

T H A N K Y O U

2023

KALI MILLER

FILLING THE VOID

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MIXED-USE SOCIAL HOUSING DEVELOPMENT



KALI MILLER, LEED AP BD+C, LFA.

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A C K N O W L E D G M E N T S

TO MY COMMITTEE CHAIR // DR. ANDREW TRIPP.  
First and foremost, I would like to thank the Chair of my committee, Dr. Andrew Tripp. I started this project wanting to make a difference for communities that need it most, and you helped me manifest this core question into architecture. I am thankful for our conversations revolving the depth of the question being asked and the differing levels of refinement within the project. The successful resolution of this project would not have been possible without our conversations.

TO MY COMMITTEE MEMBERS & STUDIO ADVISOR //  
DR. LIVIA LOUREIRO, DR. LILIANA BELTRAN,  
DR. SHANNON VAN ZANDT, & MARCEL ERMINY.  
Thank you all for your dedication to this project. I am grateful to all of you for your impactful contributions to the project and dedicated support throughout this process. This project would not have been possible without all of your guidance.

T O M Y F A M I L Y A N D F R I E N D S  
Finally, I am so thankful to all of my family and friends that have supported me with unconditional love for all of the late nights and hard days throughout my academic career. It has been a long journey, and I could not have gotten through it all without you.

C O M M I T T E E

**COMMITTEE CHAIR //**

DR. ANDREW TRIPP, PhD.  
*Assistant Professor, Department of Architecture.*

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DR. LILIANA BELTRAN, PhD, LEED AP.  
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Architecture and Urban Planning.*

**STUDIO ADVISOR //**

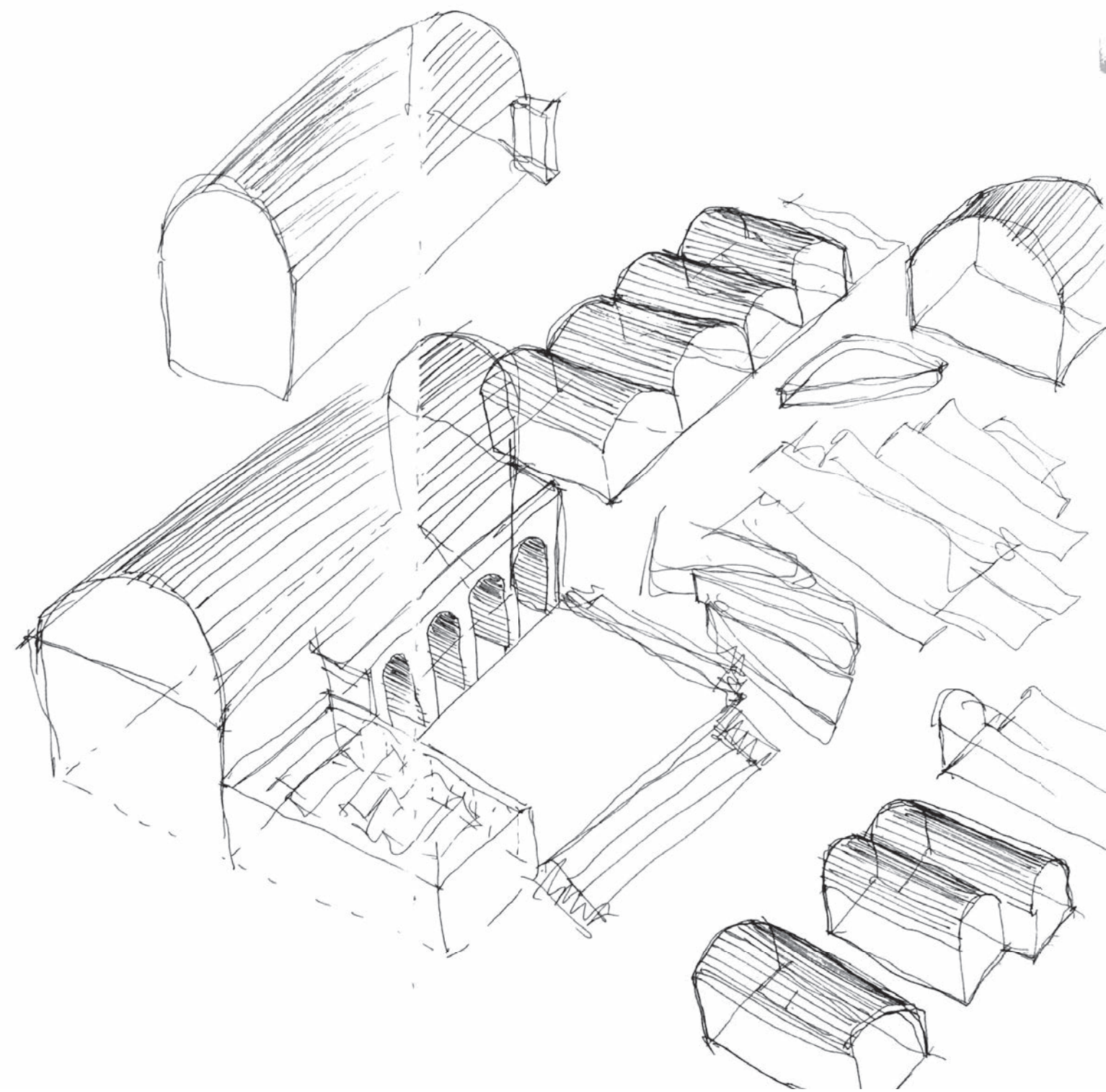
MARCEL ERMINY.  
*Associate Professor of Practice, Department of Architecture.*

I would like to respectfully acknowledge the Coahuiltecan, Karankawa, Sana, Ishak (Atakapa), and the Esto'k Gna (Carrizo/Comecrudo) People, who have stewarded this land throughout the generations.

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## A B S T R A C T

The question being asked is how can vulnerable, underserved communities feel safe in terms of economic, physical, mental, and cultural safety. This question is meant to provoke the thought of *rethinking the term architect as an advocative, enabling body, and what it means to serve all people rather than perceiving architects, architecture, and sustainability as a luxury item*. The importance in this question lies in its goals to design a solution that proposes accessibility to these luxury items, and the benefit that is given to those that currently do not have access.

Conceptual goals of providing sustainable economic, physical, mental, and cultural safety to vulnerable communities can be answered by the theory of a cave, the theory of longevity and permanence in safety and protection. In modern times, vulnerable communities in poverty have limited access to safe spaces due to financial reasons; because of this, their economic, physical, and mental safeties become disproportionately endangered. With gentrification programs rising and the social divide between economies growing, the safety of these communities is lost along with their cultural identity. This calls for a *revitalization of place through architecture that can withstand severe weather, provide affordable living, benefit physical well-being, and boost mental well-being while providing a space showcasing the cultural identity of a community*.

**1**  
**PART 01**

REDEFINING THE ROLE OF THE ARCHITECT.

*THE ARCHITECT AS AN ENABLER, ADVOCATING FOR PARTICIPATION AND FLEXIBILITY.*



## THE ARCHITECT AS AN ENABLER.

The historical disposition of the architect is that the architect is a knowledgeable body that is trained to know all aspects regarding building and design, similar to the concept of a Renaissance Man. Theoretically, all problems surrounding the built environment and its synthesis with human experience could be solved solely through architects and their virtuosic knowledge, especially when applied to the need for housing both in the United States and abroad. Yet, homeless populations continue to grow; yet, the housing solutions across international communities prove to be insufficient regardless of how well-intentioned it was. Utilizing solutions idealized by the traditional Beaux-Arts mindset results in housing that fails to recognize the culture and lifestyles of differing peoples, assuming that all people interpret the term dwelling the same way. This disposition is realized across Latin America as they experience exponential population growth at a pace quicker than formal housing solutions can handle. The need to address this bloom of people often results in the growth of informal settlements, but informality is not embraced as an option to answer the question.

A case study of the aforementioned failures in housing can be seen in Tlatelolco Housing Complex in Mexico City. The utopian promise of a modernist solution to housing quickly actualized into a monotonous estate that failed under the constraints of excessive control imposed by the policy of social housing and the design of the architect.

*"In all cases this is carried out from the top-down, being heteronomous, formal and normative ... instead of learning from the rich process of the production of space in [informality], the professionals involved just impose their own practices on them, reproducing the idea of predetermined finished spaces for generic users."* (Hernandez and Kellet, 2011, p. 2).



TLATELOLCO HOUSING COMPLEX // MEXICO CITY, MEXICO.



**HARD DESIGN** ●  
NO USER AUTONOMY

HUMANIZATION

OPEN BUILDING

INCREMENTALITY

PREFAB CUSTOMIZATION

● **SOFT DESIGN**  
MAXIMUM USER AUTONOMY



VILLAGGIO MATTEOTTI // TERNI, ITALY.

HUMANIZATION. GIANCARLO DE CARLO.

Architecture was meant to represent the users rather than the designer. The users now become part of the design process in defining their spaces through criticism and contribution with the architect to create a building that communicates representation of the users while reflecting on the application of humanization.



JUF NIENKE. AMSTERDAM // THE NETHERLANDS.

OPEN BUILDING. N. JOHN HABRAKEN.

Open building uses a support frame with detached individual units that promote static adaptability and flexibility around the frame. Using the concept of detachability, the building lends itself to an extended, circular lifecycle with the flexibility to change according to the social and ecological climate.



QUINTA MONROY // IQUIQUE, CHILE.

INCREMENTALITY. ELEMENTAL.

By providing half of a finished house, a low-income family is able to live in the house at a more affordable rate. The residents are able to build into the unfinished half of the house as needed. The user now becomes the designer of the unfinished half of the house; the result of the finished house reflects the culture and character of the users themselves while yielding a high level of flexibility and participation.

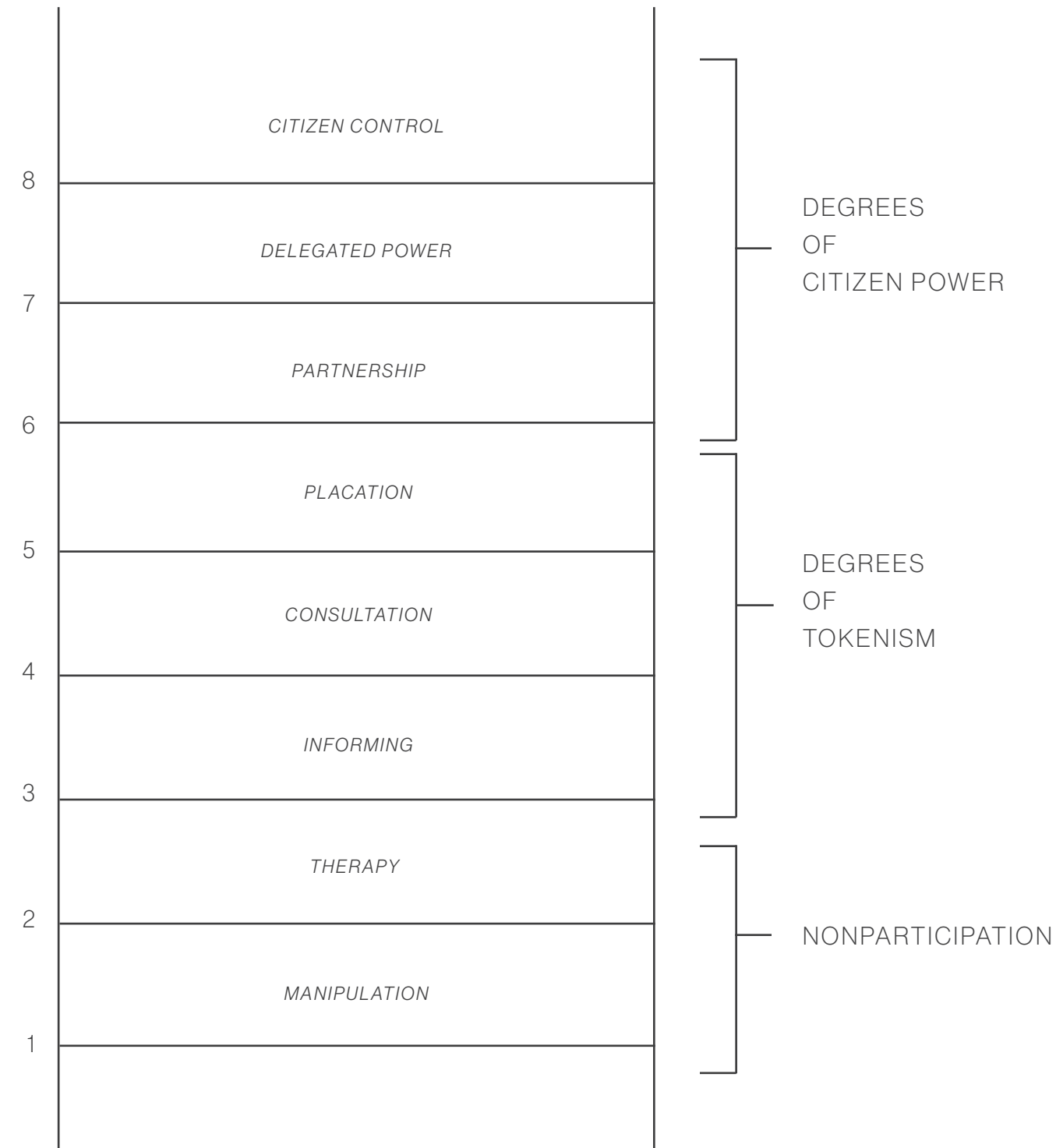


MINIMOD // PORTO ALEGRE, BRAZIL.

PREFAB CUSTOMIZATION. MAPA.

Prefabricated systems that can be customized by the user, relinquishes a significant percentage of design authority to the user. These plug-and-play systems give the user minimal, prefabricated spaces that are able to be manipulated both on the exterior and interior. This grants the user notable autonomy to adapt and update the space according to their own definition of dwelling throughout the lifetime of the building.

ADVOCATING FOR PARTICIPATION AND FLEXIBILITY.



ARNSTEIN'S LADDER OF CITIZEN PARTICIPATION.

Examples of citizen participation in sustainable housing solutions have been prevalent in the majority of countries where the populations continue to increase at a rapid pace, aside from the United States. In the United States, the broadcasted message remains: architects and sustainability are a luxury resource. This project intends to challenge the mentioned notion and the existing policy of social housing. Since examples of participation in architecture are minimal, the project will take heed from examples abroad and principles of citizen participation as dissected in Arnstein's Ladder of Citizen Participation. To be a successful project, the following rungs of citizen power were determined: consultation with the prospective residents regarding the program and form along with partnership in decision making and planning. The parameters of enablement were inspired from the works of De Carlo, Habraken, Elemental, and MAPA; their frameworks established a hybridized definition of participation consisting of a humanized, adaptive, incremental, prefabricated design applied to housing in the United States. (Arnstein, 1969).

The goal of taking the position of a citizen advocate is to design a housing environment in which vulnerable communities feel they have a sense of place that provides sustainable cultural, economical, mental, and physical safety for generations; *to design a housing environment in which vulnerable communities feel heard.*

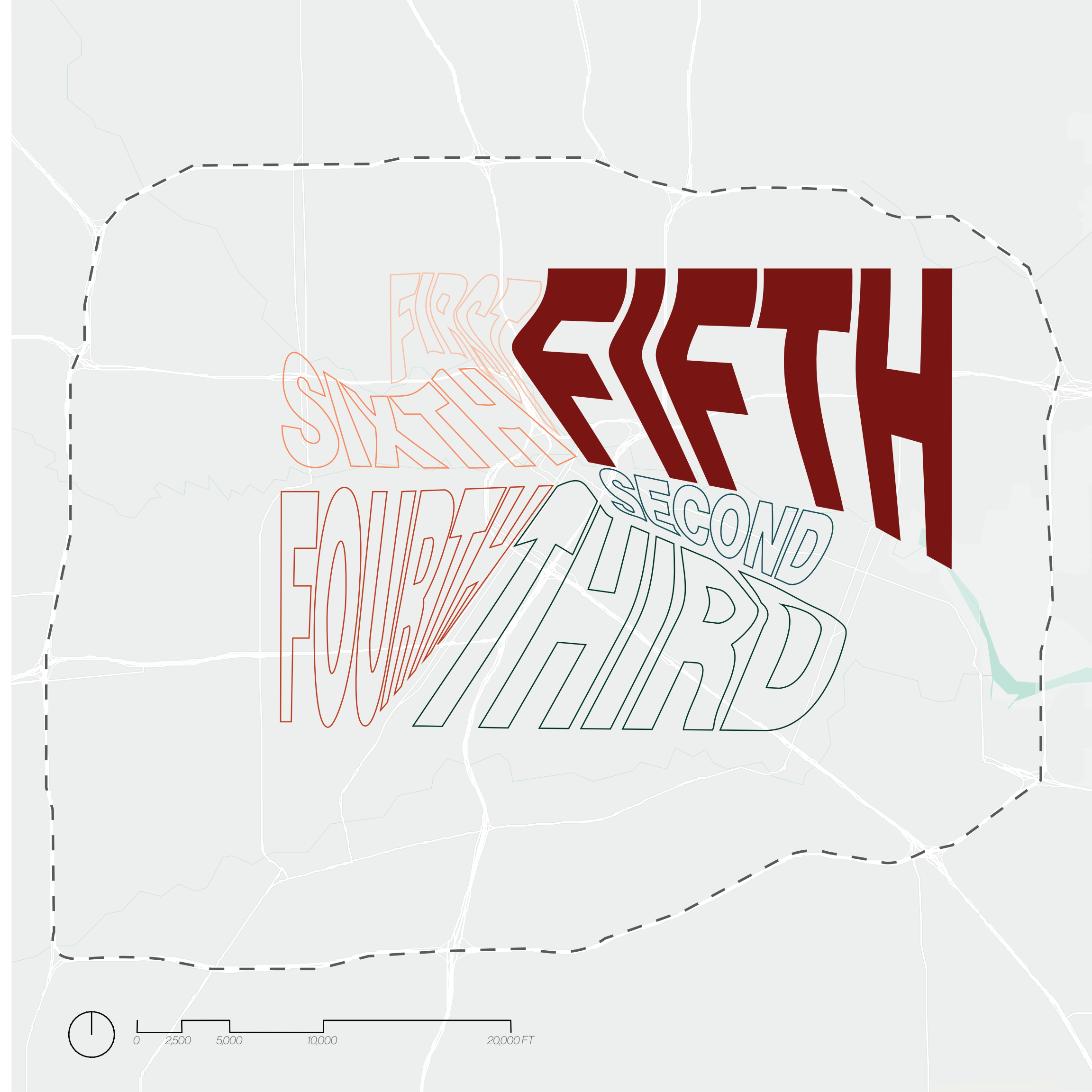
**2**  
**PART 02**

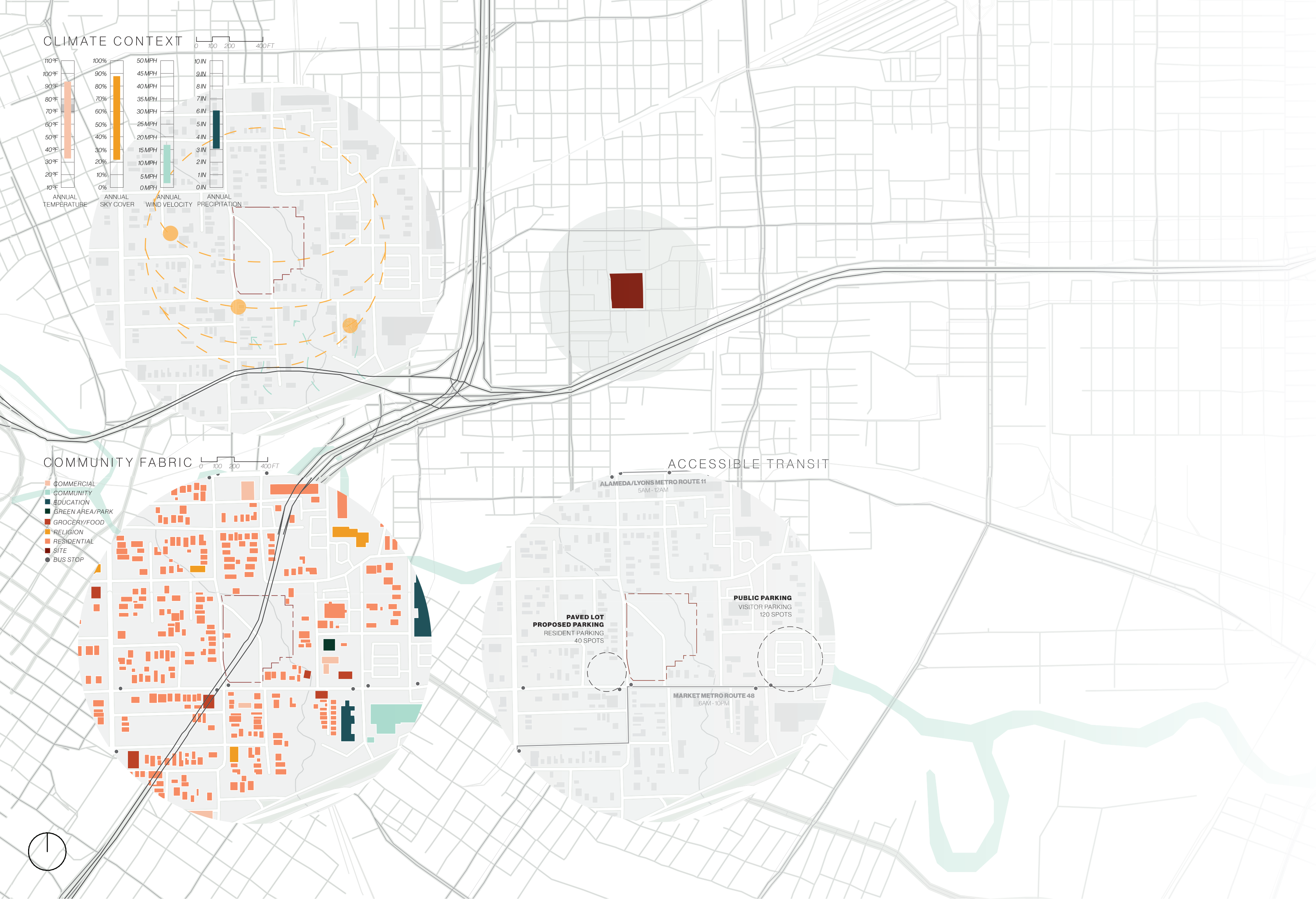
URBAN IDENTITY OF THE FIFTH WARD.  
*SITE INFORMATION, IDENTIFYING THE PEOPLE AND THE CULTURE.*



THE FIFTH WARD. HOUSTON, TEXAS.

The project is located in the Fifth Ward of Houston, Texas. Houston is a city of a diverse culture that is consistently expanding while the lack of housing contributes to an expanded low-income and homeless population disproportionately affecting people of color. In researching the different sections of Houston, the Fifth Ward held the highest possible benefit from this project; the Fifth Ward has suffered from systemic neglect in the area since the 1980's with limited resources provided by the local government.





Factors surrounding the community fabric, public transit, and design potential determined the choice of site. In this instance, the site was limited to the boundary of the Fifth Ward; given this constraint, the Fifth Ward called attention to its center. From there, the radius decreased to reveal the heart of the Fifth Ward. The next parameter was to determine an area within the center that held a substantial amount of housing spread across single-family and multi-family homes. The site also needed to provide access to popular metro lines for public transportation along with existing private and public parking areas to be used for the project. Within the center of the Fifth Ward, the site was chosen according to the criteria mentioned.

The site is situated in the middle of the Fifth Ward boundary between Interstate-69 and Interstate-10. Twelve plots of land on the corner of Bringhurst Street and Market Street merge to create a four-acre canvas on which the project has been designed. The existing house on the west side of the site will remain untouched while being incorporated into the overall site and landscape plans for the project.



THE POPULATION DENSITY OF HOUSTON IS INCREASING.



1944.

The Fifth Ward was established in 1865 by freedmen; at the beginning, the population was divided equally between black and white. Following World War II, a significant number of black populations migrated from the Deep South and rural Texas to the city of Houston around the 1940's. (West, 1979).

This shift in demographics resulted in white people leaving the area, while *people of color grew to be isolated to the Fifth Ward culturally, economically, and socially.*

THE HOUSING IN THE FIFTH WARD IS DECREASING.



2022.

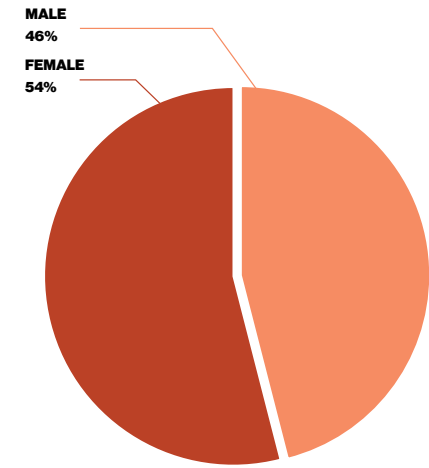
Examining the history of the site, a clear pattern of decreased housing within the Fifth Ward was seen throughout decades of photographs. According to FEMA, the site is located in Zone X; an area of minimal flood hazard. However, upon examination of the surrounding buildings and local news stories, *the irreparable damage caused by precipitation and flooding is vivid.*

With the population predominantly low-income, the destruction of housing across the Fifth Ward is inevitable due to the lack of accessible resources needed to repair the damage caused by Houston's hurricanes.

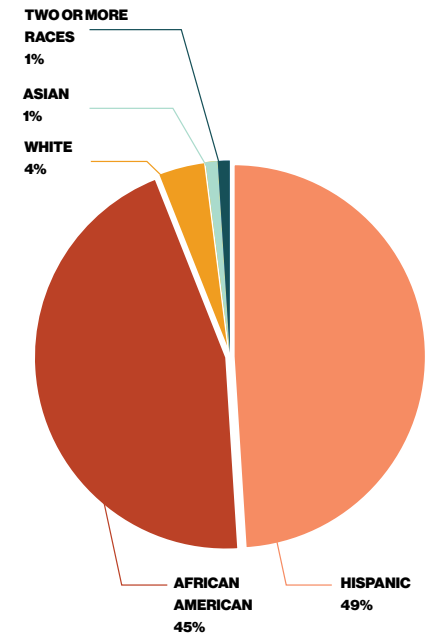


THE PEOPLE.

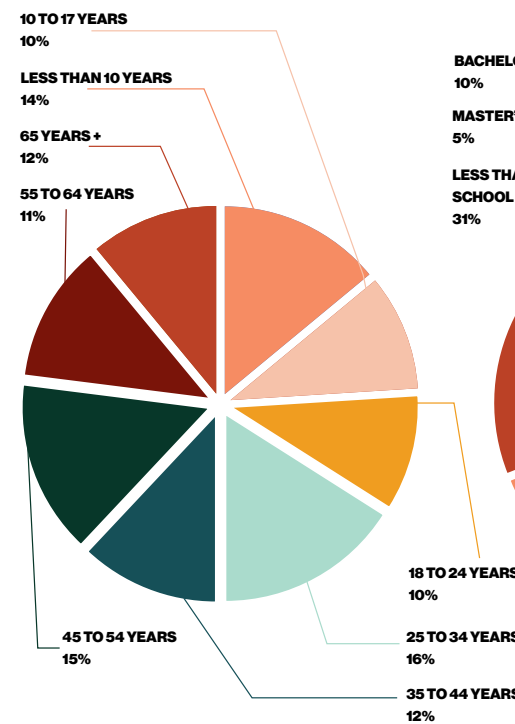
GENDER.



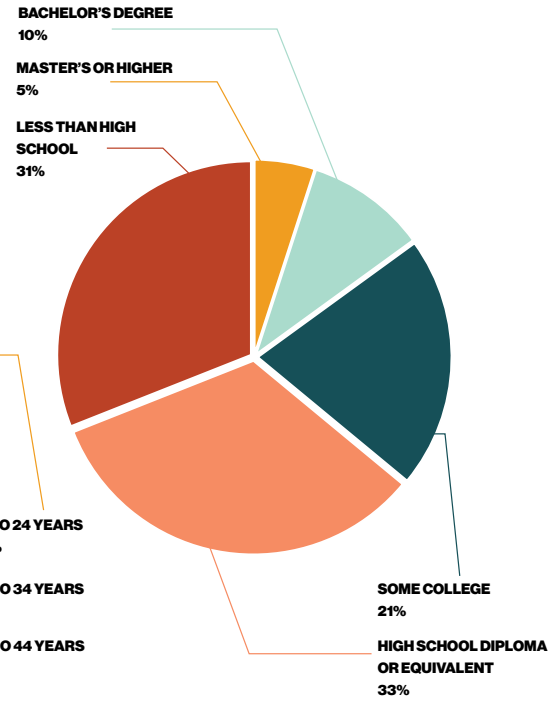
RACE.



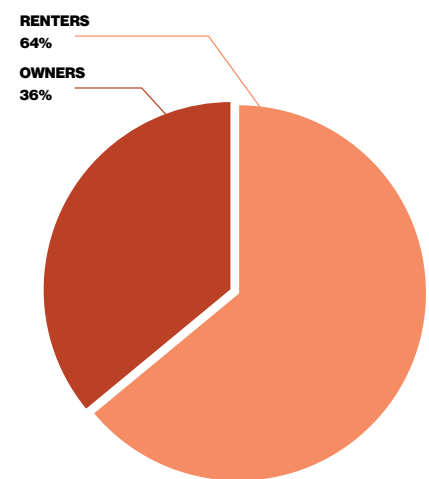
AGE.



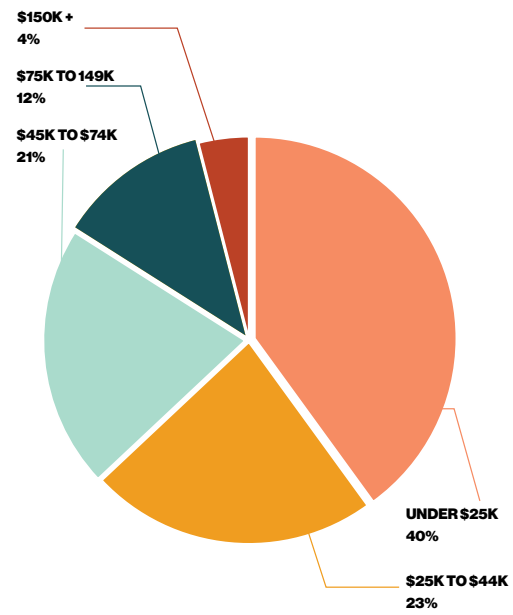
EDUCATION.



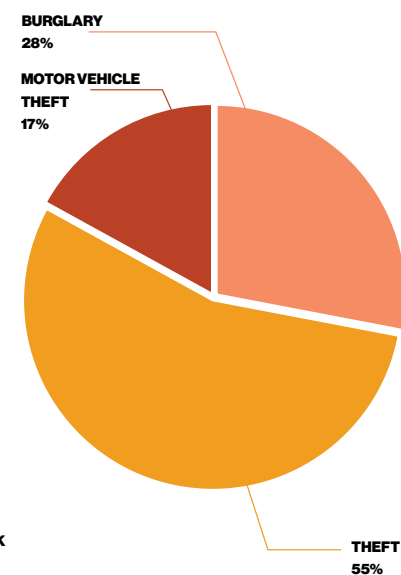
HOME.



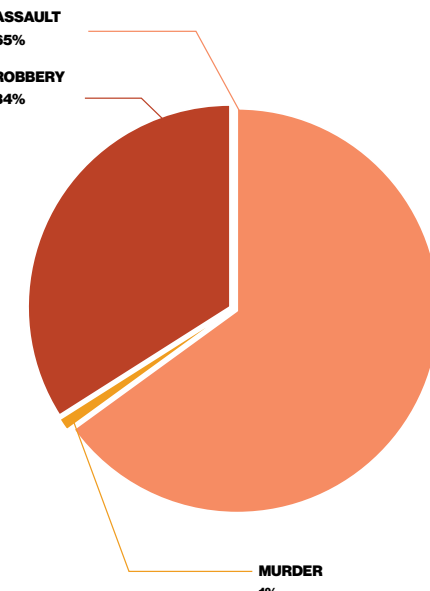
INCOME.



PROPERTY.



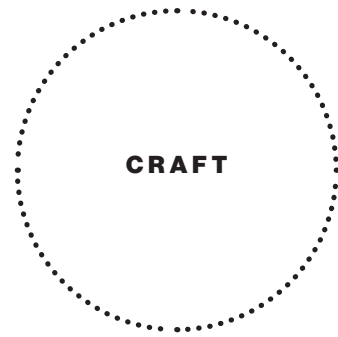
VIOLENT.



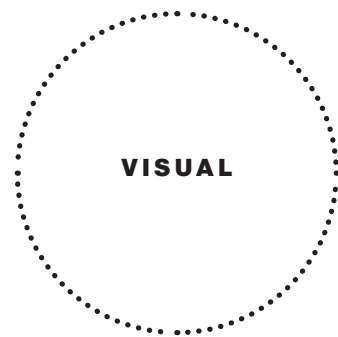
At the core of this project are the people of the Fifth Ward. Looking at the demographics of the Fifth Ward, it becomes apparent that the majority of the population can be categorized as low-income people of color with a low level of education. *The target demographic of this project was centered around vulnerable communities due to the historical lack of resources and systemic neglect low-income people of color receive.* In the research conducted, it became increasingly evident that this community deserved to be the driving force of this project.



THE CULTURE.



THE FIFTH WARD JAM // 3705 LYONS AVENUE



HELPING HANDS MURAL // 3811 LYONS AVENUE



DELUXE THEATER // 3303 LYONS AVENUE

The Fifth Ward is home to a variety of creative mediums celebrated throughout its streets. These mediums range from craft-based art such as food and handmade goods to visual-based art such as mosaics and graffiti to performance-based art such as music, theater, and dance. *This poetic sense of place is an integral part to the community of the Fifth Ward.*



PEACOCK RECORDS MURAL // 3301 CLIVE STREET



**3**  
**PART 03**

NURTURING A SENSE OF PLACE.  
*COMMUNITY, PROGRAM, CONCEPTS, TECTONICS.*

PARTICIPATION FUNCTIONAL PROGRAM.

Using the position of enablement for the people of the Fifth Ward, several residents played a part in this project in the development of multiple aspects throughout the design process. The most significant influence lies in the program. With the input of the local community, the following functional program was determined for the mixed-use design:

FUNCTION OF THE HOUSING.

**comfortability //** single-family home typology

**flexibility //** maximize the lifespan of the home

**longevity //** withstand severe hurricane patterns

**humanization //** variety of housing

FUNCTION OF THE PUBLIC SPACE.

**health //** provide fresh produce to the community

**creativity //** incorporate community through art

**safety //** FEMA-rated hurricane shelter

**community //** incorporate a local restaurant

FUNCTION OF THE LANDSCAPE.

**transit //** incorporate the bus stop onsite

**family //** green spaces for kids and dogs

**activity //** outdoor seating and entertainment



MARKET STREET



CORNER OF BRINGHURST AND MARKET STREET



BRINGHURST STREET



BRINGHURST STREET



EXISTING HOME ON BRINGHURST STREET



BRINGHURST STREET



ALLOCATION SPACE PROGRAM.

The space program was determined based on communication with the residents and the functional program to design an environment that reinvigorates the community and provides a cultural hub for the Fifth Ward.



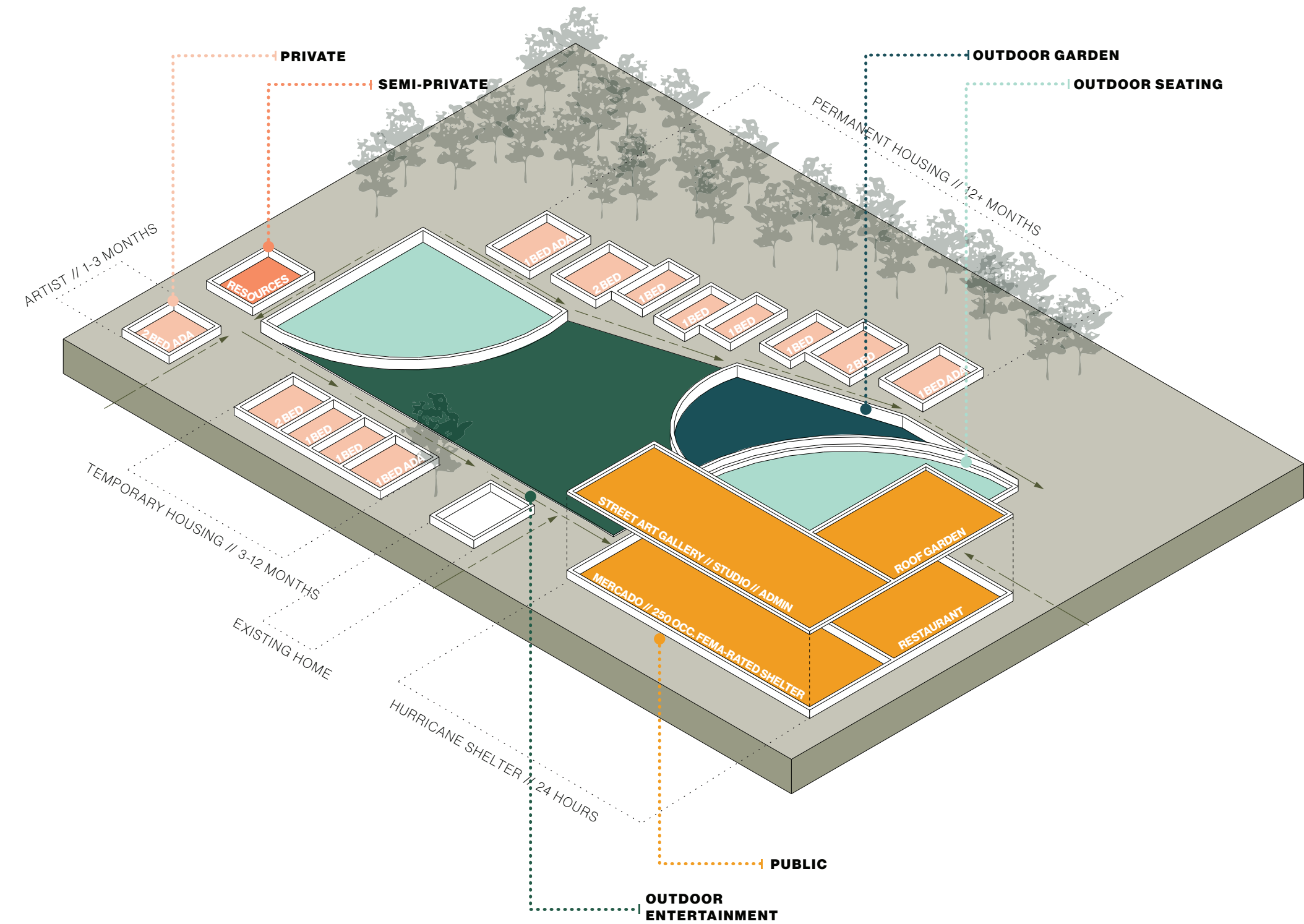
PRIVATE 19,980 SF.

- permanent housing //** lease of 12+ months
- temporary housing //** lease of 3-12 months
- artist en residence //** artists stay 1-3 months
- resources //** transit, construction, & assistance

PUBLIC 29,105 SF.

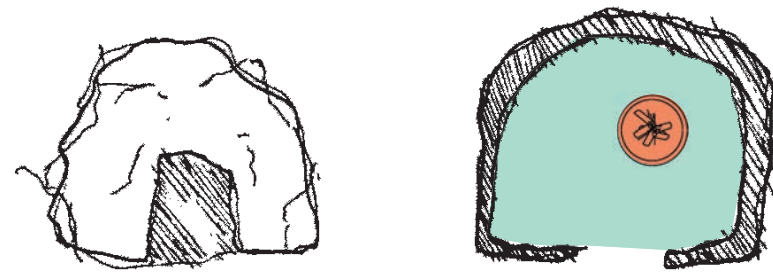
- mercado //** indoor market for local goods
- shelter //** emergency shelter-in-place for storms
- restaurant //** rotational pop-up for local chefs
- street art gallery //** rotational graffiti showcase
- studio //** interactive graffiti production
- roof garden //** communal, locally grown produce
- support //** admin, circulation, & technical

INTEGRATION OF PUBLIC AND PRIVATE ADJACENCY DIAGRAM.

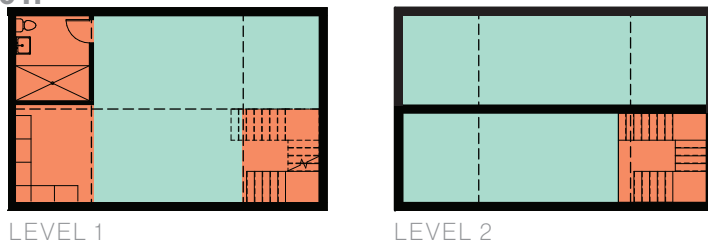




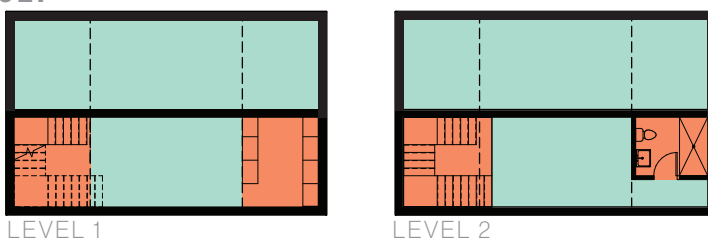
THEORY OF THE VOID.



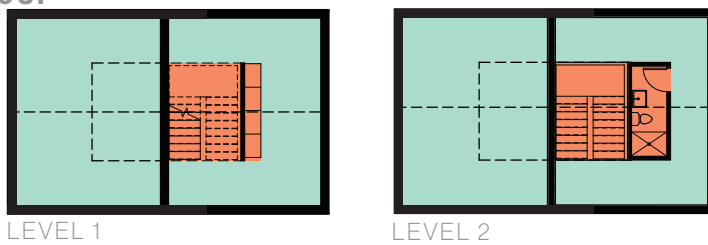
LAYOUT 01.



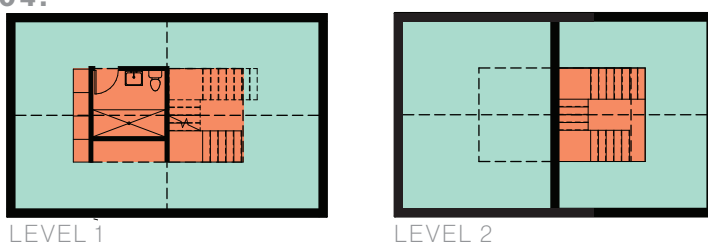
LAYOUT 02.



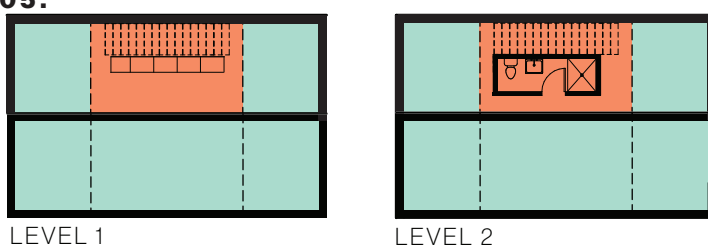
LAYOUT 03.



LAYOUT 04.



LAYOUT 05.



Applying the concepts of participatory design, the form of the project was driven by the theory of humans' first structure and its relation to incrementality. *Taking the principles of a cave, the ideology of form shapes itself into a permanent, durable structure that allows the interior a level of flexibility for its occupants to adapt the space to their definition of dwelling and allow an extended lifetime of the building.*

In defining the elements of the housing unit, the static components must be established. The static components of the unit contain its immobile functions such as the kitchen, bathroom, laundry, and stairs. *To follow the metaphor of a cave, the static functions need to be arranged in an organization that will allow a maximized flexible area for the user to manipulate.* Multiple configurations were analyzed for the housing units according to Bernard Leupen and Harald Mooij's spatial organizations of dwelling. The plans reflected using the center of the unit for static functions, defining the center as a core and using the center of the unit for the flexible floor area, defining the center as space. As the plans went through multiple iterations, the area for static functions became a blend of the two spatial organizations to visualize a solution that would maximize the dwelling's flexibility. (Leupen & Mooij, 2011, p. 90-142).

LENSES OF SAFETY CONCEPTUAL PROGRAM.

**cultural //** integration of public & private

promoting local art & goods

**economic //** promoting localized consumerism

reduce operating costs via design

**mental //** flexible, adaptive units

visual tectonics of durability

**physical //** access to fresh air

access to daylight

**long-term //** FEMA-rated construction guidelines

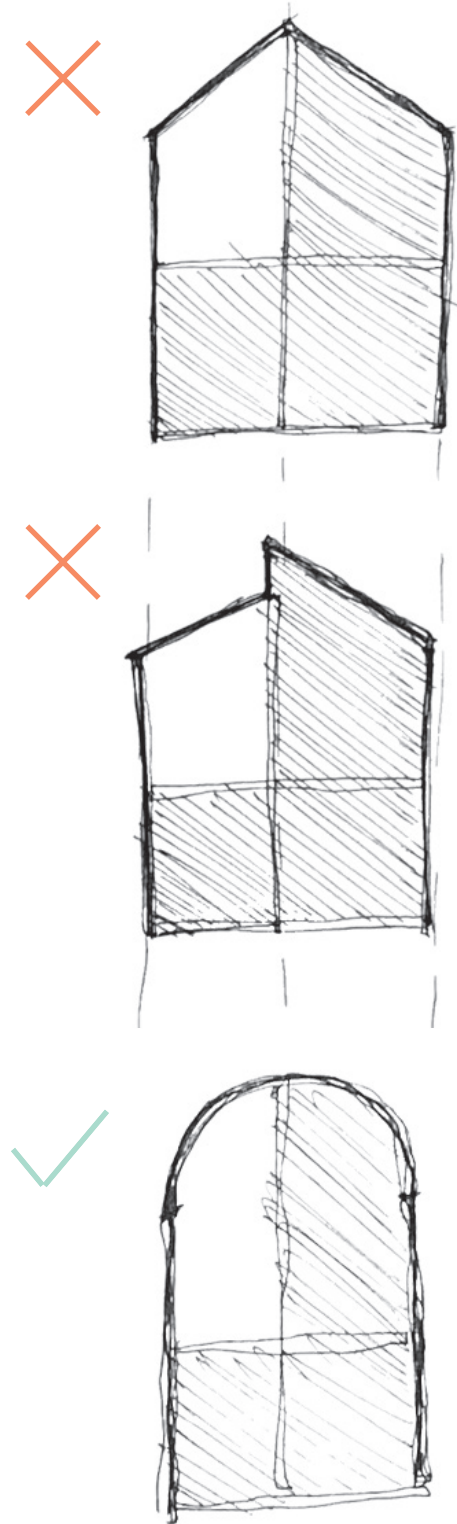
durable materials & elevated floors



## CRITIQUES OF INCREMENTALITY.

Focusing on the aspect of incrementality, the design was influenced by research involving the critiques of incrementality throughout its history. The most prevalent critiques revolved around a lack of passive design, uncontrolled boundaries of space, absence of dedicated outdoor space, insufficiency of institutional support, and oppressive aesthetics. To address these critiques, the proposed design incorporates multiple passive design strategies, defined boundaries, terraces, and the implementation of a resource center available to the residents.

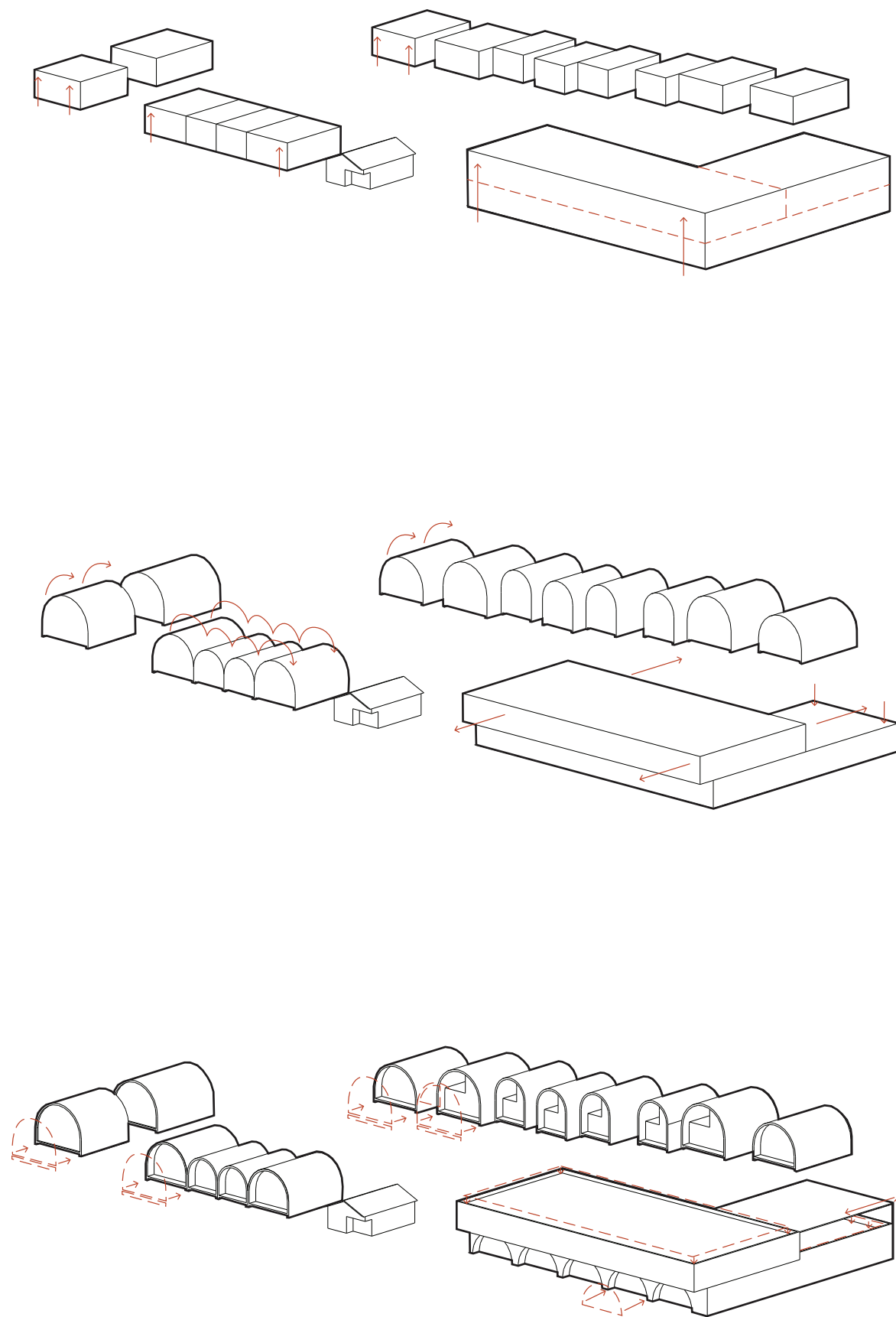
Addressing the aesthetics of the building, residents were involved throughout the design process to choose a form that exuded visual stability and durability. When given the choice between two forms reminiscent of the housing that currently exists with pitched or shed roofs or two contrasting forms using barrel vaults, the residents resonated with a barrel vault. *By choosing a form that heavily contrasts the existing housing, the form signifies a new type of housing that will not deteriorate like the existing housing.*



CASA DE ELADIO DIESTE // MONTEVIDEO, URUGUAY



MERGING PROGRAM, CONCEPT, AND FORM.

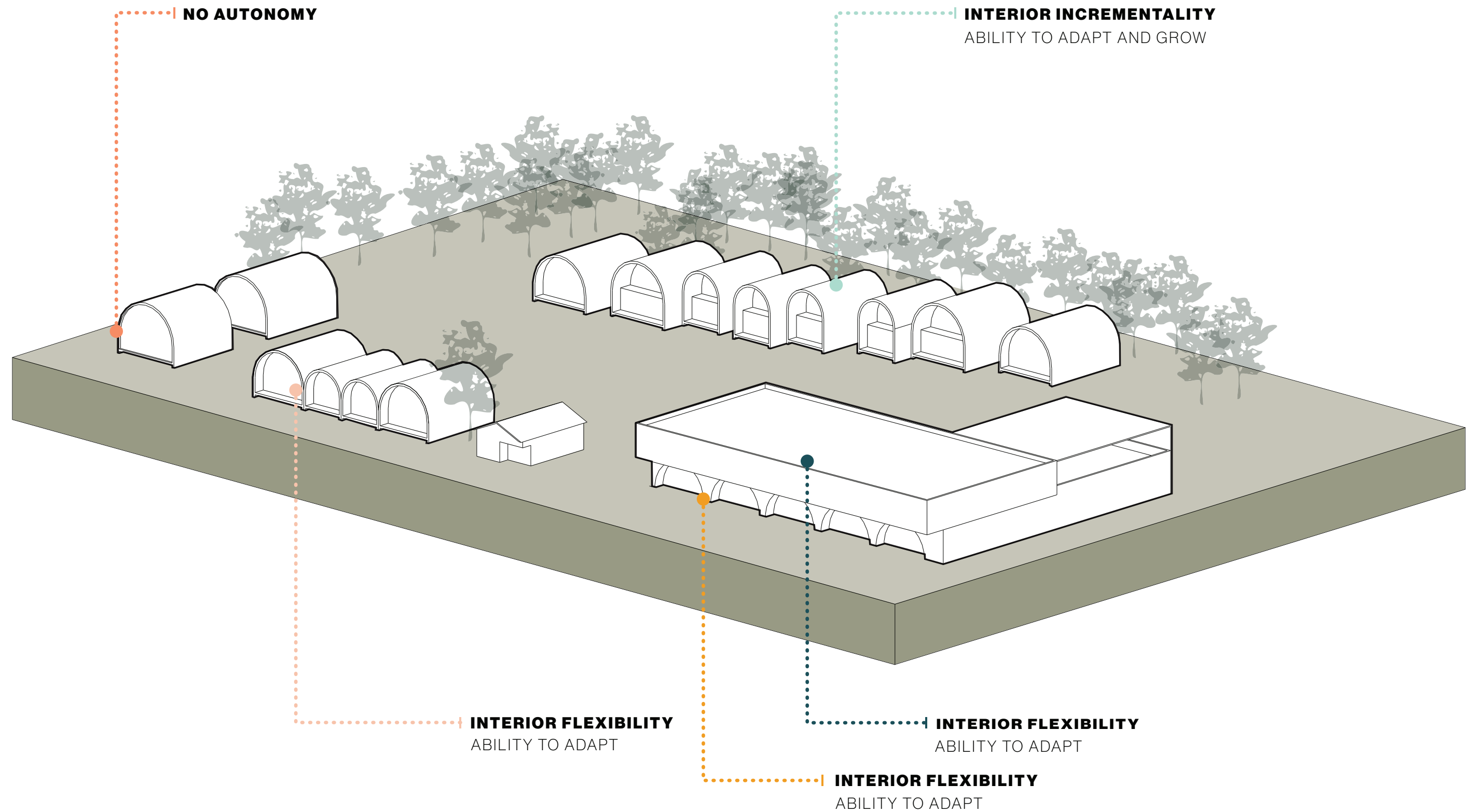


**HARD** ●  
NO AUTONOMY

INTERIOR FLEXIBILITY

INTERIOR INCREMENTALITY

● **SOFT**  
MAXIMUM AUTONOMY



**NO AUTONOMY**

**INTERIOR INCREMENTALITY**  
ABILITY TO ADAPT AND GROW

**INTERIOR FLEXIBILITY**  
ABILITY TO ADAPT

**INTERIOR FLEXIBILITY**  
ABILITY TO ADAPT

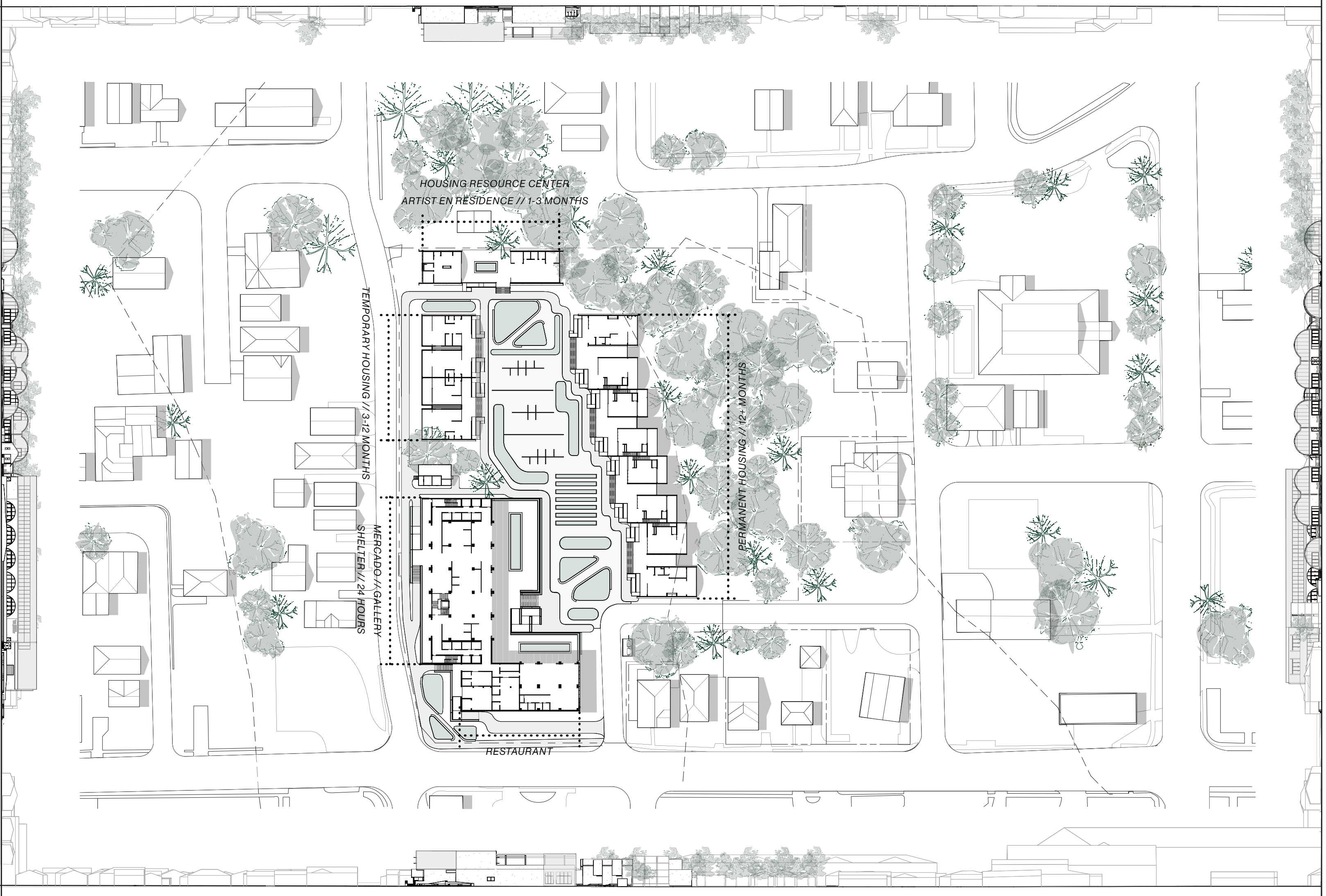
**INTERIOR FLEXIBILITY**  
ABILITY TO ADAPT



**4**  
**PART 04**

FILLING THE VOID.

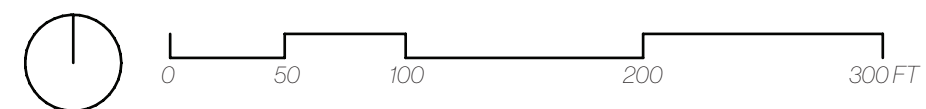
*PROJECT DESIGN, MATERIALITY, IMPLEMENTATION OF RESEARCH AND CONCEPTS.*



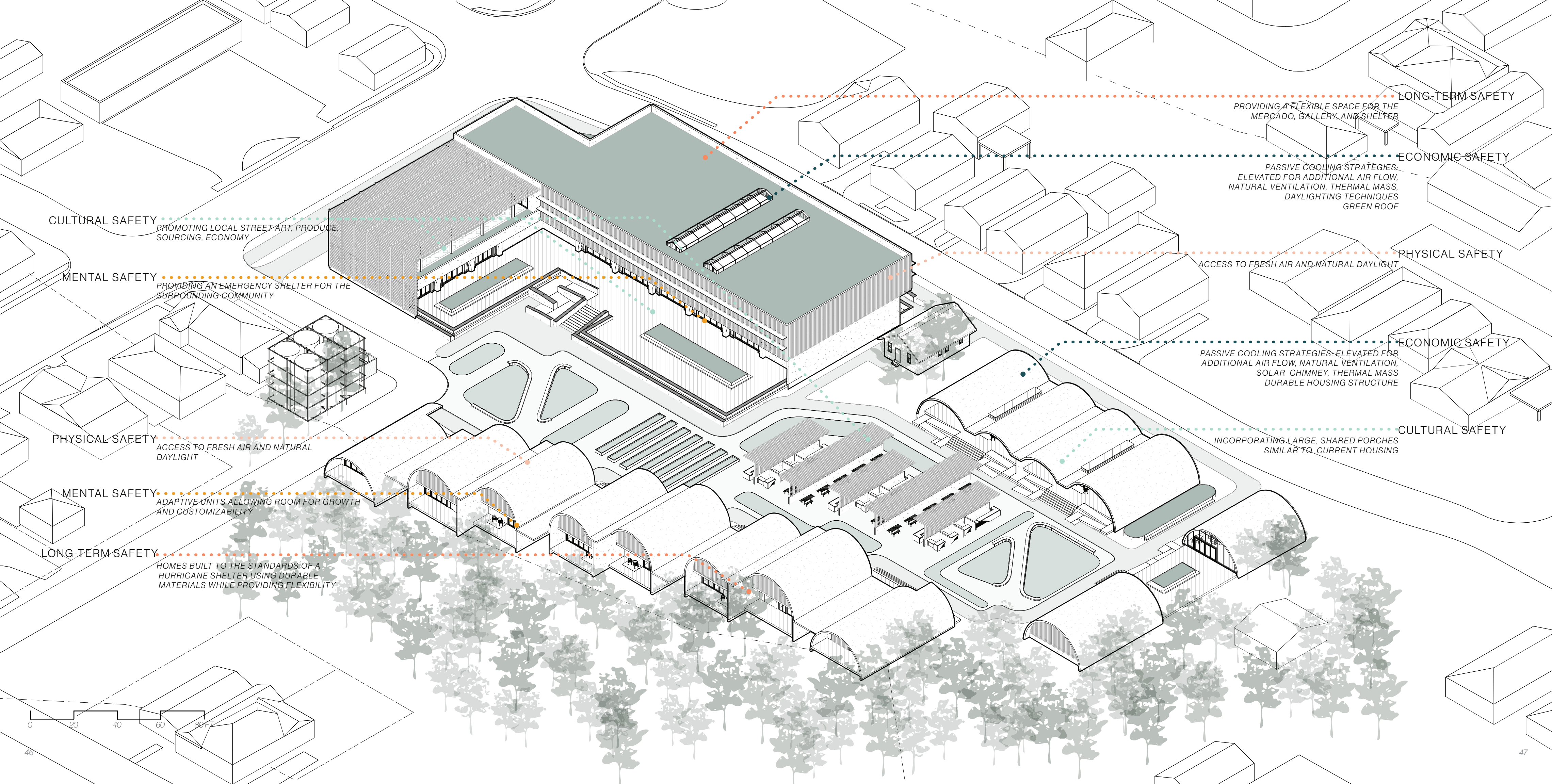
THE SITE.

On the site, the public building identifies the corner of the site with the heaviest traffic on the site located on the corner of Market Street and Bringhurst Street. *The public building bleeds into the heart of the site creating an outdoor plaza used as an extension of food, produce, art, and entertainment. Housing units wrap around the plaza space to generate revitalization of the community of the Fifth Ward.*

The housing units take the shape of a barrel vault, the mercado follows with the form of intersecting groin vaults on the first level of the public building to identify the mercado as a type of temporary shelter. Structures on the site are elevated off of the ground plane to assist the risk of flooding and allow for rainwater collection below the finish floor.







**CULTURAL SAFETY**  
PROMOTING LOCAL STREET ART, PRODUCE, SOURCING, ECONOMY

**MENTAL SAFETY**  
PROVIDING AN EMERGENCY SHELTER FOR THE SURROUNDING COMMUNITY

**PHYSICAL SAFETY**  
ACCESS TO FRESH AIR AND NATURAL DAYLIGHT

**MENTAL SAFETY**  
ADAPTIVE UNITS ALLOWING ROOM FOR GROWTH AND CUSTOMIZABILITY

**LONG-TERM SAFETY**  
HOMES BUILT TO THE STANDARDS OF A HURRICANE SHELTER USING DURABLE MATERIALS WHILE PROVIDING FLEXIBILITY

**LONG-TERM SAFETY**  
PROVIDING A FLEXIBLE SPACE FOR THE MERCADO, GALLERY, AND SHELTER

**ECONOMIC SAFETY**  
PASSIVE COOLING STRATEGIES: ELEVATED FOR ADDITIONAL AIR FLOW, NATURAL VENTILATION, THERMAL MASS, DAYLIGHTING TECHNIQUES GREEN ROOF

**PHYSICAL SAFETY**  
ACCESS TO FRESH AIR AND NATURAL DAYLIGHT

**ECONOMIC SAFETY**  
PASSIVE COOLING STRATEGIES: ELEVATED FOR ADDITIONAL AIR FLOW, NATURAL VENTILATION, SOLAR CHIMNEY, THERMAL MASS DURABLE HOUSING STRUCTURE

**CULTURAL SAFETY**  
INCORPORATING LARGE, SHARED PORCHES SIMILAR TO CURRENT HOUSING

0 20 40 60 80 FT





CUSTOM CONCRETE SIPS



PERVIOUS PAVEMENT TYPE A



PERVIOUS PAVEMENT TYPE B



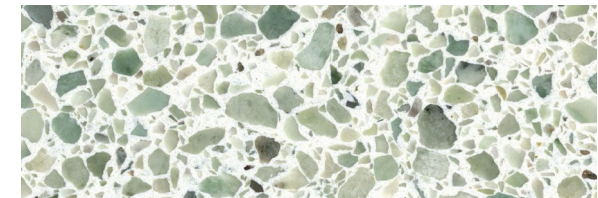
CROSS LAMINATED TIMBER



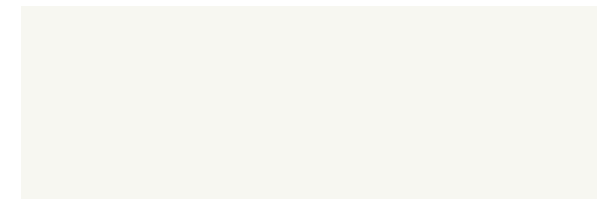
BAMBOO FINISH FLOORING



CEDAR SHADING DEVICES



RECYCLED GLASS TERRAZZO



GYPSUM WALLBOARD // WHITE



PLYWOOD CABINETS // OLIVE

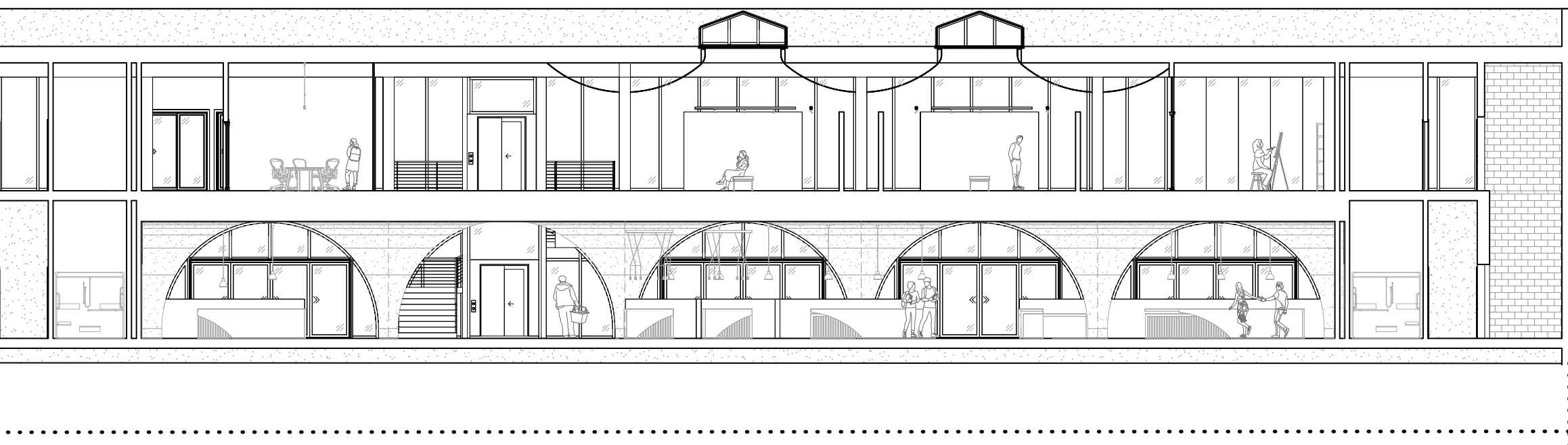
## PROJECT MATERIALITY.

Materiality played a crucial role in the development of the experience. *The materials were chosen based on their visual relationship with the tectonics of stability and their ethical responsibility of embodied carbon.* The primary material seen throughout the project is concrete in the form of custom structural insulated panels; with the embodied carbon in mind, the concrete mixture uses a low carbon makeup consisting of a slag cement. The permeable pavement is concrete-based and assists in the mitigation of stormwater. The secondary material seen is wood under the application of multiple areas such as the gallery structure, all of the finish floors, and all of the external shading devices. The interior uses recycled glass terrazzo seen on countertops, recycled gypsum wallboard for interior walls, and plywood millwork.

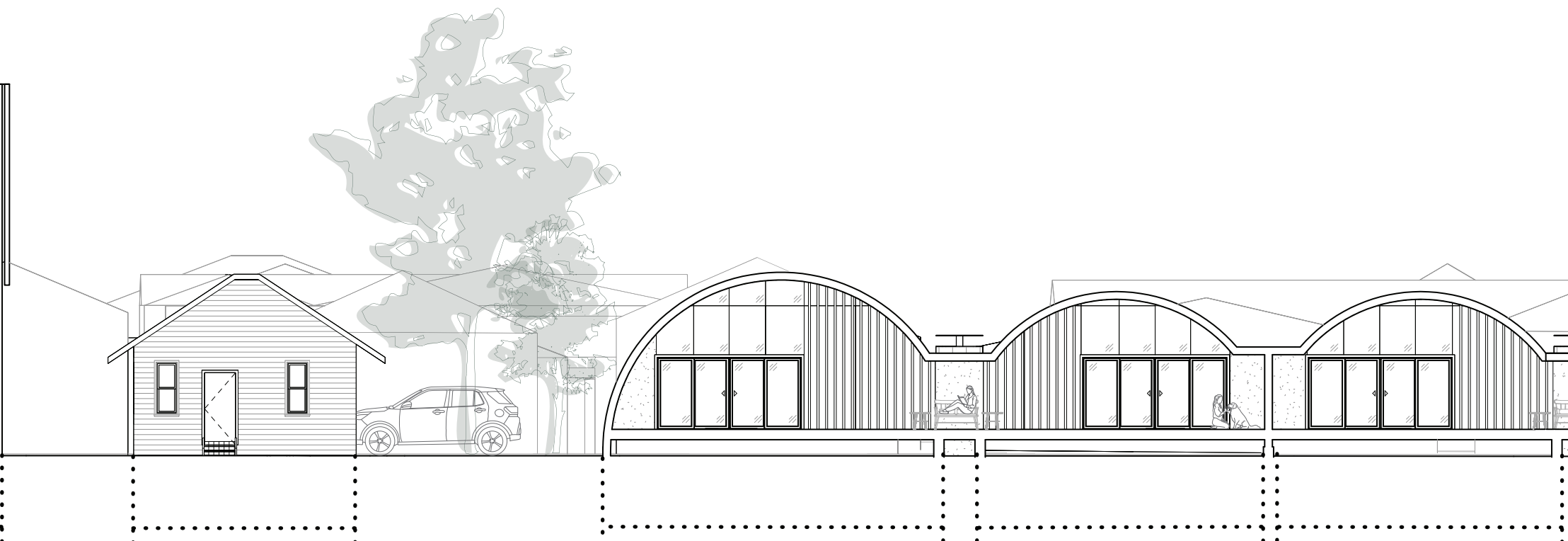
*Maintaining a neutral palette throughout the design, the community is able to add vibrancy and personality to the development and adapt it to their vernacular.*







MERCADO // GALLERY  
EMERGENCY SHELTER-IN-PLACE



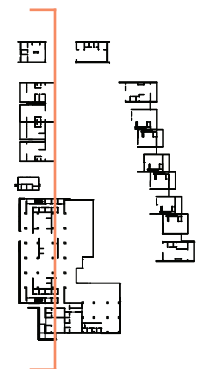
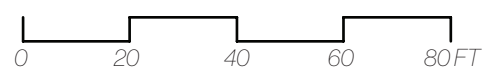
EXISTING

1 BED ADA UNIT

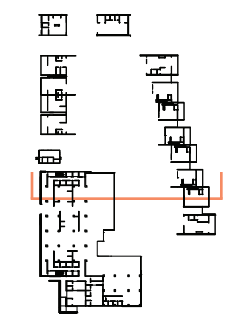
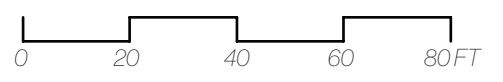
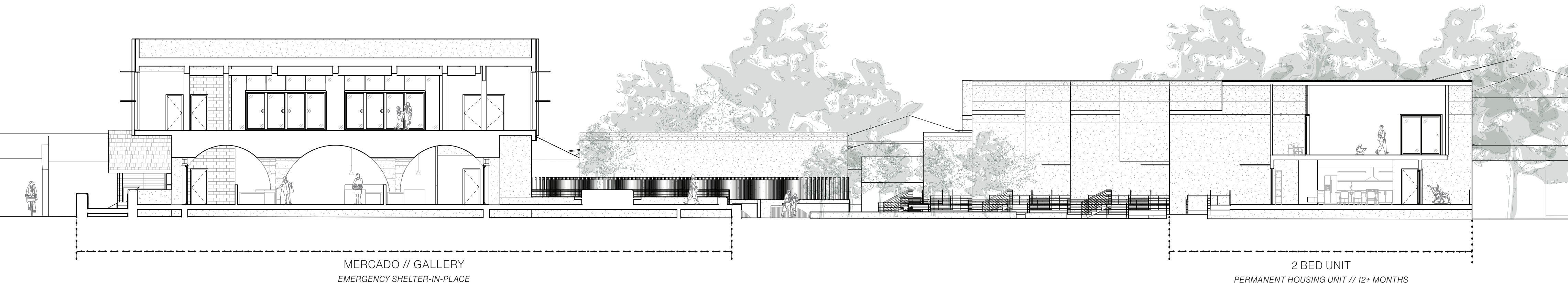
1 BED UNIT

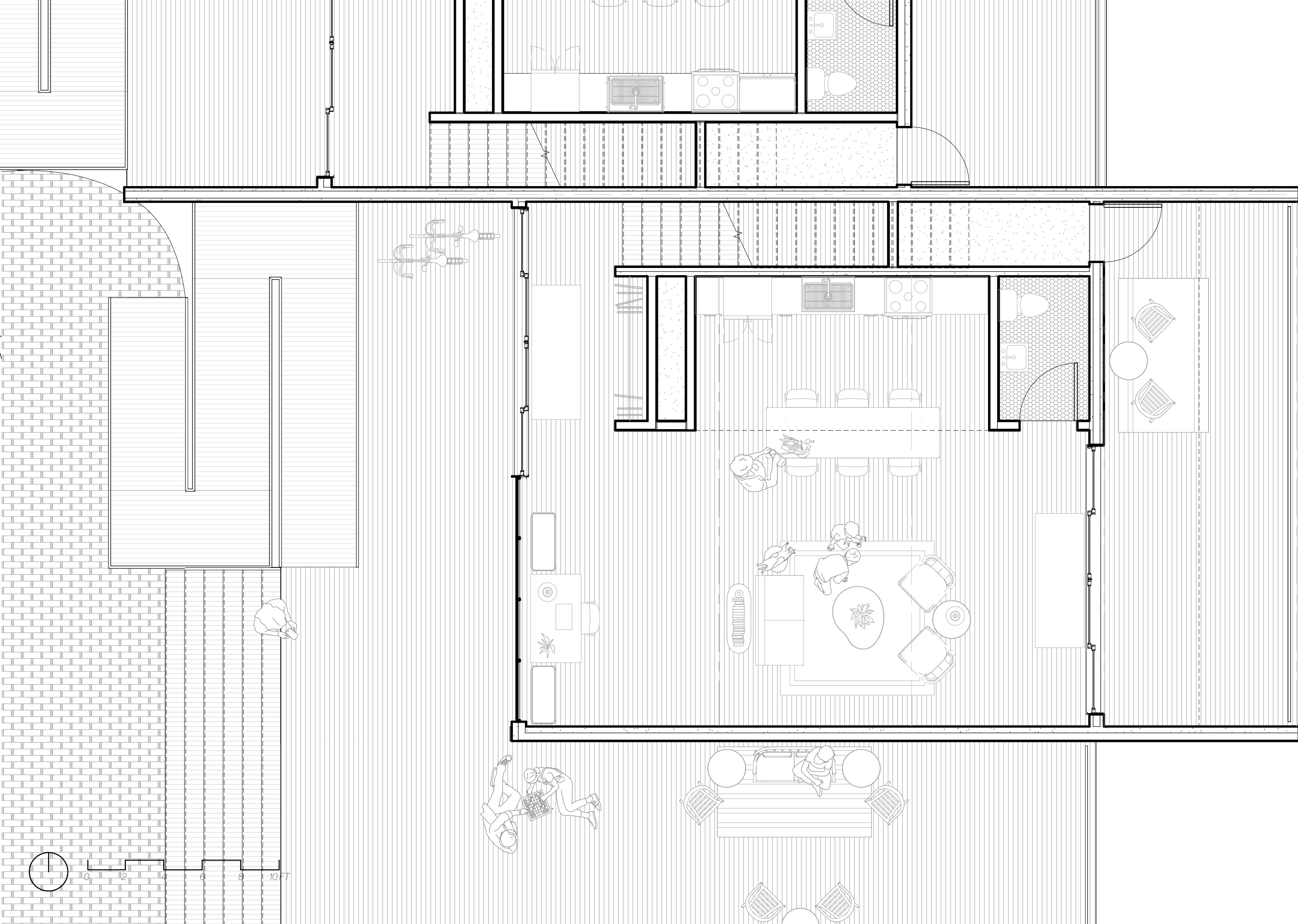
1 BED UNIT

TEMPORARY HOUSING // 3-12 MONTHS





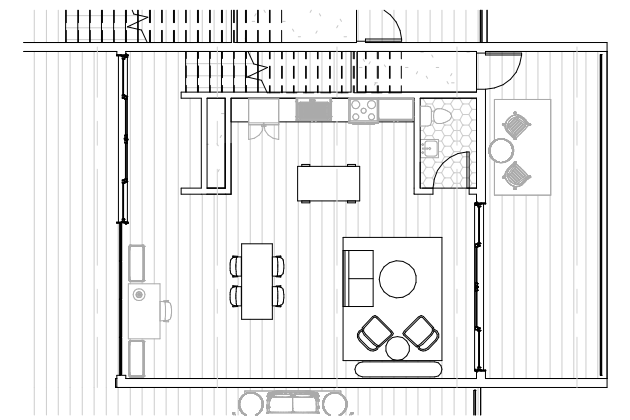
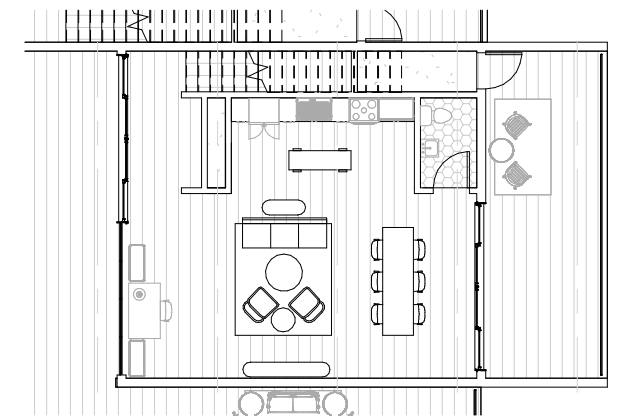




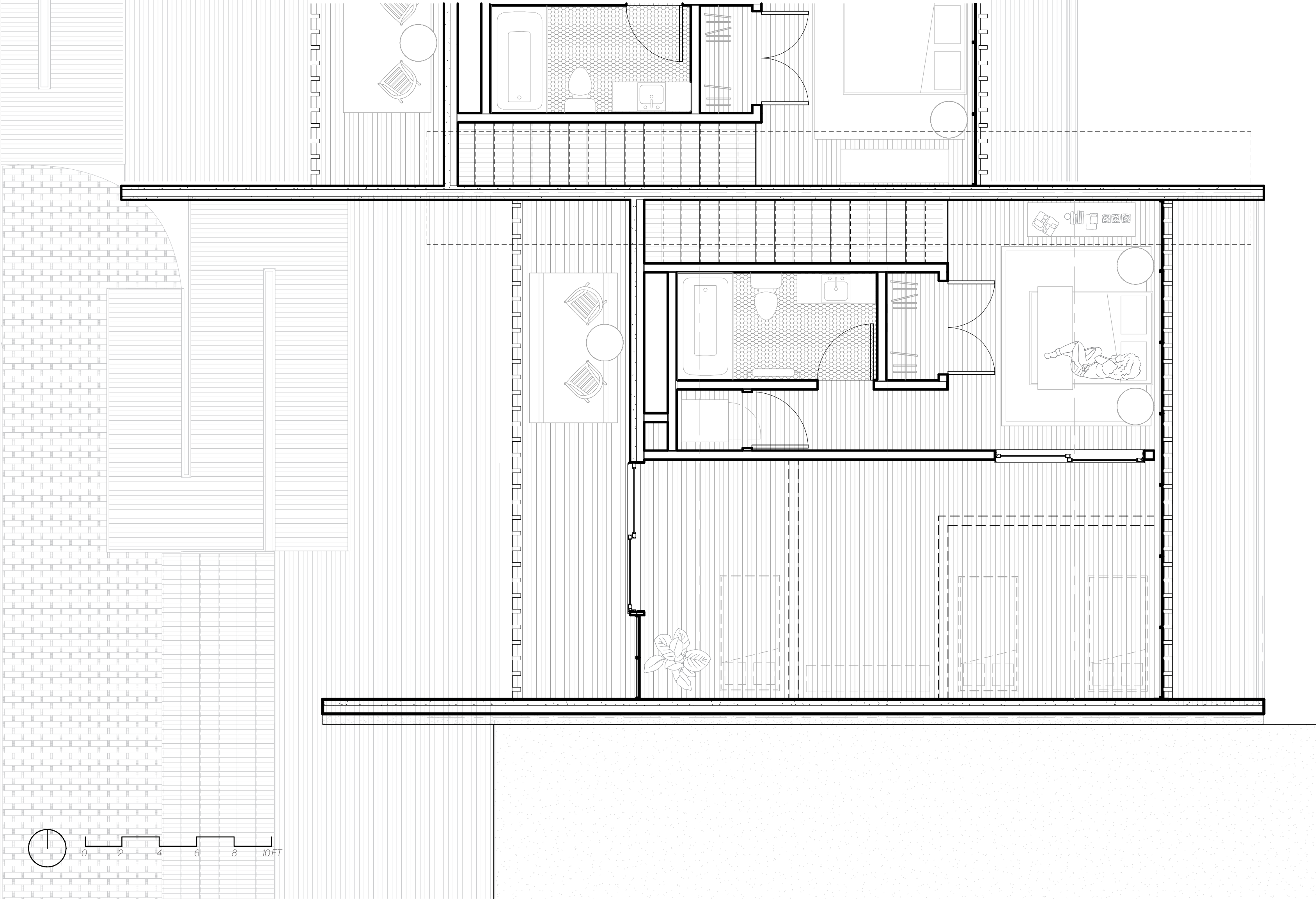
PERMANENT HOUSING LEVEL 01.

The first level of the permanent housing units holds the more public functions of the unit; utilizing *interior flexibility*, the first level allows for occupants to adapt the space to their lifestyle.

SPECULATIVE ADAPTATIONS.



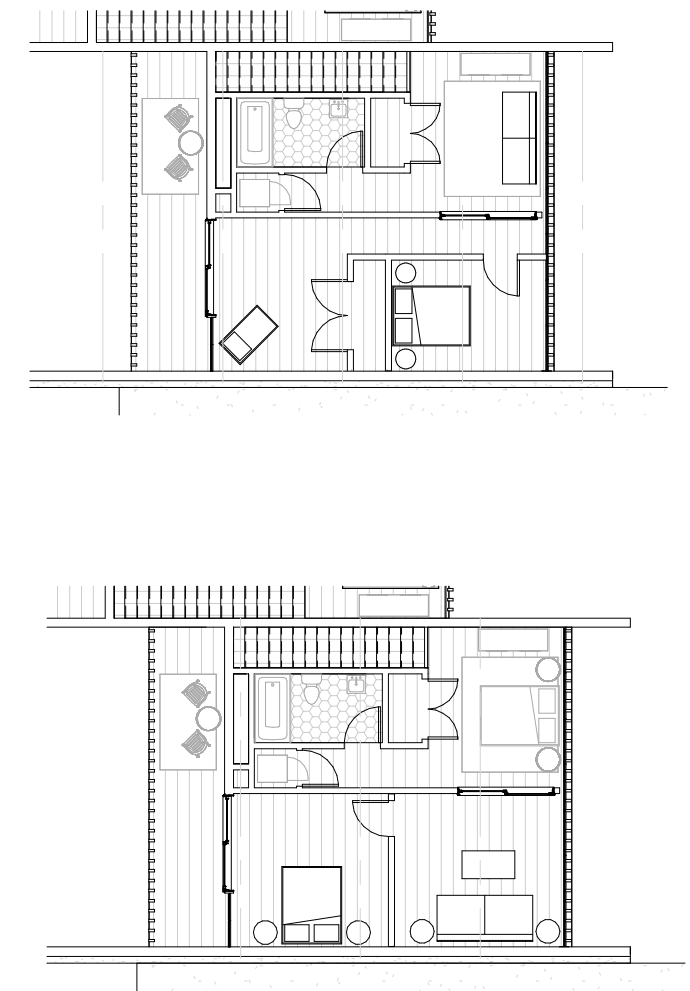




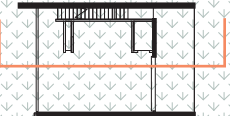
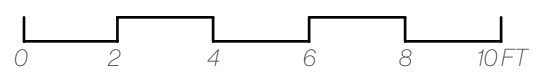
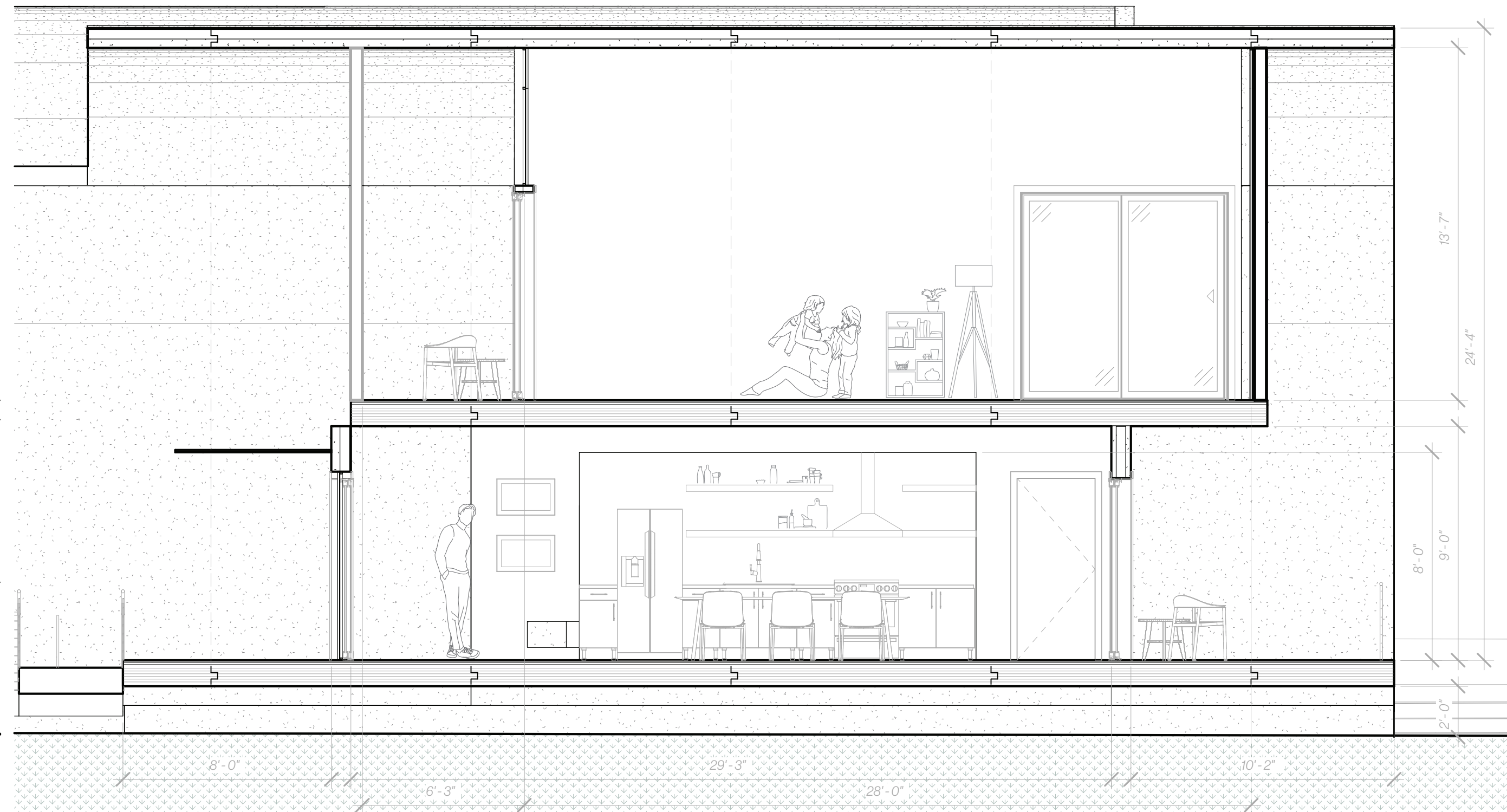
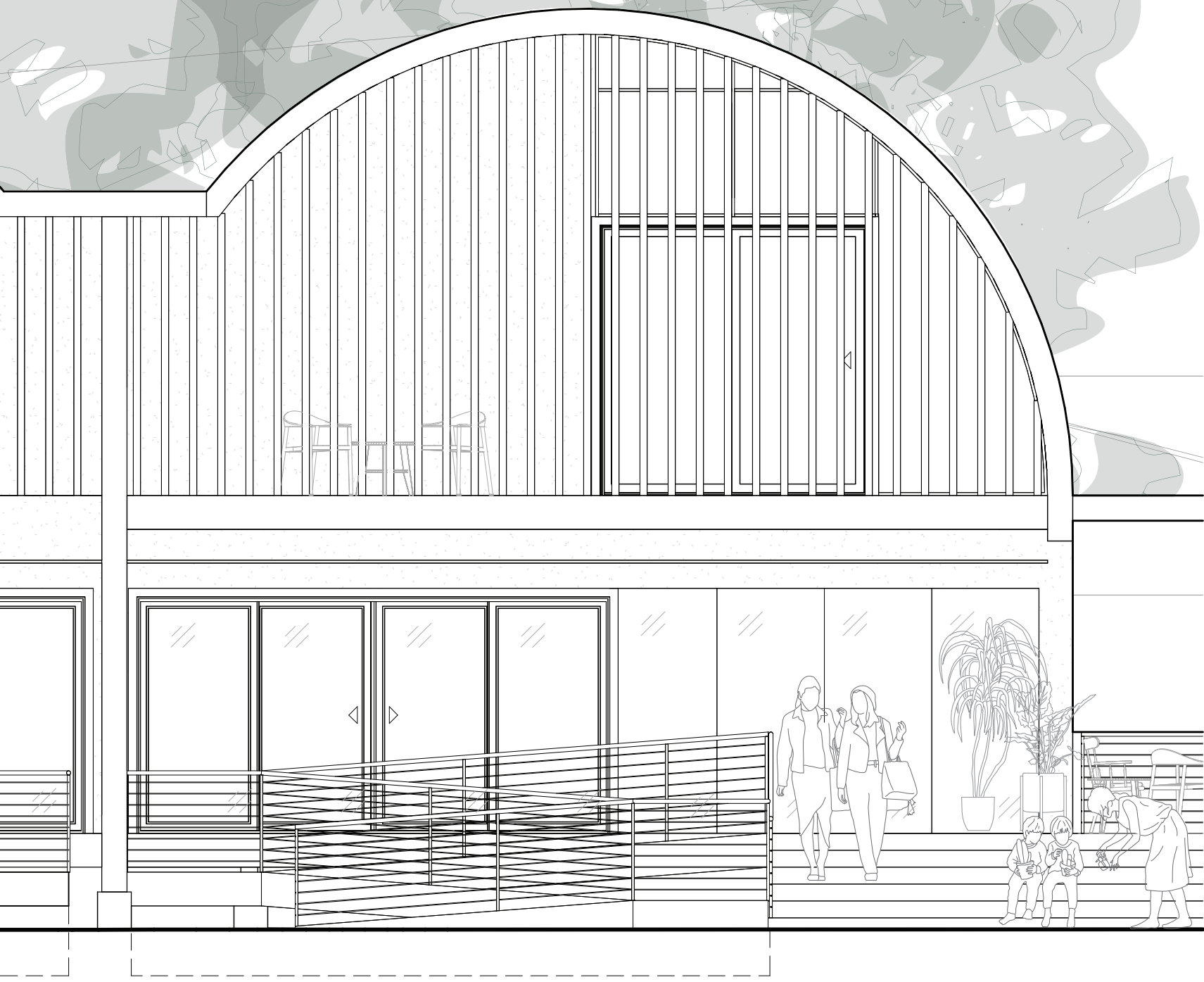
PERMANENT HOUSING LEVEL 02.

The second level of the permanent housing units holds the more private functions of the unit; utilizing *interior incrementality*, the second level allows for occupants to adapt the space to their lifestyle and grow into the additional flex space of the unit to extend the lifetime of the building.

SPECULATIVE ADAPTATIONS.



PERMANENT HOUSING ELEVATION // SECTION.

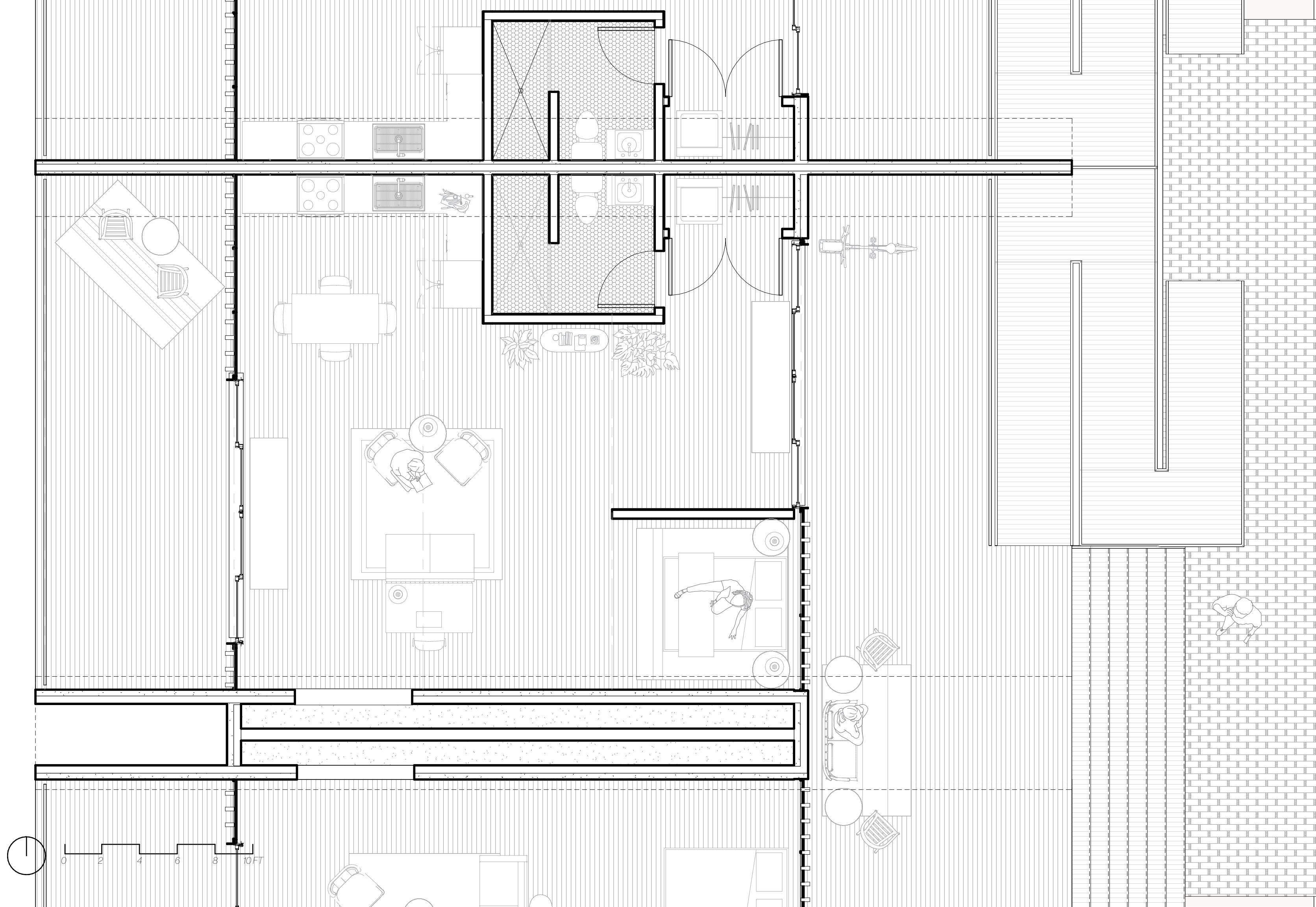




PERMANENT HOUSING EXPERIENCE.



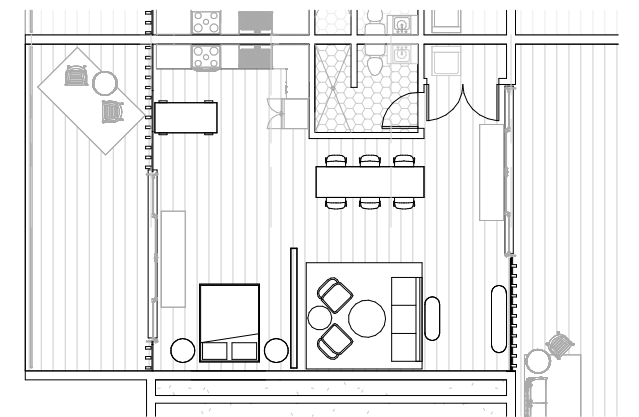
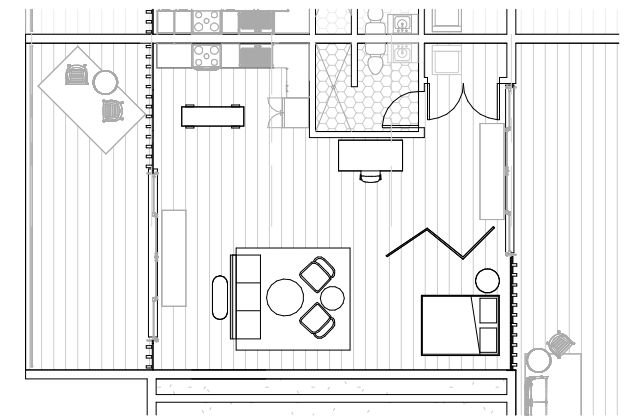




TEMPORARY HOUSING LEVEL 01.

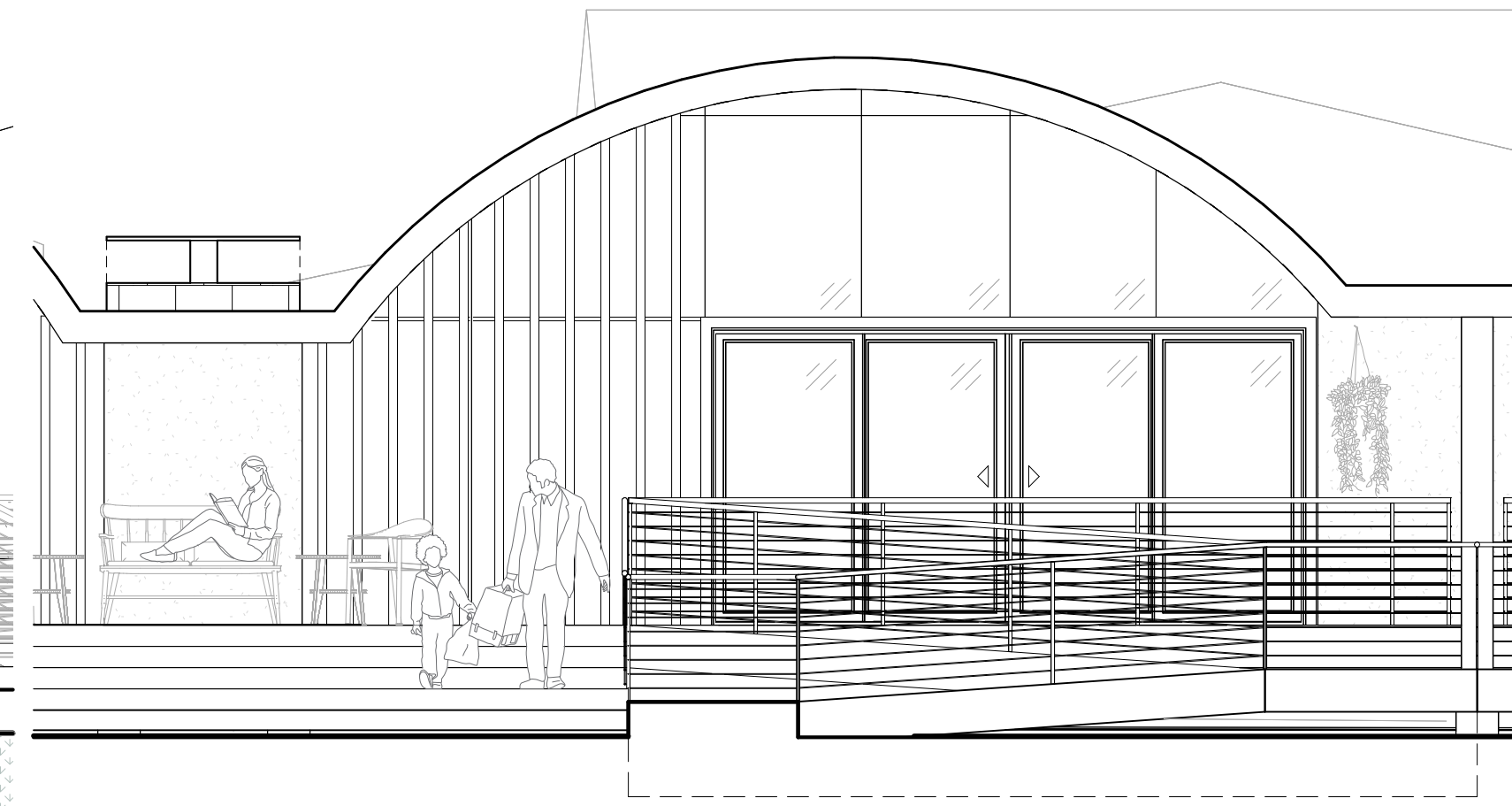
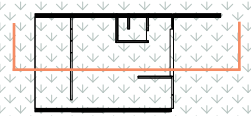
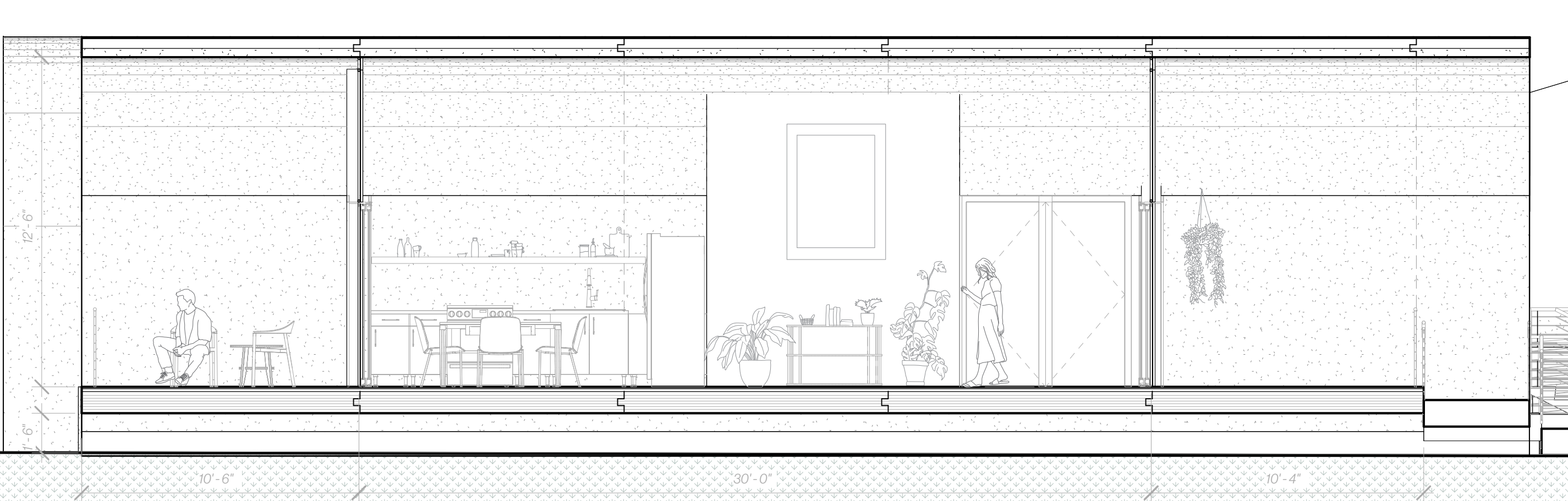
The temporary housing units implement *interior flexibility*, allowing occupants to adapt the space to their lifestyle.

SPECULATIVE ADAPTATIONS.





TEMPORARY HOUSING SECTION // ELEVATION.

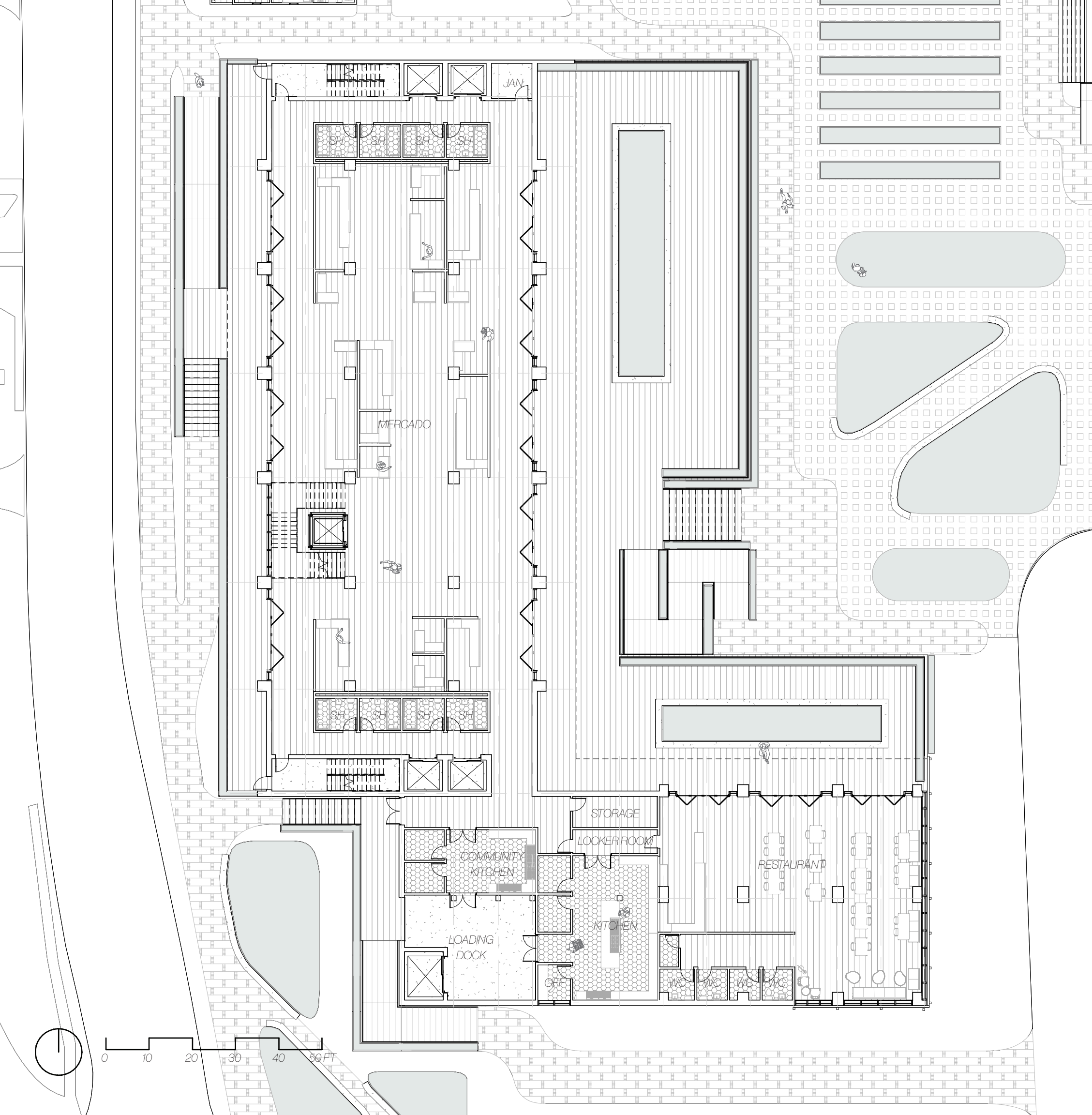




TEMPORARY HOUSING EXPERIENCE.







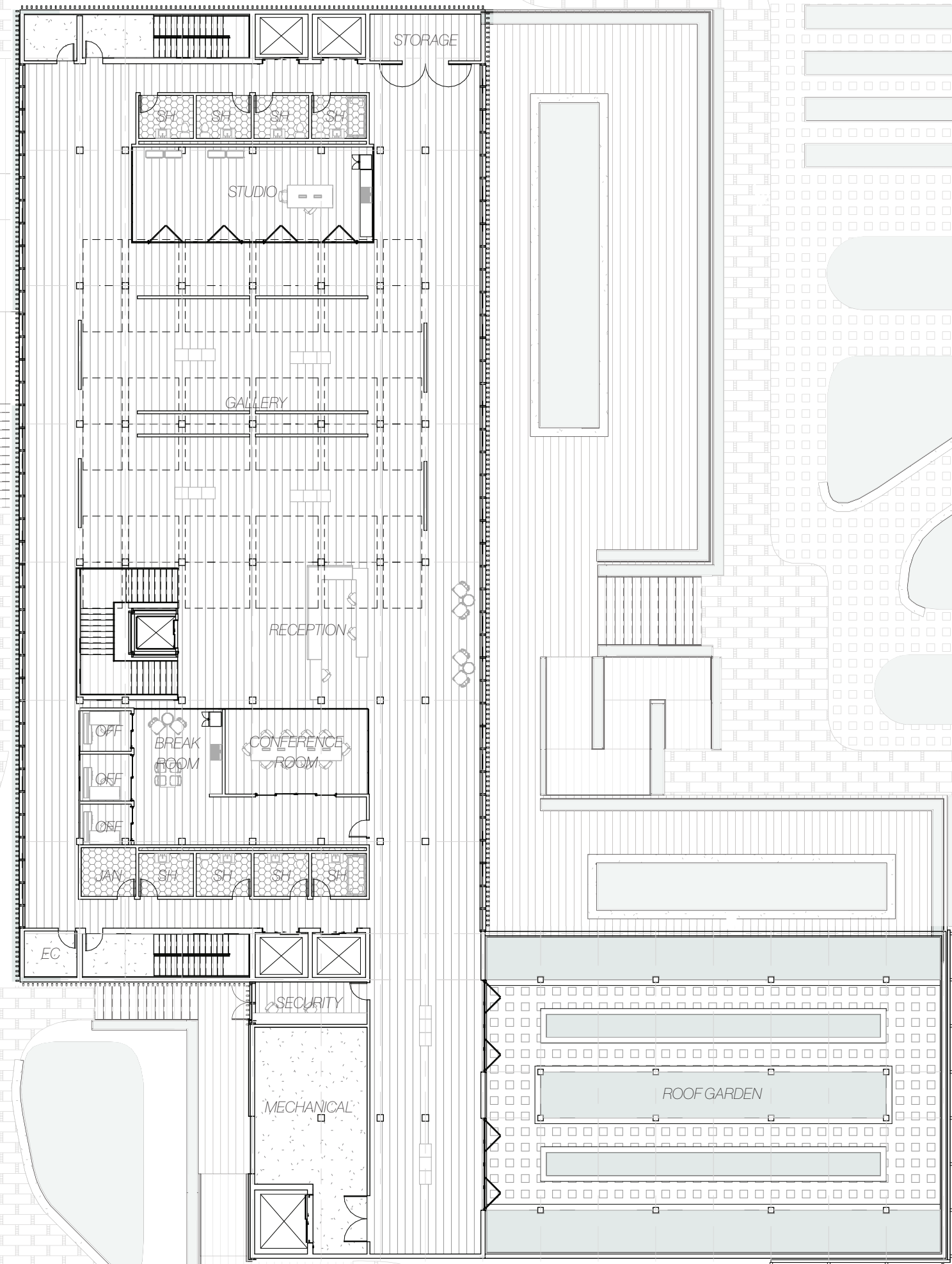
MERCADO & RESTAURANT LEVEL 01.

The first level of the public building consists of the mercado and restaurant; this level uses *interior flexibility* to allow the mercado to be adapted to an emergency shelter-in-place available to the public in the event of severe weather.



SHELTER-IN-PLACE ADAPTATION.

The dotted line around the mercado on the righthand plan illustrates the shelter-in-place space designed according to FEMA Design Guidance for Shelters and Safe Rooms; the space will hold a maximum occupancy of 250 people for 24 hours. The glazing will be protected via sectional overhead doors.

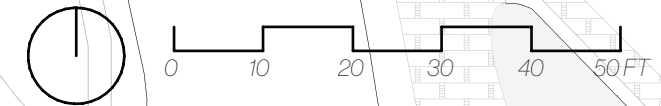


GALLERY, ADMIN, & GARDEN LEVEL 02.

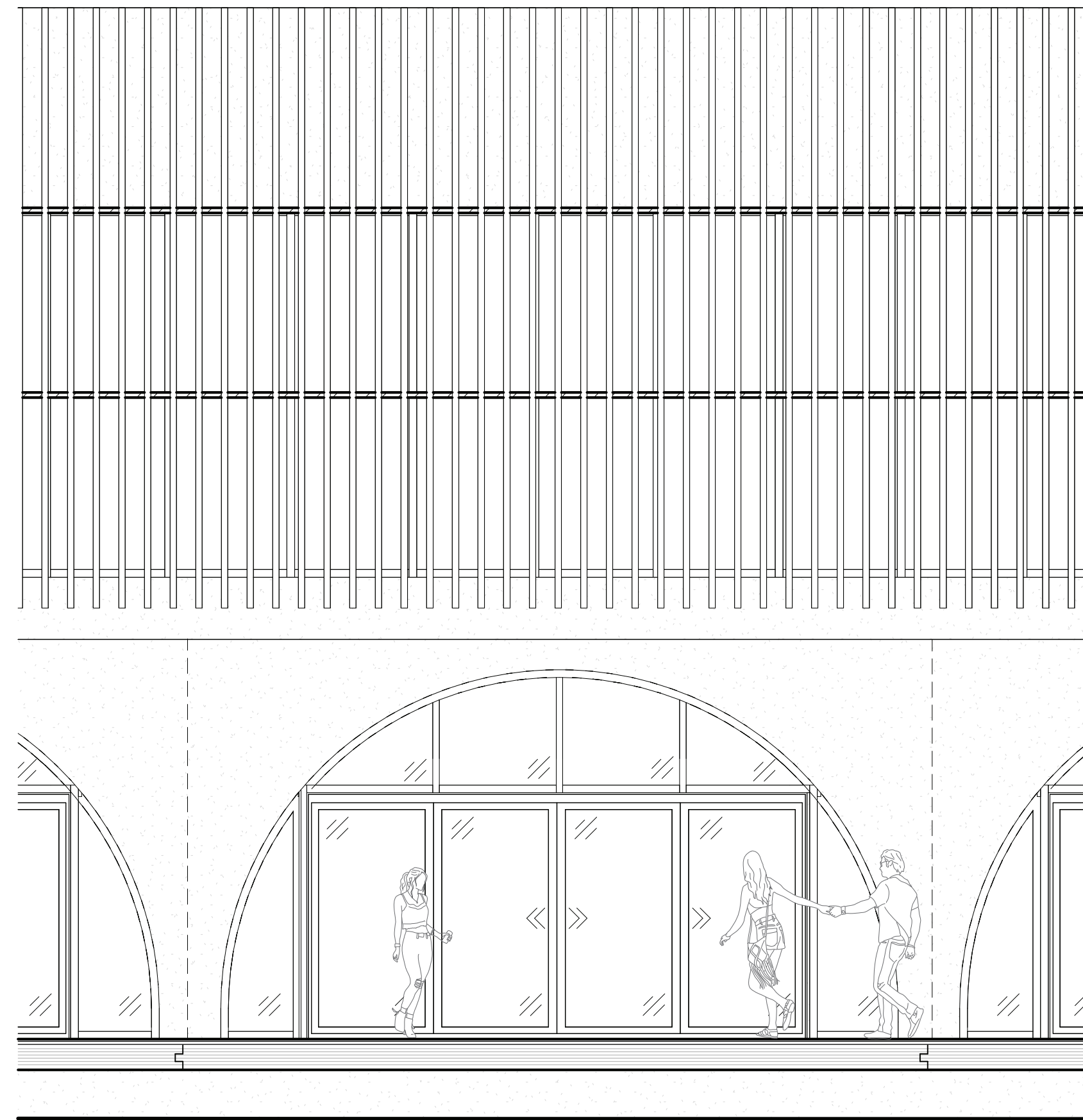
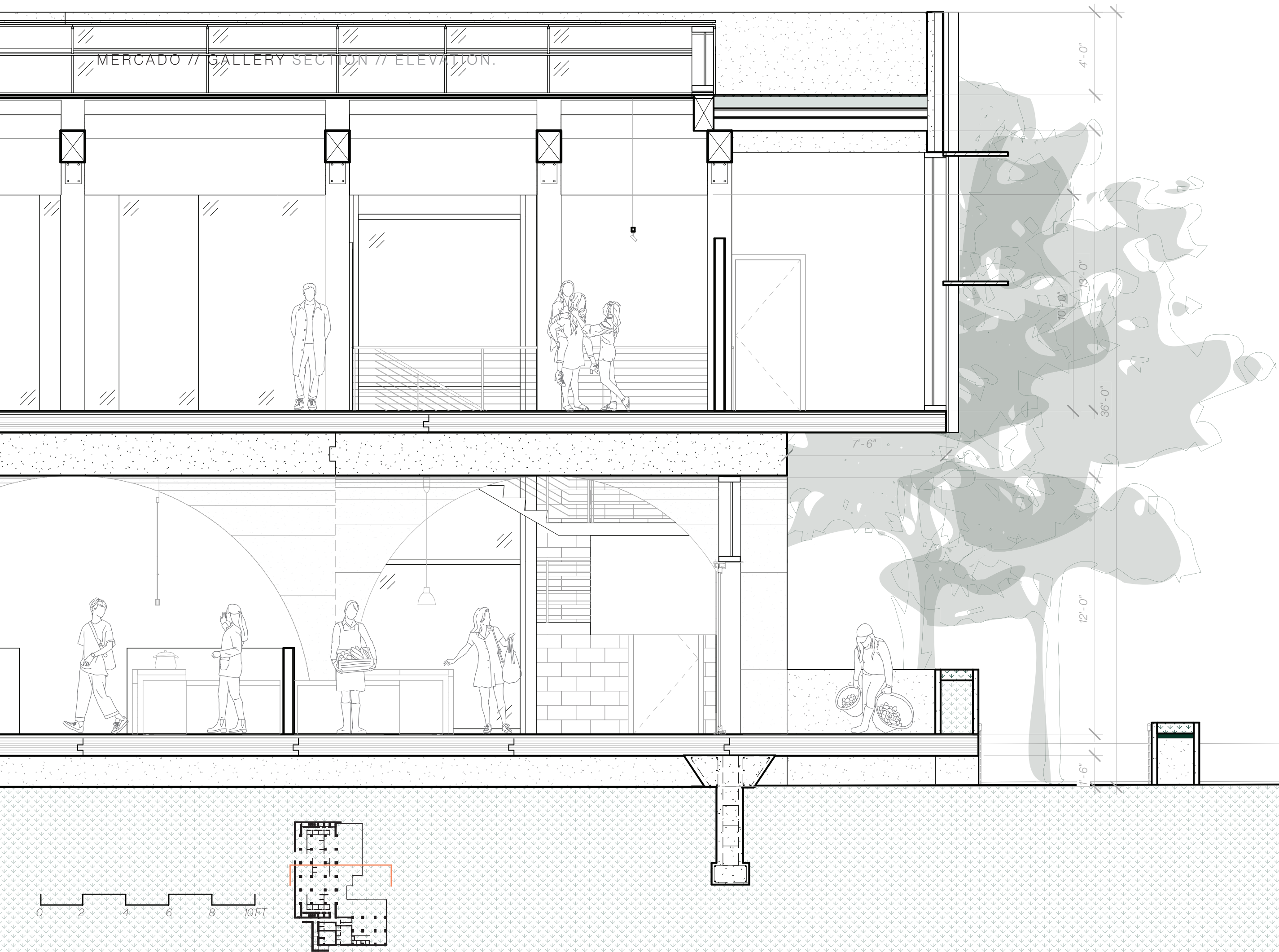
The second level of the public building consists of the gallery, administration, and rooftop garden; this level uses *interior flexibility* via moveable canvas wall panels to allow the gallery to be adapted to different layouts depending on the street art installation being showcased.

GALLERY ADAPTATION.

The righthand plan shows a speculative layout of how the space could be reconfigured according to the art on display.









PUBLIC BUILDING EXPERIENCE.



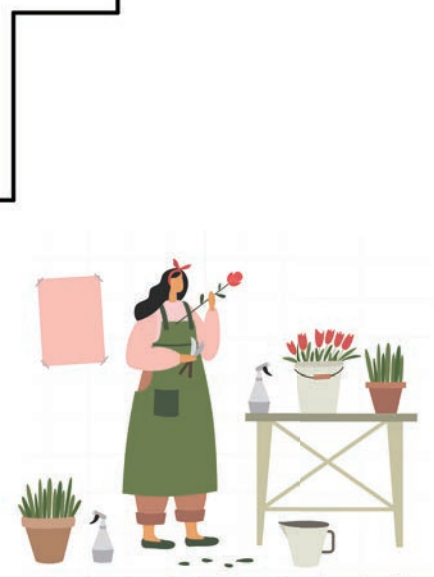














**5**  
**PART 05**

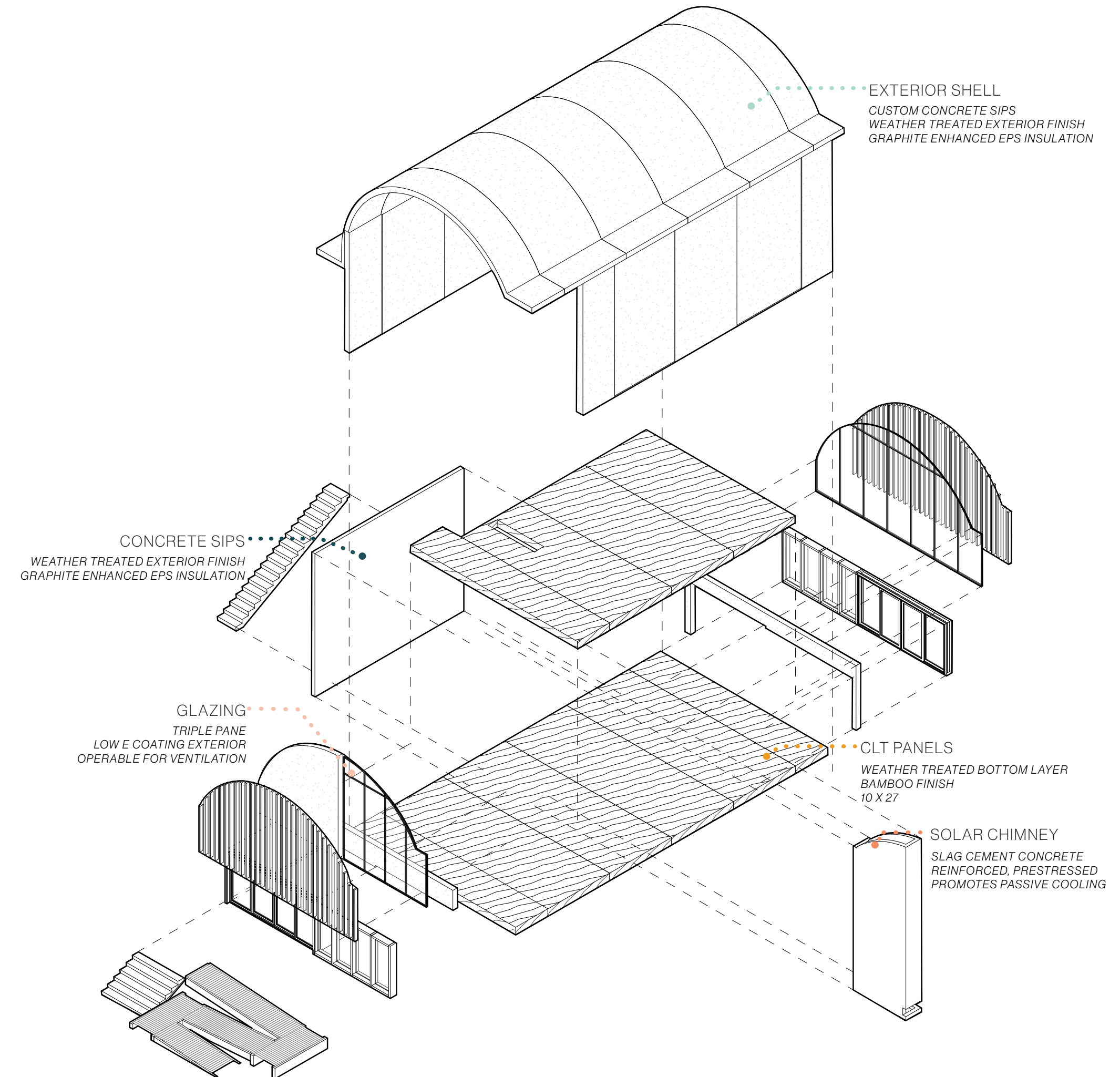
REFLECTION OF SPACE.  
*STRUCTURE, DETAILS, AND DIAGRAMS.*

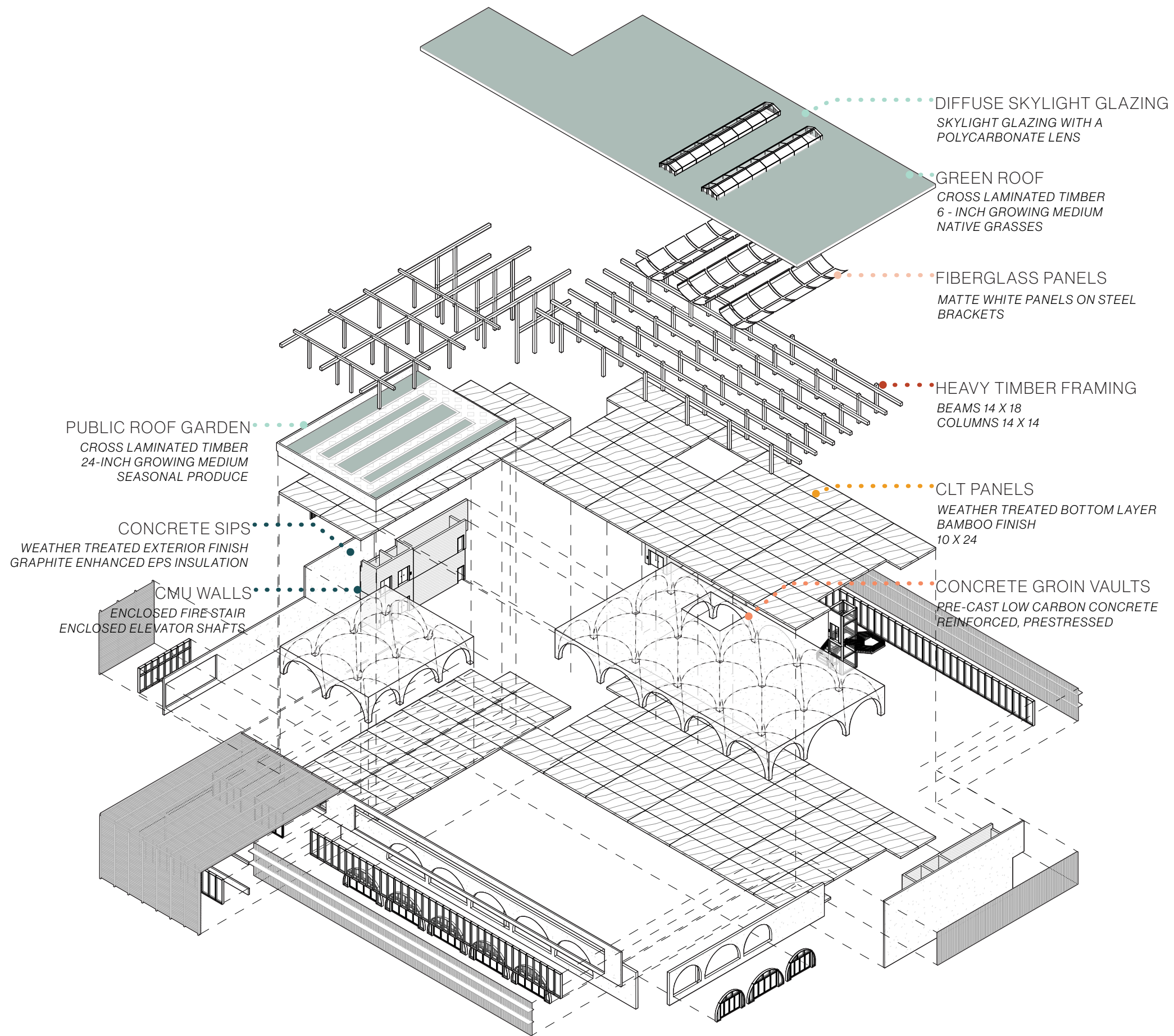


STRUCTURE PERMANENT HOUSING UNIT.

The structure of the permanent housing unit is based around the use of a barrel vault as an exterior shell. The barrel vault consists of custom concrete structural insulated panels fabricated off site to allow for a quicker pace of construction on site. Cross laminated timber panels are held by the pilotis-based concrete foundation to construct the floors. The finish floor is elevated above the ground plane with a weather barrier on the bottom layer; having the finish floor elevated decreases the flood risk associated with the ground floor, it also allows for stormwater to be collected underneath the structure. Protecting the glazing on the second level, cedar vertical louvers clad the exterior while the glazing on the first level is protected by sectional overhead doors.

The structure of the temporary units and ada permanent units is based on the same principles of the two-level permanent units.





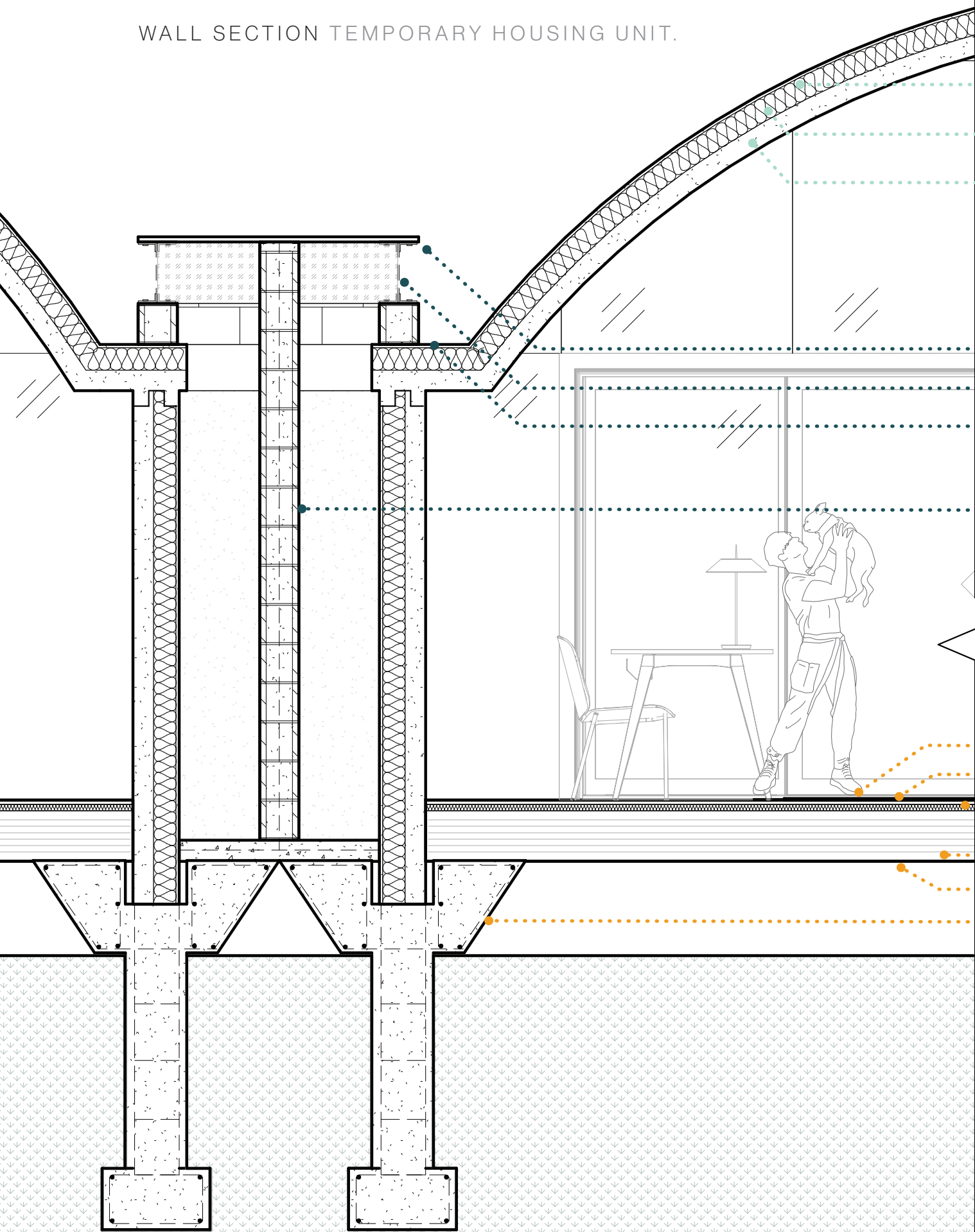
STRUCTURE MERCADO // GALLERY // RESTAURANT // ROOF GARDEN.

The structure of the public building is split between the two levels. The first level of the public building holds the mercado/shelter-in-place and the restaurant encased by precast concrete groin vaults. Broken into four quadrants, the precast groin vaults are able to be cast off site and assembled on site similar to Lake Flato's Confluence Park. The groin vaults provide a visual connection between the shelter-in-place and housing units to signify the shelter being a safe area to stay while establishing a tectonically durable structure that will withstand severe weather. Elevated above the ground plane, the finish floor is composed of cross laminated timber panels with a weather barrier on the bottom layer; the panels are held by cast-in-place concrete pilotis. Having the finish floor elevated decreases the flood risk associated with the ground floor, it also allows for stormwater to be collected underneath the structure.

The second level holds the gallery, studio, administration, and the roof garden. The interior spaces of the gallery, studio, and administration utilize a heavy timber structure to allow for greater visibility and warmth within the space. The floors use cross laminated timber panels to maintain the concept of prefabrication. The ceiling of the gallery incorporates matte white fiberglass panels curving into the space to guide additional daylight towards the art displays via skylights. The remaining roof is a green roof with the goal of reducing the urban heat island effect and cooling the interior space.



WALL SECTION TEMPORARY HOUSING UNIT.



ROOF & WALL // R-31

CONCRETE SIPS

- 01 WEATHER TREATED SLAG CEMENT CONCRETE 5/8"
- 02 GRAPHITE ENHANCED POLYSYRENE INSULATION 4 3/8"
- 03 SLAG CEMENT CONCRETE 4"

SOLAR CHIMNEY

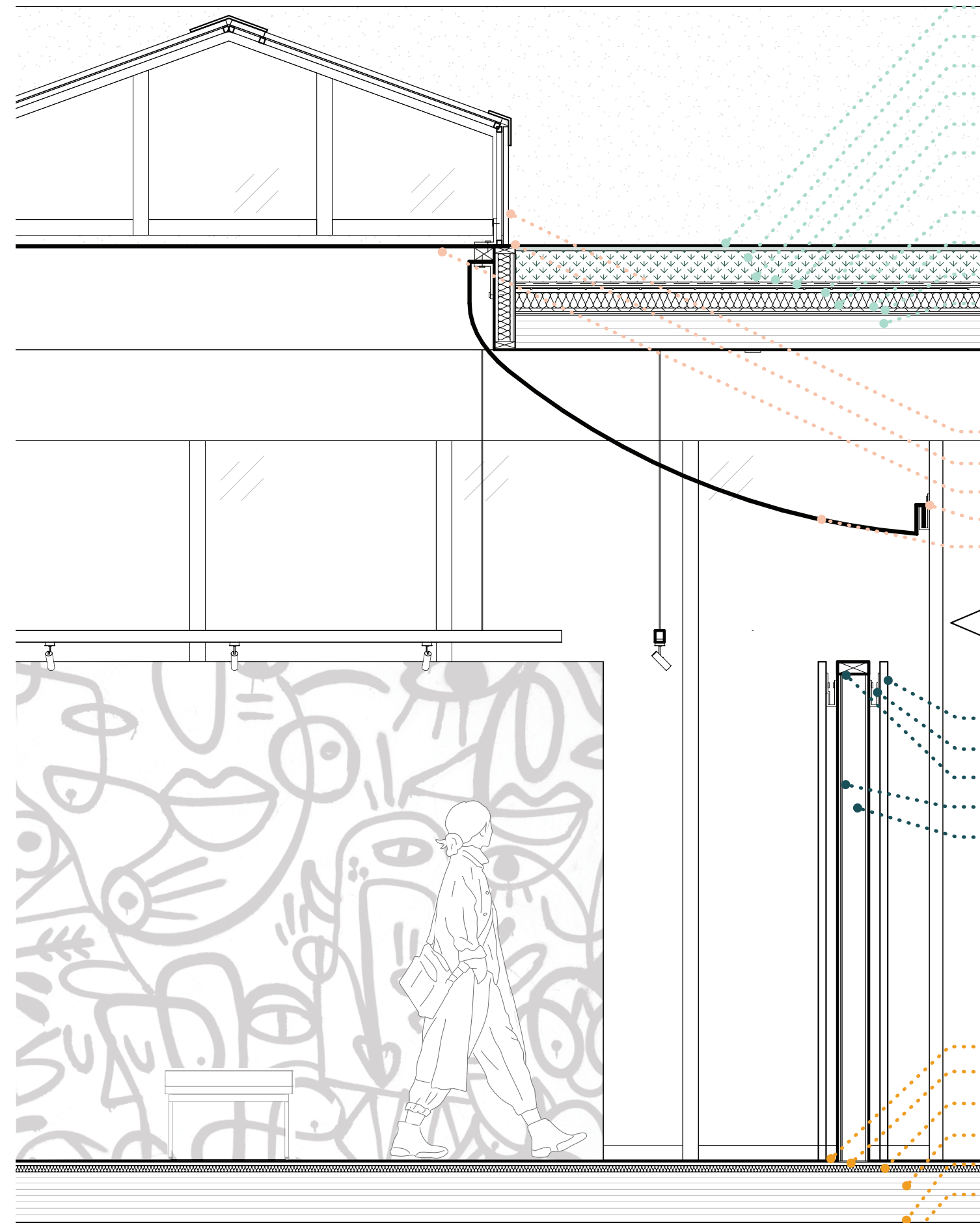
- 04 ALUMINUM CAP
- 05 ALUMINUM VENTILATION MESH
- 06 FLASHING
- 07 CONCRETE MASONRY BLOCK 8"

FLOOR // R-23

CROSS LAMINATED TIMBER PANELS

- 08 BAMBOO FLOORING 1/4"
- 09 PLYWOOD BACKING 5/8"
- 10 POLYISOCYANURATE INSULATION 1 1/4"
- 11 CROSS LAMINATED TIMBER 9 5/8"
- 12 WEATHER PROTECTION MEMBRANE
- 13 REINFORCED CONCRETE FOOTING

WALL SECTION MERCADO // GALLERY.



ROOF // R-37

CLT SUPPORTED GREEN ROOF

- 01 NATIVE GRASSES
- 02 ENGINEERED SOIL MEDIUM 6"
- 03 FILTER FABRIC 1"
- 04 MOISTURE RETENTION LAYER 5/8"
- 05 AERATION LAYER 3/8"
- 06 GRAPHITE ENHANCED POLY-SYRENE INSULATION 3"
- 07 DRAINAGE LAYER 5/8"
- 08 ROOT BARRIER 3/8"
- 09 WATERPROOFING MEMBRANE 3/8"
- 10 CROSS LAMINATED TIMBER 6 5/8"

SKYLIGHT

DIFFUSED DAYLIGHTING

- 11 UV-BLOCKING SKYLIGHT GLAZING
- 12 FLASHING
- 13 WHITE POLYCARBONATE LENS 5/8"
- 14 STEEL BRACKETS
- 15 MATTE WHITE FIBERGLASS PANEL 3/8"

GALLERY WALLS

TEMPORARY PANEL INSTALLATIONS

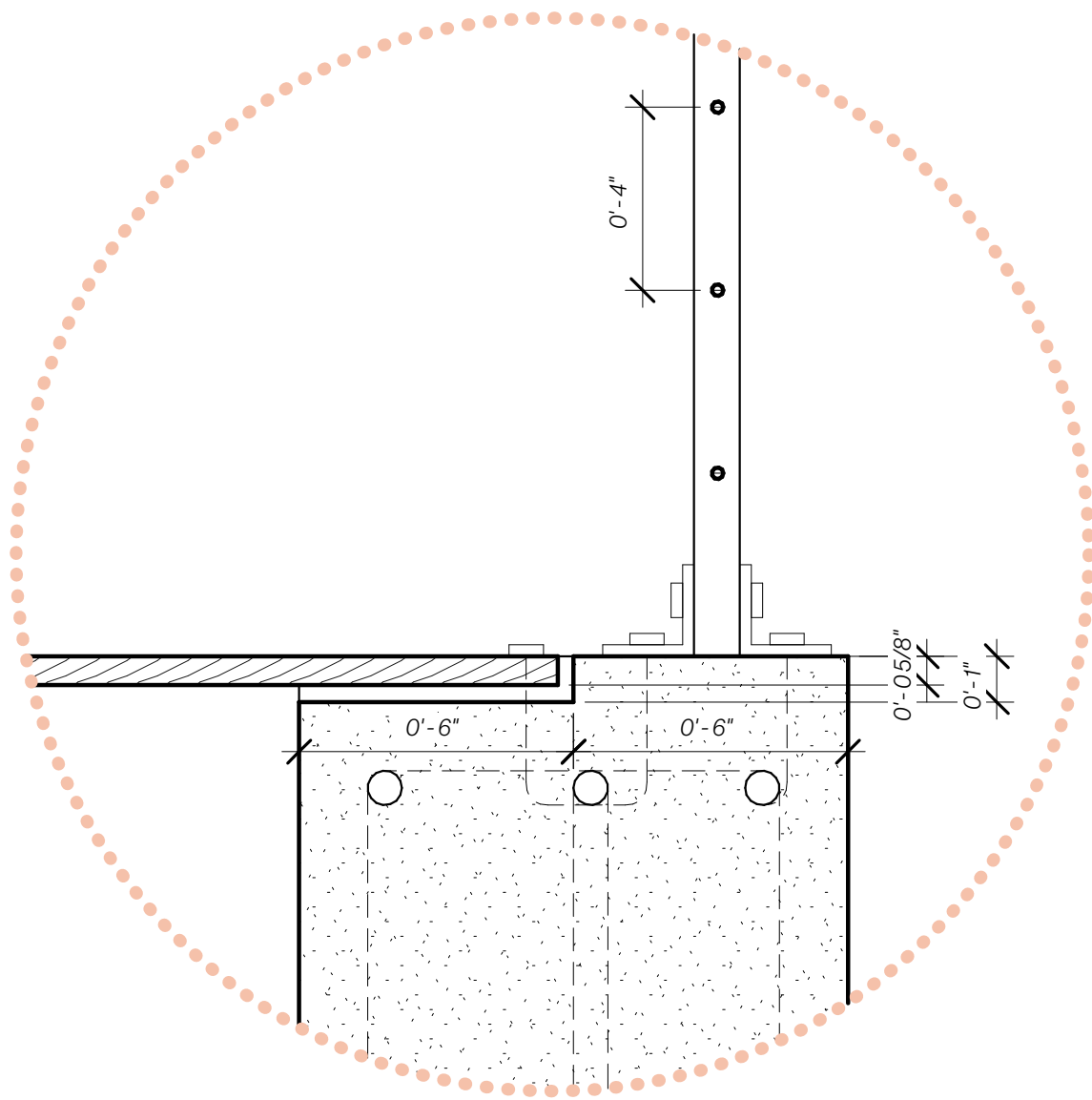
- 16 8 X 12 CANVAS PANELS 1 1/2"
- 17 INTERLOCKING ALUMINUM CHANNELS
- 18 2 X 6 WOOD HEADER
- 19 GYPSUM WALLBOARD 5/8"
- 20 2 X 4 WOOD STUDS

FLOOR // R-23

10' X 27' CROSS LAMINATED TIMBER PANELS

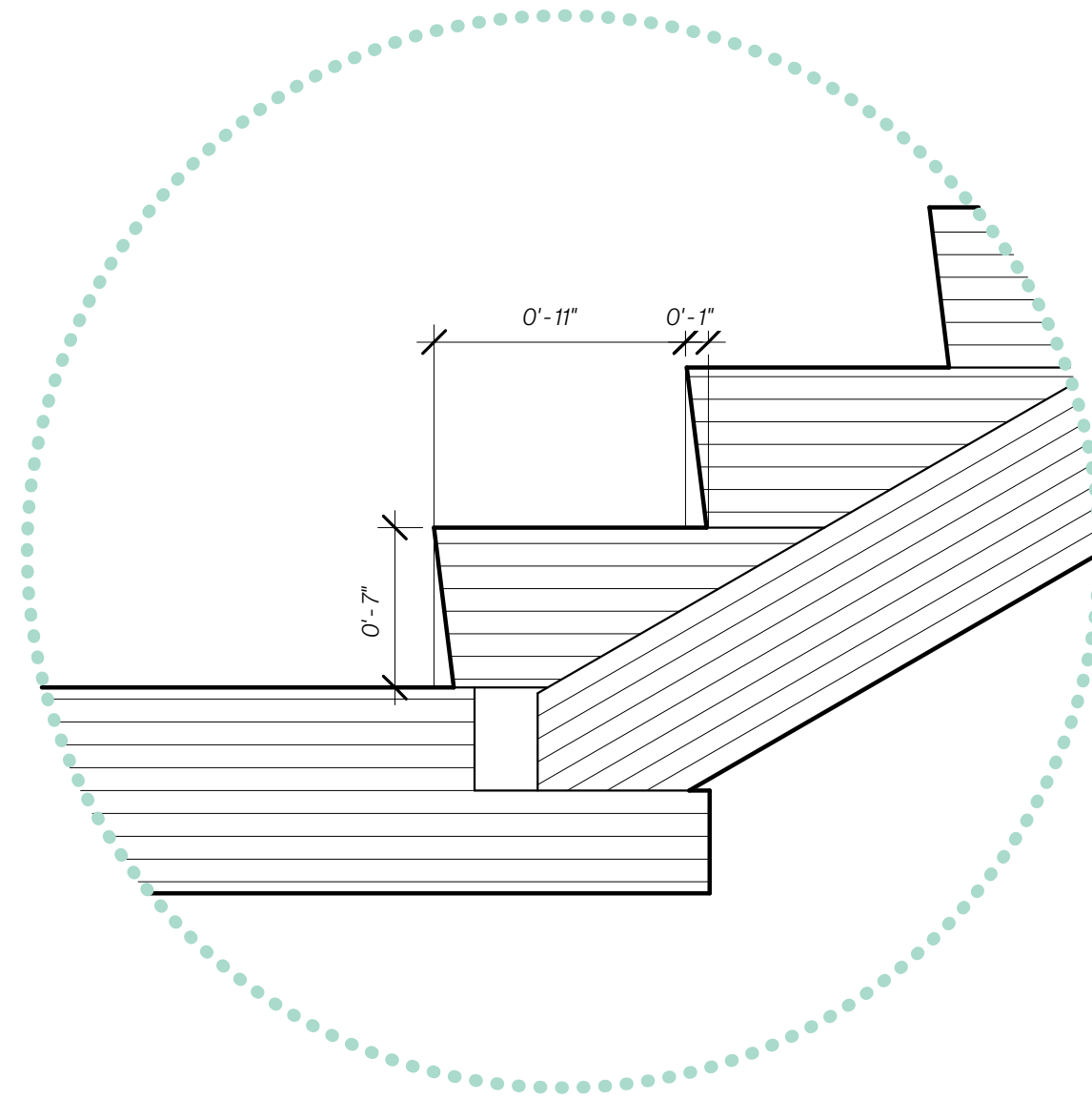
- 21 BAMBOO FLOORING 1/4"
- 22 PLYWOOD BACKING 5/8"
- 23 POLYISOCYANURATE INSULATION 1 1/4"
- 24 CROSS LAMINATED TIMBER 9 5/8"
- 25 MOISTURE PROTECTION MEMBRANE
- 26 PRE-CAST CONCRETE GROIN VAULT

DETAILS PERMANENT HOUSING UNIT.



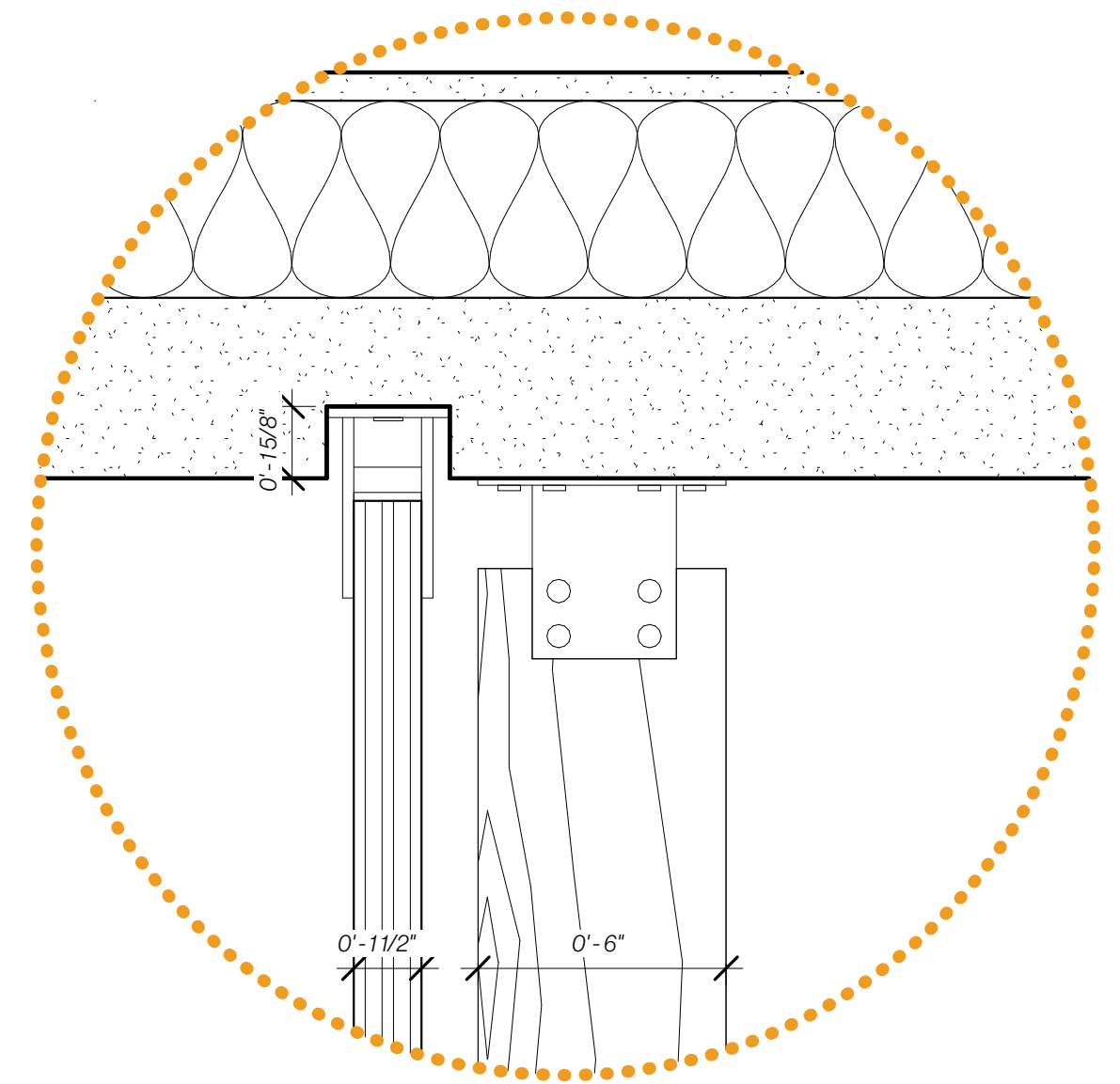
EXTERIOR RAMP. PLANKS & RAILING.

The exterior ramp of the unit consists of cedar wooden planks elevated by cast-in-place concrete. Elevating the ramp addresses the issues regarding flooding by allowing stormwater to flow beneath. The planks and the handrail were designed to be ADA compliant.



INTERIOR STAIR. CLT RISERS & TREADS.

The interior stair uses cross laminated timber to act as a monolithic stair. The risers, treads, and handrails were designed according to code, the width of the stair is 42".



EXTERIOR SHADING. CEDAR PLANKS.

The exterior shading applied to the second floor glazing uses cedar planks to create privacy and manage the daylight within the space. The cedar planks are held by steel brackets embedded in the CSIPs.



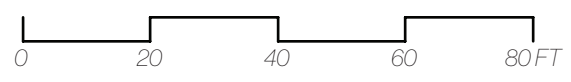
1 | STORMWATER MANAGEMENT

**VOLUME OF EACH STORAGE TANK** ~ 74,805 GALLONS  
**AVERAGE MONTHLY RAINFALL ONSITE** ~433,870 GALLONS  
4 INCHES OVER 4 ACRES

RAINWATER COLLECTION PATHS

RAINWATER WILL BE COLLECTED FROM ROOFS,  
BELOW STRUCTURES, AND ON THE GROUNDS.

THE WATER WILL BE STORED AND TREATED TO BE  
USED FOR BOTH POTABLE AND NONPOTABLE USES.

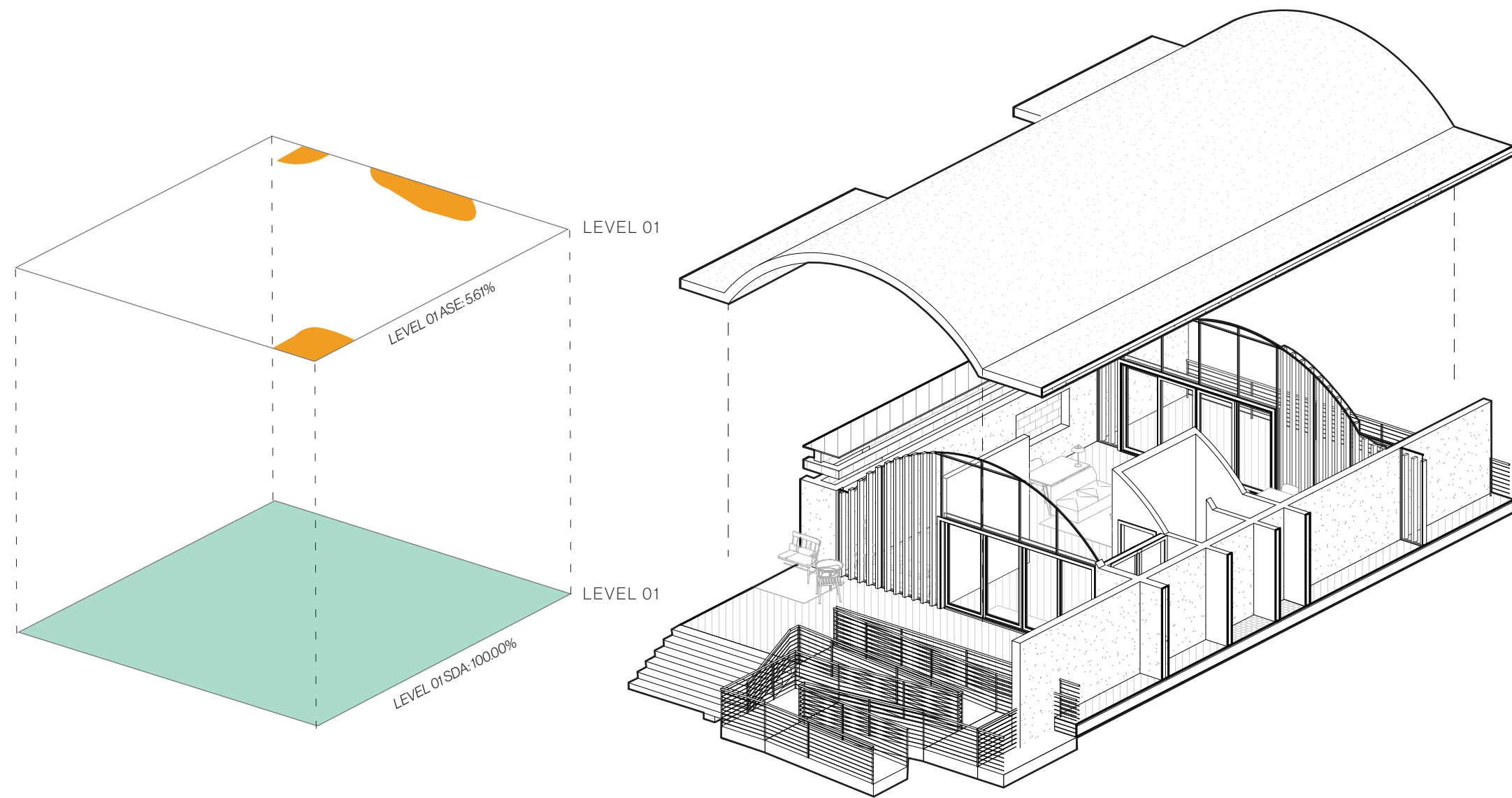




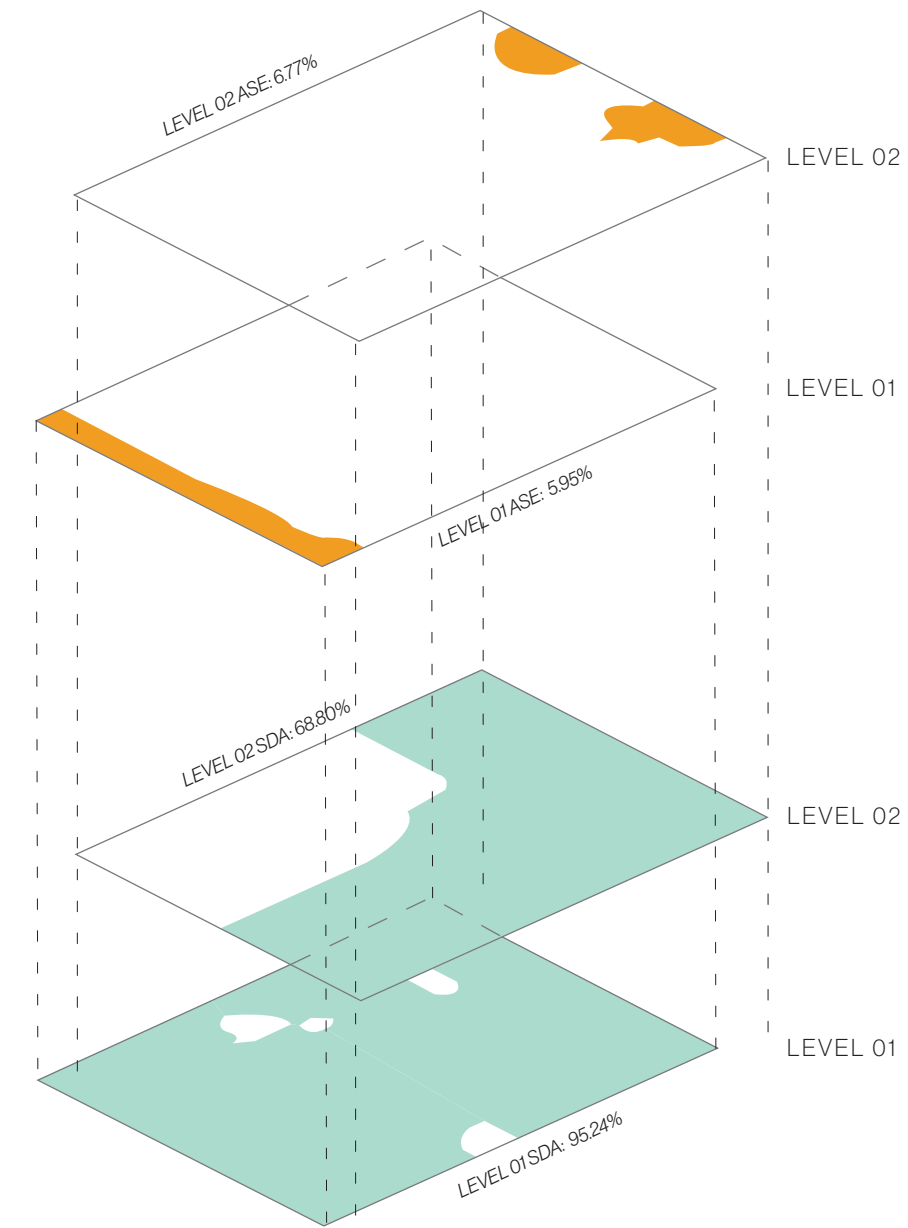
DAYLIGHTING TECHNIQUES.

sDA SPATIAL DAYLIGHT AUTONOMY : the amount of usable daylight in the space

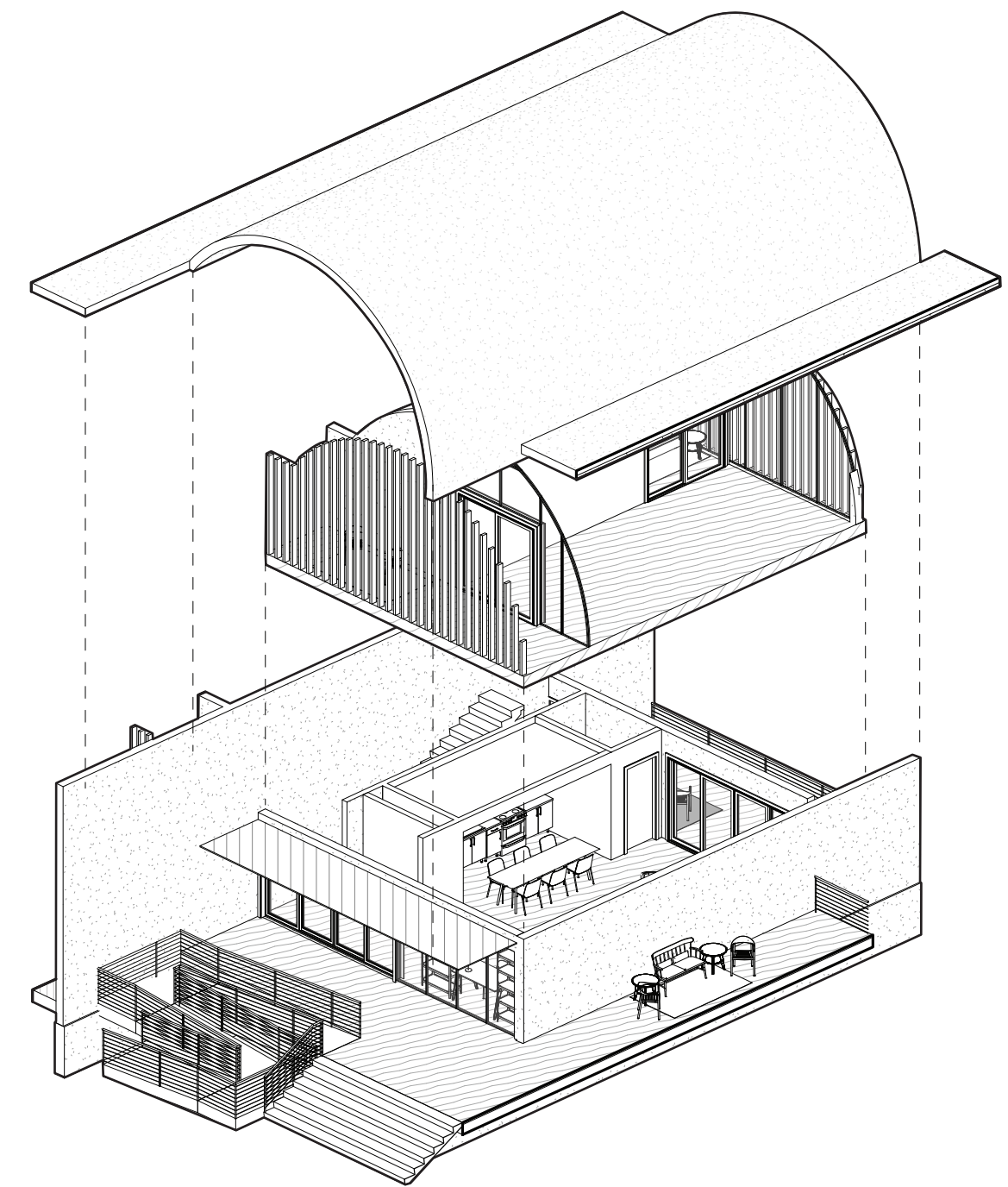
ASE ANNUAL SUNLIGHT EXPOSURE : the amount of unwanted glare



The permanent housing units rely on a shading device system that consists of vertical cedar louvers along with the overhangs caused by extruding the barrel vaulted shell. These systems allow the space to rely primarily on daylight with minimal glare while reducing the need for electric lighting.



While utilizing the same systems as the temporary units to shade the second floor, the permanent housing units shade the first floor using overhangs created by the second level and the exterior shell. Similar to the temporary units, these units also allow the space to rely on daylight.

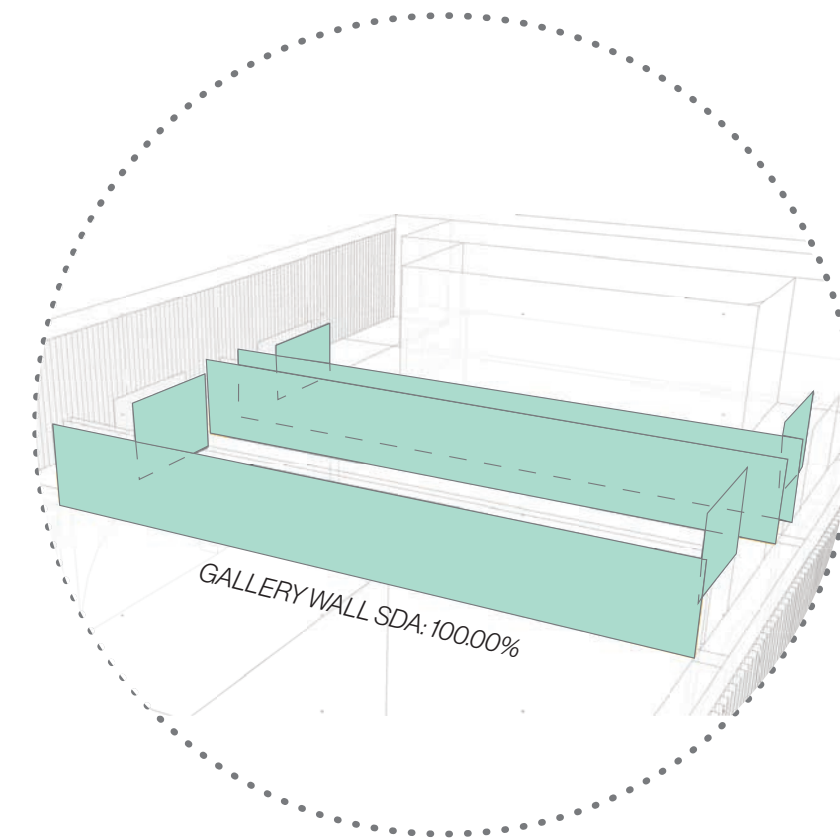
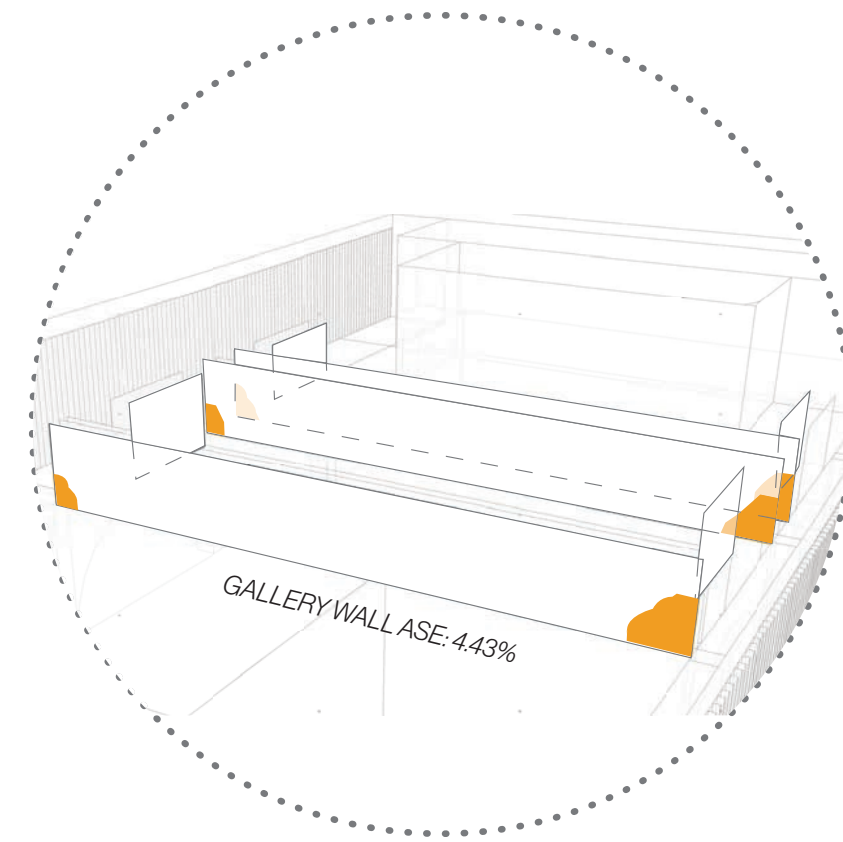
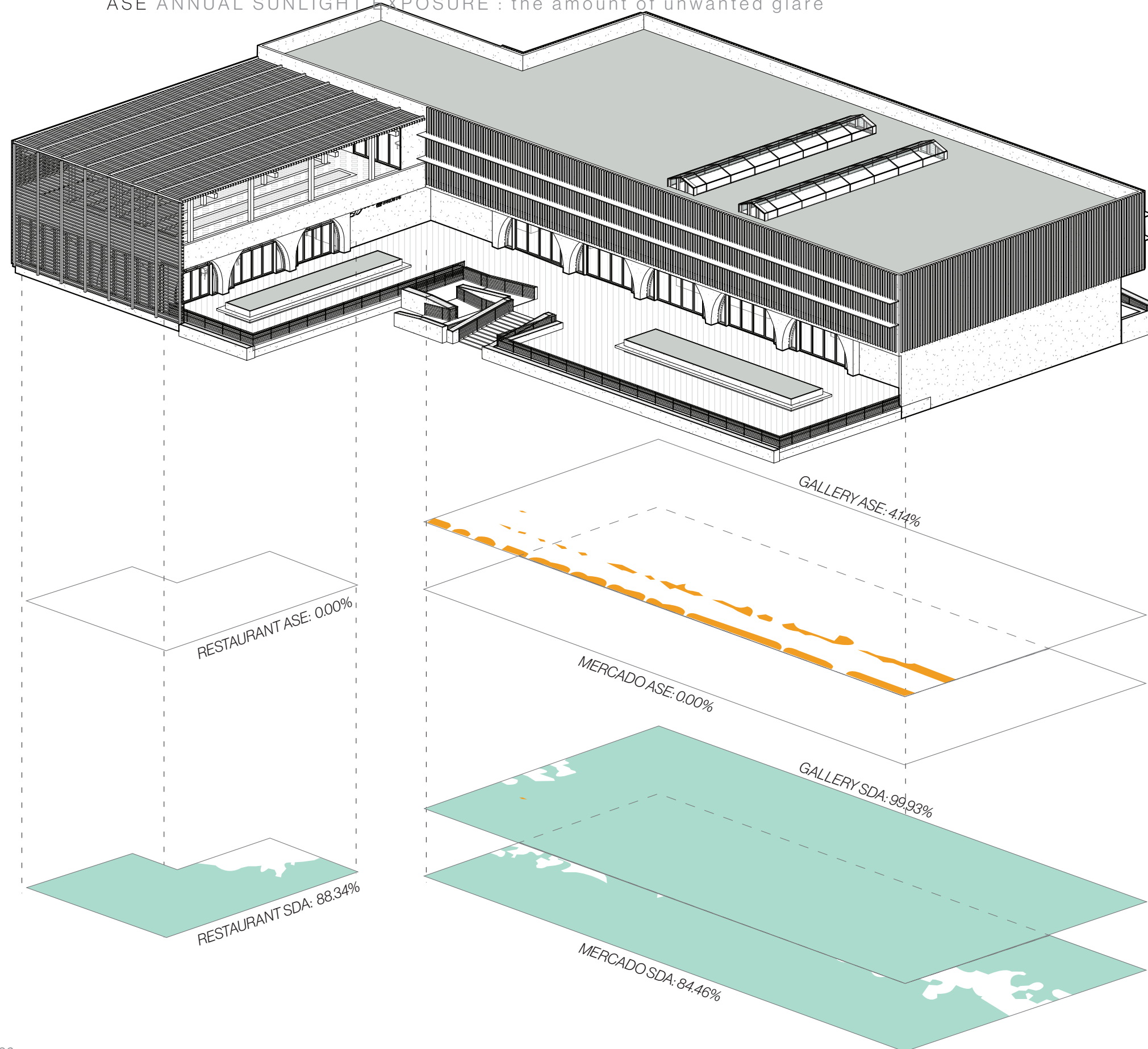




DAYLIGHTING TECHNIQUES.

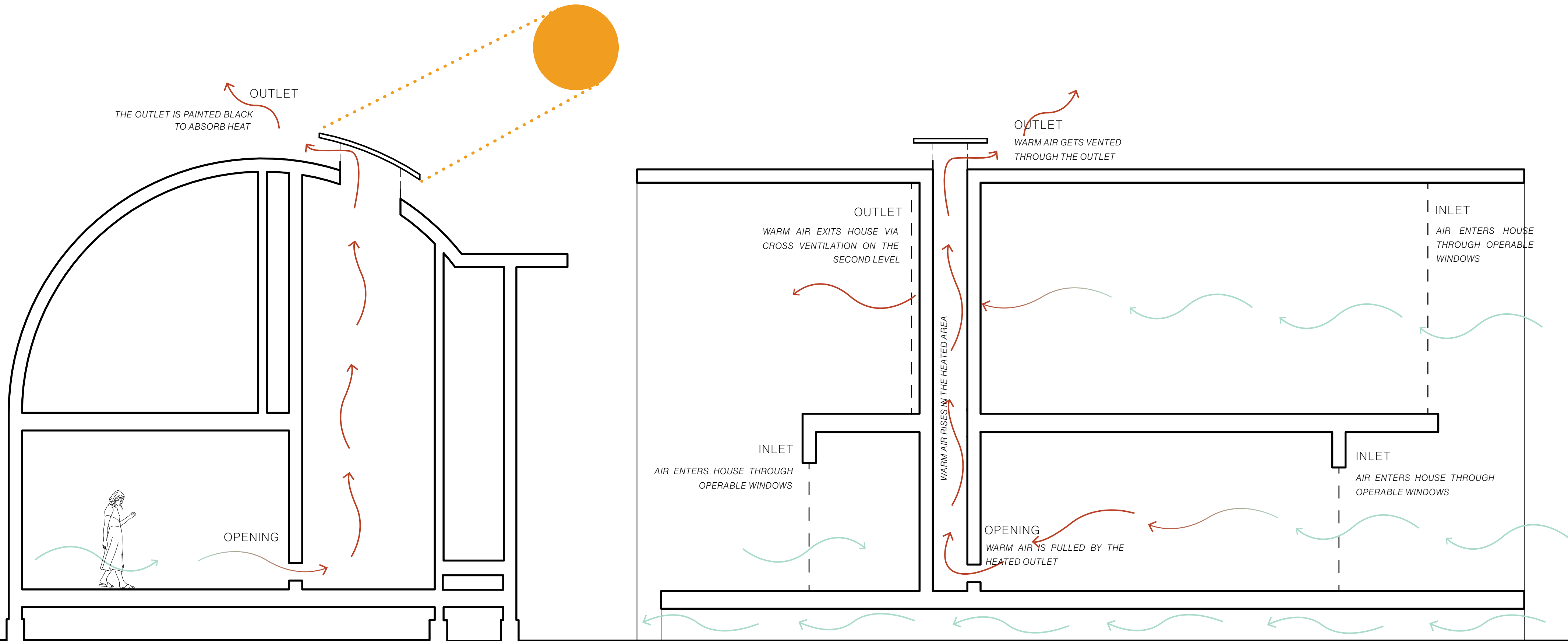
sDA SPATIAL DAYLIGHT AUTONOMY : the amount of usable daylight in the space

ASE ANNUAL SUNLIGHT EXPOSURE : the amount of unwanted glare



The public building incorporates multiple techniques to achieve appropriate daylighting both on the horizontal and vertical planes of the building. On the first level, the restaurant uses cedar vertical louvers and frosted glass while the second level overhangs the entrance. The mercado entrance is shaded by the gallery overhang, while the rest of the daylight is managed via the groin vault structure. On the second level, the roof garden uses a series of cedar shading devices that wrap around the space down to the restaurant similar to a waterfall. The gallery uses both vertical and horizontal shading devices to manage the daylight across the facade. In order to adequately light the vertical art displays within the space, the design incorporated skylights above the gallery using a polycarbonate lens to diffuse the daylight.

SOLAR CHIMNEY DIAGRAM.







## C L O S I N G

This project does not claim to be the best solution, nor does it mean the question has universally been answered across all locations. *This project took the voice of one community and centered its principles in place-based design to address an overlooked conversation; rethinking the roles of the architect and reevaluation of architecture and sustainability as a luxury item.* Architecture is a living body with people at its heart, and it is the hope that architecture will continue to be made more accessible to everyone that this project sought to ignite.

**X**  
**PART X**

INDEX.  
*REFERENCES.*



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Pg. 14: Sailko. (2022). Giancarlo De Carlo, Villaggio Matteotti, 1969-74 [jpg]. Wikimedia Commons. [https://commons.wikimedia.org/wiki/File:Giancarlo\\_de\\_carlo\\_villaggio\\_matteotti\\_1969-74\\_06.jpg](https://commons.wikimedia.org/wiki/File:Giancarlo_de_carlo_villaggio_matteotti_1969-74_06.jpg)

Pg. 14: SeARCH. (2018). OpenBuilding MarcKoehlerArchitects+MaMaOne InternalGarden [jpg]. Open Building.co. <https://www.openbuilding.co/juf-nienke-search>

Pg. 15: Elemental. (2003). Stringio [jpg]. Archdaily. [https://www.archdaily.com/10775/quinta-monroy-elemental/50102dd828ba0d4222000ff3-quinta-monroy-elemental-image?next\\_project=no](https://www.archdaily.com/10775/quinta-monroy-elemental/50102dd828ba0d4222000ff3-quinta-monroy-elemental-image?next_project=no)

Pg. 15: Finotti, L. (2013). 5-MAPA-ARQUITECTOS-5 [jpg]. MAPA. <https://mapaarq.com/en/work/min/#:~:text=MINIMOD%20is%20an%20exploration%20about,every%2Dremote%2Dlandscape%20experience.>

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Pg. 24: Google. (1944). Google Maps Map of the Fifth Ward [jpg]. Google Earth Pro.

Pg. 25: Google. (2022). Google Maps Map of the Fifth Ward [jpg]. Google Earth Pro.

Pg. 28: Institute for Public Art. (2011). 5th\_jam\_profile\_resized [jpg]. Institute for Public Art. <https://www.instituteforpublicart.org/case-studies/fifth-ward-jam/>

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Pg 28: ACHP. success-story-deluxe-theater-featured [png]. Advisory Council on Historic Preservation. <https://www.achp.gov/success-stories/deluxe-theater>

Pg 29: Hernandez, M. Peacock Records [jpg]. Houston Mural Map. <https://houstonmuralmap.com/murals/love-fifth-ward/>

Pg 37: Sma Fadu Udelar. 04\_Patio-central-aerea [jpg]. Eladio Dieste. [http://www.fadu.edu.uy/eladio-dieste/obras/casa-dieste/?utm\\_medium=website&utm\\_source=archdaily.com](http://www.fadu.edu.uy/eladio-dieste/obras/casa-dieste/?utm_medium=website&utm_source=archdaily.com)

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