"
20°0'0" S
40°0'0" S
60°0'0" S

Greenland ice sheet disintegration
permafrost lost
West Antarctic ice sheet disintegration
Atlantic meridional overturning circulation breakdown
Indian monsoon shift
West African monsoon shift
Boreal forest shift
Amazon Rainforest die back
mass coral reef die off

LONDON
13% 8%

NEW YORK
23% 13%

DHAKA
38% 6%

TOKYO
30% 16%

SHANGHAI
76% 39%

HONG KONG
46% 31%

MUMBAI
50% 39%

CALCUTTA
51% 24%

HANOI
60% 30%

JAKARTA
22% 12%

RIO DE JANEIRO
24% 13%

BUENOS AIRES
19% 8%

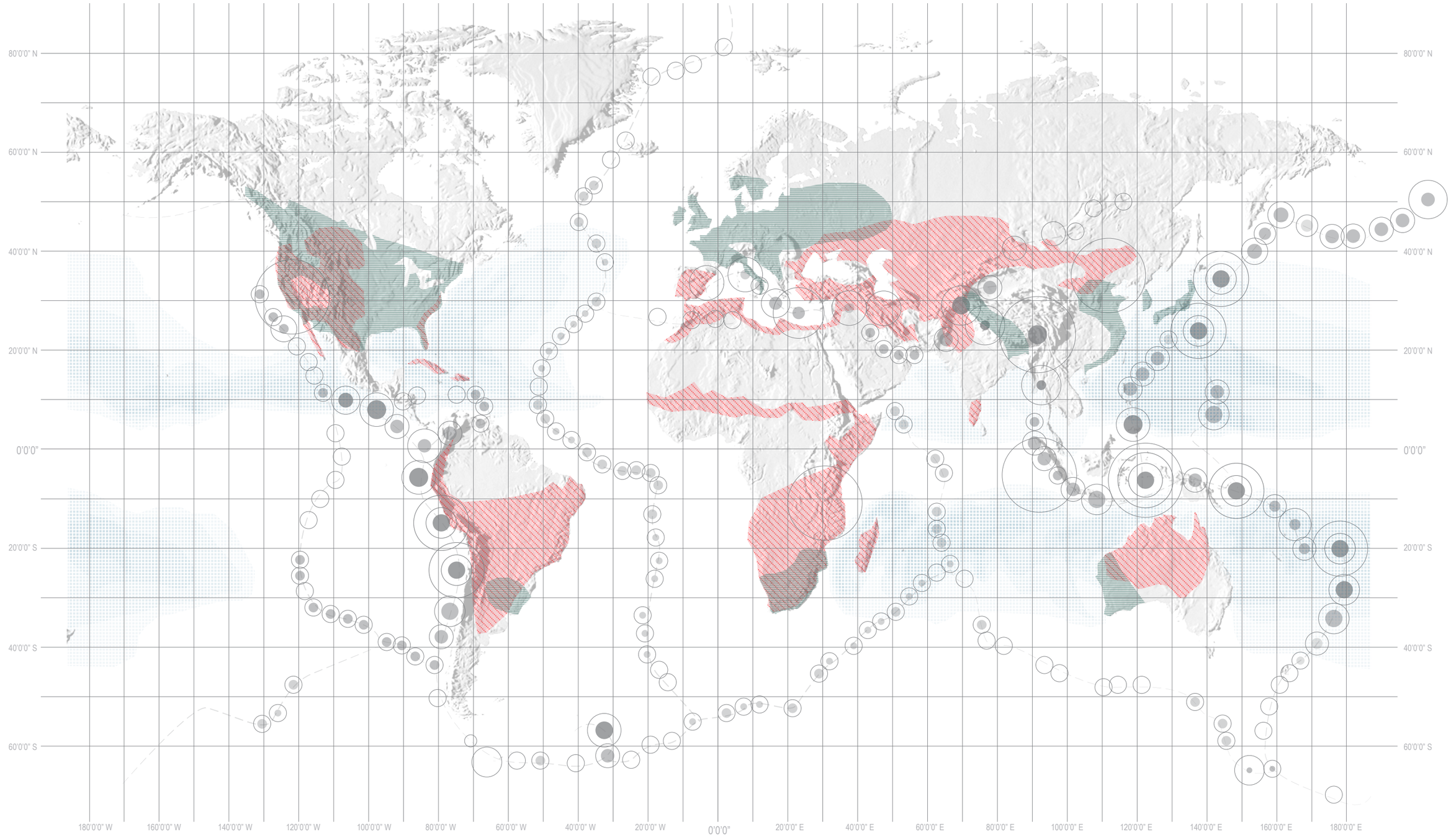
melting
biome shift
circulation change
2°C warming
4°C warming
low sea level rise
medium sea level rise
high sea level rise

SOUTHEAST UNITED STATES

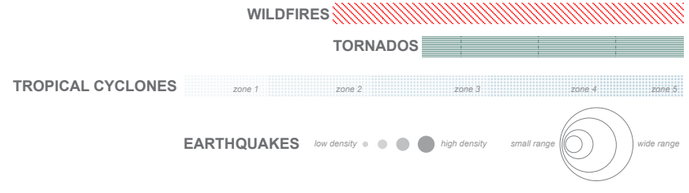
NORTHERN EUROPE

SOUTHEAST ASIA

180°0'0" W 160°0'0" W 140°0'0" W 120°0'0" W 100°0'0" W 80°0'0" W 60°0'0" W 40°0'0" W 20°0'0" W 0°0'0" 20°0'0" E 40°0'0" E 60°0'0" E 80°0'0" E 100°0'0" E 120°0'0" E 140°0'0" E 160°0'0" E 180°0'0" E



The above mapping indicates natural disaster types by geographical location. The earth's systems dictate disaster epicenters, and many locations are plagued by an overlapping of multiple typologies. Additionally, there have been extreme shifts regarding territories of certain disasters. For instance, not only does tornado alley continue to expand in North America, over recent years, Europe has started experiencing robust torando events.



03

BEST PRACTICE

INTRODUCTION

This section provides twenty-one historic and contemporary post-disaster housing case studies. While the list is not exhaustive of all noteworthy housing examples, the following were selected based on their contribution to the following criteria:

1. historic significance and groundwork for contemporary post-disaster housing
2. successful implementation as a built project
3. innovative response to social, cultural, political, economic, and/or environmental needs
4. international significance, especially in areas less represented in existing literature

Case studies are discussed on the following pages and organized into three categories based on project achievement regarding post-disaster reconstruction: temporary, temporary-to-permanent (temp-to-perm), and permanent housing. Each project is evaluated based on the fourteen design considerations outlined in the previous section. Especially successful areas of the project are further illustrated through drawings and diagrams to display layered design goals.

While researching post-disaster case studies, a number of findings became evident. First and foremost, successful projects are not a formula, and there are no single solutions to housing. Each event has a range of constraints that continuously alter based on location, disaster event, climate and environmental conditions, culture, politics, local and global economies, and more. In short, post-disaster housing is, by nature, a wicked problem - a type of problem having a myriad of interdependent factors causing design responses to be especially insurmountable due to incomplete, contradictory, and changing requirements that are simultaneously difficult to observe and measure. While wicked problems are especially challenging to overcome, they can be mitigated. If the needs and limitations of a community are identified prior to a disaster event and that community is engaged in all aspects of the reconstruction process, successful post-disaster housing and resilience efforts, in general, are more likely.

Another research finding is successful projects have a clear strategy for where the particular housing project falls on the reconstruction timeline. Projects included on the following pages incorporate design strategies focused on: 1) temporary housing during the disaster relief period, 2) permanent housing during the disaster recovery period, and 3) some projects bridge relief and recovery through a temporary-to-permanent model. The disaster or emergency relief period follows search and rescue efforts and precedes the disaster recovery phase. It can be understood as the period of time when communities, emergency management personnel, and non-governmental organizations meet basic human needs of food, water, shelter, and medicine as well as conduct initial community recovery assessments. The time required for disaster relief depends on the magnitude of the disaster, the preparedness of the country, the vulnerability

and accessibility of the affected location, and the resources that are immediately or locally available. Alternatively, the disaster recovery phase is divided into early recovery and medium- to long-term recovery, and it precedes community disaster-risk reduction efforts. The recovery phase is best identified as the period of time when permanent structures replace temporary ones, and individuals resume normal, or begin "new normal" activities such as returning to places of employment and children attending to school.

Post-disaster housing focused solely on permanent housing prioritizes design considerations such as co-designing with homeowners and end-users, integration of local building code standards and zoning policies, empowerment of the local economy, and incorporation of social and cultural practices. Conversely, projects focused on temporary housing may minimize these design considerations preferring project goals of quick deployment, ease of assembly and installation, and off-the-grid renewal energy sources. Rapido, by bcWorkshop, is an example of housing bridging relief and recovery as it offers homeowners a temporary housing option, and if desired, a long-term housing solution. The project is an exemplary case study for temp-to-perm housing due, in part, to clearly separating the temporary, panelized module, called the CORE, and the optional stick-frame construction expansion for a permanent housing solution. It is recommended that each project clearly delignate what it aims to achieve, where it exists on the reconstruction timeline, and any omissions that should be accounted for by planning officials.

A third conclusion that must be acknowledged is successful projects integrate environmental and social nuances of the place and people. Every phase in the reconstruction timeline must incorporate and be led by survivors and the local community. *Safer Homes, Stronger Communities: A Handbook for Reconstructing after Natural Disasters* states that a primary guiding principle of post-disaster housing and community reconstruction is fostering community members to be partners in policy making and leaders of local implementation. It argues that those impacted by the natural disaster are first responders with robust capacity to guide reconstruction, contribute local knowledge, and witness the realization of their reconstruction aspirations. Additionally, making community members partners in reconstruction aids psychosocial recovery and social cohesion. The temp-to-perm and permanent housing examples of Rapido by bcWorkshop, Sheeshead Bay by Gans and Co, and the Kirinda Project by Shigeru Ban prioritize co-designing recovery housing with stakeholders and end-users for long-term resilience.

Likewise, short-term, temporary housing projects also benefit from the integration of local knowledge. For instance, Shigeru Ban's Onagawa Container Temporary Housing responded to Japan's 2011 earthquake and prioritized the social needs of occupants through two primary means. First, Ban incorporated local and historical Japanese spatial sensibility through designing "universal spaces" or spaces accommodating programmatic needs via strategic furniture arrangement, lighting conditions, and movable curtains and screens. Additionally, centralized community services were provided to meet the temporary needs for markets, workshops,

and community centers. Providing opportunities throughout reconstruction for those impacted by the disaster to participate and even lead recovery efforts helps communities bounce back faster and more resiliently.

A final thought that must be highlighted in this section's introduction is the critical need for post-disaster housing teams to be interdisciplinary in nature, including, but not limited to, designers, manufacturers, contractors, emergency management personnel, and policy makers. As acknowledged previously, wicked problems reside at the nexus of multiple, interdependent challenges. If wicked problems such as post-disaster housing and community reconstruction are to progress, establishing interdisciplinary teams responding to interdependent systems is prudent. Even in our current age of hyperspecialization, it is paramount that knowledge and expertise be shared across disciplines and sectors to inform complex projects with layered goals and objectives.

Especially during disaster planning phases prior to an event when time and resources are less critical, it is paramount that experts think and work in an interdisciplinary manner. At a minimum, collaboration should occur between the disciplines listed above in order that strategic recovery efforts are informed with robust expertise and may commence immediately following an event. Items to be coordinated in advance may include but are not limited to: 1) identifying teams, 2) identifying types of disasters likely to occur and implications on housing design, 3) social and environmental considerations particular to a place, 4) building and energy codes, 5) funding opportunities and budgets. The more a community can identify and coordinate prior to an event, the more likely it is for survivors to occupy housing faster and for housing to appropriately meet needs.

Over the past three decades, there has been growing interest from architects and designers to find innovative responses to the complexities of post-disaster housing. With educational backgrounds in design thinking, ideation, and iterative problem-solving methods, designers should seek opportunities to help guide housing efforts. Only a few of a long-list of exceptional architects are included on the following pages; however, there are a myriad of new, noteworthy post-disaster housing projects being designed and built every year. Unfortunately, this book does not have the capacity to note all instances. Each new project builds upon the successes of predecessors and enhances our understanding of housing possibilities as well as their inherent challenges. While researching the following case studies, I was struck by the thoughtfulness and brilliance of each housing example as each case study illuminates another aspect of or approach to post-disaster housing. Undoubtedly, the future holds growing challenges in terms of climate change, sea level rise, social cohesion, and severity of natural disaster events. While we have enormous work ahead of us, we have a wealth of knowledge and lessons learned from which we can draw. Certainly, there have been mistakes, but these pages note some of the many housing successes. If we are committed as local and global citizen-architects, we can learn methods and procedures for responding smarter at a time when it is needed most.

03.01.03
exo

REACTION HOUSING

"Design has this tremendous potential to help people, and companies that are focused on using design to help humanity in a positive way, can be extremely powerful forces for good." -Michael McDaniel

In 2005 when Hurricane Katrina hit New Orleans, approximately 20,000 people sheltered in the Louisiana Superdome for six days. The city housed residents within the mega-structure during and immediately following the disaster event, and while the stadium protected survivors from the event and aftermath, it regrettably had no air conditioning, no showers, no additional toilets, and few on-site supplies. The conditions were so extreme that the Los Angeles Times called the situation "a sweltering cesspool of human misery."[1] Upon witnessing the catastrophe and controversial response strategy, Michael McDaniel founded Reaction Housing and began developing what is now the EXO – an innovative temporary housing strategy for survivors.

Inspired from a sleeve of Styrofoam coffee cups and lids, the Exo is a two-component, stackable housing unit. McDaniel sought a design that could be stackable, easily assembled and disassembled, provide survivors reasonable comfort during the sheltering and immediate relief time periods, and be feasibly manufactured. Regarding these goals, Reaction Housing has developed a successful, though untested, alternative model for temporary housing.

The EXO is manufactured in two, easy to assemble components. This allows the unit to be lifted and assembled by a team of four, compactly stored prior to and following a disaster event, and multiple units can be deployed as a prefabricated flat-pack. Approximately sixteen units can be shipped on one 53-foot (16m) semi-truck trailer or on one C-130 Hercules plane, and 1,940 units can be transported cross-country on a freight train providing housing for 7,760 newly homeless persons.[2] Individual units can be installed and modified to provide living, office, individual, or interconnected spaces, as required. Additionally, individual structures can be sited to respond to the local landscape, culture, and other contextual conditions.

Other features include the capacity to house up to four individuals through single, fold-out beds, inclusion of portable power generators supplying electricity to units via magnetic connection clips, and the ability to set-up an entire climate-controlled camp within hours. McDaniel wanted units to provide ample occupant comfort to relieve environmental stress immediately following a disaster event. To meet this aim, units offer air-conditioning, device charging, a weather radio, the ability to separate spaces through interconnected units, and lockable doors for increased security. Additionally, walls are constructed from a proprietary blend of metal and plastic that is engineered to be recyclable and slightly translucent. These semi-translucent walls increase interior daylighting, which as research indicates, improves occupant health.

Currently, one Exo costs USD $5,000 (2022) and can be reused multiple times. It arrives on-site with foldable furniture in place, and while it is designed for larger group sites, its compact design can fit within most residential lots while the existing house is repaired. By comparison, one FEMA trailer costs approximately $65,000 (USD 2022) for a four-person household set-up and requires 90-days to arrive on-site.[3] Many individual lots cannot accommodate the larger HUD-certified FEMA trailers.

While Reaction Housing's primary mission is to provide shelter for disaster survivors, the company is currently developing housing for the private sector as they scale-up and make systematic refinements. It remains unclear who will fund storage of the sheltering system when not in use and if the $5,000 price-point is feasible for the non-profit sector. Only catastrophic events at the level of a Hurricane Katrina require temporary units as it is typically more comfortable and economical to utilize local hotels, schools, and churches. Storage periods between events could be quite lengthy, though if climatic patterns persist, we may be witnessing more severe events more frequently in the future. Nevertheless, the EXO is a commendable example of temporary housing. As Michael McDaniel stated, "design has this tremendous potential to help people, and companies that are focused on using design to help humanity in a positive way, can be extremely powerful forces for good."[4] We look forward to seeing how the EXO increases resiliency for communities in the future.

One of the more inspiring aspects of Reaction Housing's EXO is the project's designer and founder, Michael McDaniel. He sought to solve an obvious, wicked challenge without previous manufacturing and entrepreneurial experience. In the end, he not only designed a feasible response, he designed an entirely new business model.

03.01.03
exo

DESIGN CONSIDERATIONS

- timeline to occupancy
- ease of deployment
- ease of construction
- cost of construction
- ease of disassembly
- owner-driven design
- strategic footprint
- expandability
- connection to grid
- off-the-grid operation
- economic catalyst
- environmental appropriateness
- cultural appropriateness
- durability
- resilience to acute shocks

timeline to occcupancy

If EXO is prefabricated prior to a disaster event, it can immediately be deployed to sites, only requiring hours or a few days to set up. This method calls for pre-disaster planning, storage facilities, and third-party funding. Manufacturing following an event requires 6-8 weeks, plus time for deployment and installation.

ease of deployment

The prefab EXO is easily deployed to site. It is light enough to be transported on a standard truck trailer and compact enough to be shipped by semi-truck, cargo plane, or freight train. Once on site, components can be installed by a small team.

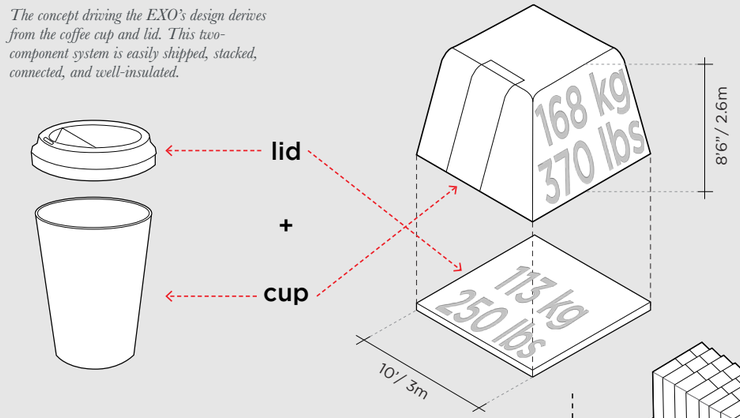
ease of construction

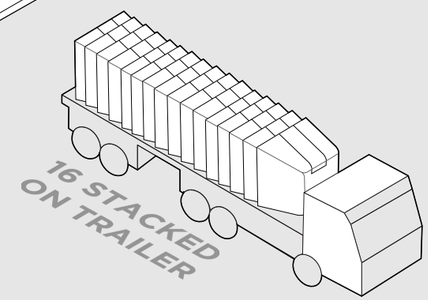
One EXO unit arrives on site in two, easy to maneuver components - the top (walls roof, and doors) and the bottom (flooring). Components are assembled in a straightforward manner in hours by a 4-person team, and an entire climate-controlled site can be constructed within hours to a few days.

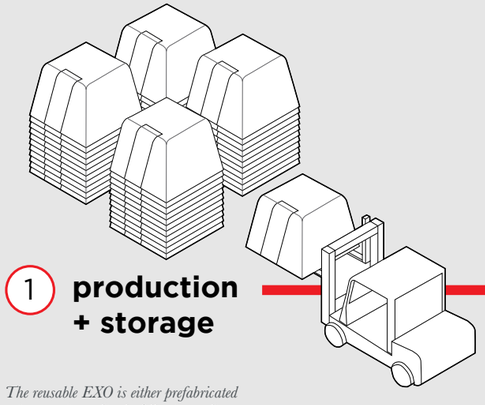
off-the-grid operation

If a group site includes portable power generators or renewable power sources, electricity can be supplied to units via magnetic connection clips. One success of the Exo unit is prioritizing occupant comfort through fully air-conditioned and powered units.

The concept driving the EXO's design derives from the coffee cup and lid. This two-component system is easily shipped, stacked, connected, and well-insulated.



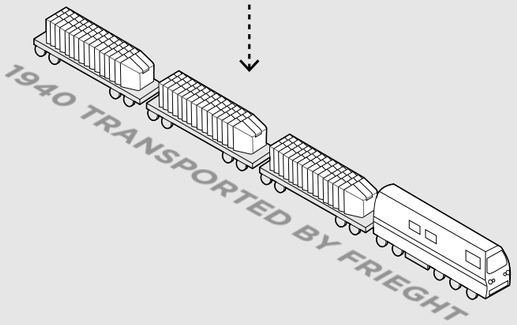




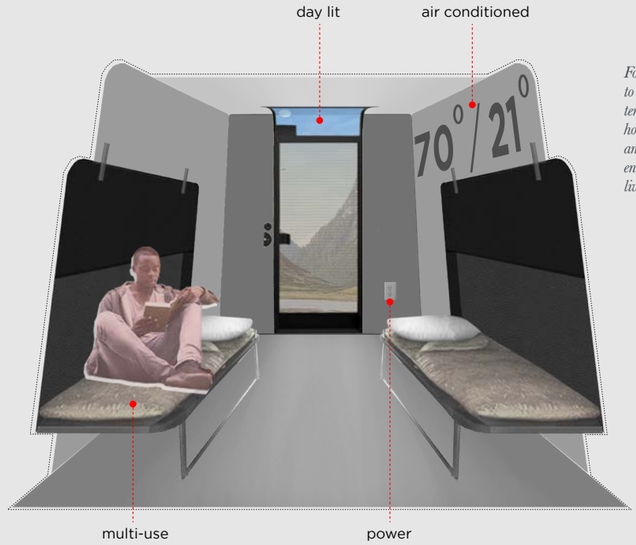
1 **production + storage**

DISASTER EVENT

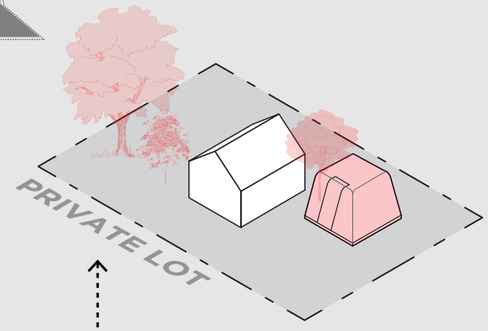
2 **deployment**



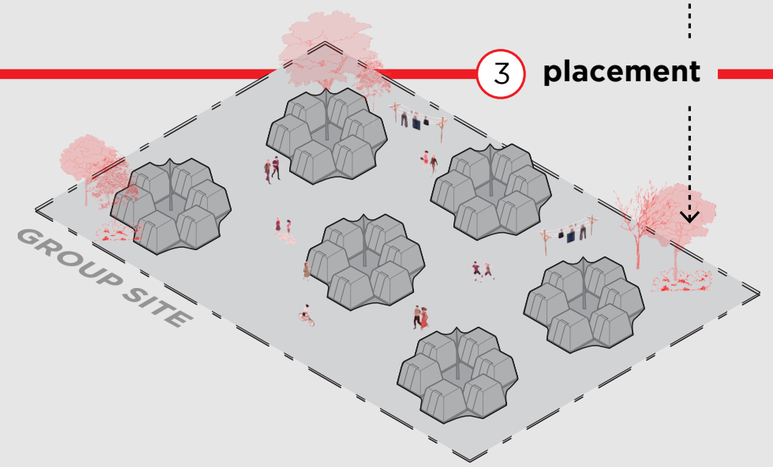
The reusable EXO is either prefabricated prior to or immediately following a disaster event. Easily and compactly shipped, it can be arranged on a group site in a communal organizational pattern or individually placed on private lots while existing homes are repaired.



For Michael McDaniel it was paramount to consider human comfort in designing temporary housing. Individuals and families housed in EXO are recovering from trauma, and to bounce back faster, a comfortable living environment for healing and reestablishing livelihoods, is critical.



3 **placement**



03.01.06
onagawa container

SHIGERU BAN + Voluntary Architects' Network (VAN)

In 2011 a 3.11 earthquake and tsunami impacted Onagawa in the Miyagi Prefecture destroying approximately 4,000 homes or 40-percent of the residential buildings.[1] Onagawa was faced with the challenge of constructing affordable, temporary housing due to the extreme topography of the area. The Voluntary Architect's Network (VAN), an assemblage of architecture students founded by Shigeru Ban to support tsunami survivors, developed a proposal for stacking units and minimizing the necessary building footprint area. The primary goal of creating affordable, well-constructed temporary housing that accommodates daily needs guided the design process. The following discusses Shigeru Ban's main design strategies, shipping container structures and their seismic-resistance, and how the Pritzker-Prize winning architect's design theories influence the project.

Because the topography does not allow for multiple slab-on-grade residential units, as is typical for temporary post-disaster housing, Shigeru Ban Architects conceived of three-story stacked, multi-family housing accommodating 190 households. This not only minimizes required building footprints, it additionally increases housing density and conserves land for centralized community needs such as markets, workshops, and community centers.[2] As daily needs were inaccessible for residents at the temporary baseball field site, it was paramount that the design include community services. These social spaces could be used by residents for selling goods and services, as needed, especially during a time when income sources may be reduced. Additionally, because temporary disaster housing is, by nature, impermanent and frequently makes use of simplified, repetitive housing forms, shipping containers became an obvious option for SBA.

Shipping container micro-housing has become a trend of the millennium as society looks for affordable housing that meets monumental demand and adaptively reuses this plentiful, industrial product. While frequently critiqued for their lack of durability and size constraints, Shigeru Ban Architects found a convincing affordable, short-term application. In the coastal area of Onagawa, shipping containers are plentiful and their adaptive reuse reduces the overall construction schedule to two and a half months. When constructed in a "checkerboard pattern," shipping containers provide unit sizes of 20'x16'(6m x 4.8m), feasible housing unit dimensions aligning with government emergency guidelines.[3] In this project, units are prefabricated wood and steel structures that are deployed to the site and craned into place. When erected, they comprise a 'checkerboard pattern' assemblage of in-fill units and voids that are highly seismic-resistant. Additionally, the void spaces provided between each container creates daylit living spaces using large, in-fill glazing while the solid exterior surfaces are clad with colorful fiber-cement panels.[4]

The 190-unit housing development offers three apartment types based on household needs. These include a 1-2 person, studio unit at 65ft2 (20m2), a 3-4 person, 1-bedroom unit at 97ft2 (29m2), and a 5+ person, 2-bedroom unit at 130ft2 (40m2).[5] Each apartment is equipped with electrical and plumbing systems and offers ample storage. Because the units are compact, standard furnishings could not be accommodated. Instead, furniture and storage shelves were constructed by students of the Volunteer Architects Network (VAN) or donated by companies. They were then installed in each room to maximize floor space, provide additional storage, and reallocate household resources typically spent on these items.[6] Finally, Shigeru Ban's housing cannot be discussed without noting how design theory influences spatial design. Compact, temporary housing design demands multi-use spaces that can transform to accommodate a range of needs. Ban's approach has a Japanese sensibility and heritage as he creates 'universal spaces' that accommodate occupant needs through calculated furniture arrangements, nuanced lighting conditions and moveable curtains and screens.[7] From these slight yet strategic design choices manifest an invisible spatial domain that provides households agency over housing design.

When we think of architects of this century who have worked in service of the masses, Shigeru Ban is one who immediately comes to mind. He has created a robust portfolio of post-disaster housing projects that respond thoughtfully to societal and environmental conditions. He clearly articulates his ever-present desire to create beautiful buildings, even in disaster areas. He states, "I want to move people, and I want to improve people's lives."[8] No doubt he has and will continue to achieve that mission as the Onagawa Temporary Container Housing is one case study establishing a new benchmark for temporary survivor housing.

After a 2011 earthquake and tsunami devastated Onagawa, Shigeru Ban Architects and VAN reused an existing baseball field and abundant shipping containers to create temporary, higher density (190 units) housing to meet mammoth demand. The temporary housing settlement also provided centralized community services for survivors.

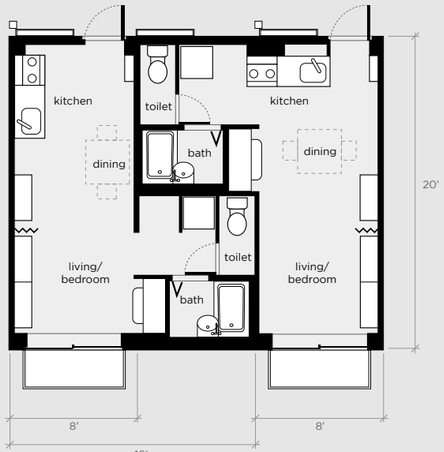
03.01.06
onagawa container

DESIGN CONSIDERATIONS

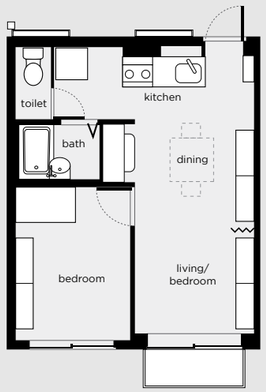
- timeline to occupancy
- ease of deployment
- ease of construction
- cost of construction
- ease of disassembly
- owner-driven design
- **strategic footprint**
- expandability
- connection to grid
- off-the-grid operation
- economic catalyst
- environmental appropriateness
- **cultural appropriateness**
- durability
- **resilience to acute shocks**

floor plan types

studio (1-2 persons)

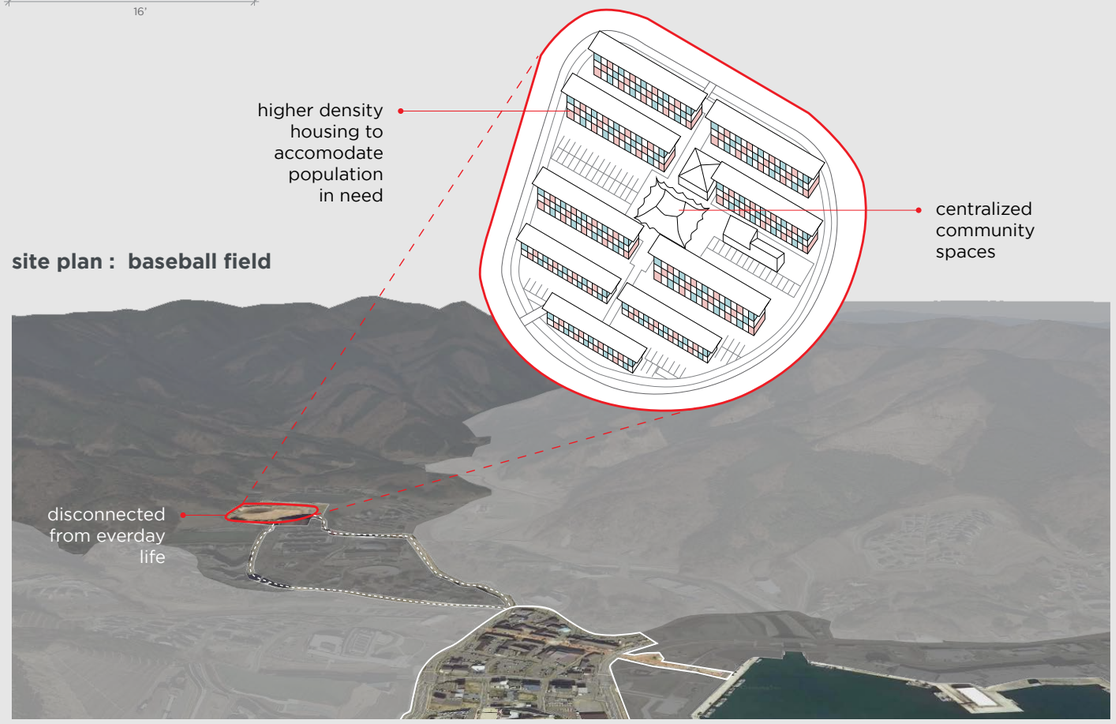


1-bedroom (3-4 persons)



2-bedroom (4+ persons)

site plan : baseball field



● strategic footprint

Topographic constraints required temporary housing to be sited on a baseball field and stacked to increase density and reduce required land. Because the site was removed from daily necessities, the design included a market, community center, and workshop.

Spatial constraints of each unit could not accommodate standard furniture, therefore the Voluntary Architects Network (VAN) assembled and installed furniture and shelves in each room to maximize floor area and increase storage.

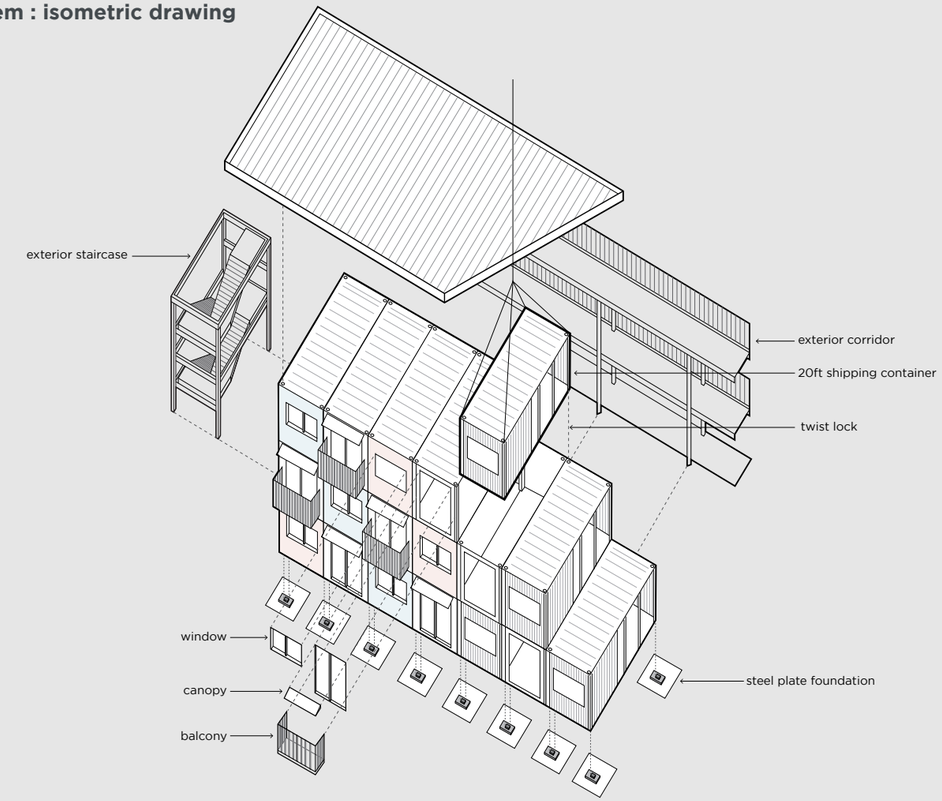
● culteral appropriateness

Shigeru Ban's use of a calibrated open floor plan allows for a diversity of uses within a limited square footage (or meterage). As stated in *Shigeru Ban,* "'Universal space' may seem quite unrestricted at first glance, but in fact precisely calculated, and arranged furniture create a thoroughly calculated, invisible spatial domain."[9]

● resilience to acute shocks

Shipping containers were organized in a "checkerboard pattern" with "twist-lock" detailing, which provides excellent seismic performance. While the housing is intended for temporary use, the resilient structural system may have long-term applications.

structural system : isometric drawing

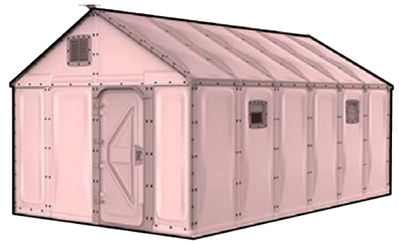


interior views

03.01.09 better shelter

IKEA + UNHCR

"…the Better Shelter is a real improvement – from its flexibility to it being the only shelter of its kind you can actually stand up in. It's big enough for children to do homework in and adults to do some kind of home-based enterprise. It offers a chance for basic, dignified living." Dr. Tom Corsellis



In 2019, natural disasters triggered 25 million new displacements, and a changing climate indicates this number will only increase in coming years.[1] Recognizing this looming challenge and great humanitarian need, UNHCR and the IKEA foundation partnered with Johan Karlsson, Dennis Kanter, Christian Gustafsson, John van Leer, Tim de Haas, and Nicolo Barlera to develop what is now known as the Better Shelter.[2] This temporary housing system provides shelter for displaced families through prioritization of occupant safety and an infrastructure promoting health, protection, and education. Since its original development, the Better Shelter has provided 65 million shelters distributed worldwide and garnered multiple awards including the 2016 London Design Museum's Beazley Design of the Year.[3] The sheltering system sought to improve typical tent refugee housing as displaced persons often reside in refugee camps for multiple years. In fact, UNHCR estimates that there are now 2.6 million refugees who have lived in camps for over five years, and some for more than a generation.[4]

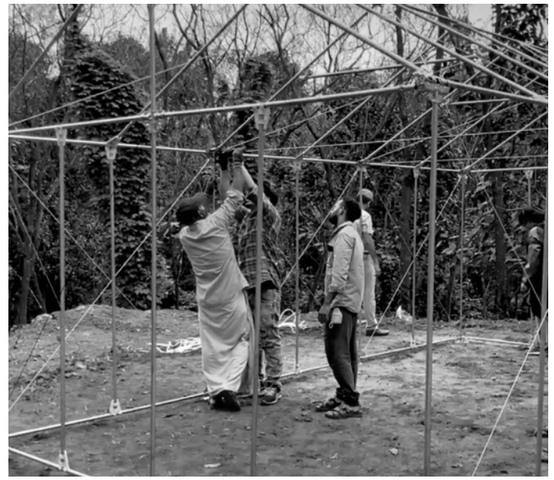
Noteworthy achievements of the Better Shelter include durability, ease of deployment and installation, occupant comfort, overall cost, and the adaptability of the modular structure. In terms of durability, IKEA's design lasts six-times longer than a typical emergency tent and up to three years. Similar to the furniture giant's picture-based assembly instructions, the unit arrives flat-packed with an infographic-based instruction guide. In lieu of the ubiquitous Allen wrench, assembly requires a hammer and no extra tools, and one unit can be installed within four-hours by a small team. Due to its modularity, a family can disassemble the structure, and take the shelter with them, applying local materials to the existing framework.

In addition, the Better Shelter meets occupant security and comfort by providing a lockable door, firm anchoring to the ground with a groundsheet or concrete slab, and a stab-proof exterior wall assembly, which is a potentially life-saving feature unafforded by tent structures. The overall unit is 190ft^2 (17.5m^2) that can be configured to accommodate housing, small clinics, or temporary schools, as needed.The structure consists of a steel frame clad with insulated lightweight polymer panels that further increase thermal comfort. An optional roof or wall solar panel system can be integrated into the design to provide hours of electric light or mobile phone charging via a USB port. [5]

One Better Shelter is an affordable USD $1,250 (2022). Although this is two-times the cost of a typical emergency tent, its lifespan averages six-times longer.[6] When used the full three years, the plastic panels begin to degrade, and due to the structure's modularity, the streel frame can be reclad with locally-sourced materials. In many scenarios, the original frame contains additions that reflect the needs of different households.

As of 2021 Better Shelter provided 60,000 shelters to 60 countries.[7] The Better Shelter provides an affordable, easy to deploy and easy to construct option that can somewhat adapt to local conditions. As Dr. Tom Corsellis, executive director of NGO Shelter Centre, states, "…the Better Shelter is a real improvement – from its flexibility to it being the only shelter of its kind you can actually stand up in. It's big enough for children to do homework in and adults to do some kind of home-based enterprise. It offers a chance for basic, dignified living."[8]

At first glance, these rather simple structures may appear rudimentary; however, flat-packing an insulated shelter that is lightweight, adaptable, and easy to install with simple tools and a small team, is profound. While the Better Shelter is funded through UNHCR, it has been used internationally for post-disaster, temporary housing.



03.01.09
better shelter

DESIGN CONSIDERATIONS

- timeline to occupancy
- **ease of deployment**
- ease of construction
- cost of construction
- ease of disassembly
- owner-driven design
- strategic footprint
- **expandability**
- connection to grid
- off-the-grid operation
- economic catalyst
- environmental appropriateness
- **cultural appropriateness**
- durability
- resilience to acute shocks

ease of deployment

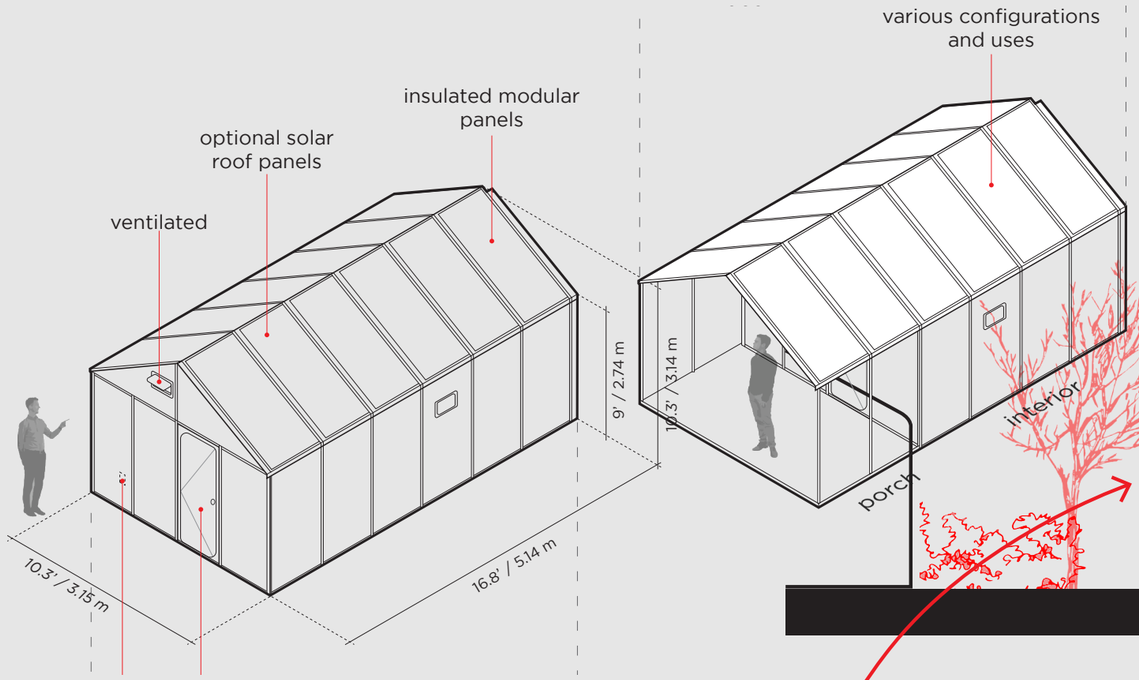
It makes sense that UNHCR would partner with IKEA for designing, fabricating, and shipping temporary shelters. IKEA, and industrial designers, in general, are masters at designing products for shipment and assembly. Together, they created a lightweight assembly that can be flat-packed to site and assembled with simple tools by individuals without constructionn skills.

expandability

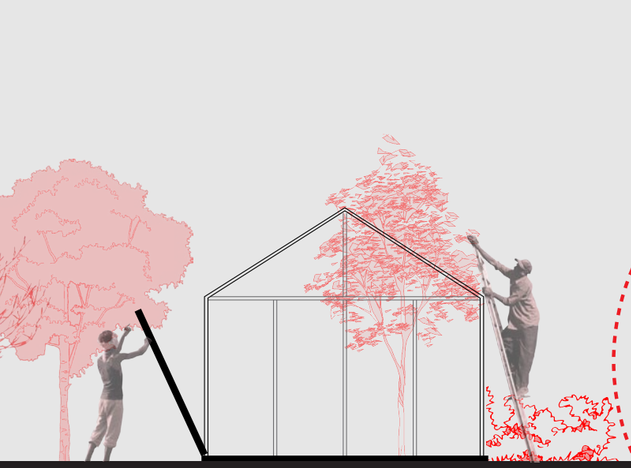
The Better Shelter is designed to be adaptable for various uses including housing, schools, and clinics, as well as opportunities for recladding with locally-sourced materials. The units, due to their modularity and variability, have taken on even more diverse implementations from courtyard and restroom block configurations, to front porches, to clinics via conglomerated units.

cultural appropriateness

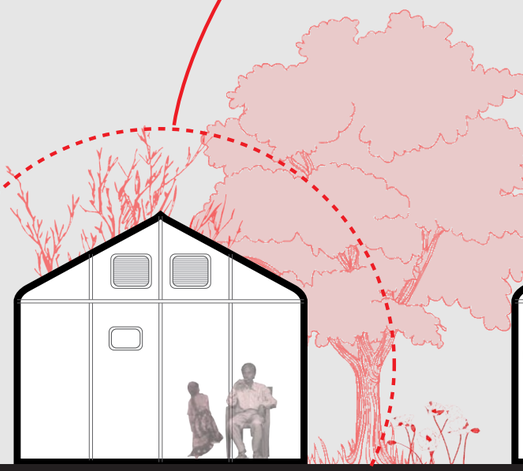
It is surprising that this “one-size-fits-all” unit could accommodate cultural appropriateness; however, compared to its tent alternative, the Better Shelter provides security and adaptability based on cultural and religious needs. What separates this from many modular assemblies is the ability to alter the gridded structure and shell to meet individual and societal needs. The structure is easy understood and alternations can be made with minimal construction knowledge.



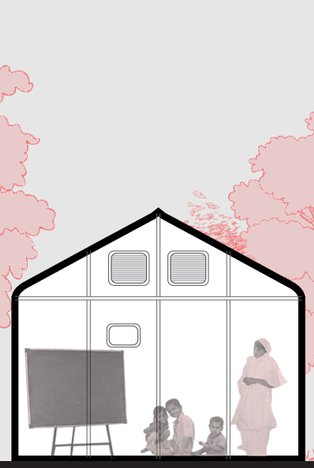
separately installed bathrooms in shared space



4 hour installation by team of 4



home



school

clinic

03.02.01
rapido

bcWORKSHOP

"RAPIDO is a temporary-to-permanent housing model focused on decreasing displacement by providing housing within the property boundaries of an owner's lot."

After Hurricane Harvey, a devastating Category 4 hurricane, hit the United States' Gulf Coast of Texas in 2017, catastrophic flooding ensued. At USD $125 billion in damage, it is one of the costliest tropical cyclones on record. This is primarily due to the massive rainfall and flooding in the Houston metropolitan area and Southeast Texas, some areas receiving nearly 50-inches (127cm) of rainfall over a four-day period.[1]

Following this destructive event, RAPIDO emerged with a holistic disaster recovery housing program for families affected by the storm. RAPIDO is a temporary-to-permanent housing model focused on decreasing displacement by providing housing with the property boundaries of an owner's lot.

To accomplish this, several key systems were integrated:
+ community outreach
+ case management
+ housing design & construction
+ labor recruitment & resource deployment

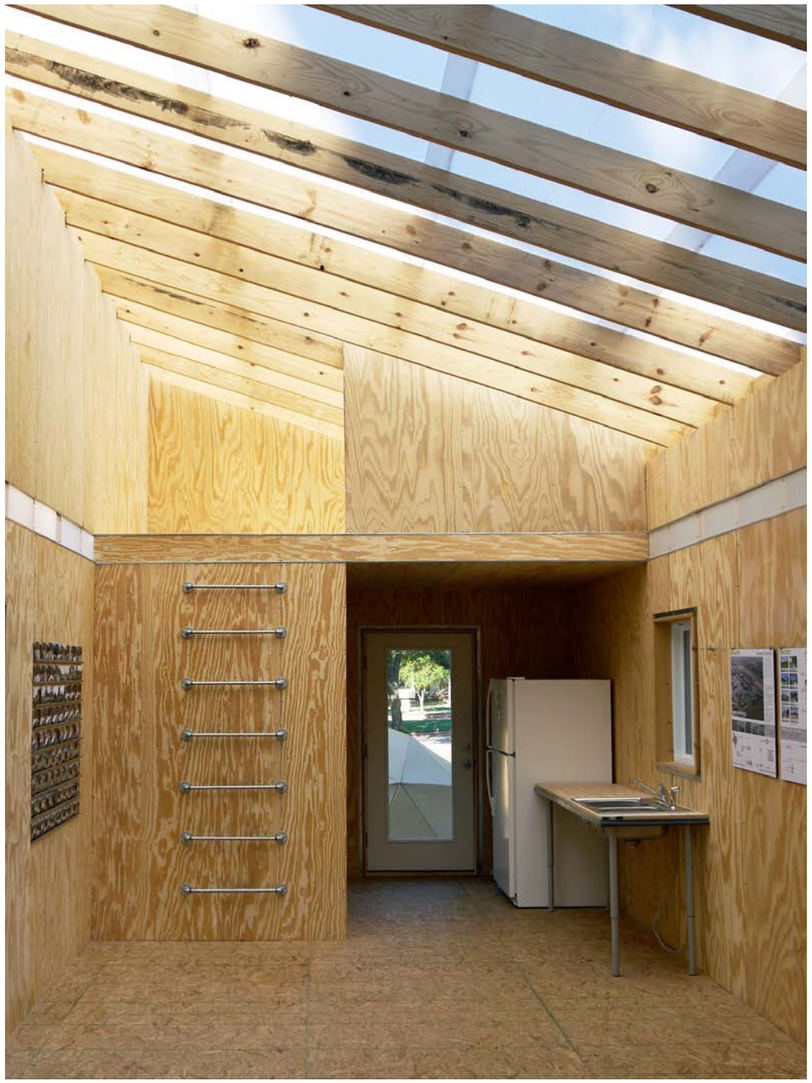
Approaching the complexities of post-disaster housing through the lens of various systems builds long-term capacity and provides opportunity for residents to return to their home within 12 to 20 weeks following a disaster event.[2]

RAPIDO resolved on a temporary-to-permanent housing model for two primary reasons: it is quick deployment housing that accommodates future long-term use, and it provides owner agency and choice. First, temporary-to-permanent housing provides minimal housing requirements: conditioned kitchen, bathroom, living spaces, and sleeping spaces while designing for future expansion, as desired. This compact, smart housing model reduces the timeline to occupancy and allows many families to remain on their household property. This not only relieves the burden placed on group site infrastructure, it allows property owners to readily oversee reconstruction on existing property (e.g. damaged housing structures), and stay connected to existing neighborhoods and support networks. Another broadly recognized advantage of the temporary-to-permanent housing model is the element of choice afforded to disaster survivors. After a disaster event, many impacted homeowners are not ready to make long-term mortgage investments for a new home. Temp-to-perm housing can be only temporary and returned to the provider once an existing home is repaired and inhabitable or a new home is acquired. If desired, the temporary, or as RAPIDO calls it, CORE model is desired, it can be become a household's long-term dwelling and expanded upon, as needed.[3] The opportunity for increased agency for survivors is advantageous.

RAPIDO's overwhelming success arises from its response to post-disaster housing through a holistic, integrated approach. Rejecting the architect's role relegated to solely building designer (although that is more than enough), bc WORKSHOP recognizes that wicked, complex problems require complex responses. As such, they broaden their efforts from housing designer to participating in and advocating for civic engagement, education, and housing policy. This multiplicity allows for: owners to engage in participatory design, local industry, such as building materials and labor, to benefit economically from reconstruction efforts, and decreased household displacement, which is advantageous for a community's ongoing resilience and a jurisdiction's tax base.[4] Specifically, a RAPIDO core unit costs less than 12-months of housing in a FEMA temporary shelter, which ranges between $60,000 - $115,000). The CORE rejects outsourcing materials and labor by incentivizing the local economic through requiring two contractors, one electrician, and one plumber. Additionally, the CORE unit as well as expanded design options employ resilient design through resistance to high winds, flood mitigation, and installing required R-value insulation in envelope assemblies.[5]

Possibly, the greatest challenge for RAPIDO is the reluctance from governing bodies to create and maintain disaster preparedness guides and teams at local, state, and federal levels. The fact that how we respond to a natural disaster event is learned anew each time, is enough evidence to suggest this area is under-appreciated and under-funded. Models like RAPIDO provide more housing with tighter budgets, minimizes community displacement, honors the disaster survivor with opportunity for agency and choice, and increases resilience to future disaster events.

bcWORKSHOP created a temporary-to-permanent housing model that incrementally grows as a household requires. This model proves beneficial for post-disaster housing, affordable housing, and accessory dwelling units (ADUs).



The interior of an unexpanded CORE unit makes use of panelized assemblies to ease construction means and simplify disassembly. Additionally, plumbing for the restroom (to left of the door) and the kitchen is congregated at the entry to reduce intial and long-term construction costs.

03.02.01
rapido

DESIGN CONSIDERATIONS

- timeline to occupancy
- **ease of deployment**
- ease of construction
- cost of construction
- **ease of disassembly**
- **owner-driven design**
- strategic footprint
- **expandability**
- connection to grid
- off-the-grid operation
- economic catalyst
- environmental appropriateness
- cultural appropriateness
- durability
- resilience to acute shocks

ease of deployment

Rapido's CORE is comprised of panelized assemblies fabricated off-site and deployed by truck trailer by anyone with a standard driver's license. This allows survivors and volunteers to assist with deployment. Additionally, smaller vehicles can more readily navigate debris zones.

ease of disassembly

Rapido also considered disassembly of relief housing when the unit is no longer required. The CORE is detached from simple foundations and flat-packed for removal, storage, or reuse.

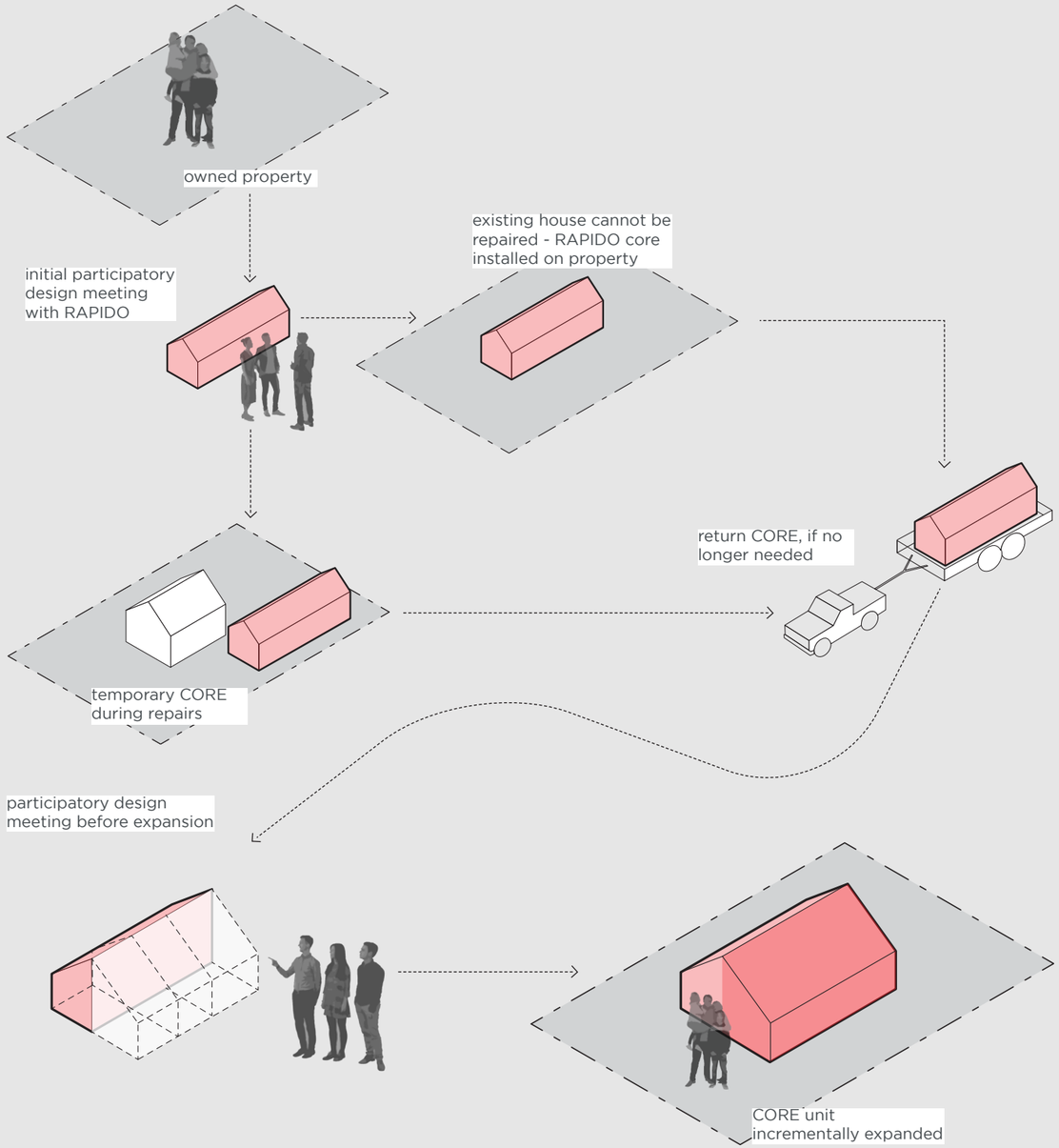
owner-driven design

Since Rapido offers a temporary-to-permanent housing model, residents are engaged in a participatory design process as they consider future expansion. It is critical for homeowners to be given agency in considering long-term housing needs and preferences.

expandability

Rapido designed the CORE unit to include much of the expanded housing's plumbing, electrical, and mechanical needs. By providing these more expensive and labor-intensive needs up-front, a household's expected future expansion costs are reduced and made more feasible.

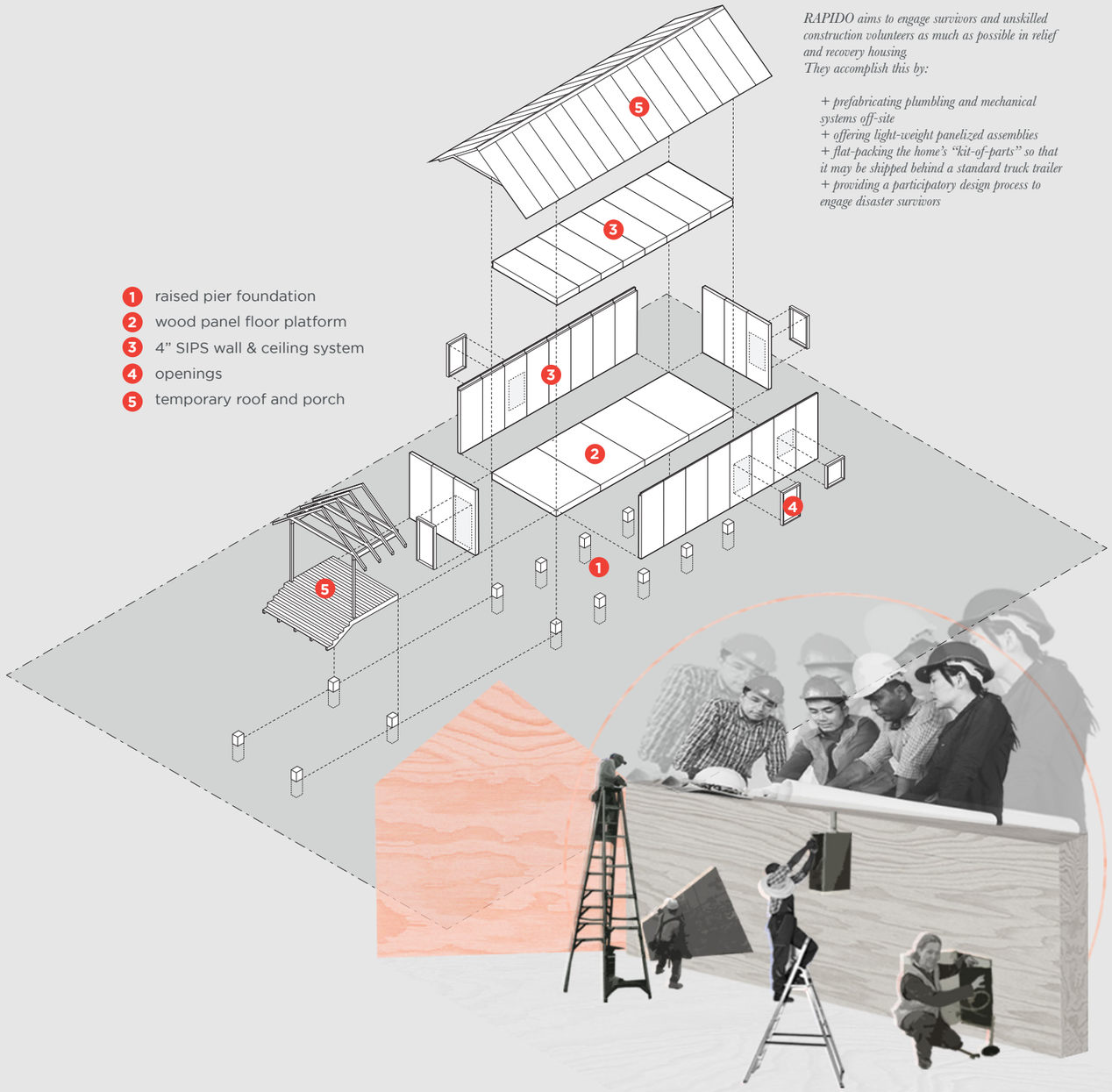
housing scenarios



RAPIDO aims to engage survivors and unskilled construction volunteers as much as possible in relief and recovery housing
They accomplish this by:

+ prefabricating plumbing and mechanical systems off-site
+ offering light-weight panelized assemblies
+ flat-packing the home's "kit-of-parts" so that it may be shipped behind a standard truck trailer
+ providing a participatory design process to engage disaster survivors

1. raised pier foundation
2. wood panel floor platform
3. 4" SIPS wall & ceiling system
4. openings
5. temporary roof and porch



03.03.04
kirinda project

SHIGERU BAN + Voluntary Architects' Network (VAN)

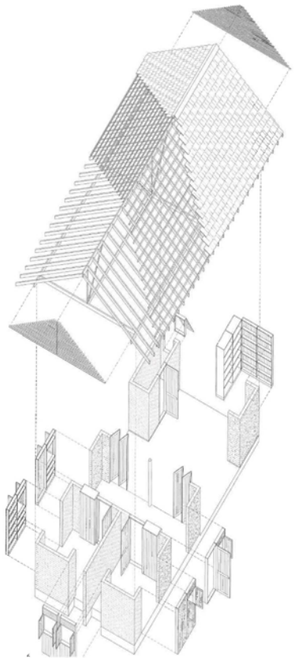
This project, designed by Shigeru Ban Architects, is noteworthy for its sensitivity to cultural and environmental conditions. Conceived as a longer-term, recovery housing project on the southeastern coast of Sri Lanka, the Kirinda Project sought to create resilient housing integrating residents into design and construction processes. As is consistent with Shigeru Ban, the project is informed by the spirit of the place, while simultaneously drawing from theoretical concepts grounded in traditional Japanese architecture.[1] The Kirinda Project stands as a case study in thoughtful, localized post-disaster housing.

On December 26, 2004 the Sumatra Earthquake initiated a catastrophic tsunami killing nearly 300,000 people and destroying numerous fishing villages reliant on marine life for livelihoods and sustenance. Sri Lanka's southeastern coastline was likewise severely impacted, including the Islamic fisherman village where the Kirinda Project currently exists.[2] The project, unique to many reconstruction initiatives, placed high importance on preserving the social life that has held ancient fishing villages like this one together for millennia. In response, Shigeru Ban established a design process and proposal reverent to the rich social and cultural conditions by including fishermen in the participatory design process, providing construction training opportunities, using local materials and labor, providing household spaces aligning with traditional Islamic religion, and drawing from design theories grounded in traditional Japanese architecture.[3]

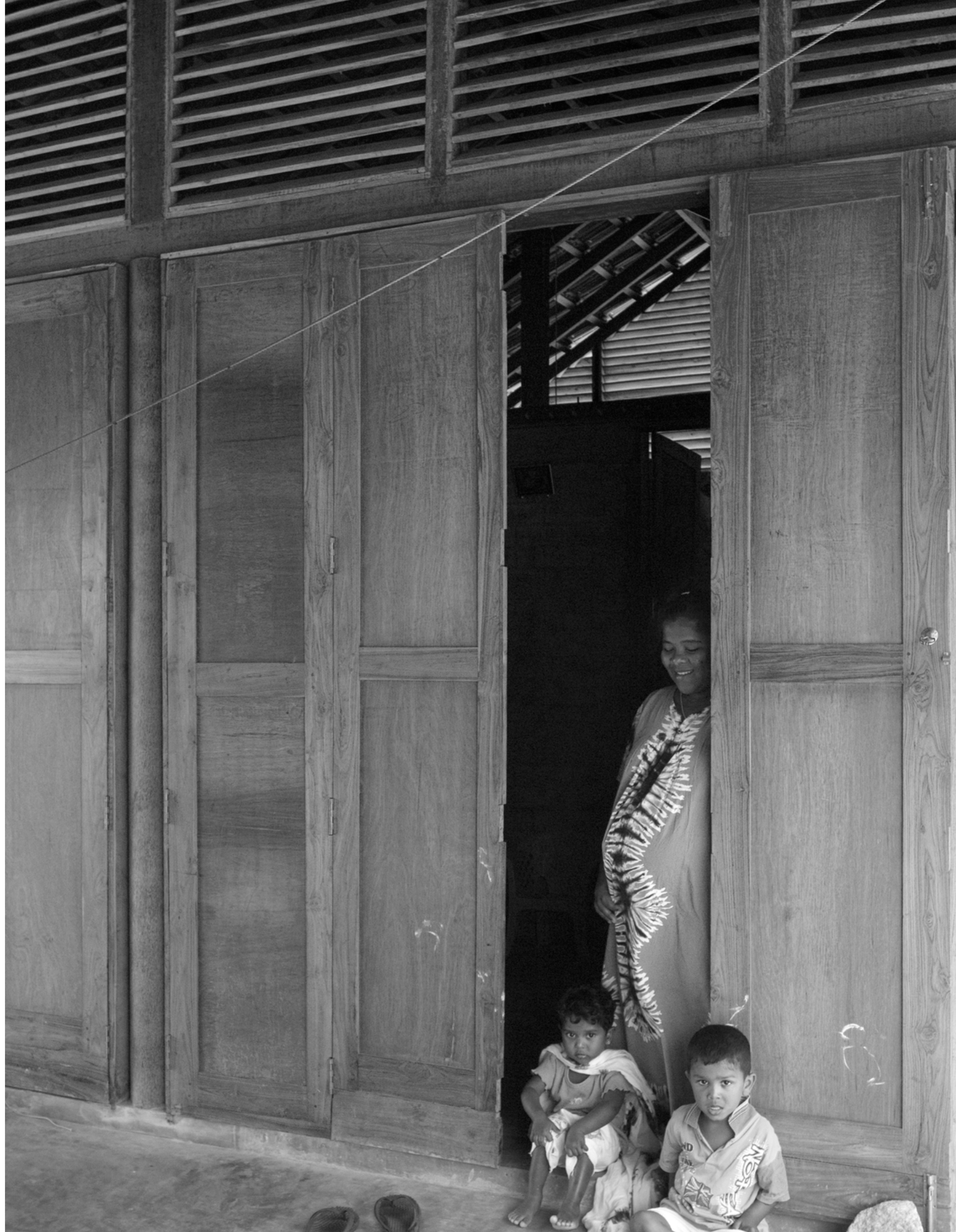
When considering the housing design, it is important to recognize that the Kirinda Project was conceived as a long-term, recovery housing project adhering to Sri Lanka's Urban Development Authority. This requires that housing be architecturally feasible while accommodating the local climate and indigenous culture. Regarding local climate, the Kirinda Project uses passive ventilation strategies, local materials, and reinforces Compressed Earth Blocks (CEB) to be more resilient against lateral structural loads. To meaningfully integrate religious culture Shigeru Ban engaged the local Muslim fishermen in an open dialogue regarding specific housing needs. [4]

Regarding local climatic conditions, building form is akin to a Western "dog-trot" typology, which in hot-humid climates, facilitates passive cooling through a centralized court space. Additionally, each room has multiple window openings to facilitate cross-breezes, naturally cooling the interior air temperature. The building section makes use of a high gable allowing less dense, warmer air to rise out of the high louvers while the cooler air remains within occupiable areas. The concrete slab with a large overhead roof structure, acts as a thermal mass by retaining cooler evening temperatures throughout the daytime hours. In terms of materiality, the design makes use of local resources. Compressed Earth Blocks are fabricated locally and affordably. They can be easily constructed by residents due to their interlocking Lego-block assemblies. Once a concrete slab is poured with rebar and tie-downs, CEBs may be laid with minimal mortar. Because CEBs are "tied down" to the slab foundation, the walls are more resilient to lateral loading, such as future storm surge and flooding. Additionally, furniture is made from locally plentiful rubber tree lumber as the tire industry is popular and rubber trees are planted systematically across the country.[5]

Housing design is also responsive to religious and cultural conditions. In traditional Islamic households, it is common for women to be isolated from guests. Additionally, male and female sleeping courters are separate. When Shigeru Ban engaged Muslim fishermen in the design process, it was revealed that different households have a range of spatial requirements. For instance, some families did not strictly adhere to traditional religious perspectives of isolating women. In response, SBA developed a series of moveable panels that would allow for different spatial conditions. The two central rooms, for example, offer four spatial conditions based on family preference and activities. There are still two separate sleeping areas for men and women. The centralized flexible space derives from a traditional Japanese Doma, which mediates interior and exterior spaces while providing a social gathering space.[6]



The following visuals focus on the transitional "Doma" space, which provides a range of uses based on family needs. Additionally, the exploded axonometric drawing highlights construction elements and the use of "U" and "L" forms to minimize the quantity of load-bearing walls required.



03.03.04
kirinda project

DESIGN CONSIDERATIONS

- ○ timeline to occupancy
- ◐ ease of deployment
- ◐ **ease of construction**
- ◐ cost of construction
- ○ ease of disassembly
- ● **owner-driven design**
- ● **strategic footprint**
- ◐ expandability
- ○ connection to grid
- ◐ off-the-grid operation
- ● economic catalyst
- ● environmental appropriateness
- ● **cultural appropriateness**
- ● durability
- ● resilience to acute shocks

◐ ease of construction

Locally-sourced and locally fabricated Compressed Earth Blocks (CEB) comprise the wall assemblies. Similar to stacking LEGOs, this simplified construction method allows survivors and volunteers to participate in construction.

● owner-driven design

A noteworthy aspect on this project is the engagement of local Islamic fishermen in the design process. While each structure looks more or less the same, participatory design allowed Shigeru Ban Architects to understand various household needs.

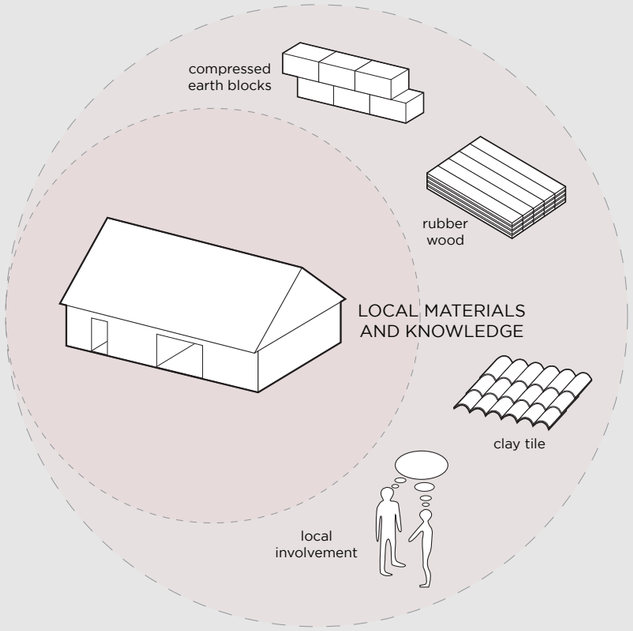
● strategic footprint

The participatory design process engaging local Islamic fisherman revealed families had a range of lifestyle preferences. Shigeru Ban created adaptable spaces derived from traditional Japanese architecture. The centralized “Doma” can transform into four different spaces based on needs.

● environmental + cultural appropriateness

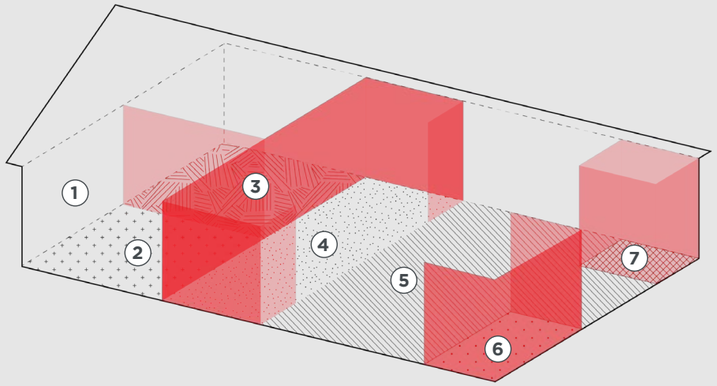
The design responds to Sri Lanka’s climate and culture of the Islamic fishing community. Rather than relocating the community to a low-risk disaster area, homes were rebuilt in the higher-risk tsunami zone with more resilient construction that maintains their access to water.

local construction



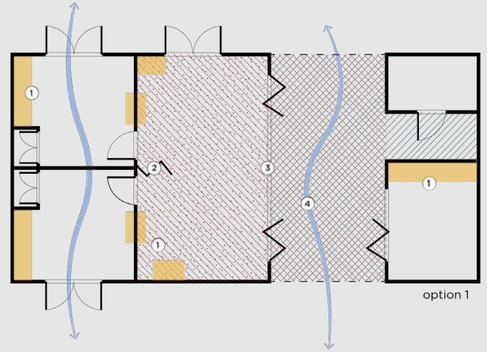
strategic floorplan + programming

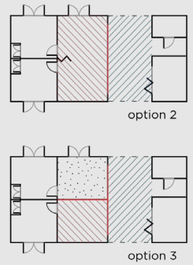
1. non-load-bearing built-in shelving
2. women’s bedroom
3. men’s bedroom
4. transitonal space (doma)
5. open-air eating and gathering
6. kitchen
7. bathroom



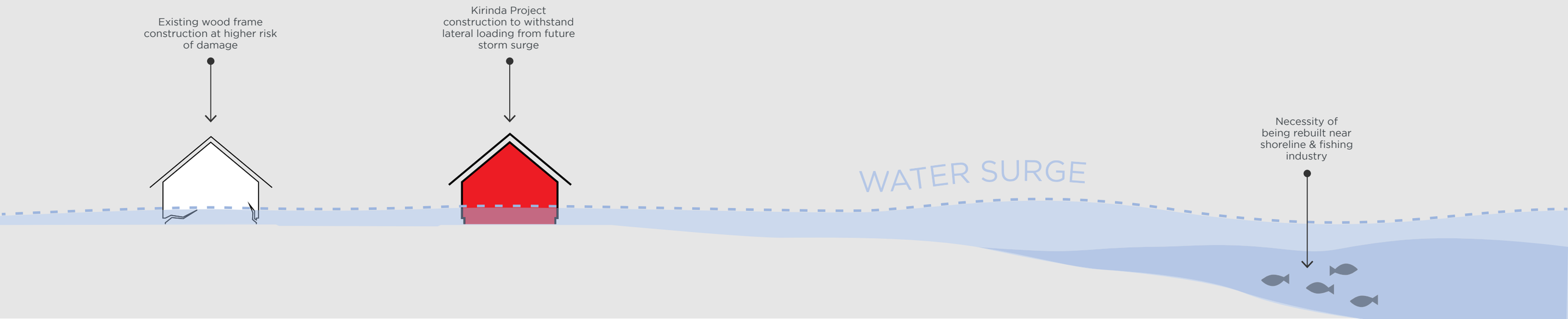
The structural system uses “L-” and “U-” forms for structural, load-bearing walls to minimize materials.

The design maximizes passive ventilation and offers a range of organizational options based on household needs. The diagrams indicate how the traditional Japanese Doma-inspired space provides various configurations.





proximity to water + resilient design



03

END NOTES

EXO, REACTION HOUSING

1 Fast Company. Kessler, Sarah. If Reaction Housing Wants to Provide Disaster Relief, It'll Have to Shelter Festival-Goers First. Accessed July 19, 2022.
2 Inhabitat. Leahy, Allison. Reaction Housing System: A Rapid Response Flat-Pak Emergency Shelter. Accessed July 19. 2022.
3 Ibid.
4 Fast Company. Kessler, Sarah. If Reaction Housing Wants to Provide Disaster Relief, It'll Have to Shelter Festival-Goers First. Accessed July 19, 2022.

Visuals credited to and courtesy of Reaction Housing.

ONAGAWA CONTAINER TEMPORARY HOUSING, SHIGERU BAN ARCHITECTS

1 Hildner, Claudia. *Future Living: Collective Housing in Japan.* Birkhauser. Basel. 2014.
2 Ibid.
3 Container Temporary Housing. *Shigeru Ban Architects*. Onagawa, MIYAGI. 2011. Accessed July 1, 2022.
4 Ibid.
5 Ibid.
6 Hildner, Claudia. *Future Living: Collective Housing in Japan.* Birkhauser. Basel. 2014.
7 Ban, Shigeru, Eugenia Bell, and Deb Wood. *Shigeru Ban.* New York, NY: Princeton Architectural Press, 2001.
8 Ibid.
9 Ibid.

Visuals credited to and courtesy of Shigeru Ban Architects.

BETTER SHELTER, IKEA + UNHCR

1 "How Climate Change Impacts Refugees and Displaced Communities." UNHCR: United Nations High Commissioner for Refugees. September 21, 2021. https://www.unrefugees.org/news/how-climate-change-impacts-refugees-and-displaced-communities.
2 "Better Shelter." Bettershelter.org. Accessed July 20. 2022.
3 The Guardian. Wainwright, Oliver. "Why Ikea's flatpack refugee shelter won design of the year." Jan 2017. Accessed July 20, 2022.
4 Ibid.
5 Ibid.
6 Ibid.
7 "Better Shelter." Bettershelter.org. Accessed July 20. 2022.
8 The Guardian. Wainwright, Oliver. "Why Ikea's flatpack refugee shelter won design of the year." Jan 2017. Accessed July 20, 2022.

Visuals credited to and courtesy of UNHCR.

RAPIDO, BCWORKSHOP

1 "RAPIDO in Houston." bcWorkshop. October 11, 2018. https://www.bcworkshop.org/posts/rapido-in-houston.
2 "Rapido." bcWorkshop. Accessed March 21, 2022. https://www.bcworkshop.org/rapido.
3 Bc. "Expanding Rapido for Gulf Coast Recover." [bc]. [bc], October 31, 2018. https://www.bcworkshop.org/posts/ expanding-rapido-for-gulf-coast-recovery.
4 Rep. *RAPID DISASTER RECOVERY HOUSING PROGRAM.* Community Development Corporation of Brownsville buildingcommunityWORKSHOP, 2015. https://static1.squarespace.com/static/5248ebd5e4b0240948a6ceff/t/5810df50579fb3fe2a9c4ef8/1477500764983/RAPIDO-Introduction.pdf.
5 Ibid.

Visuals credited to and courtesy of bcWORKSHOP.

KIRINDA PROJECT, SHIGERU BAN ARCHITECTS

1 Ban, Shigeru, Eugenia Bell, and Deb Wood. *Shigeru Ban.* New York, NY: Princeton Architectural Press, 2001.
2 *Tsunami Reconstruction Project in Kirinda.* Shigeru Ban Architects. Shigerubanarchitects.com. 2007. Accessed July 1, 2022.
3 Miyake, Riichi. *Shigeru Ban Paper in Architecture.* Rizzoli International Publications. New York, NY. 2009.
4 *Tsunami Reconstruction Project in Kirinda.* Shigeru Ban Architects. Shigerubanarchitects.com. 2007. Accessed July 1, 2022.
5 Ibid.
6 Ibid.

Visuals credited to and courtesy of Shigeru Ban Architects.

place making via story telling

In Auburn and throughout the U.S. there are a bottom-up movements to communicate under-represented, Black and African-American history through a series of “sacred sites” in the landscape. This underrepresented history includes: former slaves engaged in early city development, Black land owners, redlining practices, and racial injustice. History education presently does not have the capacity to fully discuss these truths, and there is a movement to make them apparent in our cities. Rosenwald Schools, lynching sites, cemeteries, and formerly segregated schools are considered sacred due to their significance in the African-American and simply, American experience. In *The Power of Place* Dolores Hayden argues that we are fascinated with the past when touring historic sites but miss opportunities to translate this to our neighborhoods imbued with placemaking potential. She states, “If Americans were to find their own social history preserved in the public landscapes of their own neighborhoods and cities, then connection to the past might be different” (Hayden, 46). This connection to place and history exists for local African-American families and has potential to engage a collective city. While some histories are painful, all should be evident for united progress. As stated by a Community Remembrance Project member, “There can be no reconciliation and healing without remembering the past” (2021).

These ideas are explored through a local, historic African- American cemetery dating back to Emancipation, and those buried were key figures in early city development. While a prominent landmark sited at the terminus of a historic road, its past is scarcely known. In fact, the cemetery has been poorly maintained over the past century compared to other cemeteries in the city, despite being one of the oldest. Additionally, due to erasure and lack of equitable agency, this African-American landmark is one of a few remaining in the town, and there is a movement to protect these assets and communicate their stories.

For this project students and I are working with stakeholders to envision public space that provides storytelling and placemaking opportunities. Stakeholders include: cemetery descendants, researchers, city representatives, and more. By elongating the schematic design schedule, we can gather stories from community members, host participatory design sessions, and increase bottom-up advocacy. We are exploring placemaking and storytelling through a number of design considerations including: physical markers in the landscape, vernacular building typologies, and local materials. Presently, the project has land for development adjacent to the cemetery, has the interest of city officials, and has gone through initial participatory designs. Looking forward, we aim to continue participatory design sessions, and research grant opportunities to match city funding.

As with many U.S. cities, African-American assets have largely been erased. This erasure is more than the loss of building infrastructure. It represents who has a voice and who is excluded in urban development. It furthermore provides opportunity for neighborhoods to communicate history representative of all past, present, and future residents.

Hayden, Dolores. *The Power of Place.* The MIT Press, 1995, 46.

Eji's Community Remembrance Project. Equal Justice Initiative. (2021, October 22). Retrieved October 26, 2021, from https://eji.org/projects/community-remembrance-project/.

sacred spaces

Loachapoka
Rosenwald School

C

MLK PARK +
J.F. DRAKE MIDDLE SCHOOL

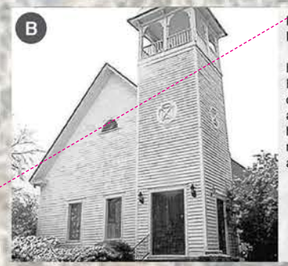
Today, MLK Park is a recreational space for the community. It is located on the site where the Lee Co training School once resided and closed in 1957.

The school opened in 1958 as J. F. Drake High School and brought together black students from Auburn, surrounding cities like Loachapoka and Waverly, and the county.

D

D

B



BAPTIST HILL CEMETERY +
EBENEZER BAPTIST CHURCH

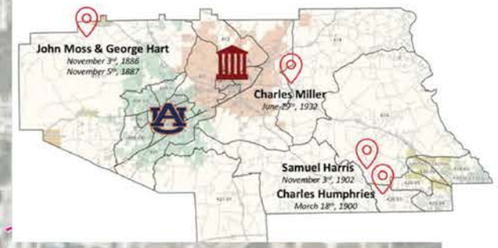
Land was donated after Emancipation in 1863 for the creation of Baptist Hill Cemetery and Ebenezer Baptist Church, both historic landmarks. Congregation members constructed the building and held services here in 1969.

SITE

A

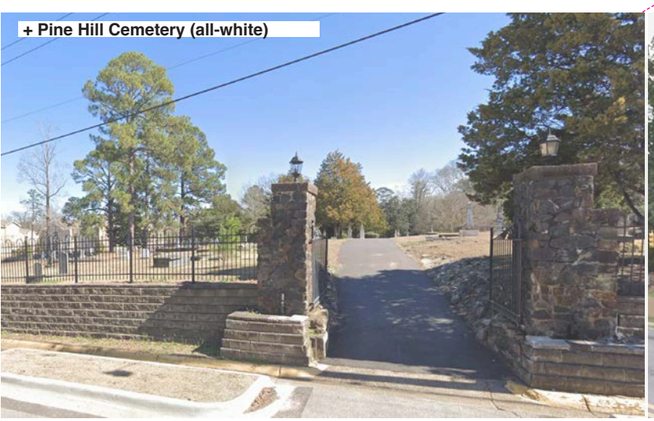
A

Lee Co
Remembrance Project

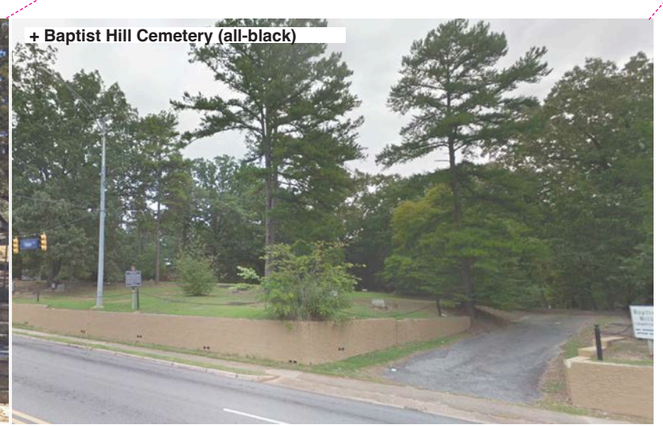


AUBURN
UNIVERSITY
COLLEGE OF ARCHITECTURE, DESIGN AND CONSTRUCTION

+ Pine Hill Cemetery (all-white)



+ Baptist Hill Cemetery (all-black)



With the help of Dr. Terrance Vickerstaff and Dr. Robert Bubb, a series of historically significant Black and African-American sites are documented. Dr. Vickerstaff, a Baptist Hill Cemetery representative, considers these sites "sacred" due to their signifance and is working with researchers to make their stories legible.

NEIGHBORHOOD HOUSING
is increasingly transient rental property. this has been an ongoing change over the last 10-20 years.

BOOKSHOP + PARK
city sees this site as a possible passive park + library connection

BAPTIST HILL
family-owned cemetery plots, started after emancipation (1863) along with ebenezer baptist church (african-american landmarks); sacred space

RECREATION CENTER
pedestrian safety, ADA walking trails, areas for leisure seating

DEAN ROAD ELEMENTARY SCHOOL

to retail + commercial

to auburn junior high

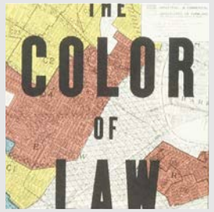
AUBURN PUBLIC LIBRARY
interested in enhancing exterior public space, sculpture art, better pedestrian corridor + connection to historic baptist hill.

to auburn university

EBENEZER BAPTIST CHURCH

In multiple Environmental Design courses, Smith focused on design projects and programs for Baptist Hill Cemetery, always careful to partner with individuals and organizations with a depth of knowledge and buy-in.

Lee Country Remembrance Project members and Baptist Hill Cemetery representatives were gracious with their time as they communicated the site's value to students.



site analysis + asset mapping
survey findings mapped
university coursework/research

readings on race
relevant readings with coffee or wine

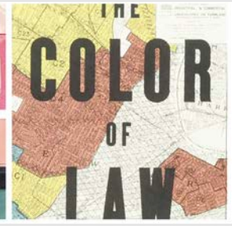
public exhibits
2 gallery exhibits

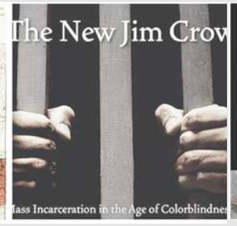
research and visualization
spring 2021
univesity teaching + research

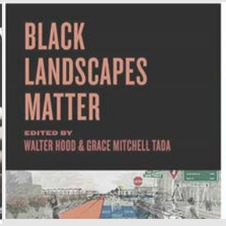
design seminars + studios
3 hybrid seminars/studios
2 public presentations

participatory design sessions
summer 2021

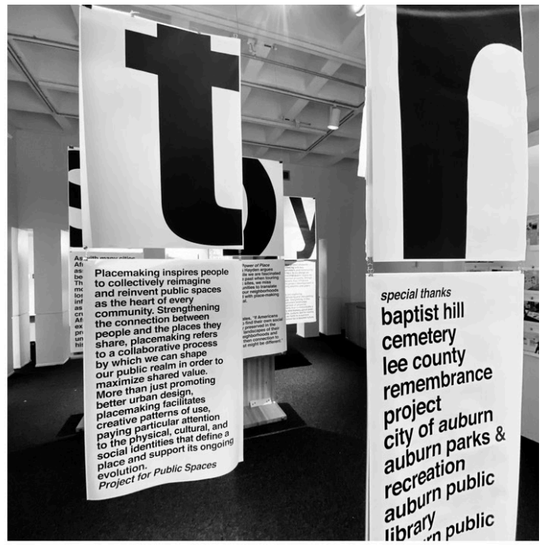
community surveys
120 community surveys







Smith's participatory design work with students was extensive as it is critical that designers practice working with stakeholders and end-users. Additionally, Smith started a book club at a local coffee shop to work through the above five books in four months.



2021 ACSA/AIA INTERSECTIONS

COMMUNITIES

Placemaking through Storytelling

PAPER

New Amsterdam 1623–1664

SITE TYPOLOGIES

1) **FORT AMSTERDAM AT U.S. CUSTOM HOUSE**
1 Bowling Green
Built by first slaves on Manhattan.
First Dutch Reformed Church Inside Fort.
1626

2) **HOSPITAL FOR SICK SOLDIERS AND BLACKS**
Bridge Street
Castello Plan Section E, Lot 23 & 24

3) **"BLACK JACOB'S HOUSE"**
Home built by Jacob Hellekers
The Black Carpenter of Gravesend.
Castello Plan Section A, Lot 18

4) **JACOB STOFFELSEN OF ZIERICKZEE**
Home of the Overseer of the Dutch
West India Company's Slaves.
Castello Plan Section J, Lot 15, 1639

5) **HOUSE OF THE DUTCH WEST INDIA COMPANY'S SLAVES**
32–34 South William Street
Castello Plan Section J, Lot 15, 1640

6) **SUSANNA ANTHONY ROBERT'S HOUSE**
Free Black Woman's Home
52–54 Beaver Street
Planted with 8 Small Trees

7) **THE HARLEM ROAD**
Later the Boston Post Road
Built by the Slaves of the Dutch West India Co.
Currently Includes portions of 5th Ave.,
Park Ave., Madison Ave., and the Bowery, 1658

8) **FREE AFRICANS LOTS**
Chinatown, Little Italy, Soho, Greenwich Village, Washington Square Park. Land Granted to Africans freed from slavery after years of dedicated service. Prince St. to Astor Place and from the Bowery to Broadway. Includes the land of Lucas Santomee, a black physician,
1645–1716

9) **BIG MANUEL'S FARM**
Greenwich Village, Washington Square Park

10) **DOMINGO ANTHONY'S FARM**
Greenwich Village, 1643

11) **THE AFRICAN'S CAUSEWAY**
Minetta Lane and Minetta Brook
The "Negroes" Causeway on historic maps

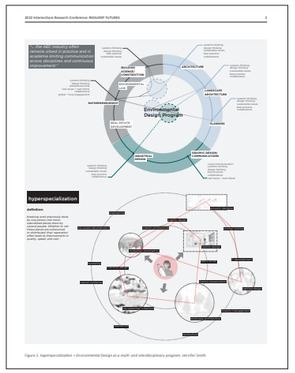
12) **PAUL D'ANGOLA'S FARM**
MacDougal & West 4th Street, 1644

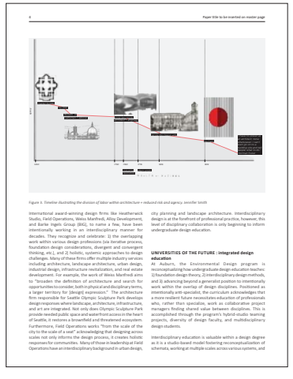
Figure 4. Walking Tours of Manhattan, New Amersterdam 1623-1664. Davis.

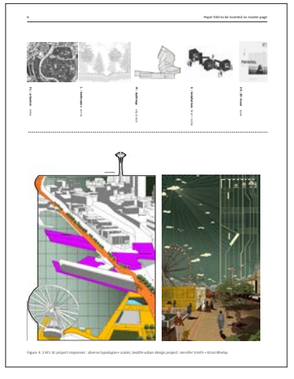
Barton, C. E. (2001). *Sites of Memory: Perspectives on Architecture and Race.* Princeton Architectural Press. 178.

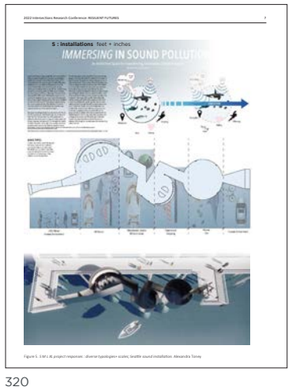
2022 ACSA/AIA INTERSECTIONS

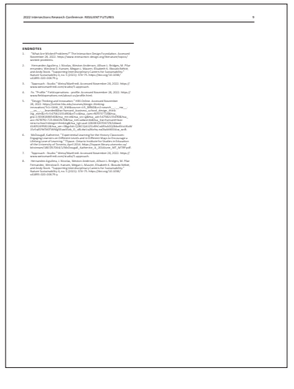
RESILIENT FUTURES
The Unsiloing: Design Theory + Praxis











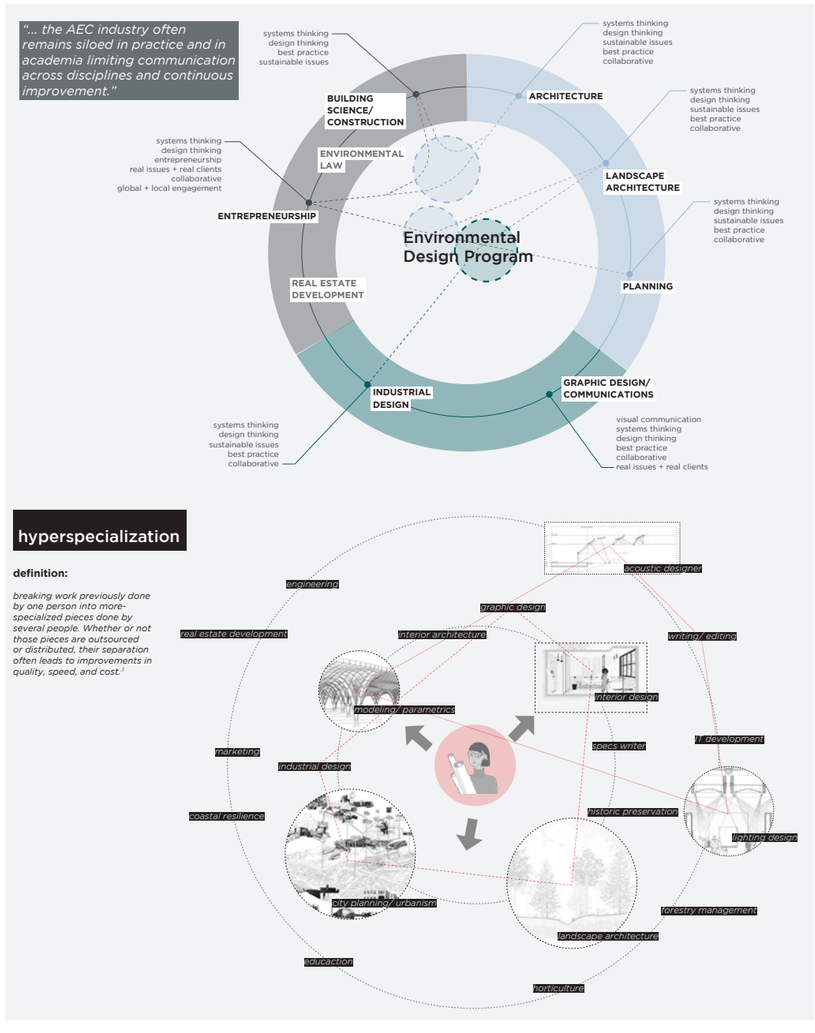
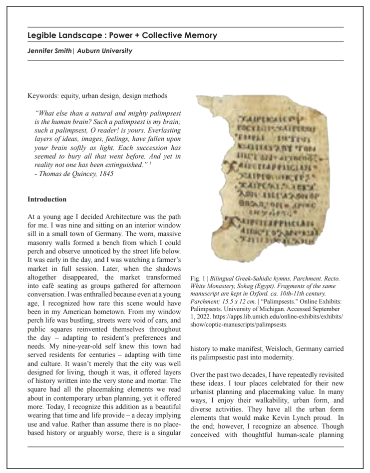


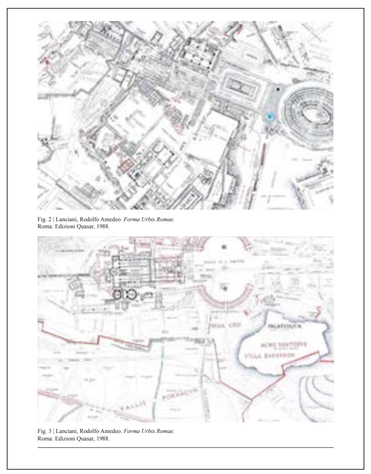
Figure 2. *Hyperspecialization + Environmental Design as a multi- and interdisciplinary program.* Jennifer Smith

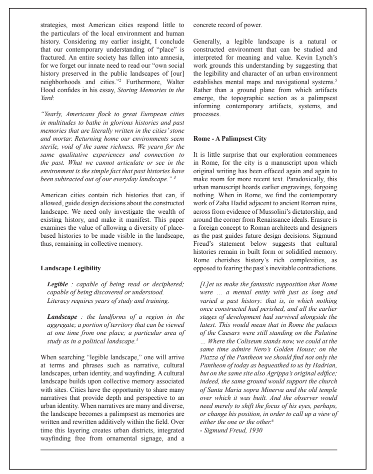
2022 DESIGN COMMUNICATION ASSOCIATION

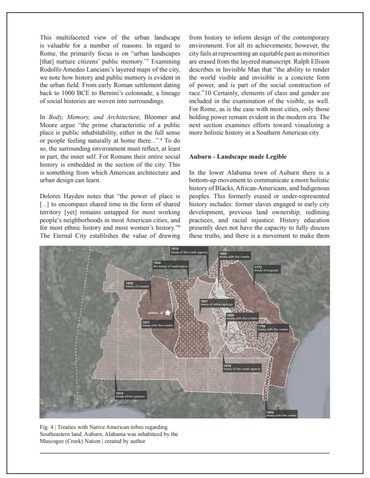
FORGETTING/ REMEMBERING

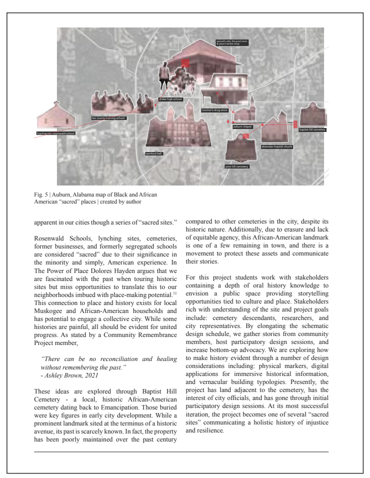
Legible Landscapes: Power + Collective Memory

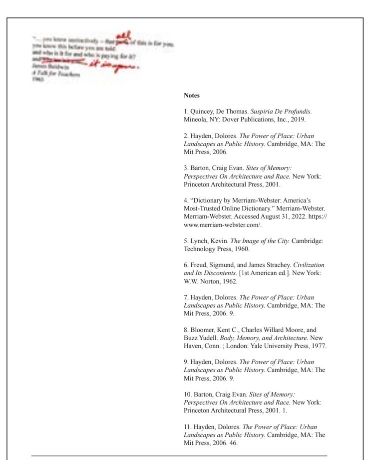












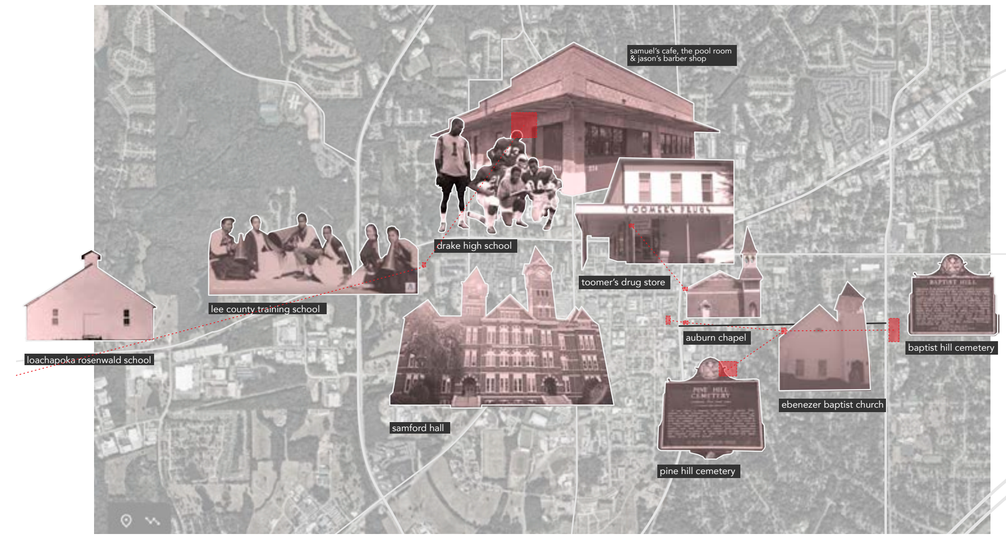


Fig. 5 | Auburn, Alabama map of Black and African American "sacred" places | created by author

apparent in our cities though a series of "sacred sites."

Rosenwald Schools, lynching sites, cemeteries, former businesses, and formerly segregated schools are considered "sacred" due to their significance in the minority and simply, American experience. In The Power of Place Dolores Hayden argues that we are fascinated with the past when touring historic sites but miss opportunities to translate this to our neighborhoods imbued with place-making potential.[11] This connection to place and history exists for local Muskogee and African-American households and has potential to engage a collective city. While some histories are painful, all should be evident for united progress. As stated by a Community Remembrance Project member,

> *"There can be no reconciliation and healing without remembering the past."*
> *- Ashley Brown, 2021*

These ideas are explored through Baptist Hill Cemetery - a local, historic African-American cemetery dating back to Emancipation. Those buried were key figures in early city development. While a prominent landmark sited at the terminus of a historic avenue, its past is scarcely known. In fact, the property has been poorly maintained over the past century compared to other cemeteries in the city, despite its historic nature. Additionally, due to erasure and lack of equitable agency, this African-American landmark is one of a few remaining in town, and there is a movement to protect these assets and communicate their stories.

For this project students work with stakeholders containing a depth of oral history knowledge to envision a public space providing storytelling opportunities tied to culture and place. Stakeholders rich with understanding of the site and project goals include: cemetery descendants, researchers, and city representatives. By elongating the schematic design schedule, we gather stories from community members, host participatory design sessions, and increase bottom-up advocacy. We are exploring how to make history evident through a number of design considerations including: physical markers, digital applications for immersive historical information, and vernacular building typologies. Presently, the project has land adjacent to the cemetery, has the interest of city officials, and has gone through initial participatory design sessions. At its most successful iteration, the project becomes one of several "sacred sites" communicating a holistic history of injustice and resilience.

2023 ARCC

DESIGN-RESEARCH INTERFACE

Operating at the Overlap

captures that is appropriate for education in all disciplines (design or otherwise). Essentially, the deeper a student moves towards the interior layers, the stronger their understanding develops. The diagram also implies that a deeper understanding is dependent upon comprehension of the shallower layers. What it does not cover, is the inherent overlap between the sub-topics of the discipline and the informative value found between them, for example, how one can learn a great deal about building technologies by understanding the history of architecture or the way that design methodologies might be informed by practice.

A better diagram might be something like what is pictured below. The various subjects that make up the discipline and practice of architecture overlap in a multitude of ways and learning or working within one infers that architects and students must understand not simply one area of study, but several simultaneously. For the purposes of this discussion, this area is referred to as “the overlap” of knowledge and expertise.

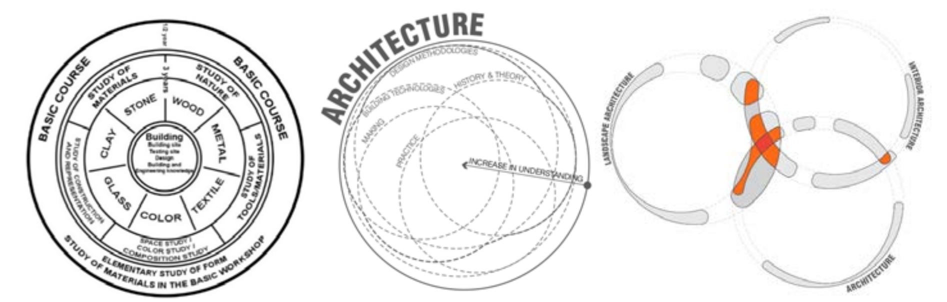
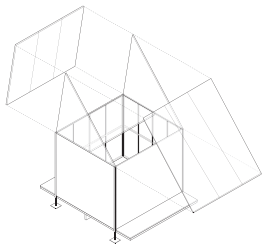


Figure 1: Diagrams of Education within a Discipline. (Far left: Architecture at the Bauhaus. W. Gropius, 1923, Center and far right: R. Sproull, 2022)

The act of operating at the overlap of design disciplines is understood by different names. Interdisciplinary, multidisciplinary, and cross disciplinary, are all well-known terms often loosely interchanged to define (sometimes incorrectly), the same thing. At the heart of these terminologies is an overlap of various expertise that work together to solve a problem through design. In general, cross disciplinary refers to the overarching notion of combining disciplines. It can encompass both multi- and inter- disciplinary design. However, there are subtle, yet meaningful, differences between these last two and working within them means a slightly different approach to the design process. Both approaches bring together different design disciplines to create a solution to a problem, but in multi-disciplinary design, each discipline is specifically focused on its own part of the problem.

Multi-disciplinary design is the most common form of design process as seen in many design-bid-build projects. It implies expertise and specialization within an individual’s discipline and does not require individuals to consider areas of expertise other than their own. Communication is key for this process to be successful as it does not require individual proficiency in multiple fields. Interdisciplinary design, by contrast, is the process of combining various design fields into a cohesive whole. It involves bringing together different specialties within design, such as graphic design, industrial design, landscape architecture, and architecture. However, it can also involve working with other professionals outside of the design world, such as scientists, engineers, and other professions. It has been recognized in recent years as the design process best suited for complex problem-solving as it allows for a more diverse range of perspectives to be considered when approaching difficult questions and issues. Lastly, transdisciplinary design reconceptualizes existing theoretical frameworks embedded in traditional disciplines to create new fields of study and innovate within industries. Ecological Urbanism is an example of a more recent transdisciplinary design development.[4] All forms of cross-disciplinary work are advantageous for complex problem-solving, and each can be employed intentionally for emergent relationships to be discovered.

Presently, there is an increasing trend across the nation for higher-education interdisciplinary design degrees. (cite) Scholars and students, alike, recognize our global predicament and are interested in programs centered on responding to complexity. While we require professionals with a depth of knowledge and expertise in specific fields, there is an additional need for those working between industries through interdisciplinary and transdisciplinary design methods. In a paper from Nature Sustainability, authors write that “interdisciplinary has proven advantageous for scholars who find themselves at innovative institutions that recognize the value of collaborative work.” Many universities over the past decade have bolstered cross-disciplinary research centers including the Climate School nested within the Earth Institute at Columbia University as well as Arizona State University’s Global Futures Lab, in alliance with the University of Washington and the Nippon Foundation, started a center focused on social equity and ocean sustainability.[5] Initiatives like these are uniquely positioned to include transformations in career development and capitalize on grant and foundation funding focused on collaborative processes. We require design practitioners who are prepared to strengthen collaboration across industries because they commence professional careers with an understanding of the values and responsibilities related to interdependent fields. Untethered to disciplinary boundaries, design professionals work as collaborative project managers amid complexity, fostering holistic design responses to stubborn problems.



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