



MODULAR TYPOLOGIES

VOLUMETRIC PREFAB REMOTE HOUSING

Naamveer Sond & Maryam Khalid

in collaboration with Kasian
Architecture interior design and
planning

Instructed by Anna Batebe, Architect
AAA, (Senior associate)

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VOLUMETRIC PREFAB REMOTE HOUSING

CHAPTER ONE



PURPOSE



Remote housing is often treated as temporary, generic, and disconnected from the people who live in it. MOSAIC challenges this by introducing modular units and shared spaces that feel personal, grounded, and adaptable to changing needs. The purpose of this project is to demonstrate that remote communities can be designed with care, offering comfort, identity, and a sense of belonging while still meeting the demands of industry. Through thoughtful planning, material choices, and flexible spatial strategies, MOSAIC shows how design can support daily life, strengthen community, and create healthier living environments in challenging climates and isolated regions.



TYOLOGIES

WHAT IS PREFAB CONSTRUCTION?

A process where building elements are manufactured off site in a factory and then transported to the final location for assembly. By producing walls, floors, or entire volumetric units in a controlled environment, construction becomes faster, more consistent, and less dependent on weather or remote site conditions. Prefab systems reduce waste, improve quality control, lower labor demands on site, and allow buildings to be installed efficiently even in regions that are difficult to access.

WHAT IS MODULAR ARCHITECTURE?

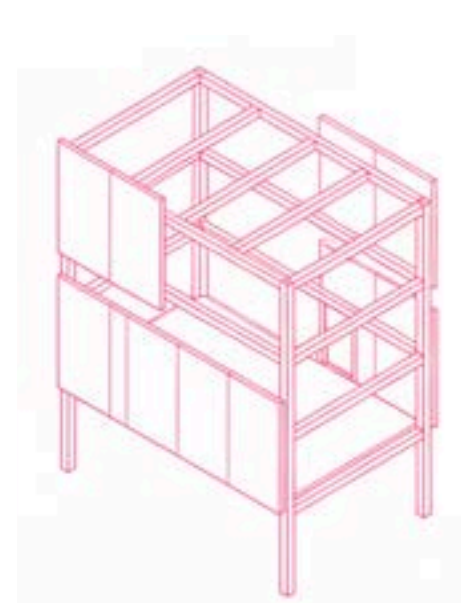
KIT-OF-PARTS



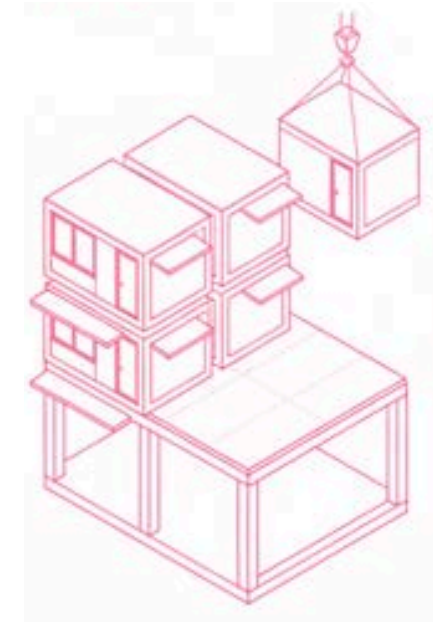
VOLUMETRIC



PANELIZED



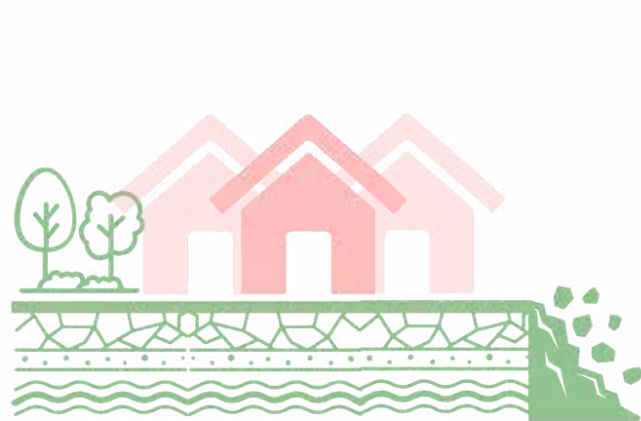
HYBRID



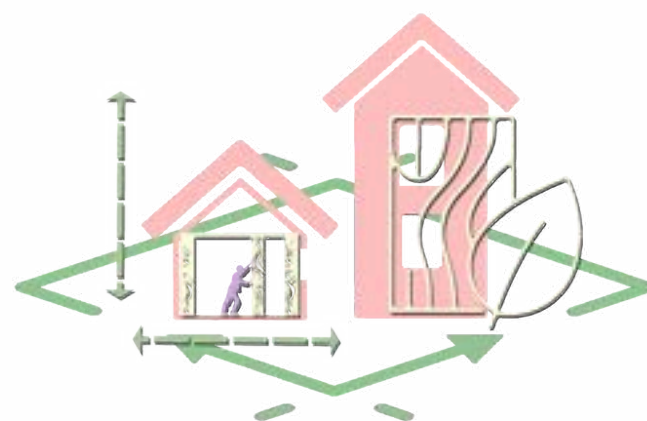
HOW TO CLASSIFY “REMOTE”

- Limited/seasonal access
- High freight cost, infrequent deliveries
- Off-grid or limited utilities
- Scarce workforce
- Challenging climate/terrain

WHAT IS MOSAIC REMOTE HOUSING?



LAND AND STABLE GROUND



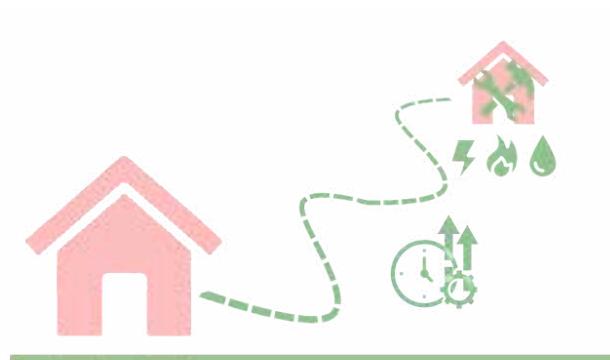
FLEXIBILITY AND ADAPTABILITY SITE



POPULATION AND CULTURE



ACCESS ROUTES AND TRAVEL



SERVICES AND UTILITIES



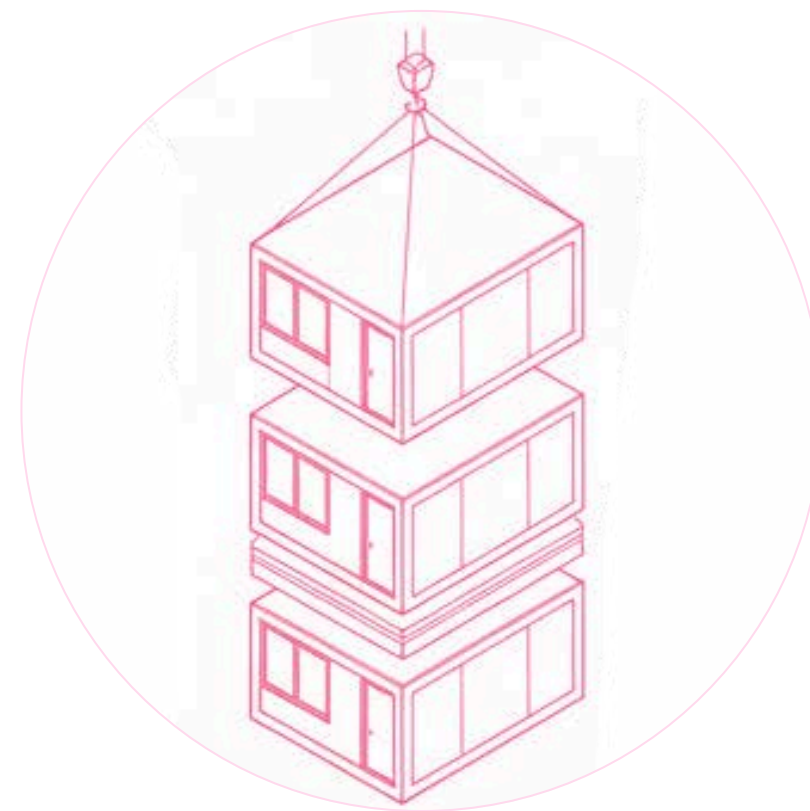
CLIMATE AND ORIENTATION



VOLUMETRIC PREFAB REMOTE HOUSING

WHY VOLUMETRIC PREFAB MODULES

- Modular units adaptable across programs and scales
- Camp-style clusters foster community in remote contexts
- Functional layouts: 10 ft spans, efficient rooms
- Flexible units that grow with users
- Deconstructable and reusable systems
- Scalable from single homes → blocks → neighborhoods



USER TYPES FOR REMOTE HOUSING



SEASONAL WORKERS

INDIVIDUALS WITH MOBILITY DIFFERENCES

FAMILIES

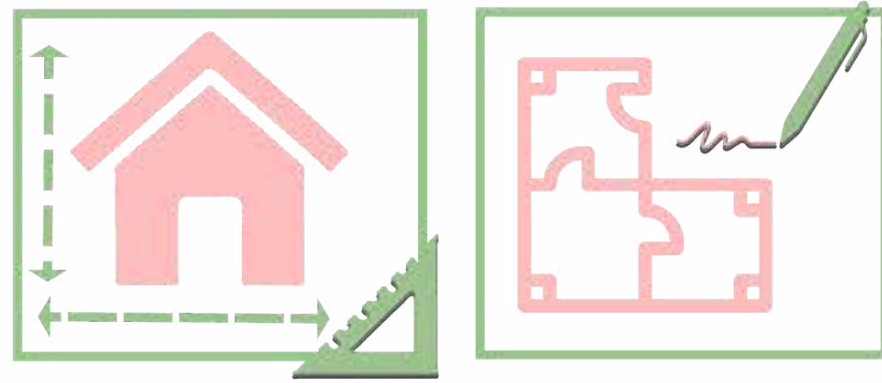


VOLUMETRIC PREFAB REMOTE HOUSING

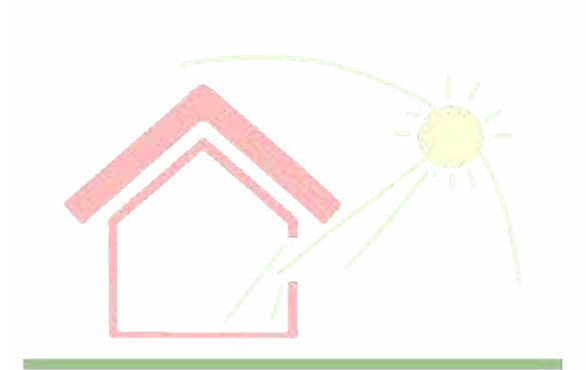
ISSUES WITH THE CURRENT REMOTE HOUSING



LACK OF IDENTITY



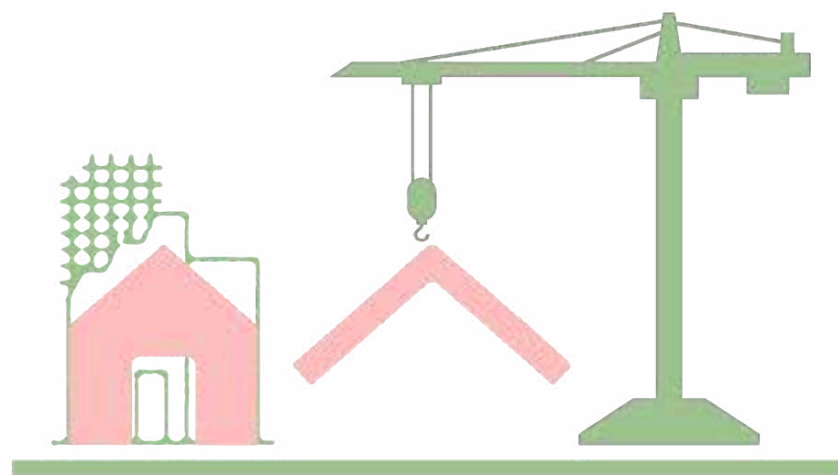
RIGID LAYOUTS, "ONE-SIZE
FITS ALL" DESIGN



LIMITED NATURAL
LIGHTING



POOR COMMUNITY LIFE



CONSTRUCTION AND DESIGN
LIMITATIONS

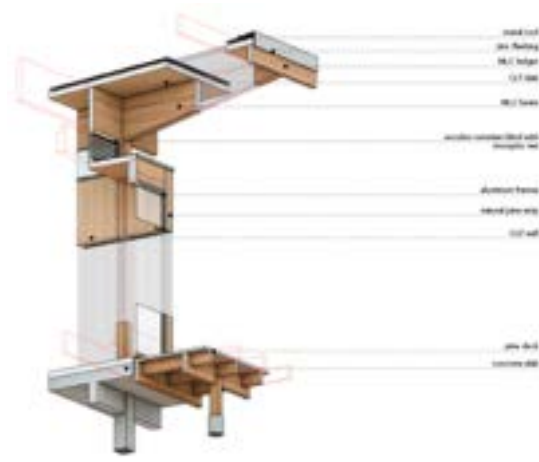


NOT SUSTAINABLE



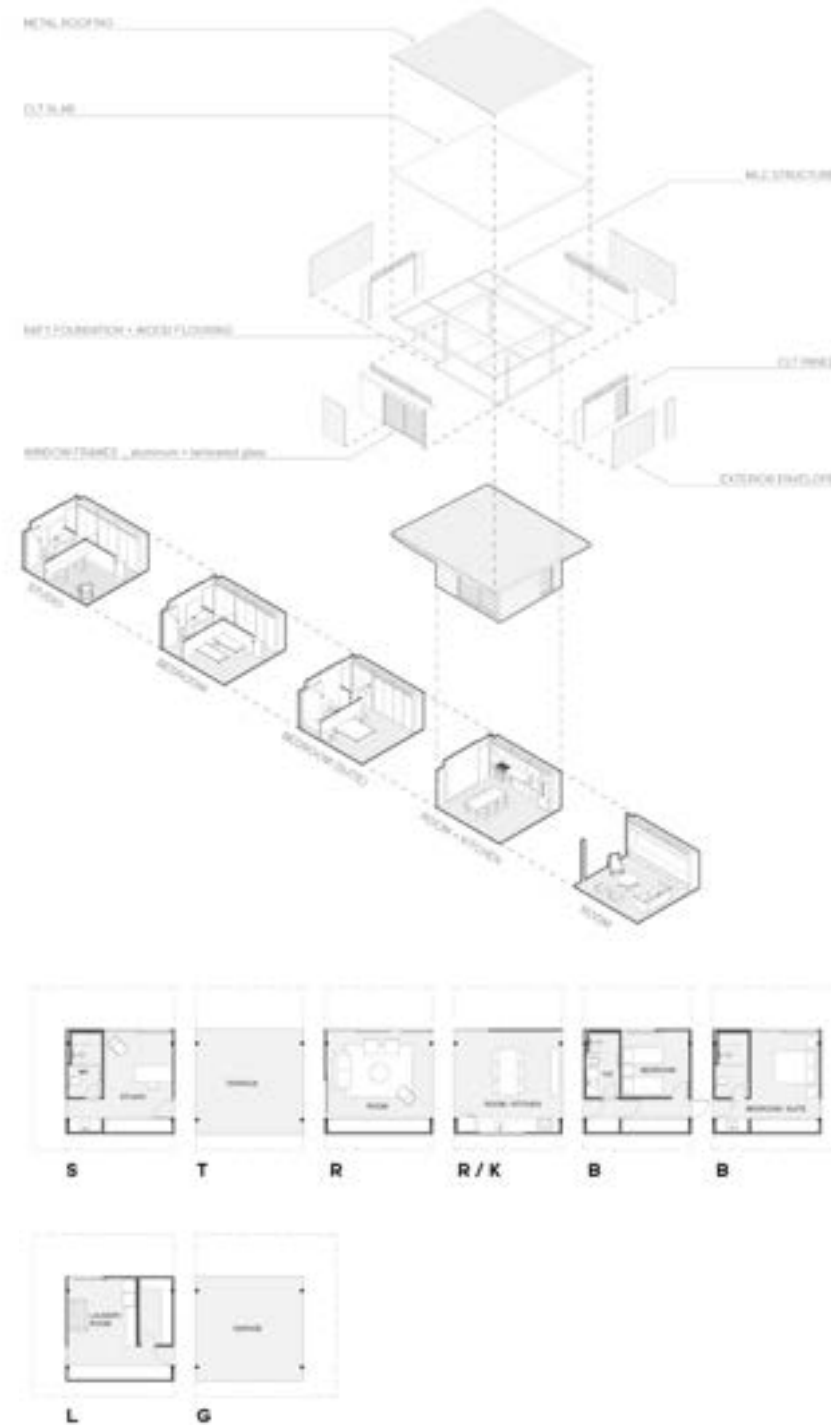
PRECEDENTS

STUDY 1



MODULARES BV

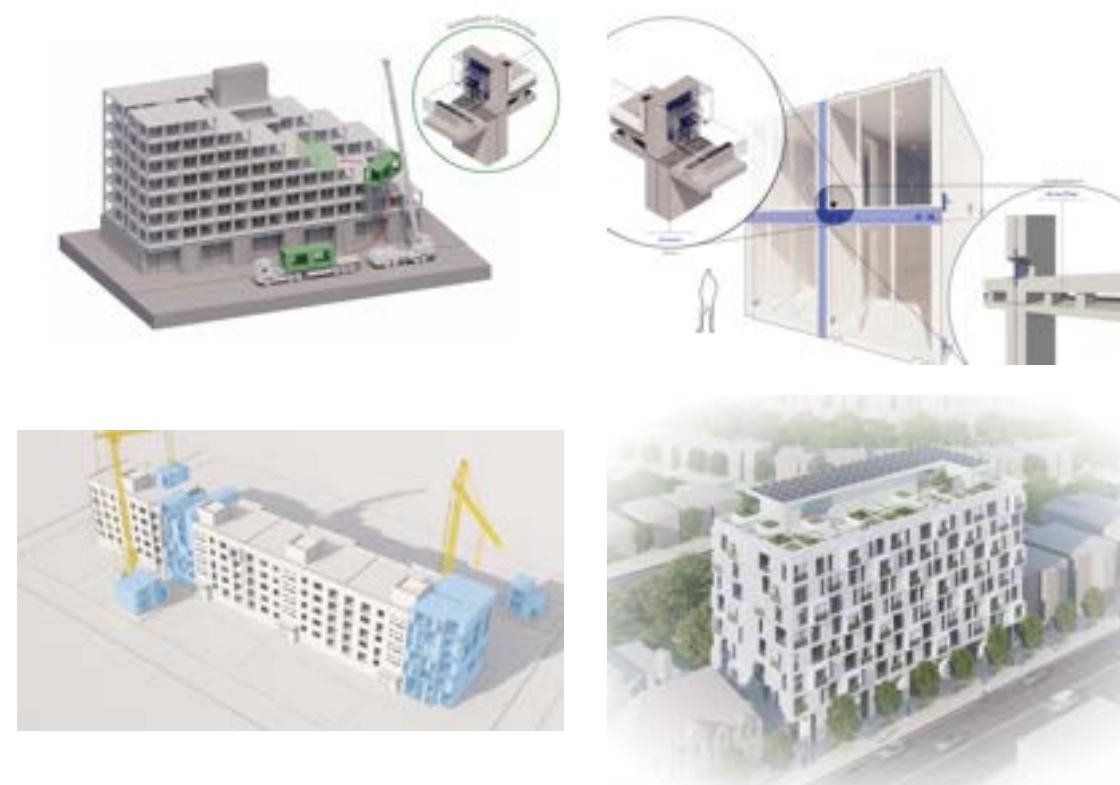
The BV Modular system functions through prefabricated volumetric units that can be stacked or arranged to create diverse residential layouts. From this precedent, we drew inspiration for efficient assembly, flexible unit combinations, and scalable community-oriented housing.



STUDY 2

SPEEDSTAC BY WZMH ARCHITECTS

Speedstac is a prefabricated volumetric system developed by WZMH Architects. Each module is built off site with its structure, mechanical systems, and interior already completed, then transported and placed on site with minimal labor. This method reduces construction time, improves quality control, and limits waste. Designed for efficient mid to high rise buildings, Speedstac has also been adapted as a rapid reconstruction tool, showing how modular construction can support both new development and rebuilding efforts.





VOLUMETRIC PREFAB REMOTE HOUSING

CHAPTER TWO





MOSAIC

Deconstructing Community - Modular Living for Flexible Futures



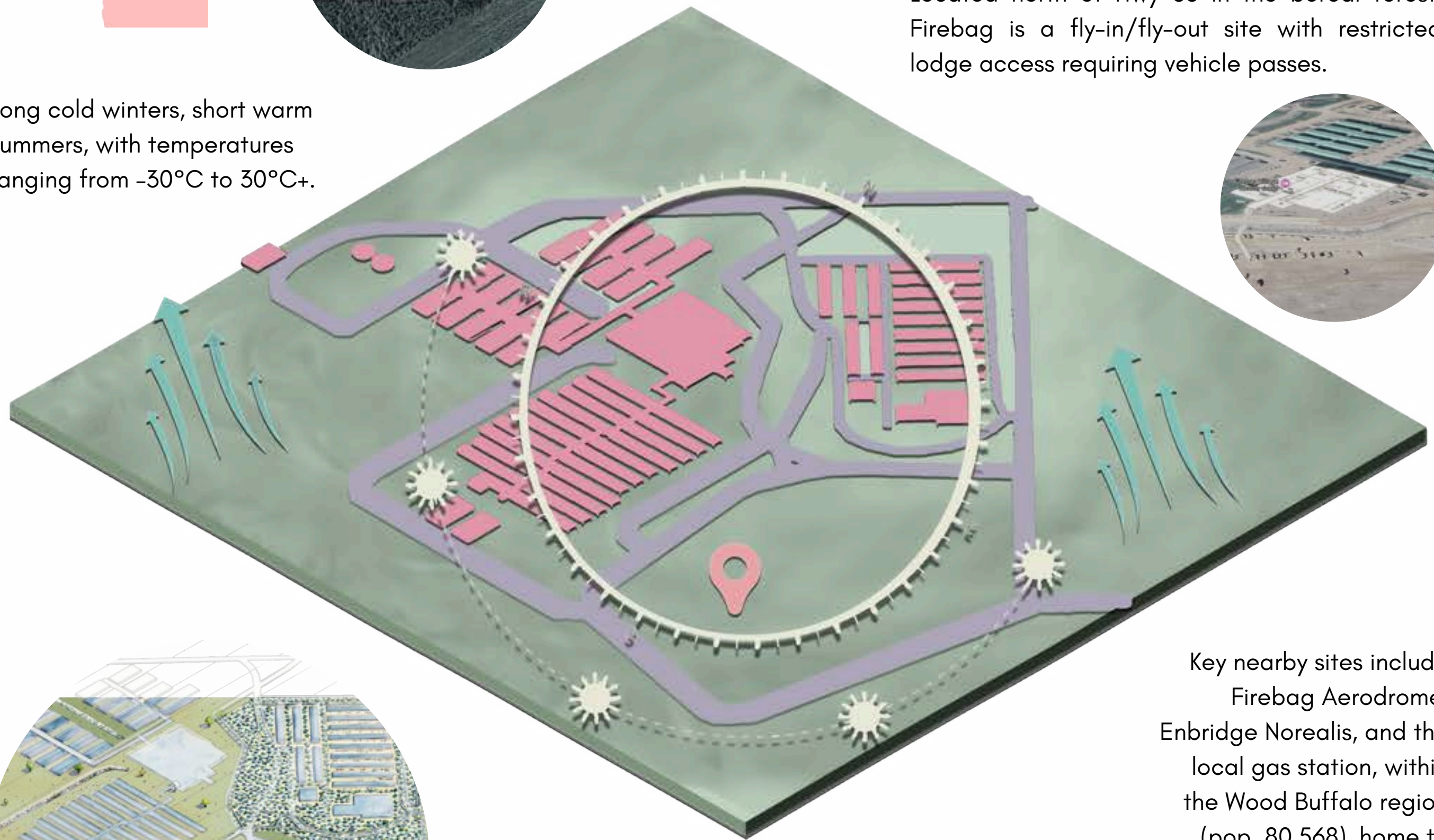
Long cold winters, short warm summers, with temperatures ranging from -30°C to 30°C+.

SITE ONE

WOOD BUFFALO, AB T9H 0H7

Region name: McMurray Lowlands
Region number: 7

Located north of Hwy 63 in the boreal forest, Firebag is a fly-in/fly-out site with restricted lodge access requiring vehicle passes.



Key nearby sites include Firebag Aerodrome, Enbridge Norealis, and the local gas station, within the Wood Buffalo region (pop. 80,568), home to Suncor's largest in-situ operation

- Boreal lowlands and wetlands with deep valleys
- Thick sediments with buried valley aquifers
- Oil sands over carbonates/evaporites; variable groundwater quality
- Regional groundwater discharge zone

A flat boreal plain with wetlands and muskeg, where poor drainage and frost susceptibility require raised gravel pads and pile/grade-beam foundations.

- Industrial oil sands facility with major processing and infrastructure
 - Encircled by boreal forest and muskeg
- Isolation provides buffers but heightens wildfire risk



- Strong focus on thermal envelope, vestibules, compact massing, and wind protection
- Snow drifting, ice, and freeze-thaw cycles shape roof, entry, stair, and service-yard design
- Orient façades and outdoor spaces for low winter sun and shelter from west winds

450-500 mm of annual precipitation with notable snowfall and west-dominant winds that shift seasonally.

- Wind Direction
- Existing Infrastructure
- Roads/Pathways
- Sun Analysis
- Ground





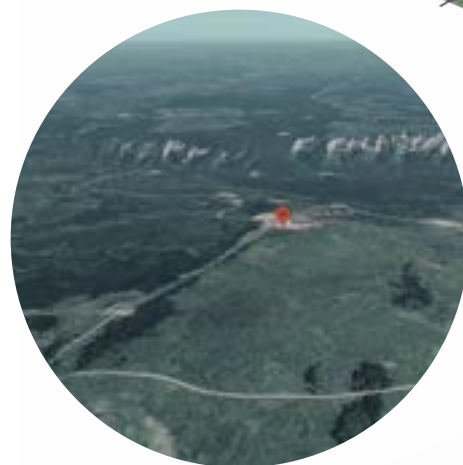
SITE TWO

TOURMALINE 09-29 GAS COMPANY MUNICIPAL DISTRICT OF GREENVIEW NO. 16, AB T0H 0C0

Region name: Western Plains and Benchlands
Region number: 2

Surroundings include well pads, service yards, heavy-truck access roads, and nearby forestry/agricultural lands with boreal forest patches and cleared fields.

Fine, seasonally saturated soils require gravel pads and pile foundations.



-16 °C in winter
23 °C in summer

- Long, snowy, wind-chill winters; snow drift affects access and roof loads
- Short summers with long daylight for construction
- Heavy rain/snow → drainage, frost heave, and muddy roads are major issues
- Grid power with onsite backup systems

- Insulated, airtight envelopes; minimize thermal bridges
- Strong snow-management strategies
- Sheltered entries + wind protection

- River
- Wind Direction
- Existing Infrastructure
- Roads/Pathways
- Sun Analysis
- Ground



- A region driven by energy, oil and gas, agriculture, and forestry, anchored by Tourmaline's Deep Basin gas facilities within the vast, sparsely populated MD of Greenview No. 16.

- Near Beaverlodge (55.21°N, 119.42°W) in a mountains + oil region
- 715-720 m elevation on the Peace Country plateau
- Rural industrial/resource lands with required buffer zones



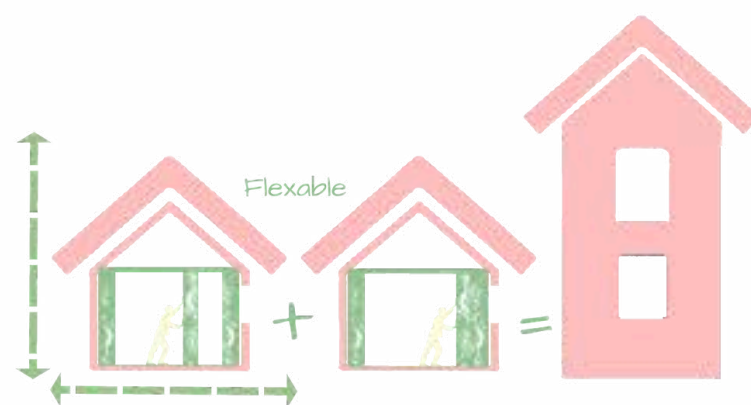
VOLUMETRIC PREFAB REMOTE HOUSING

SOLUTIONS WITH MOSAIC REMOTE HOUSING

MOSAIC offers a holistic approach to remote living by combining efficient prefab construction with a focus on comfort, identity, and long term adaptability. Each module is designed to reduce disruption to the land, streamline transport and installation, and create spaces that feel meaningful for residents who spend long periods of time away from home. Through careful planning and thoughtful material choices, MOSAIC aims to provide higher quality living environments that support well being while remaining practical and cost effective for industry.



LOWER SITE IMPACT



ADAPTABILITY



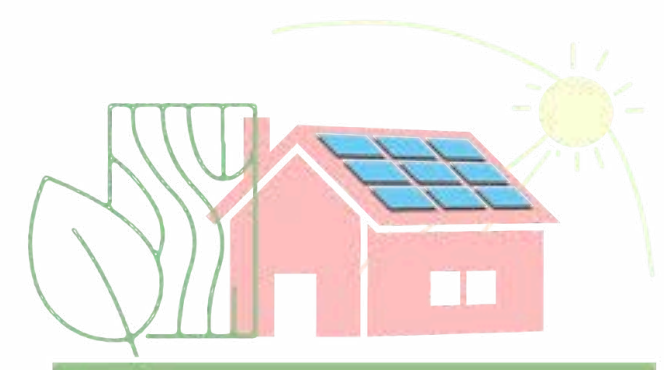
TRANSPORT
EFFICIENCY



SENSE OF BELONGING



LESS CONSTRUCTION
WASTE



BETTER QUALITY

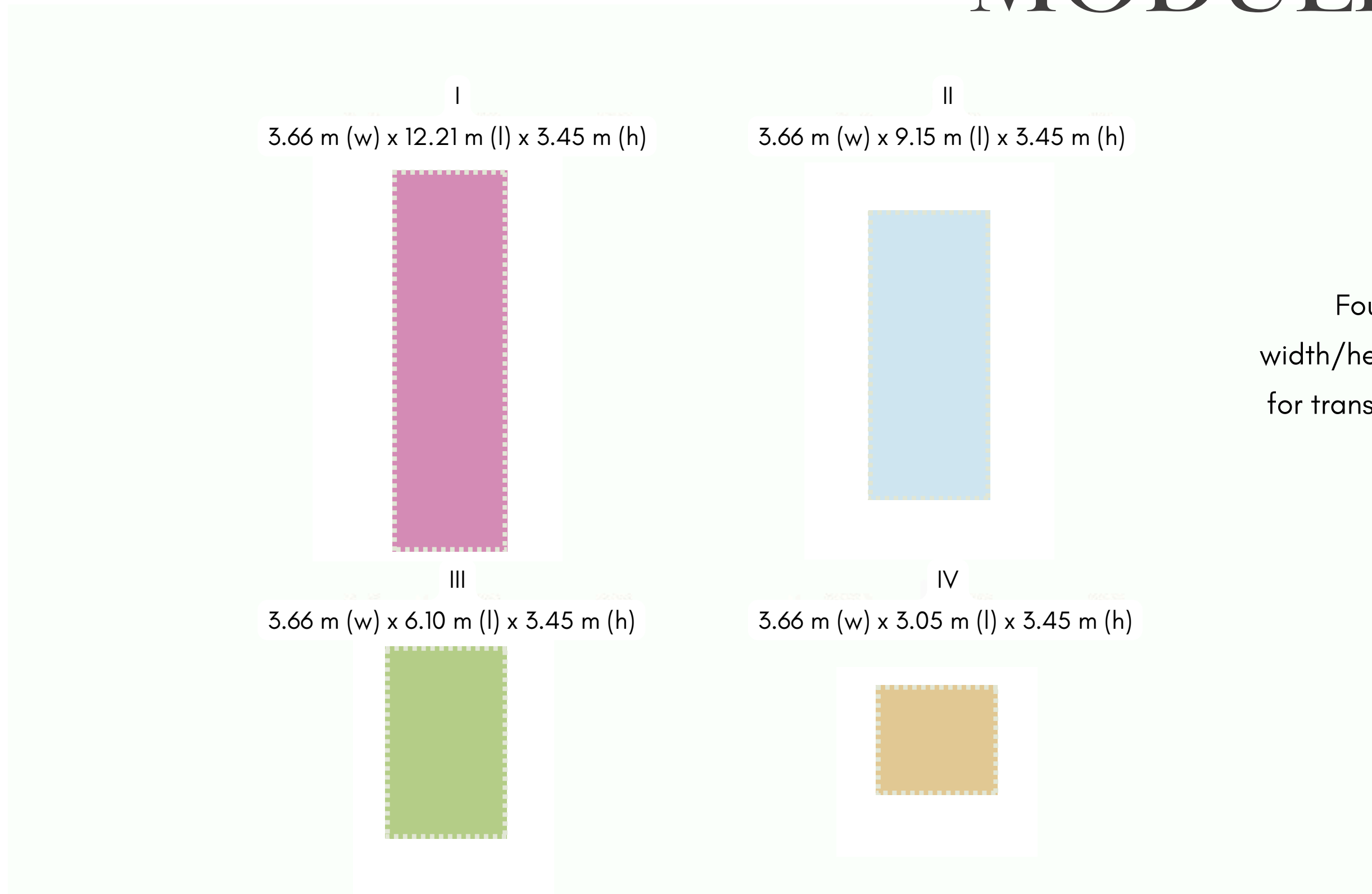


VOLUMETRIC PREFAB REMOTE HOUSING

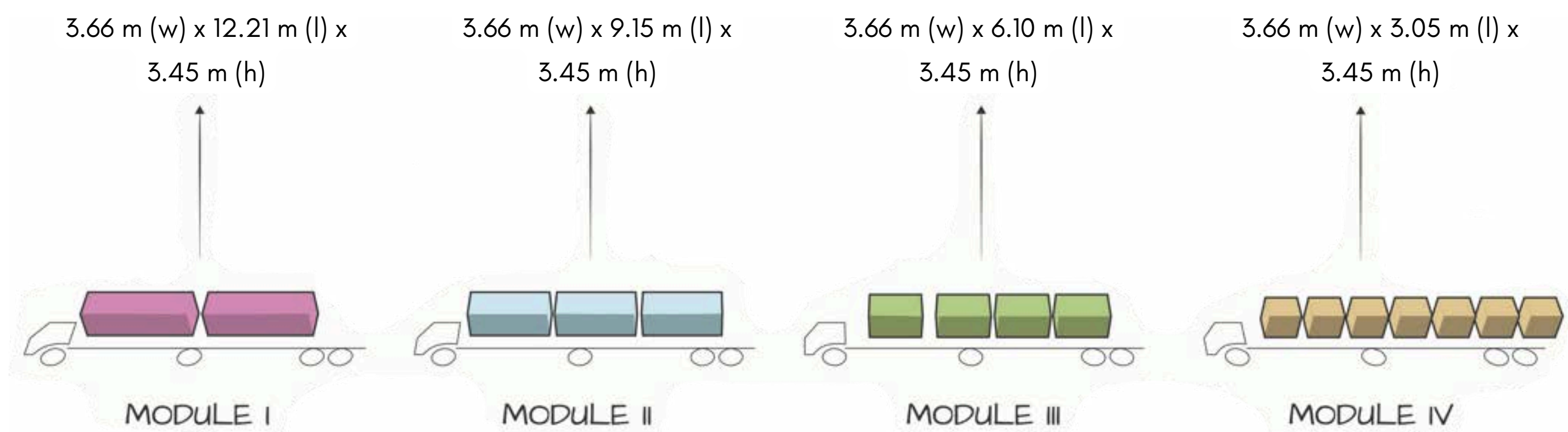
CHAPTER THREE



STANDARDIZED MODULE SIZES



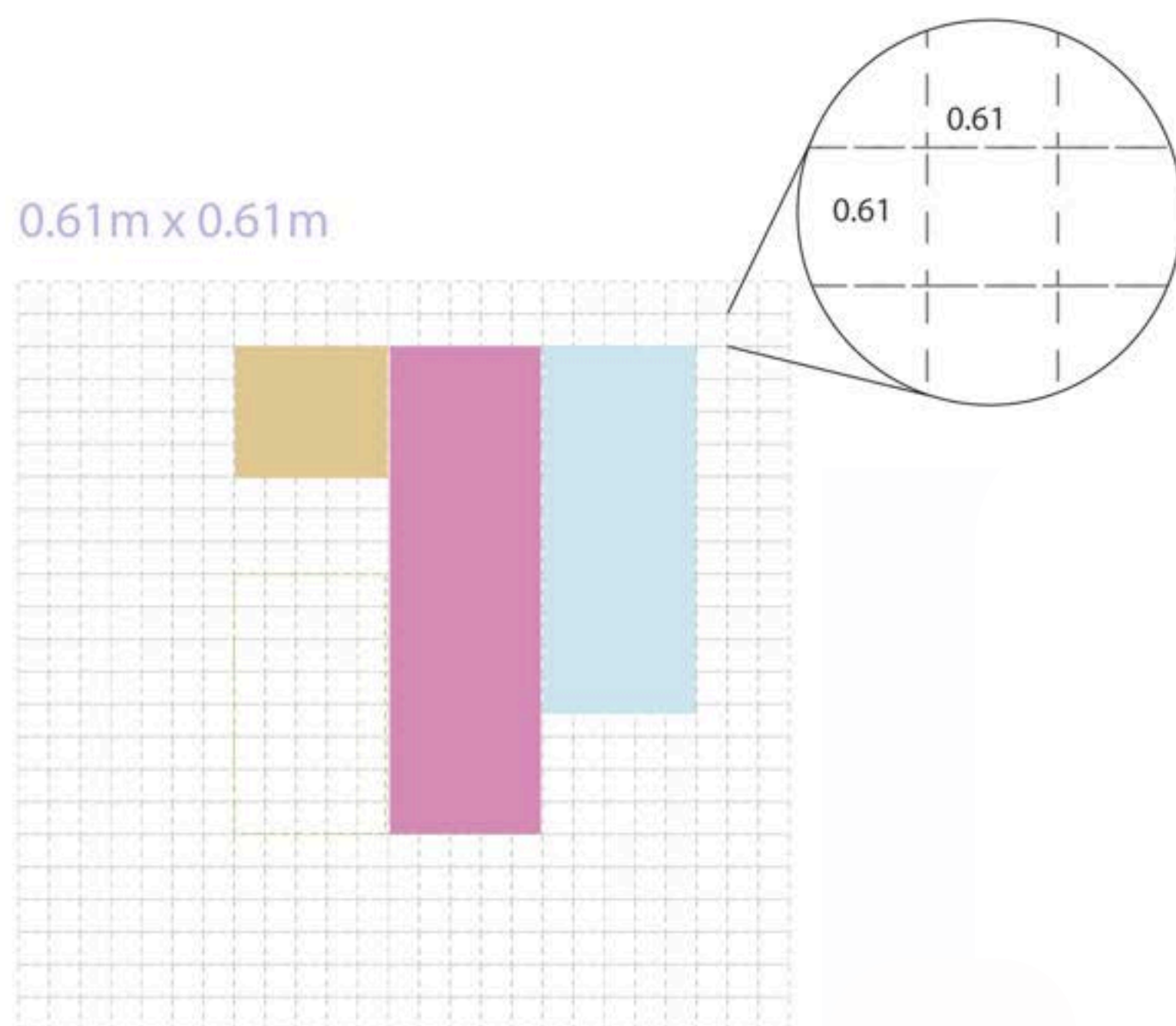
TRANSPORTATION



This diagram illustrates the primary module sizes based on transportation and assembly efficiency. Each truck can carry modules of different lengths while maintaining the same width (3.66m) and height (3.45 m),

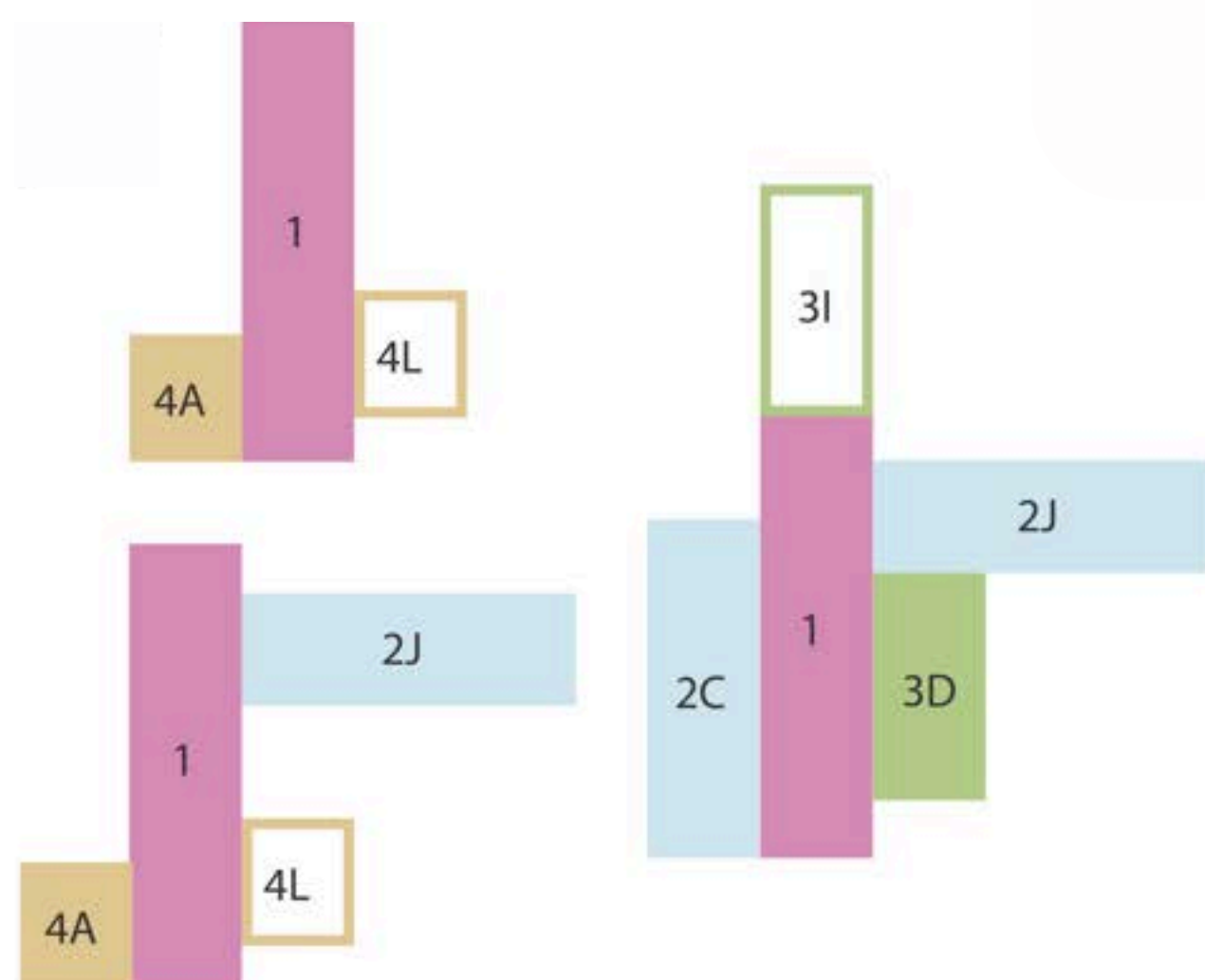


GRID-BASED MODULE ARRANGEMENT



- Flexible: Units expand or cluster as needs change
- Community-oriented: Shared courtyards and communal spaces
- Deconstructable: Reusable, transportable, sustainable modules
- Scalable: From single homes to full neighborhoods

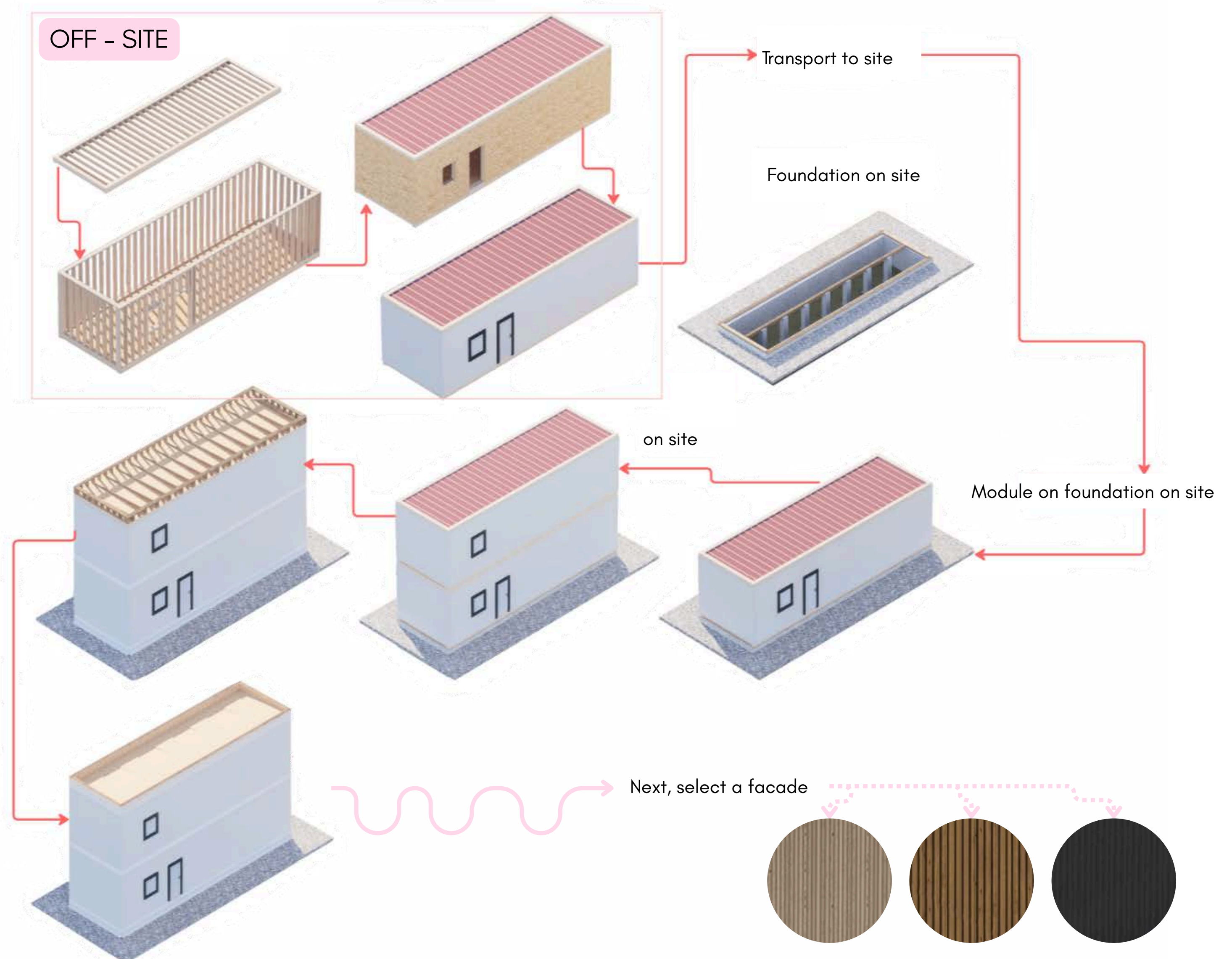
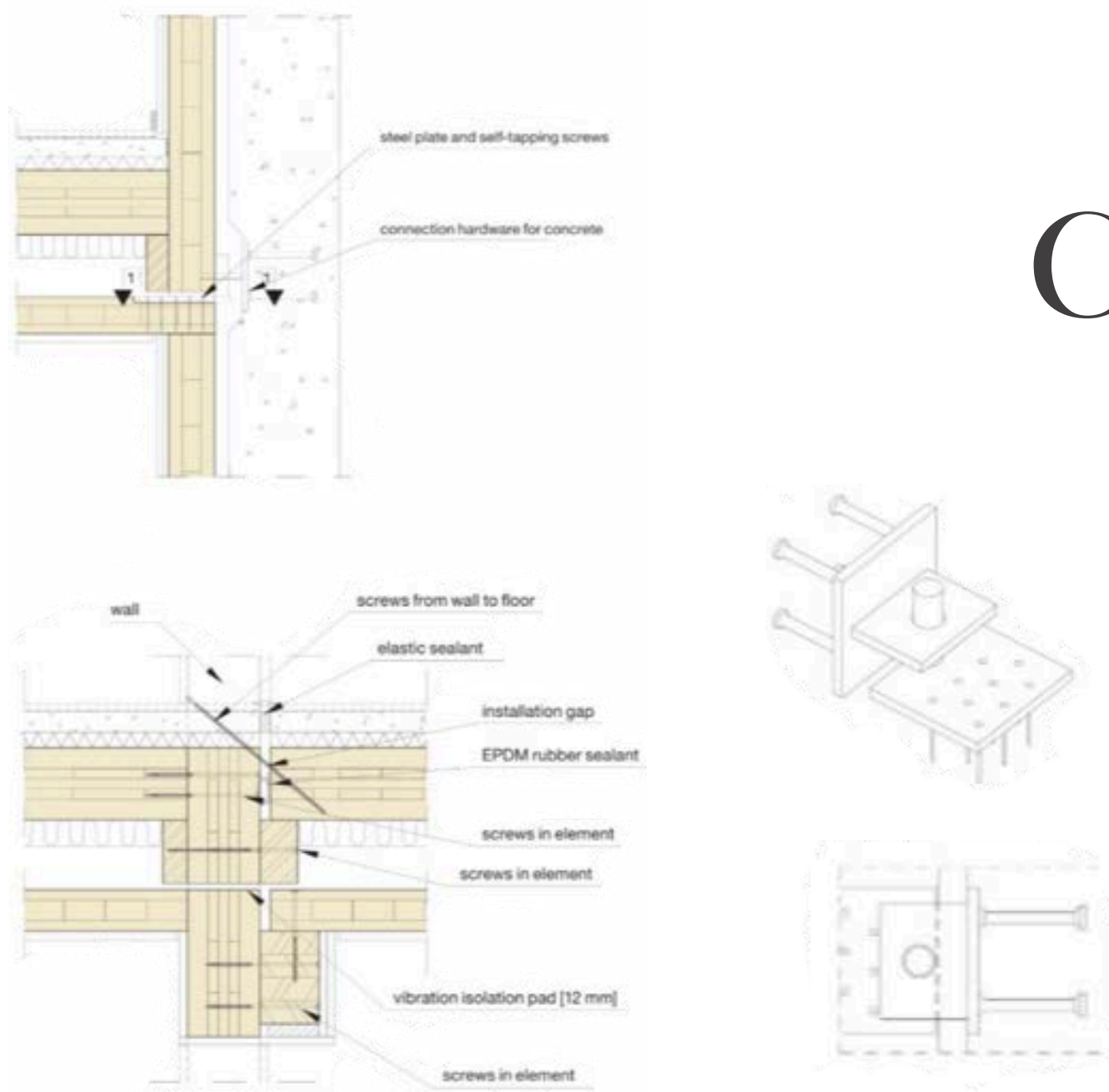
POSSIBLE CONFIGURATIONS OF MODULES



These configurations show how the four standardized module sizes can be arranged to create different layouts based on program, circulation, and site needs. By using a simple grid system, modules can connect, extend, or rotate to form single units, shared clusters, or larger neighborhood arrangements. This flexibility allows MOSAIC to adapt to changing occupancy, seasonal workforce patterns, and the varied requirements of remote communities.

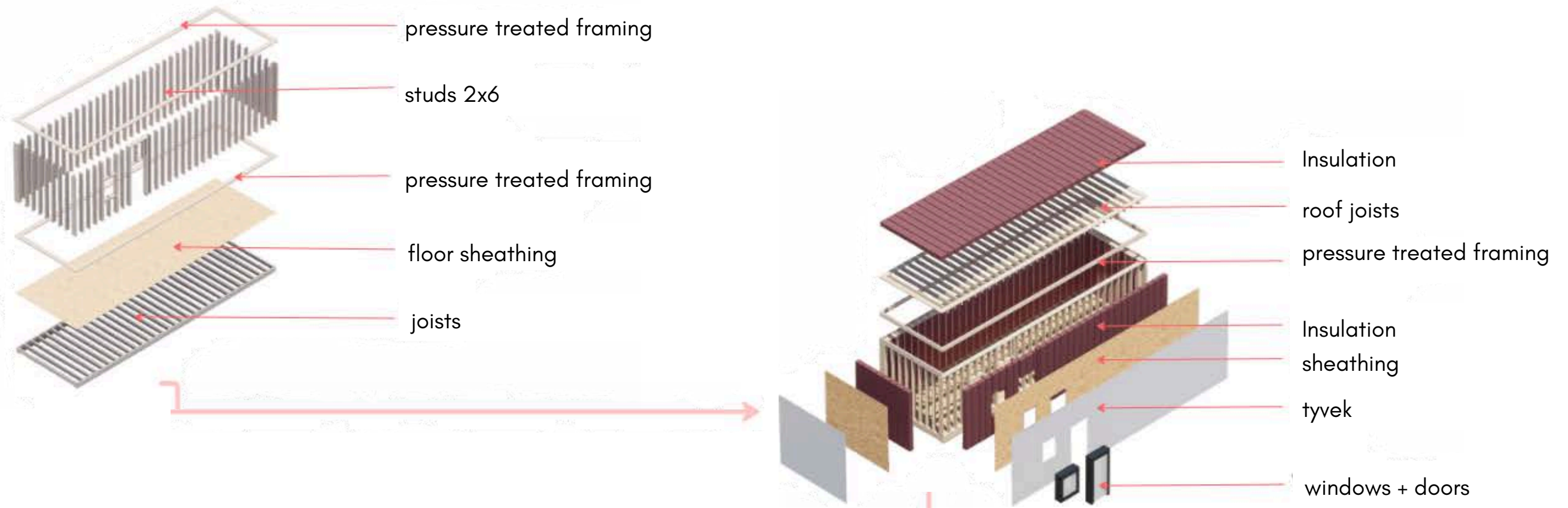
OVERVIEW CONSTRUCTION PROCESS

Modules are fully built off site, transported to the foundation, and quickly assembled on site. Once stacked or arranged, exterior cladding and final details are added. This process shortens construction time and ensures consistent quality in remote locations.

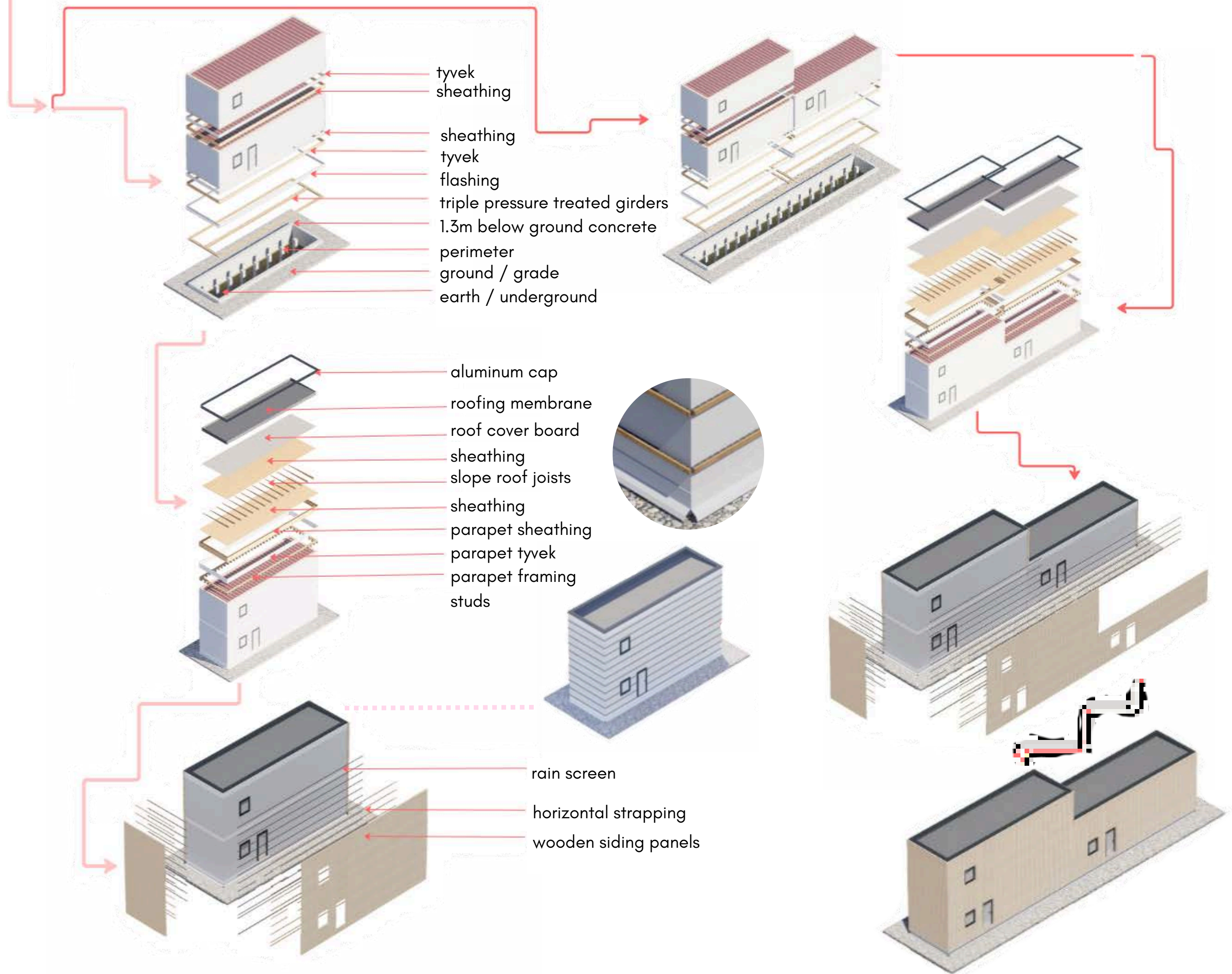


WOOD CLADDING

OFF - SITE



ON - SITE

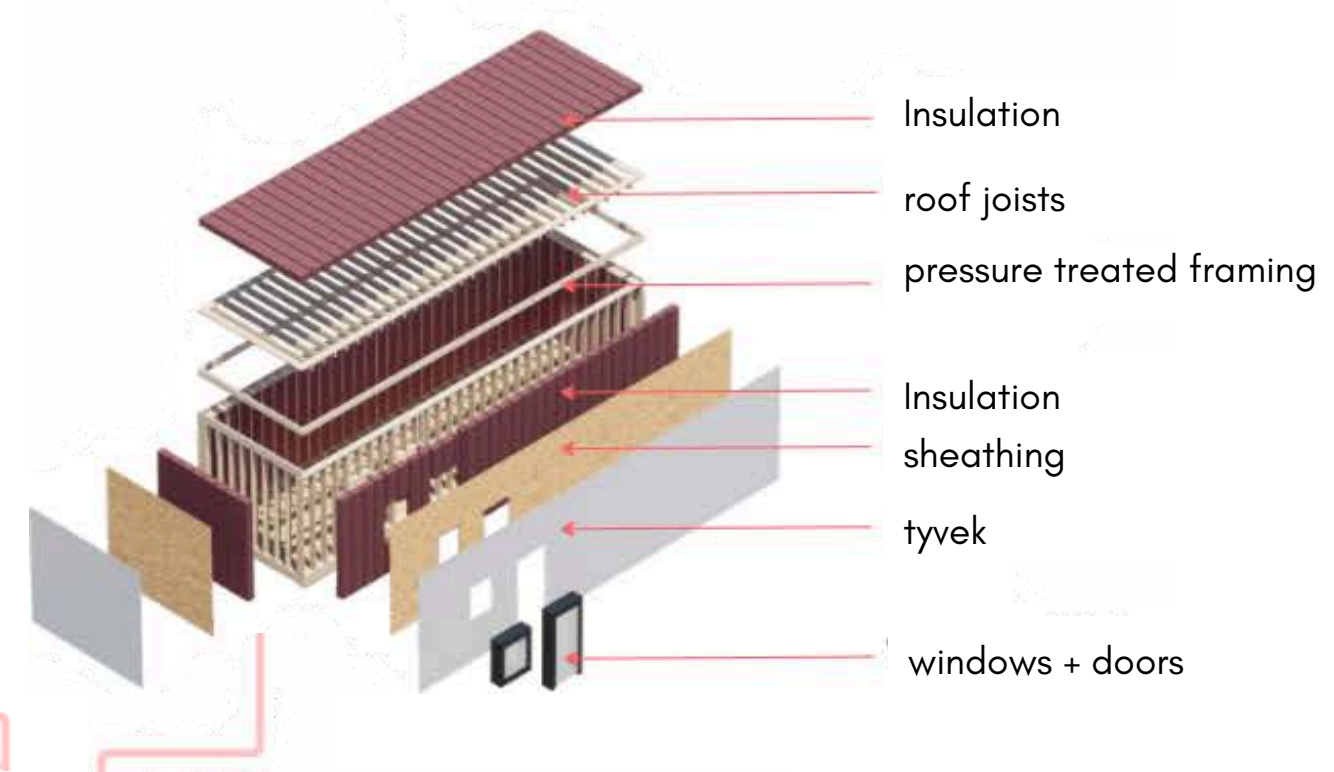
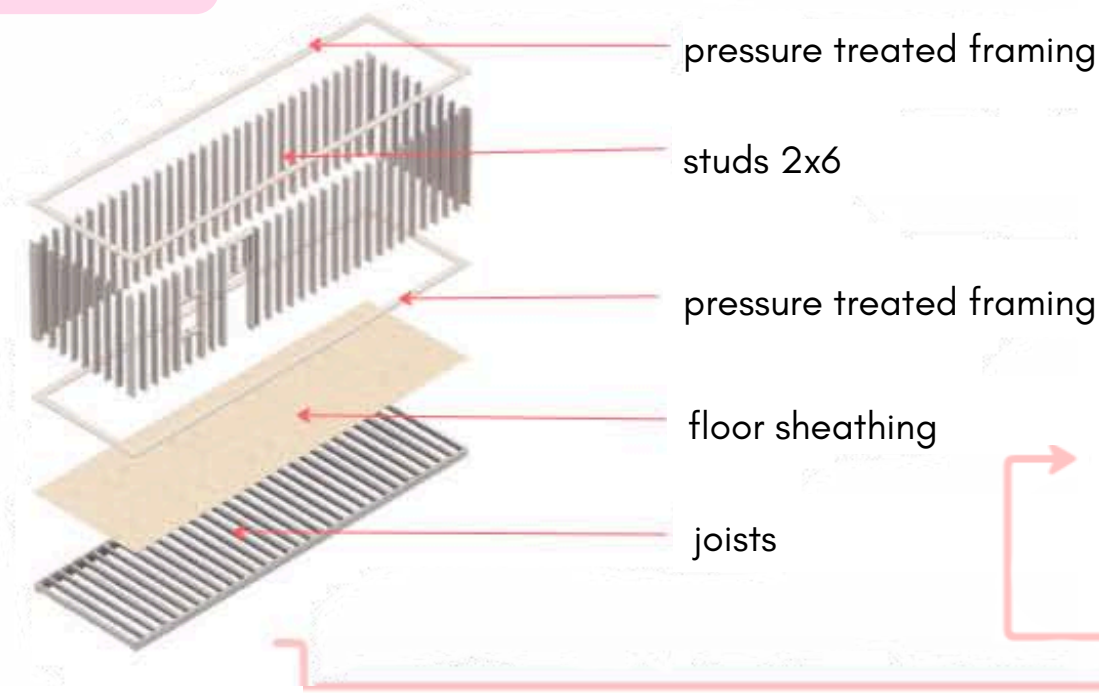




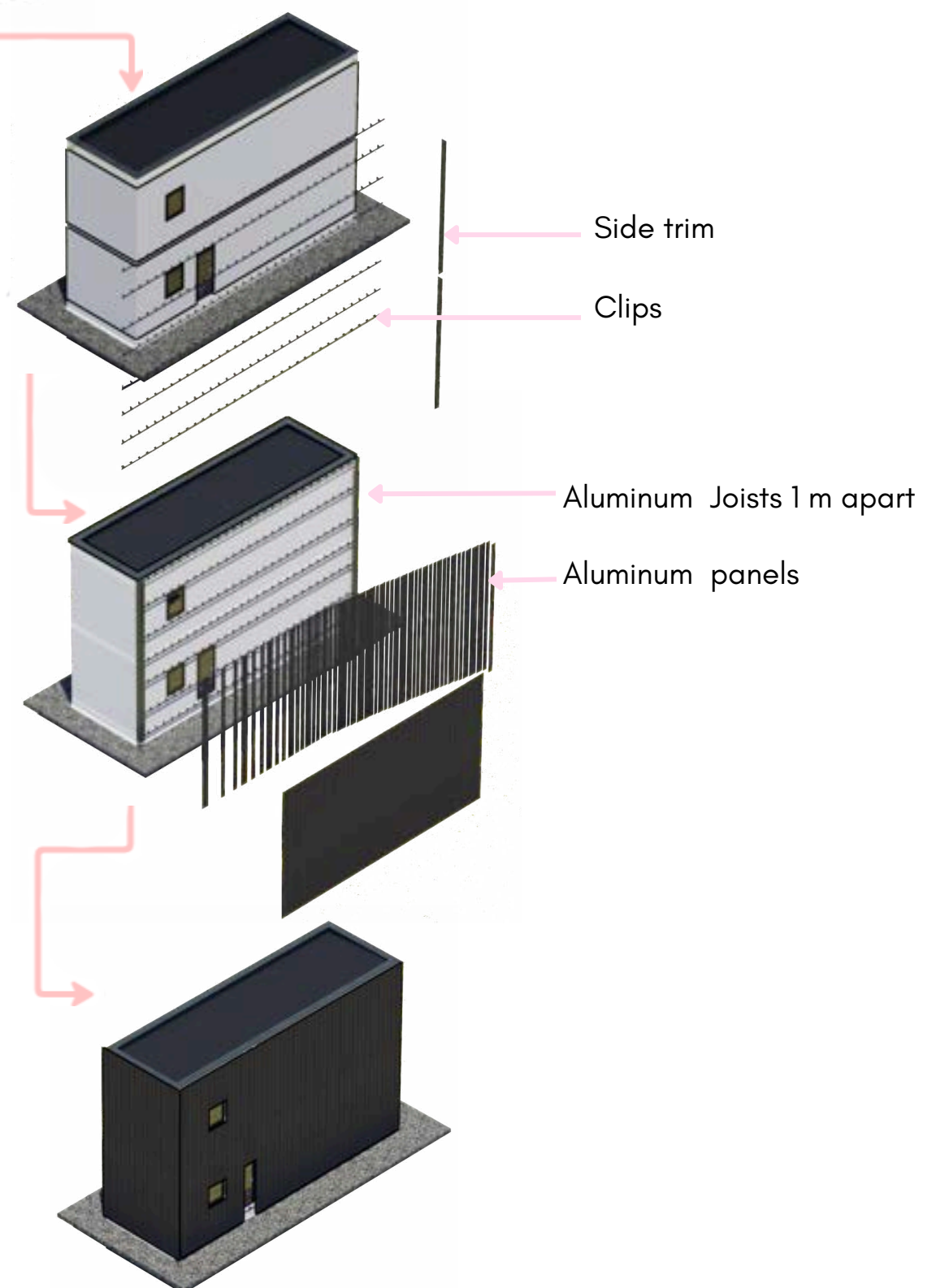
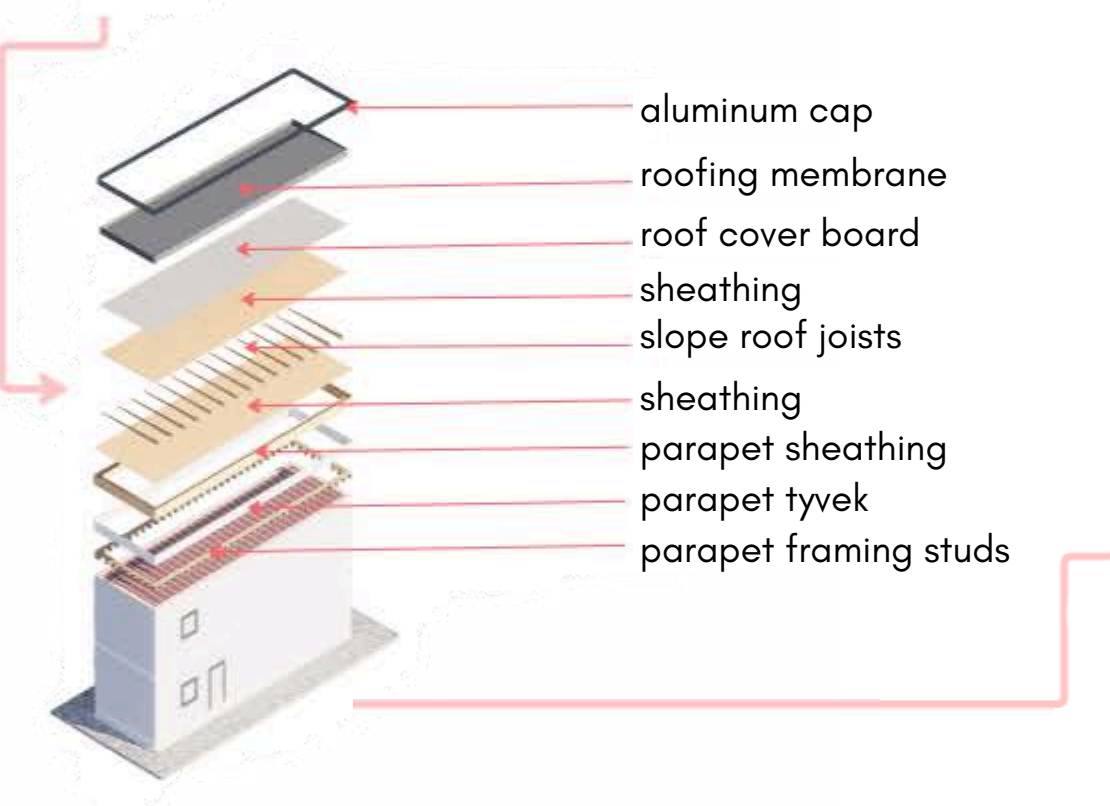
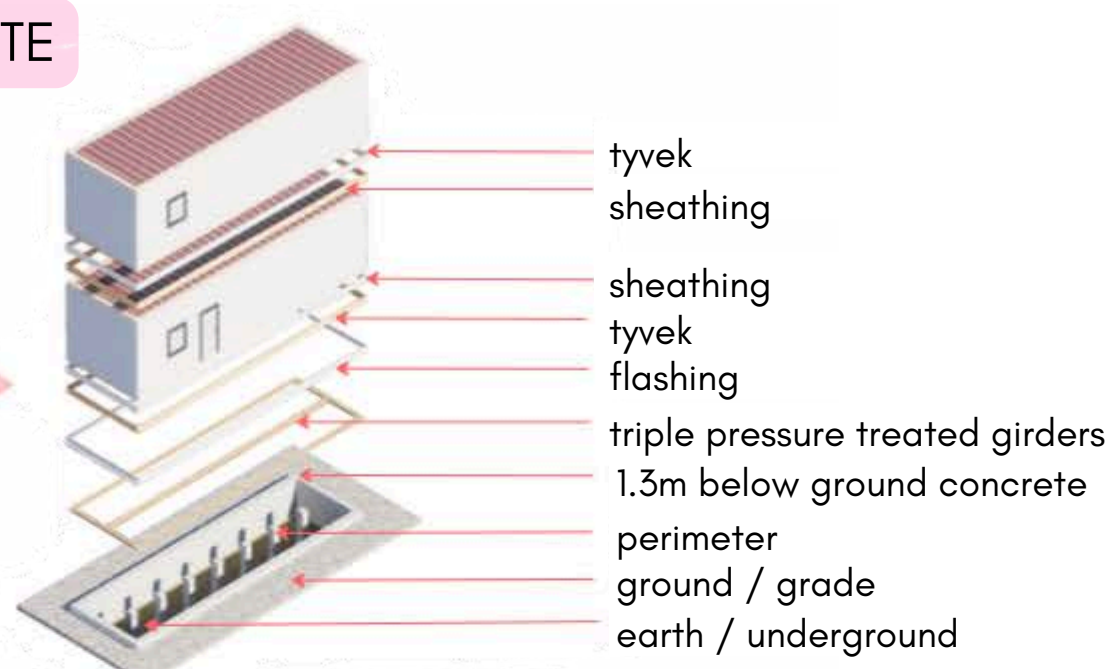
ALUMINIUM CLADDING



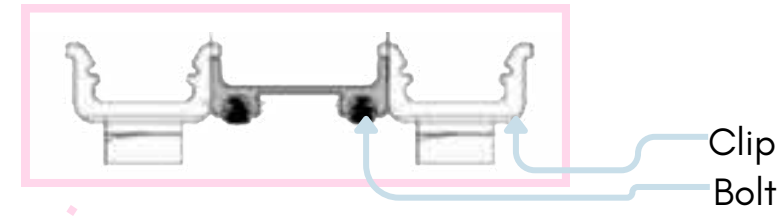
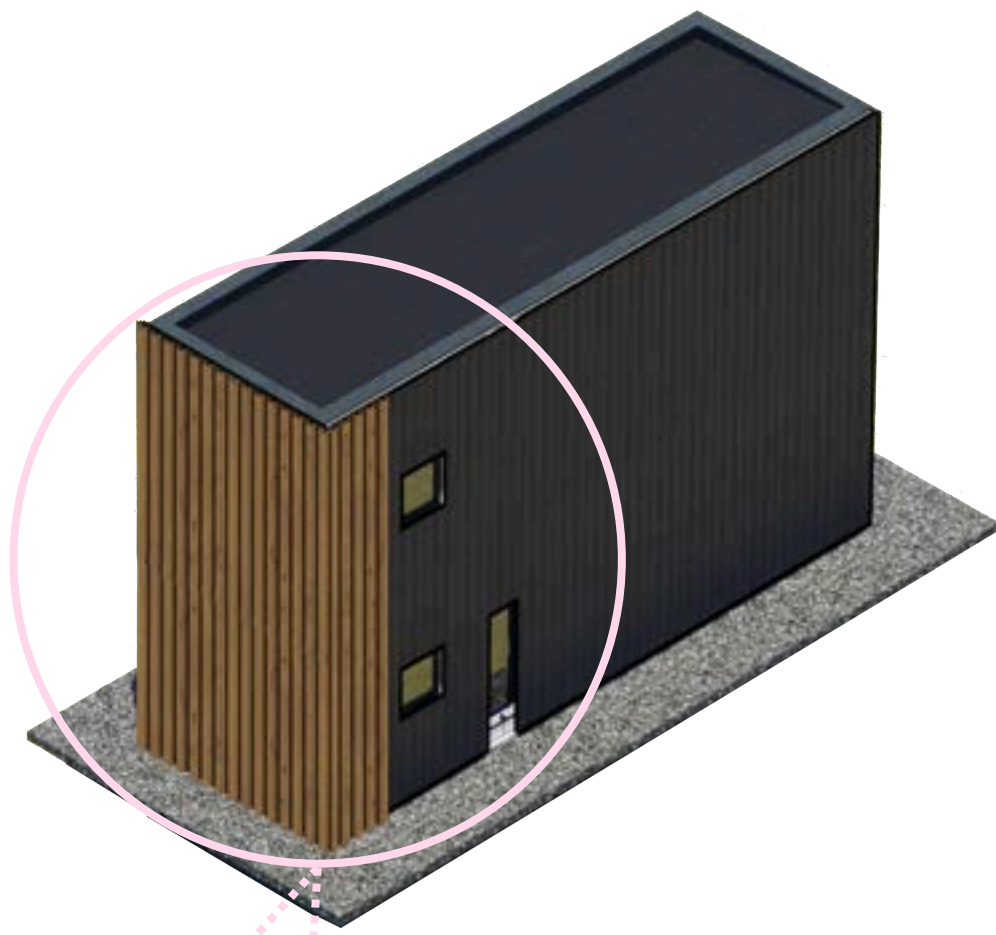
OFF - SITE



ON - SITE



ALUMINUM BATTON



ON - SITE

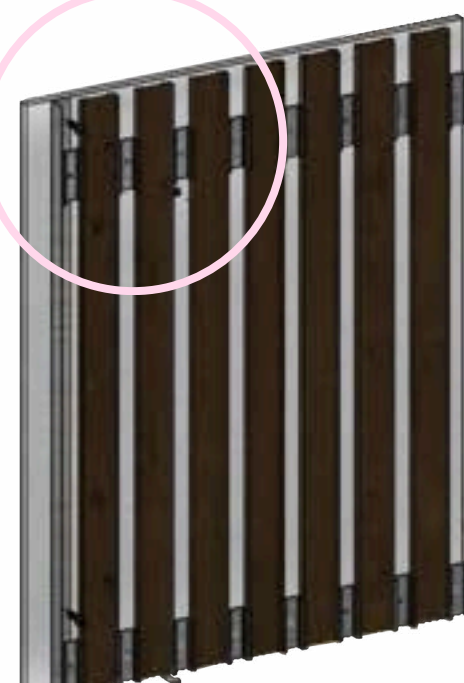


Support
Spacer
Clip



Spacer
L Profile trim

Apply clips and
spacers



Bolt
L Profile trim

Fix L-Profile to the
wall



Spacer
Batton
Clip

Snap Battens onto the
clip



Spacer
Batton

Apply
Battens

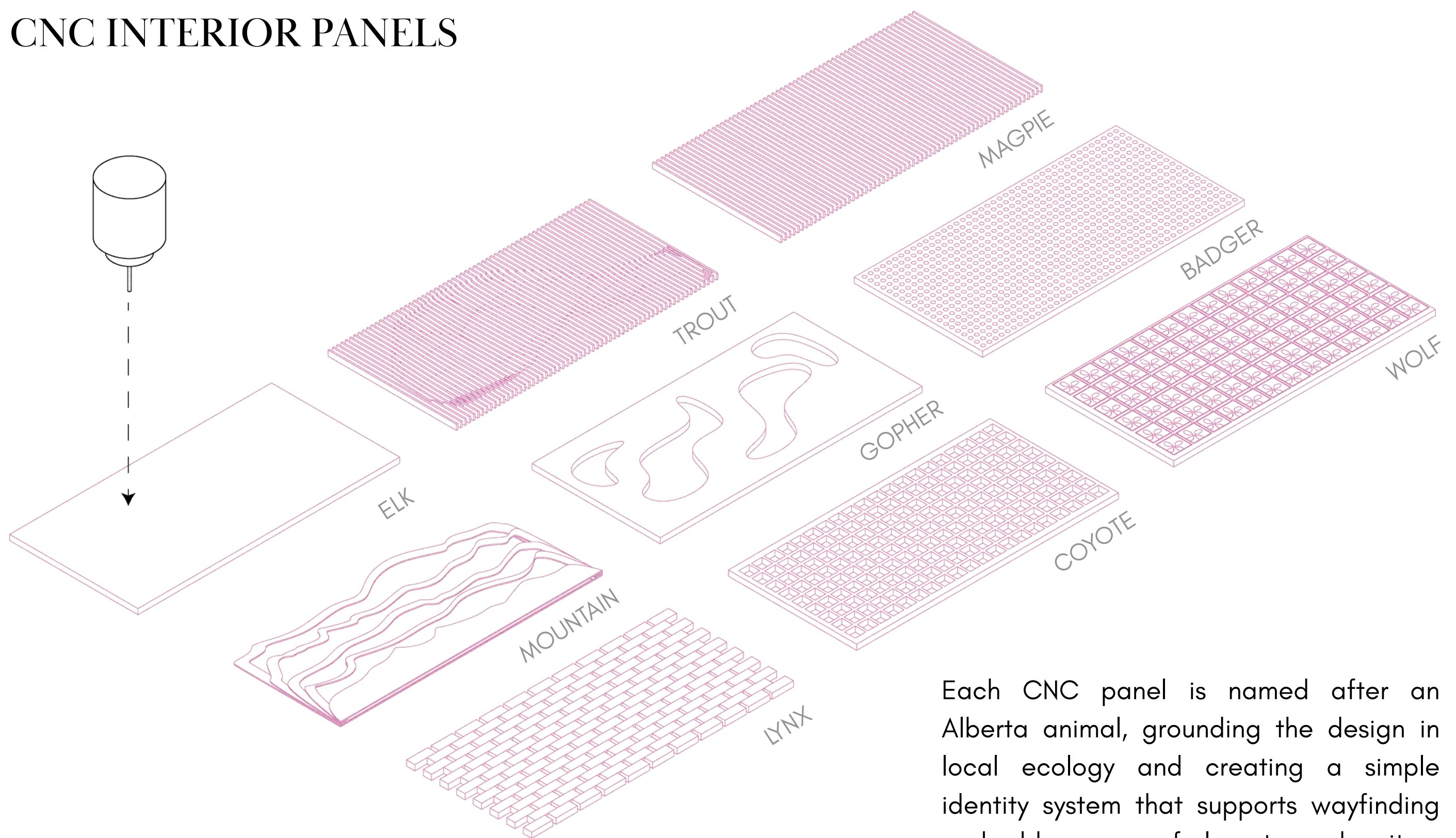
The first support profile is 3.9" from the floor
The last support profile is 3.9" from the ceiling
Supports 2.5' apart

Apply plastic clip to support
Insert spacer after placing the gaskets



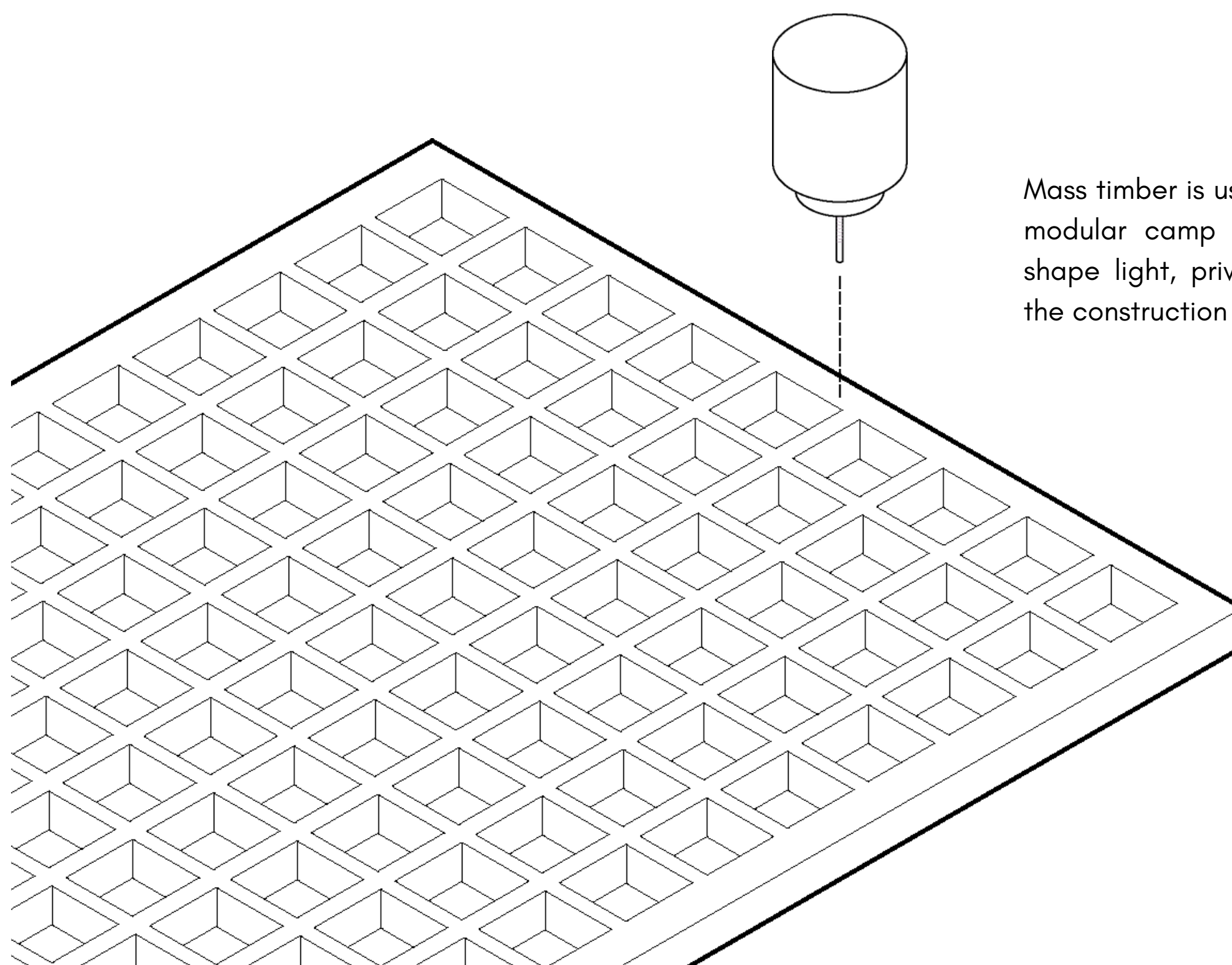
DETAILS

CNC INTERIOR PANELS



Each CNC panel is named after an Alberta animal, grounding the design in local ecology and creating a simple identity system that supports wayfinding and adds a sense of place to each unit.

MODULAR PANELS



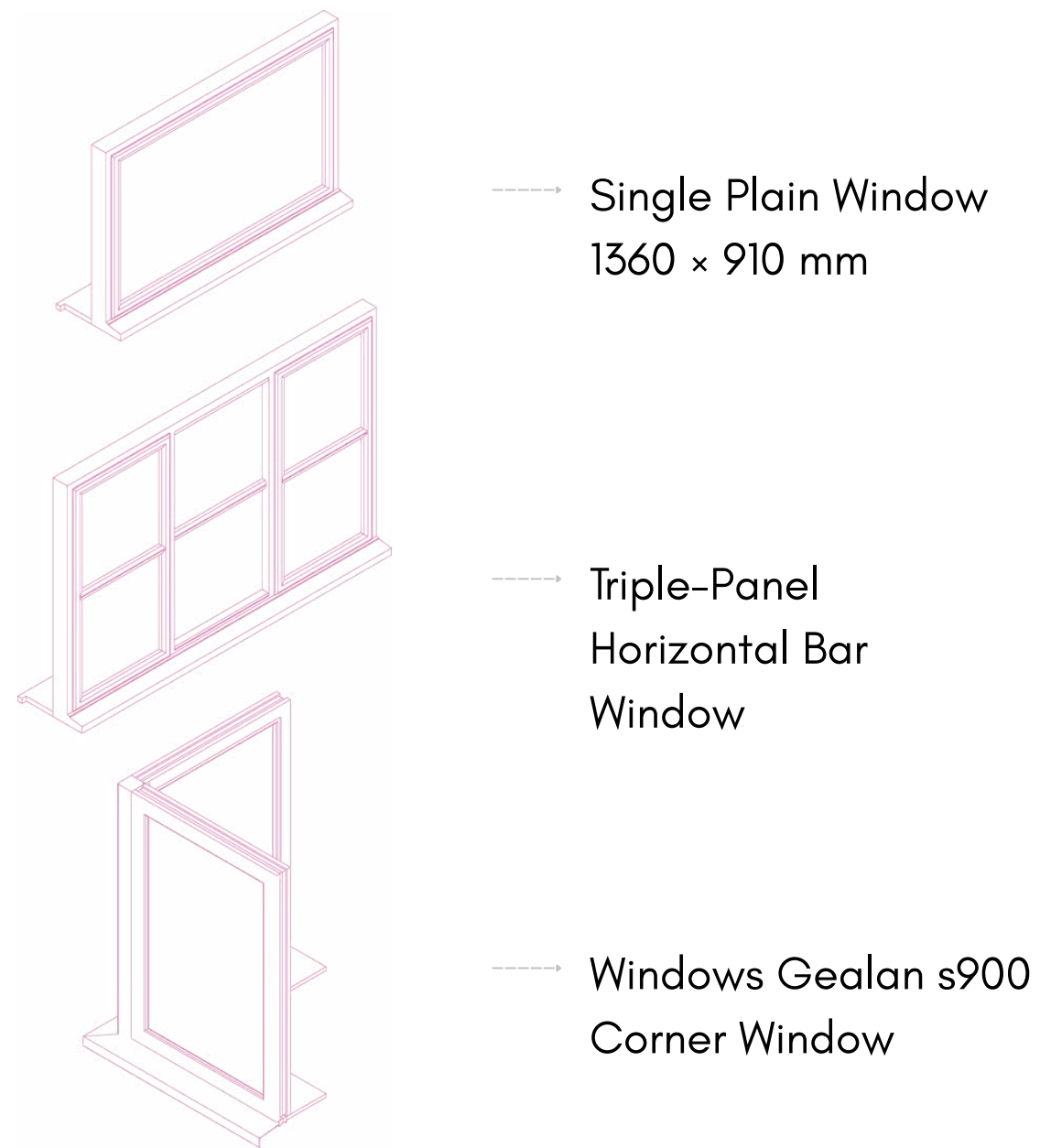
Mass timber is used as an interior skin that gives each modular camp unit its own character. The panels shape light, privacy, and atmosphere while keeping the construction system consistent.

Each interior panel is a 3.66 m × 3.45 m prefabricated mass-timber module. CNC-routed patterns / grooves, screens, or textures, differentiate each unit type while maintaining efficiency and a unified material language.

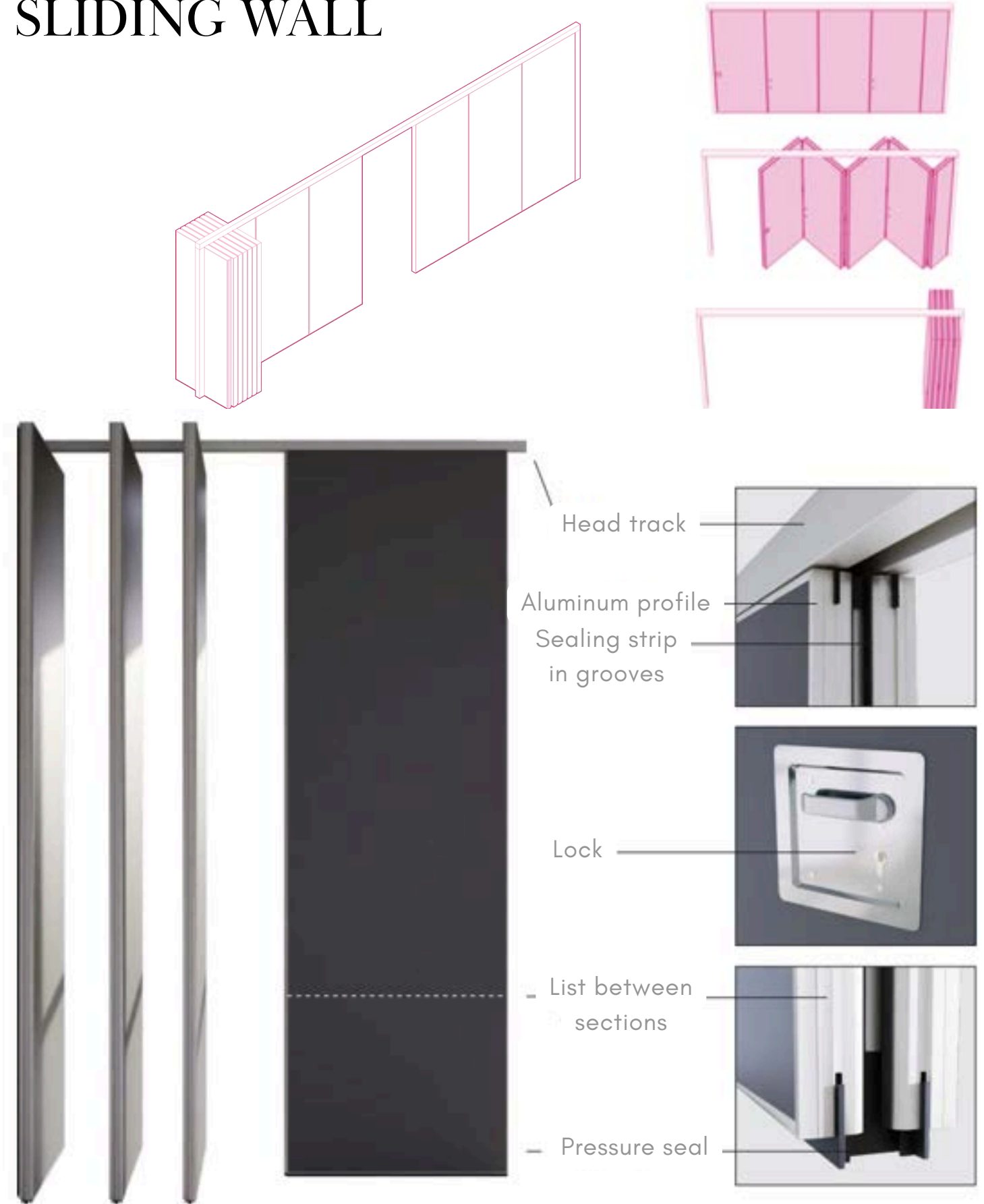


DETAILS

WINDOW TYPES



SLIDING WALL



Sliding Moveable Wall

The dorm units use the WINAB Movable Wall Centric system, which allows residents to reconfigure their rooms by sliding panels to adjust privacy, create shared zones, or open spaces for circulation.



VOLUMETRIC PREFAB REMOTE HOUSING

CHAPTER FOUR

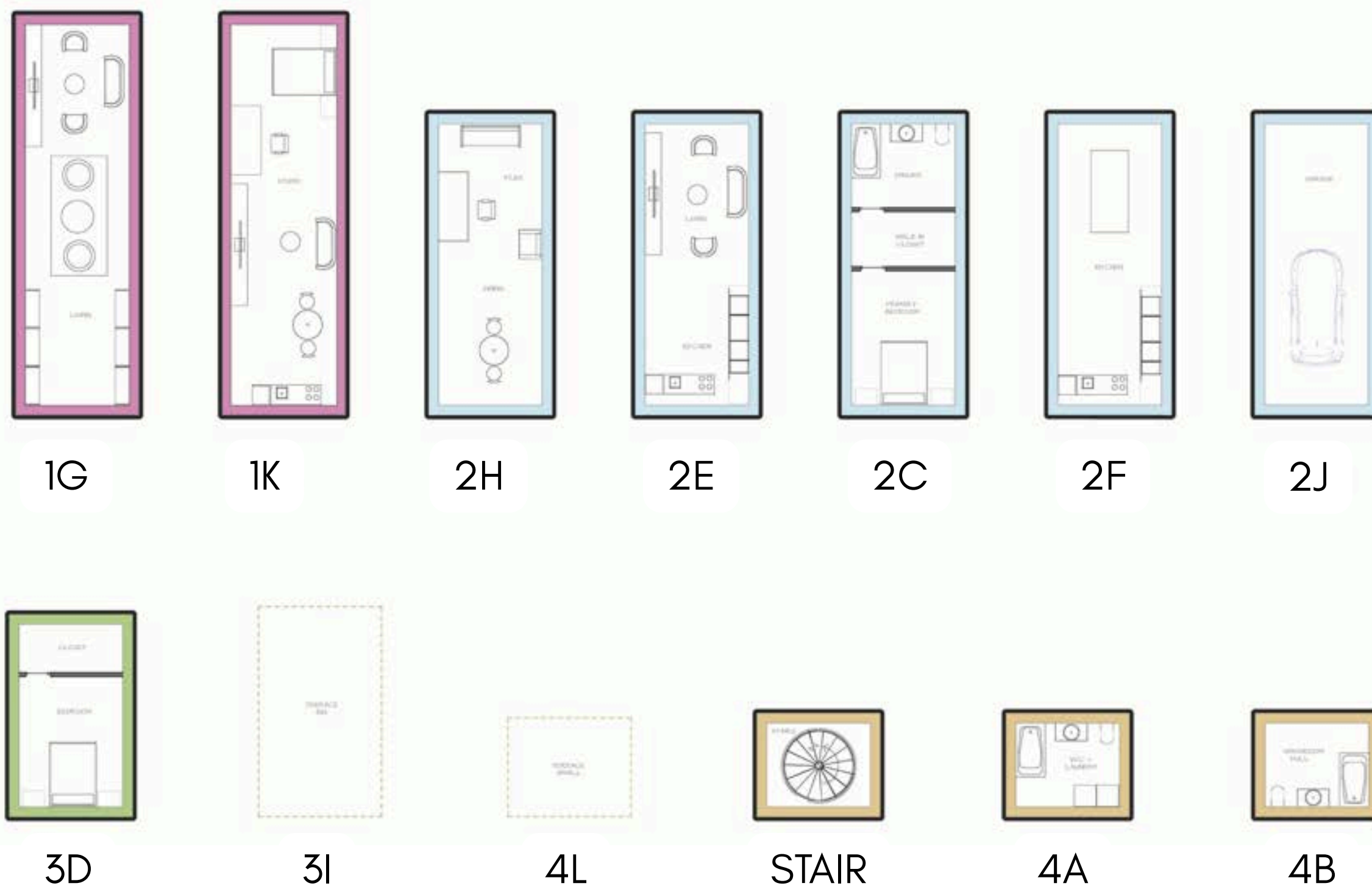


MODULE CLASSIFICATION SYSTEM

FAMILY / STUDIO

- | | |
|---|-------------------------------------|
| A Washroom Full Module | G Living Room / Recreational |
| B W/C + Laundry | H Dining Room / Flex |
| C Primary Bedroom + Ensuite + Closet | I Large Terrace |
| D Bedroom + Closet | J Garage |
| E Kitchen + Living Room | K Studio |
| F Large Kitchen | L Small Terrace |

Modules are organized A-L for easy reference, with each letter tied to a program and each color to a module size. This creates a clear system for naming, scaling, and reconfiguring layouts.

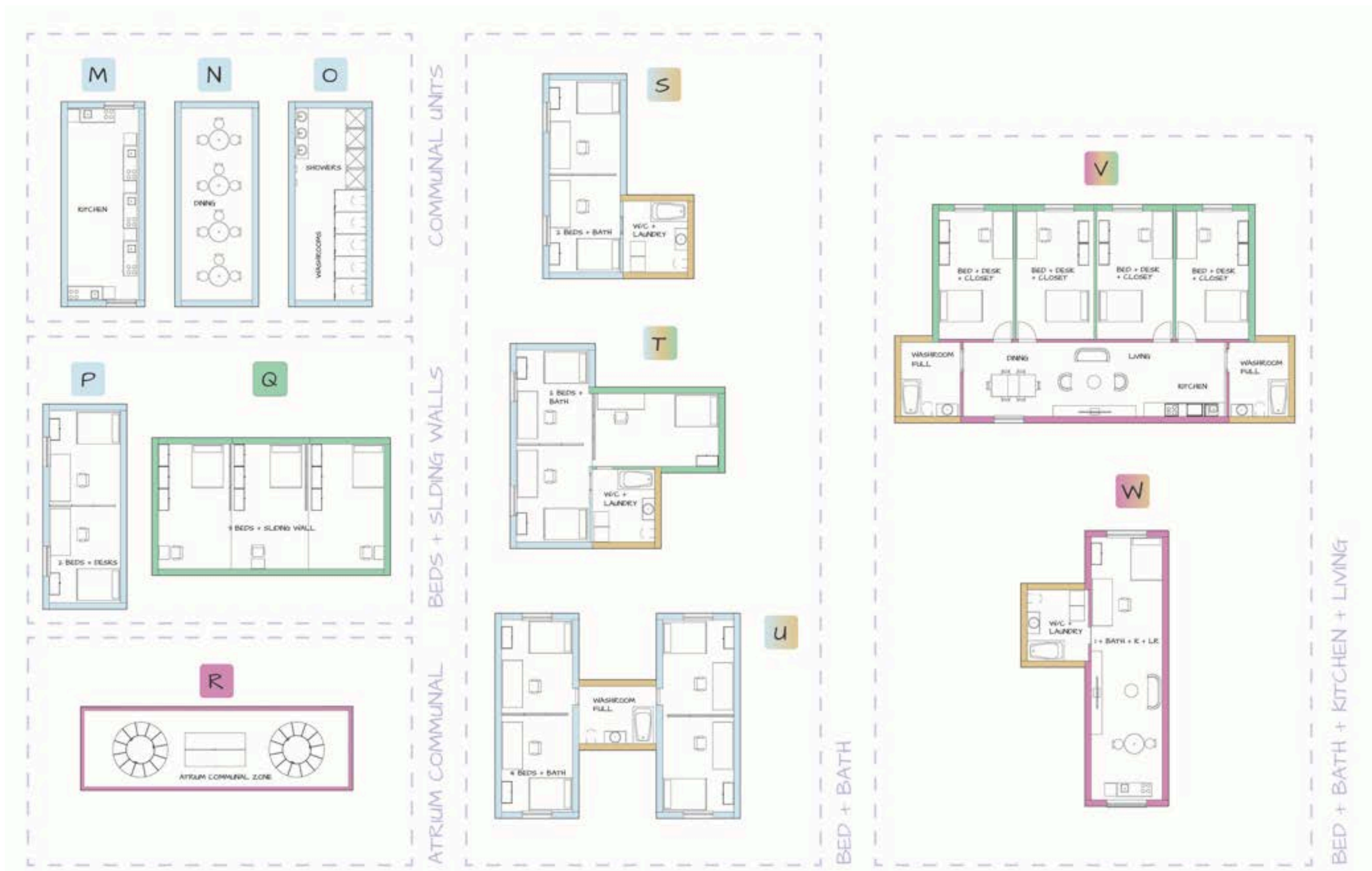


MODULE CLASSIFICATION SYSTEM

- | | | |
|--------------------------------|---------------------------------|---|
| M Shared Kitchen | R Atrium Communal Space | V 4 Beds + Kitchen + Dining + Bath |
| N Shared Dining | S 2 Beds + W/C + Laundry | W Studio + W/C + Laundry |
| O Shared W/C + Showers | T 3 Beds + W/C + Laundry | X Vestibule |
| P 2 Beds + Sliding Door | U 4 Beds + W/C | Y Locker / Mudroom |
| Q 3 Beds + Sliding Door | | |

DORM STYLE

Dorm-style modular units combine shared kitchens, dining, and washrooms with flexible sleeping modules to balance privacy and community in remote camps.

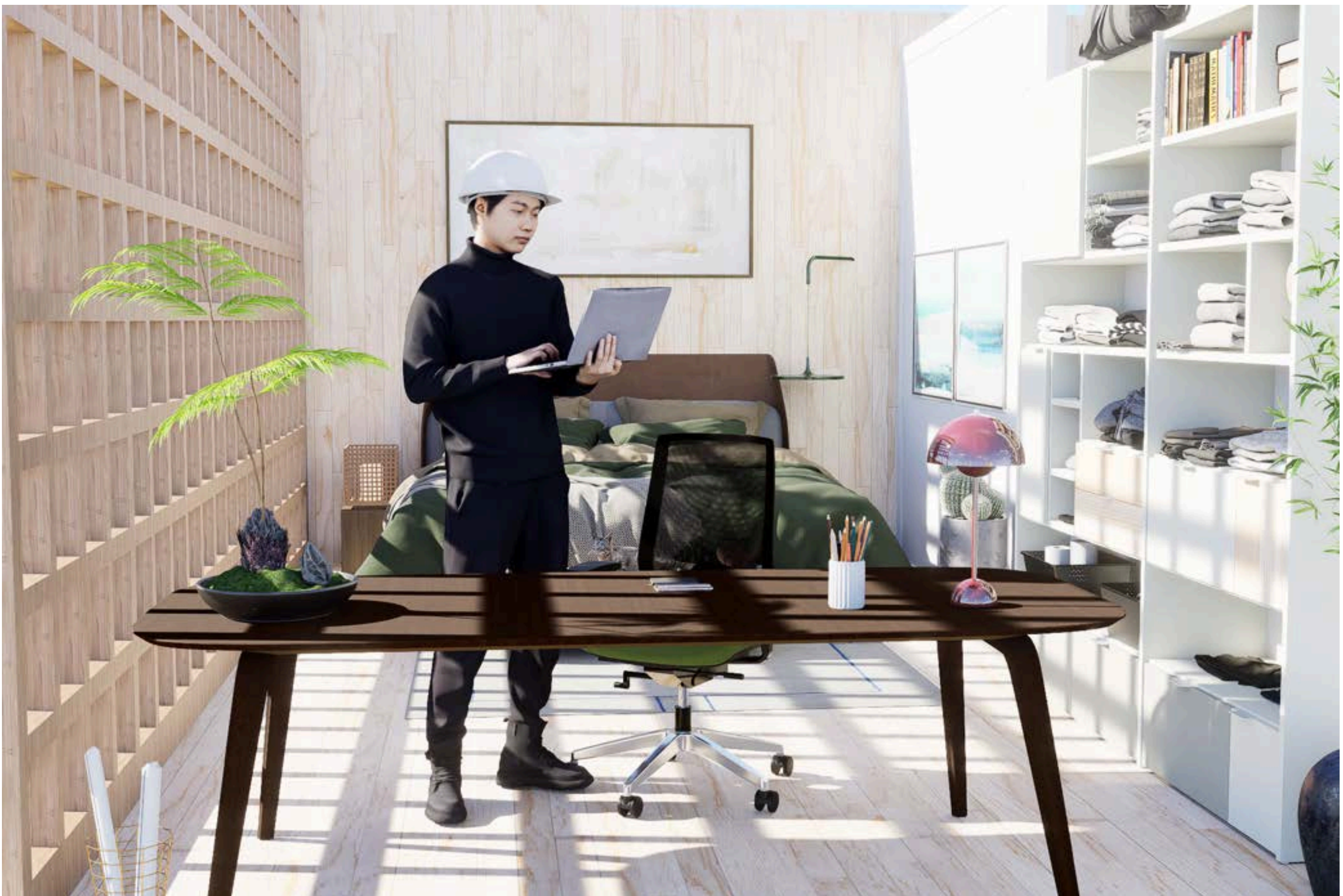


MODULE CLASSIFICATION SYSTEM

DORM STYLE



A dorm style apartment is a small, shared living setup where each resident has a private bedroom but shares communal spaces like the kitchen, lounge, and sometimes bathrooms. It has compact rooms, simple finishes, and an emphasis on community living. This type of apartment is usually designed to be affordable, efficient, and easy to maintain, making it common for young workers and remote or temporary housing projects.



MODULES

LOCKER ROOM / MUD ROOM



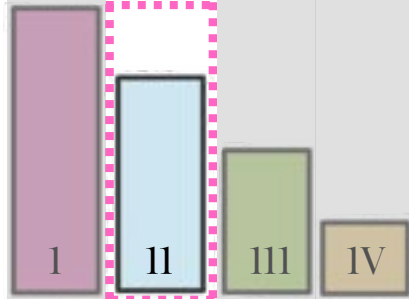
INTERIOR ELEMENTS

- Quiet nook with stool for a quick reset
- Vertical grain white oak with ventilated or slotted panels
- Small ERV or intake vent for dusty clothing
- Personal lockers with integrated LED strip
- Motion activated night lighting
- Warm linear LED along ceiling edges (3000K)
- Shelf for grooming and essentials
- Hooks for gloves, hats, PPE, and outerwear
- Pull out drawers under bench for boots
- Durable metal interior for easy cleaning
- Small plants for a natural, calming touch

Different shifts,
different people, same
system, always
adaptable.

Size:
3.66 m (w) x 9.15 m (l) x 3.45 m (h)

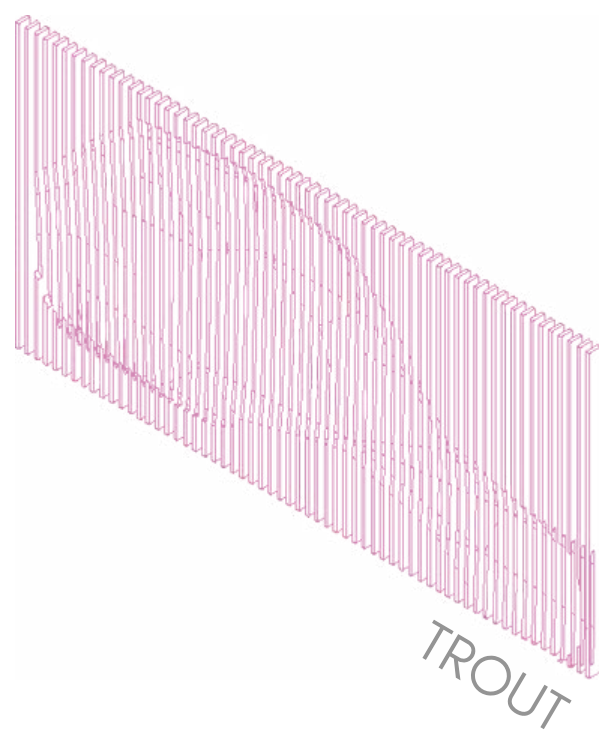
Module: II



Users:

- All user types
- Public zone

Facade type:



MODULES

COMMUNAL ATRIUM



EXTERIOR ELEMENTS

- Large glazing for passive sun and clear outdoor sightlines

INTERIOR ELEMENTS

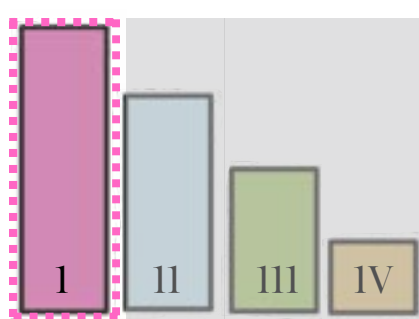
- Light shelves or clerestories to bring daylight deeper
- Layered planting with trees, shrubs, and hanging vines
- Soft earthy palette with a warm wood slat ceiling
- Lounge chairs with small swivel tables
- Low sectional sofas and circular conversation pits
- Coffee tables for casual interaction
- Soft mats, poufs, and area rugs at key nodes
- Lower lux lighting for decompression with warm task lamps
- Media wall, gaming consoles, foosball, pool, or air hockey

A quiet space after a 12-hour shift, not just a room.

Size:

3.66 m (w) x 12.21 m (l) x 3.45 m (h)

Module: I



Users:

- All user types
- Public zone



MODULES

SHARED DINING



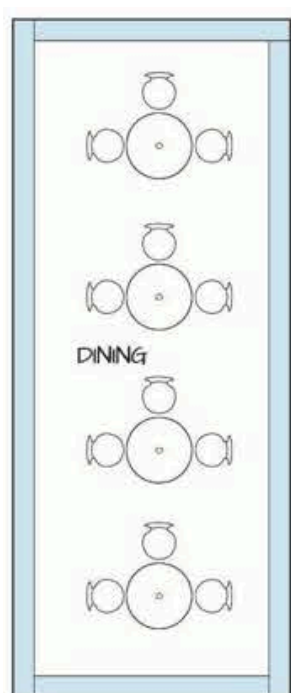
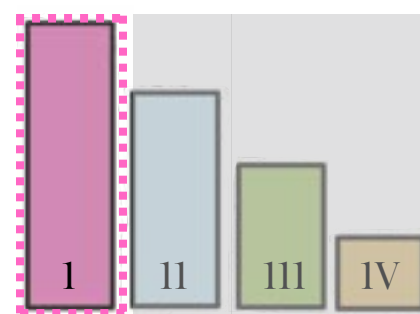
INTERIOR ELEMENTS

- Warm wood slat walls for acoustic comfort and atmosphere
- Flexible dining tables for group or individual seating
- Mix of round and rectangular tables to support different social settings
- Durable, easy-to-clean furniture for high daily use
- Integrated lighting that creates a soft, welcoming dining environment
- Open layout to support circulation and casual interaction
- CNC feature panel as a focal element and identity marker



Size:
3.66 m (w) x 12.21 m (l) x 3.45 m (h)

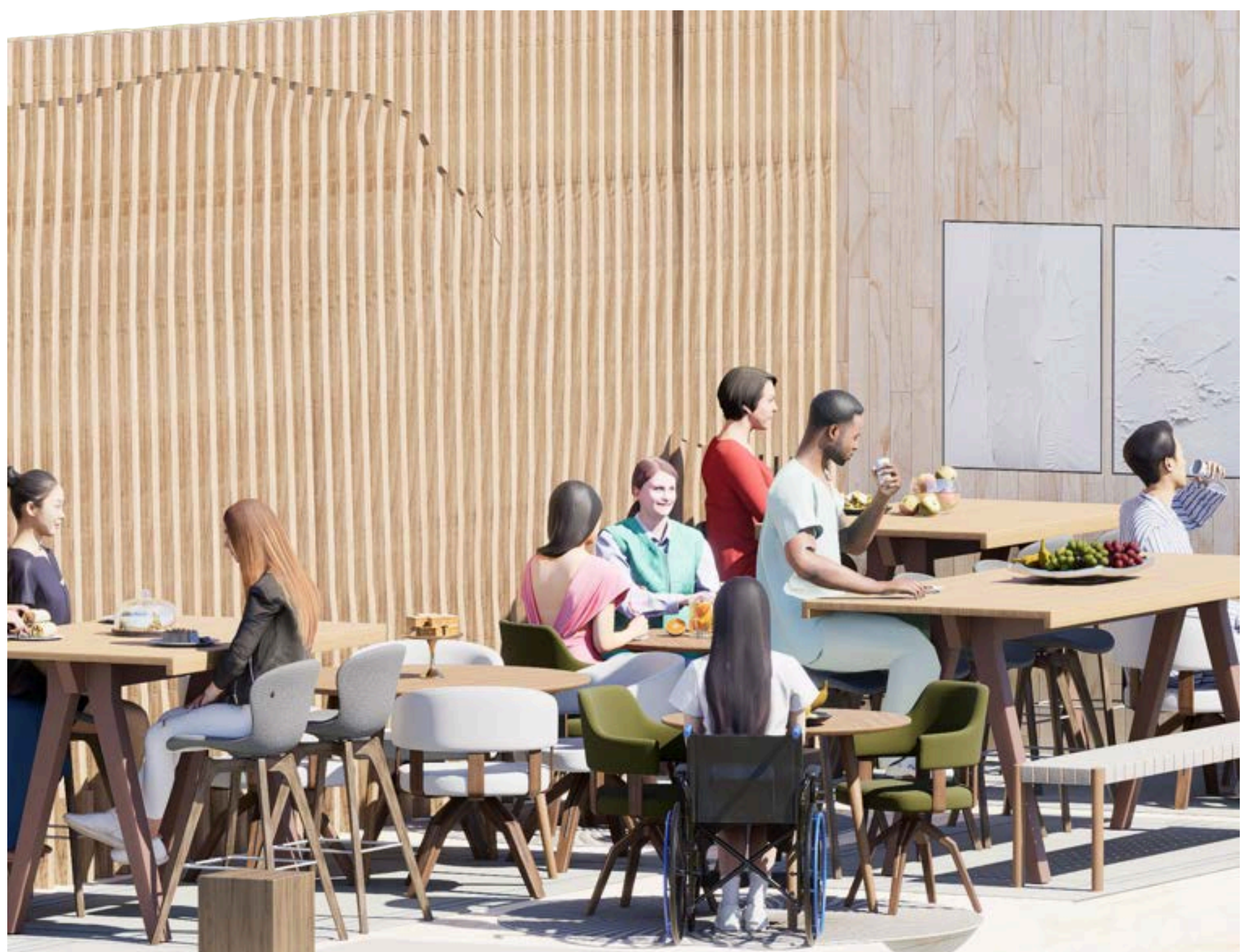
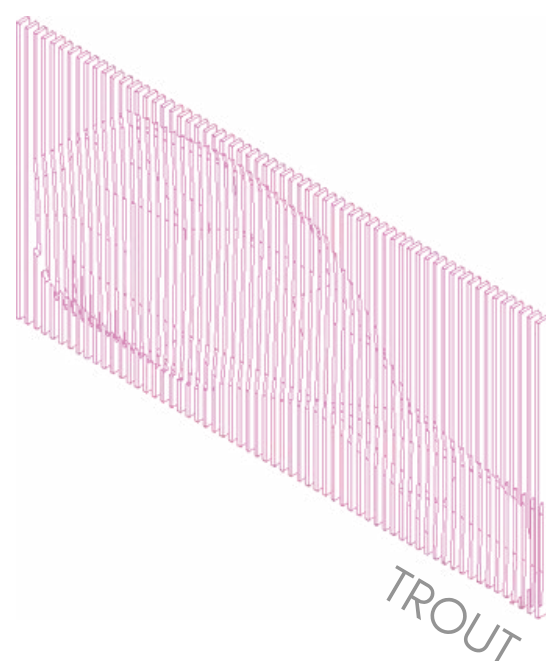
Module: I



Users:

- All user types
- Public zone

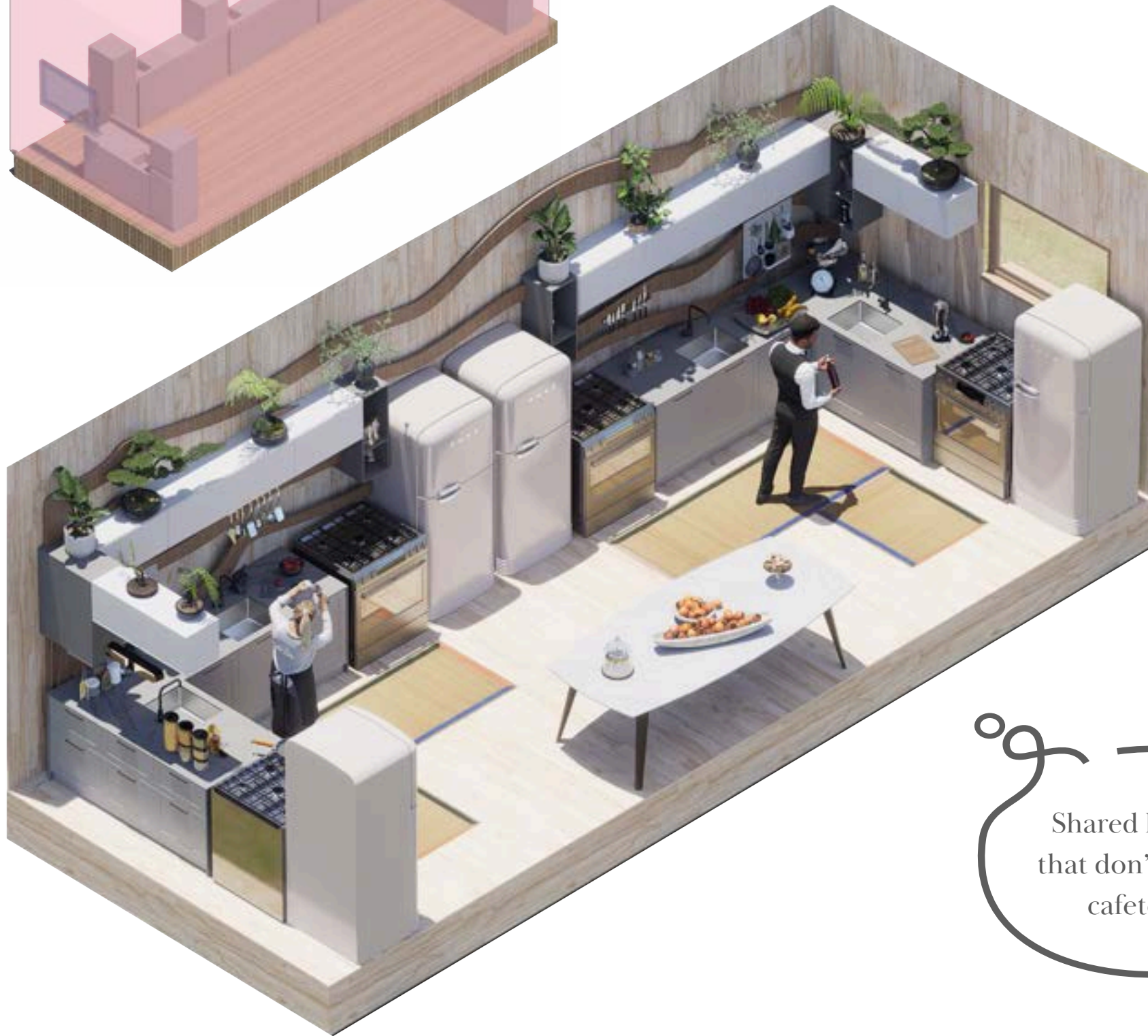
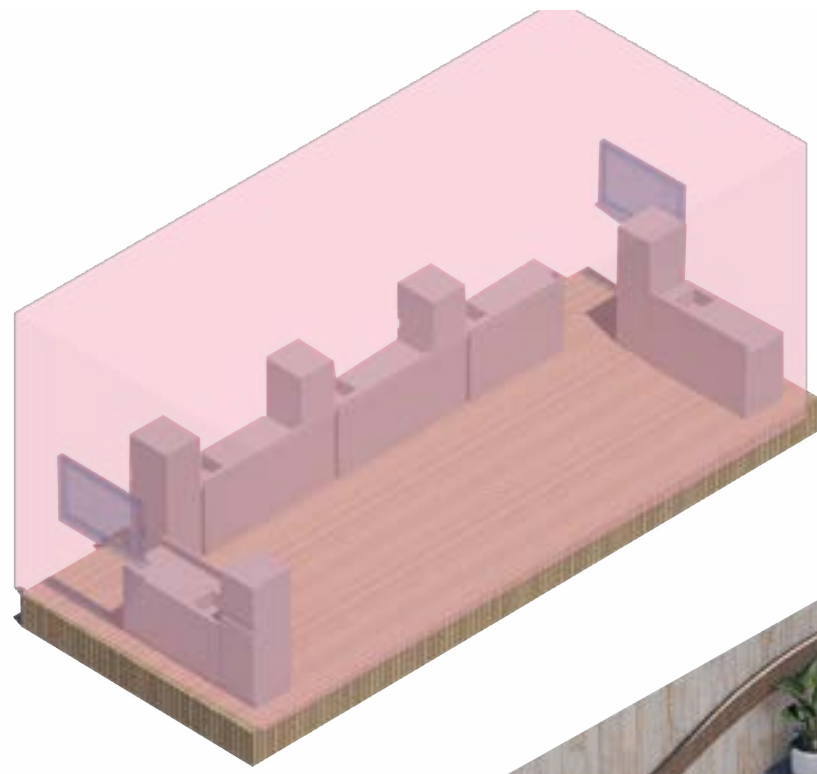
Facade type:



MODULES

SHARED KITCHEN

N



INTERIOR ELEMENTS

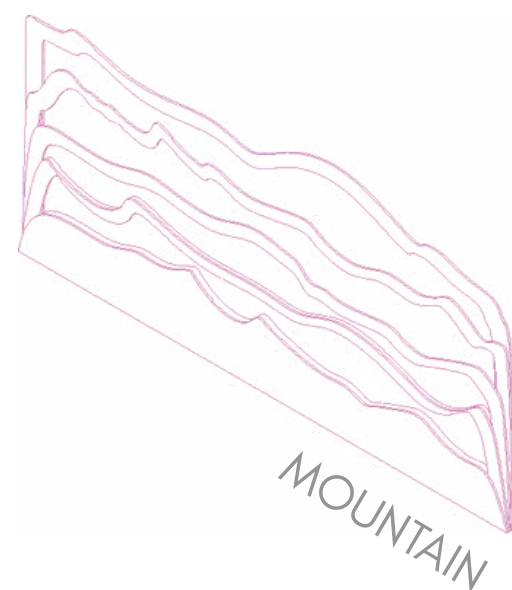
- Long continuous counters for multiple users at once
- Durable appliances and easy-to-clean surfaces
- Warm wood accents and CNC panels to soften the space
- Central prep island that supports both cooking and social interaction
- Potted plants for possible vegetation
- Several cabinets for personal storage
- Shared utensils and appliances

Shared kitchens that don't feel like cafeterias.

Users:

- All user types
- Public zone

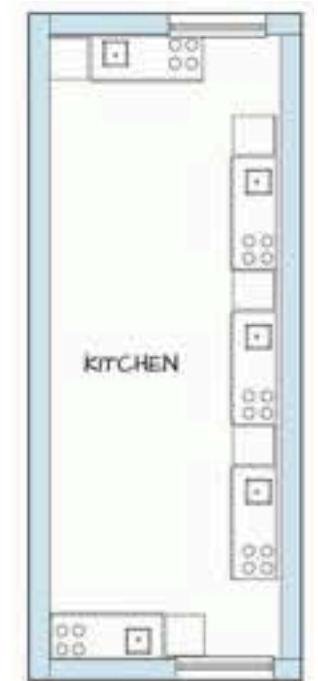
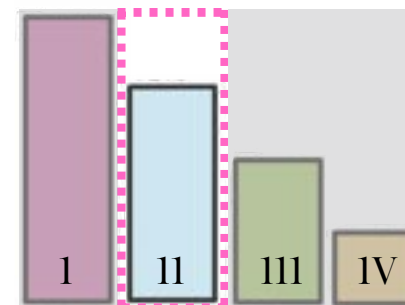
Facade type:



Size:

3.66 m (w) x 9.15 m (l) x 3.45 m (h)

Module: II



MODULES

SHARED W/C + SHOWERS



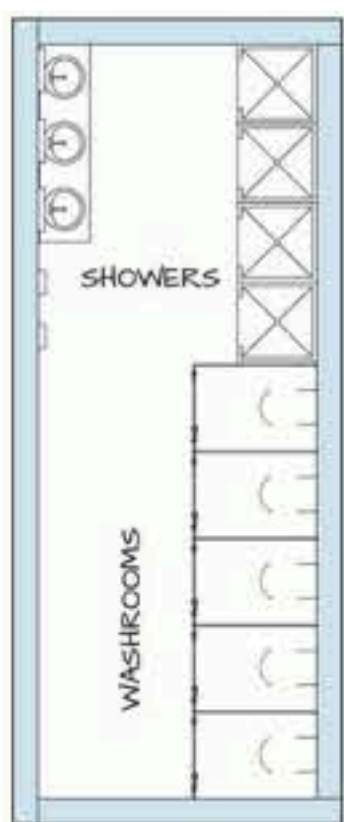
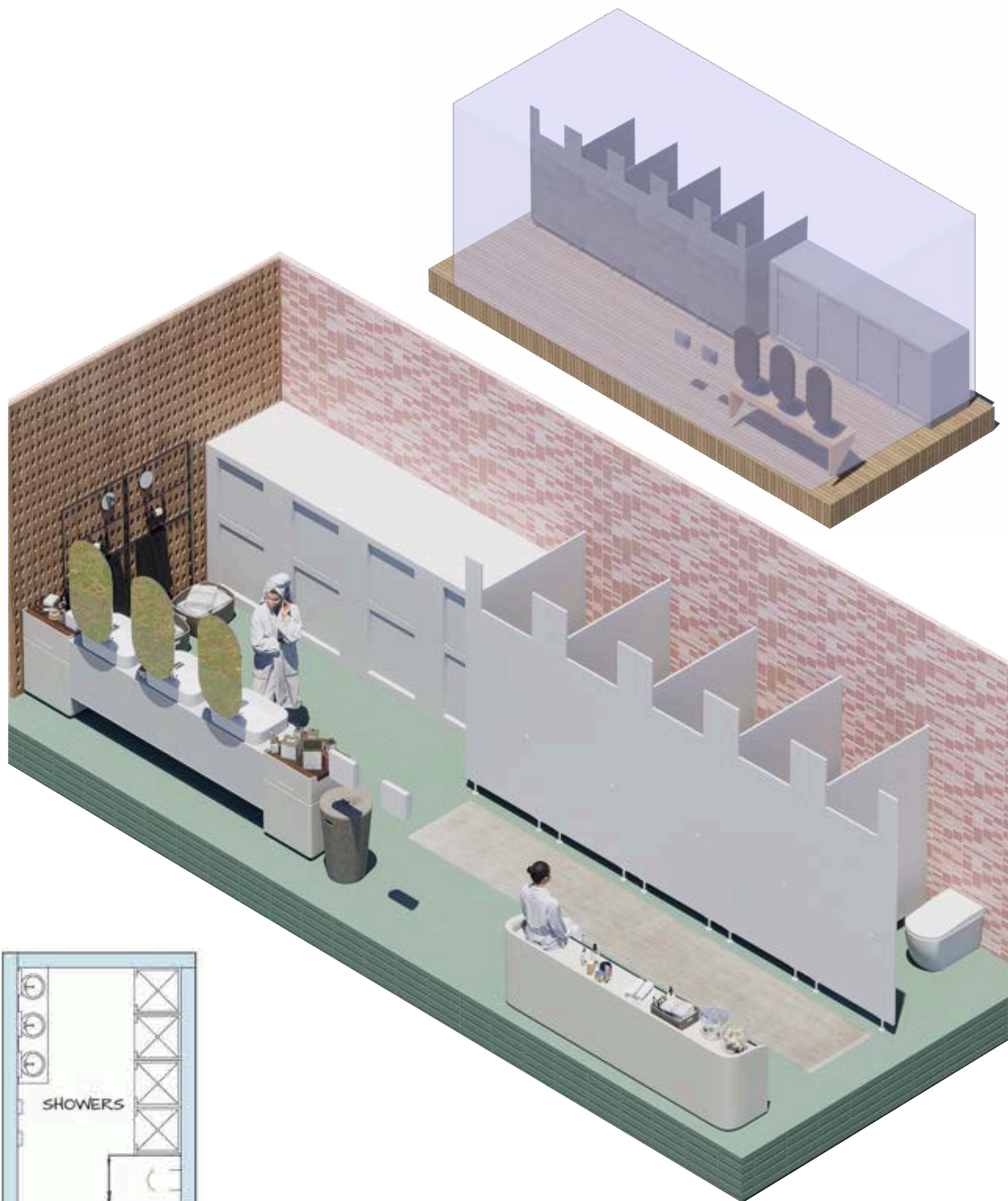
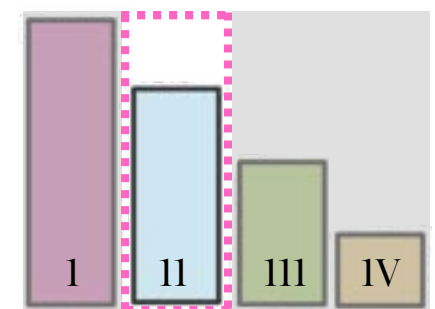
INTERIOR ELEMENTS

- Individual shower stalls for privacy
- Long shared vanity with durable, easy-to-clean surfaces
- Warm textured wall panels to soften the space
- Efficient circulation and clear separation of wet and dry zones
- Easy flexibility with storage, variety of options with a hood on wall system and underneath counter space

Size:

3.66 m (w) x 9.15 m (l) x 3.45 m (h)

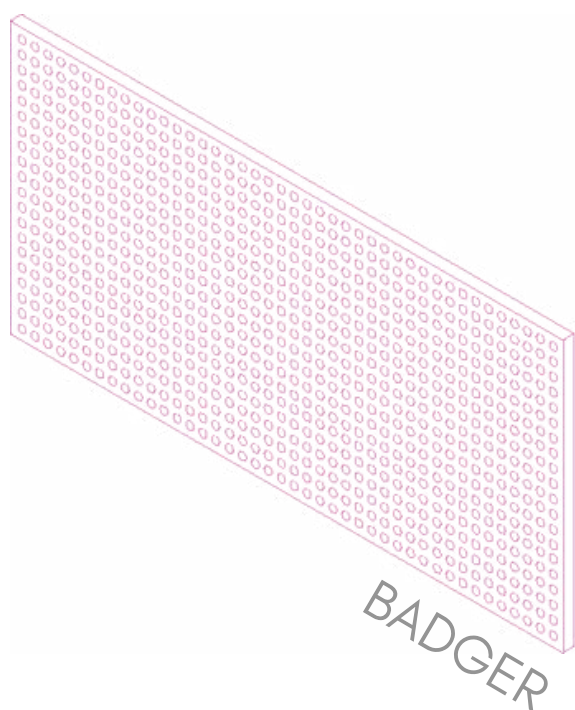
Module: II



Users:

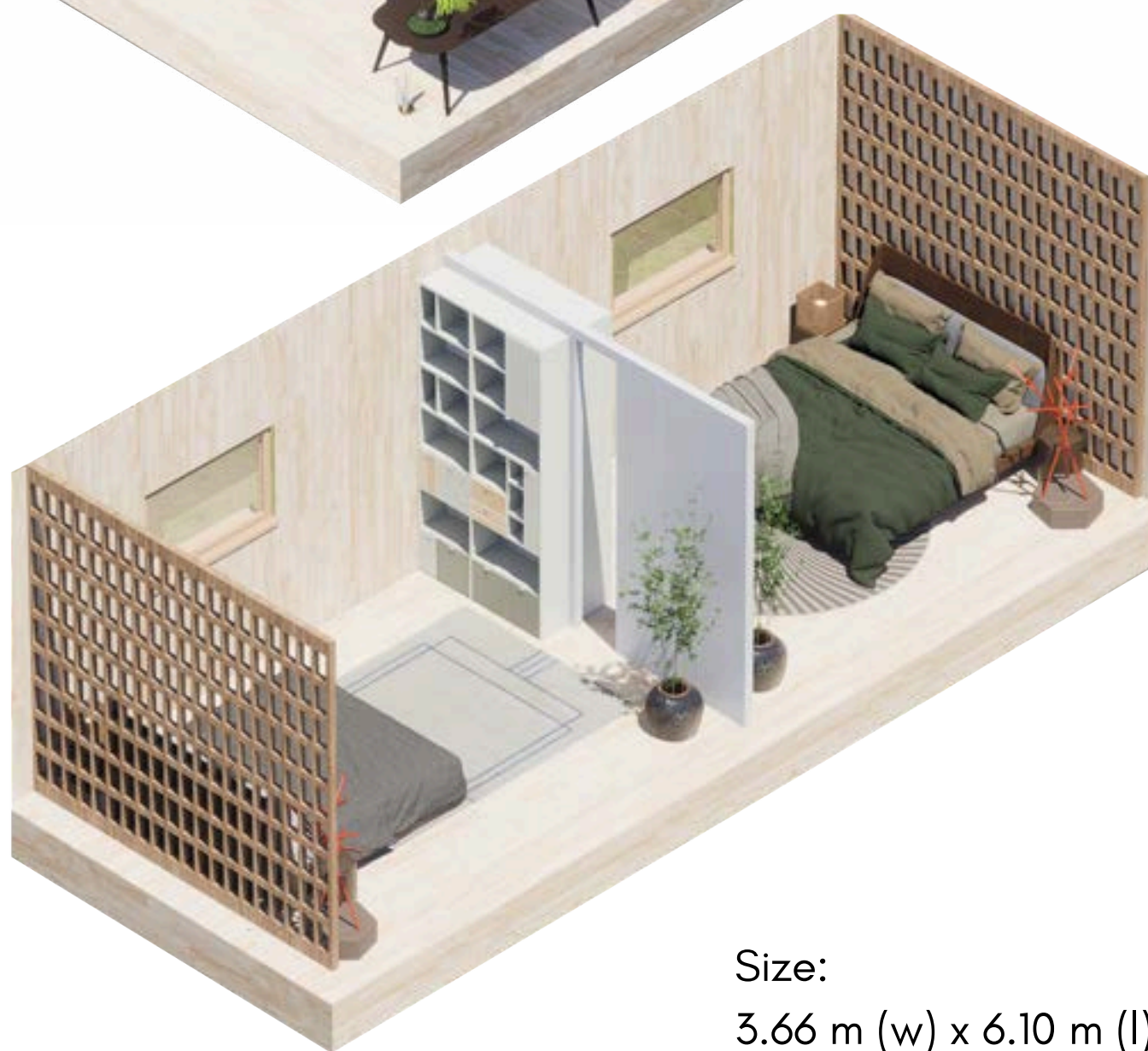
- All user types
- Public zone

Facade type:



MODULES

3 BEDS + SLIDING DOOR



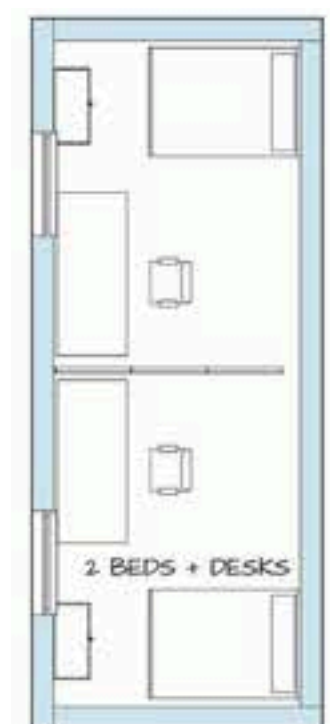
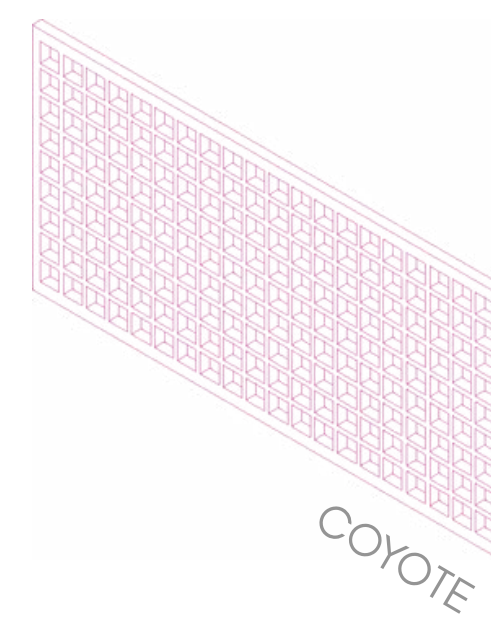
INTERIOR ELEMENTS

- Sliding partitions for adjustable privacy between beds
- Warm wood walls and CNC screens for softness and texture
- Simple storage and shelving integrated into the layout
- Tall windows to bring in daylight and keep the rooms bright and calm

2 BEDS + SLIDING DOOR

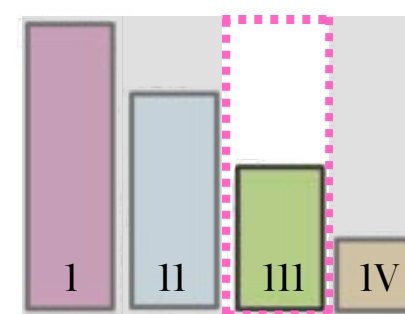


Facade type:



Size:
3.66 m (w) x 6.10 m (l) x 3.45 m (h)

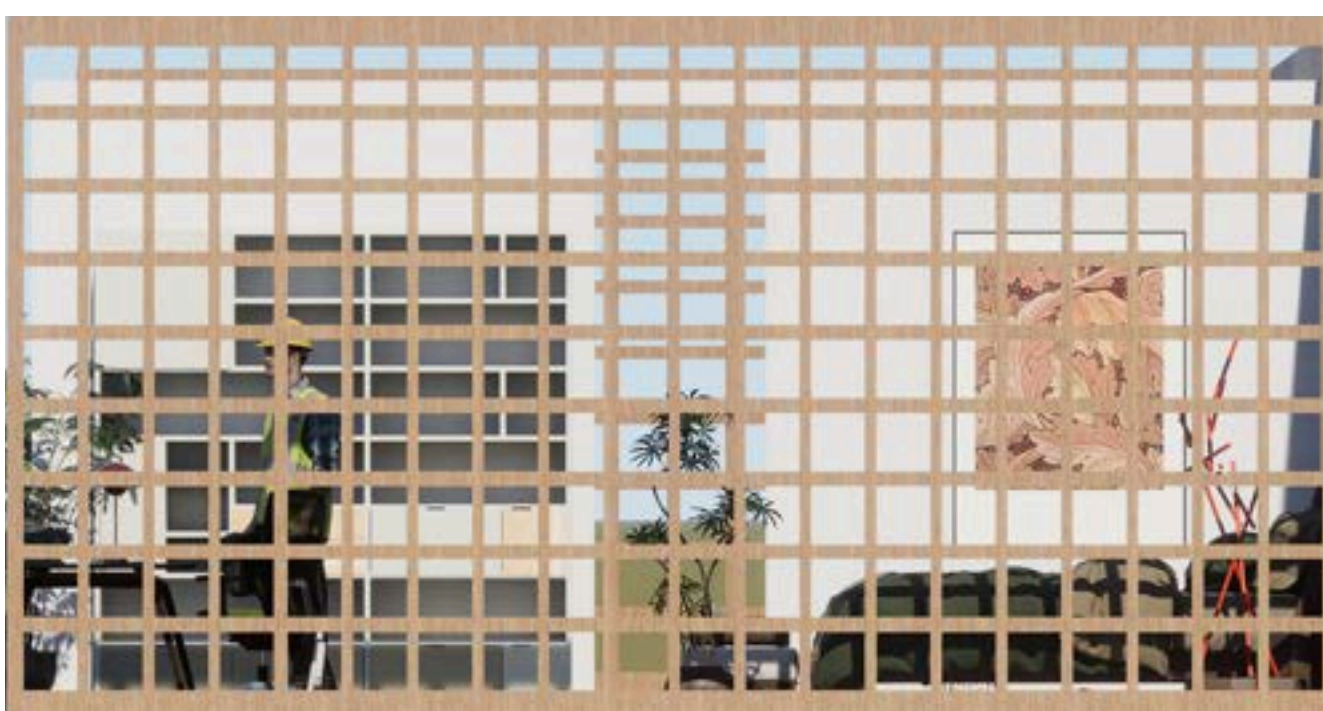
Module: III



Users:

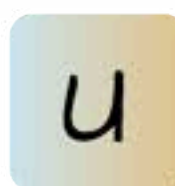
- All user types
- Private zone

Your façade, your pattern, every cluster gets its own character



UNITS

4 BEDS + W/C



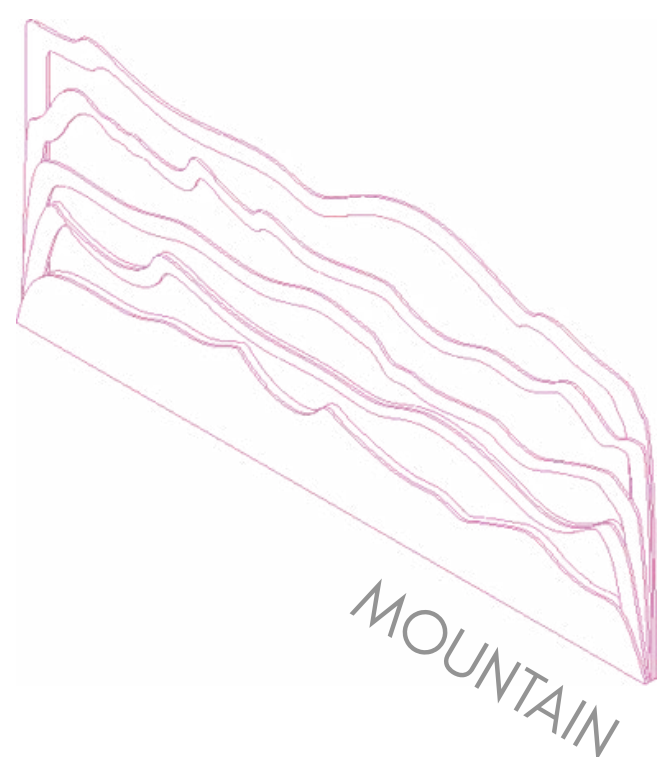
Move the partition and make space for your own routines



INTERIOR ELEMENTS:

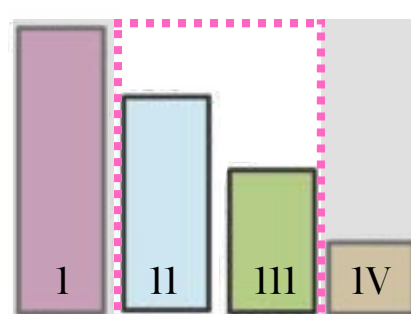
- Inspiration from the mountains comes in the form of the CNC facade
- The facade anchors the room and allows for personalization

Facade type:



Size:
 3.66 m (w) x 9.15 m (l) x 3.45 m (h)
 3.66 m (w) x 3.05 m (l) x 3.45 m (h)

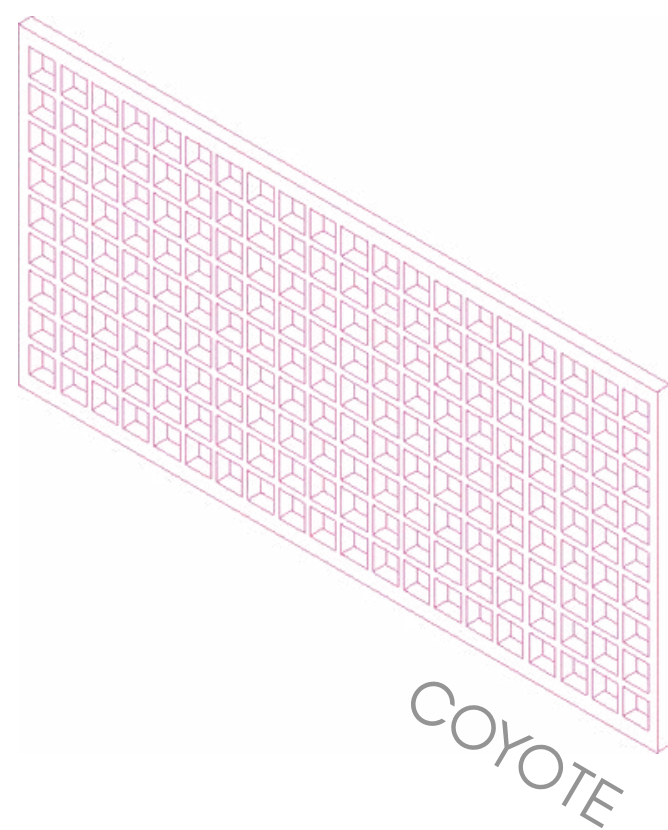
Module: II + IV



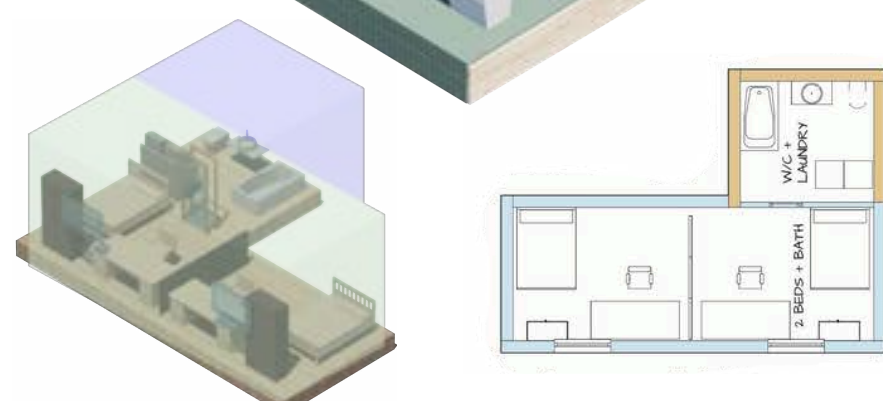
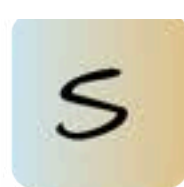
Users:

- All user types
- Private zone

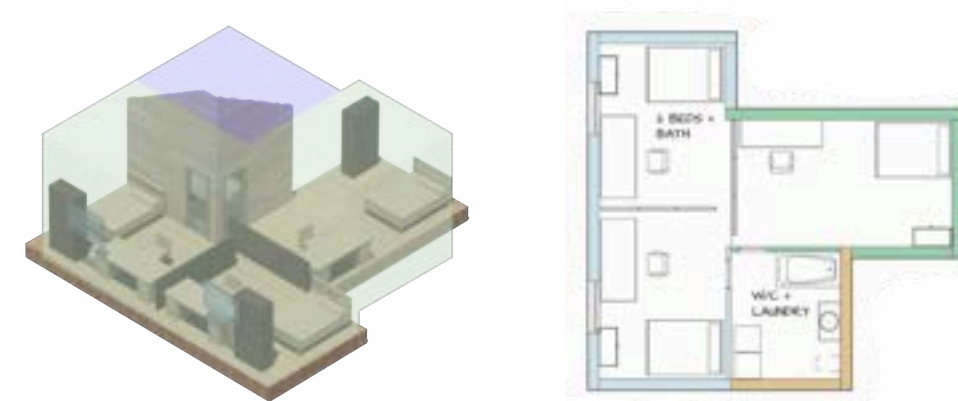
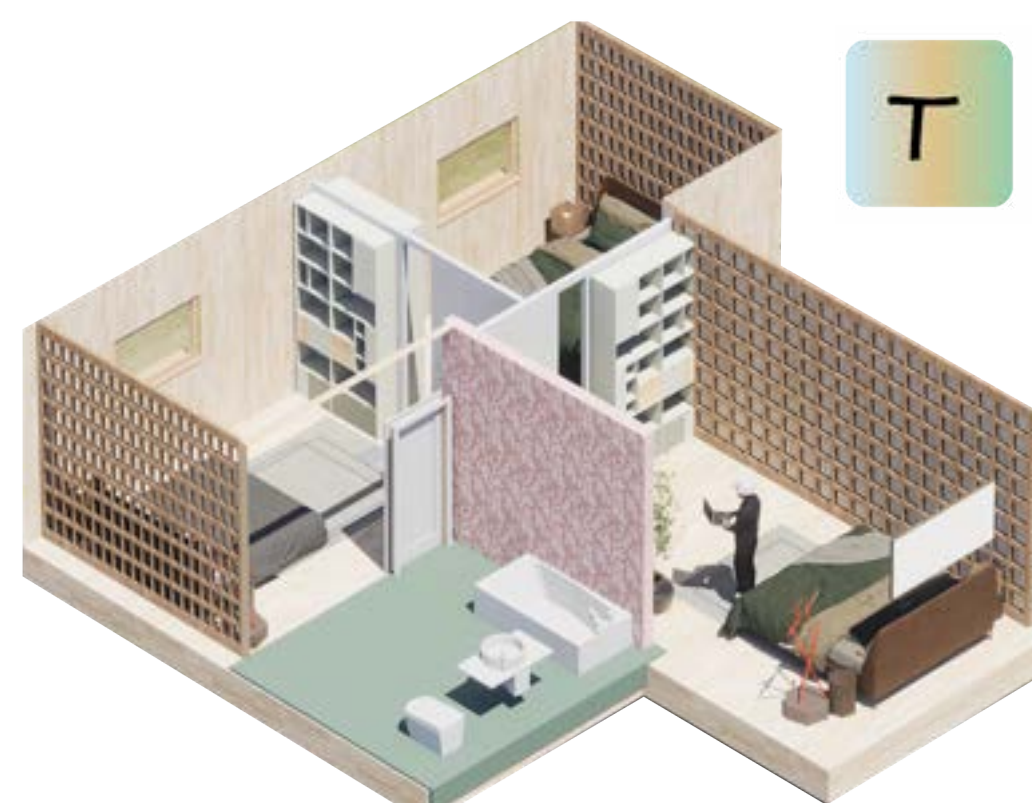
Facade type:



2 BEDS + W/C + LAUNDRY



3 BEDS + W/C + LAUNDRY



UNITS

STUDIO + W/C + LAUNDRY



INTERIOR ELEMENTS

- Open studio layout with sleeping, living, and workspace combined
- Compact kitchenette and integrated laundry for daily convenience
- Warm wood finishes and CNC panels for texture and identity
- Soft neutral palette with daylight to keep the space calm and comfortable

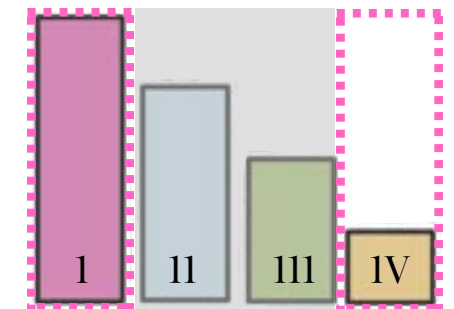


Size:

3.66 m (w) x 3.05 m (l) x 3.45 m (h)

3.66 m (w) x 12.21 m (l) x 3.45 m (h)

Module: I + IV

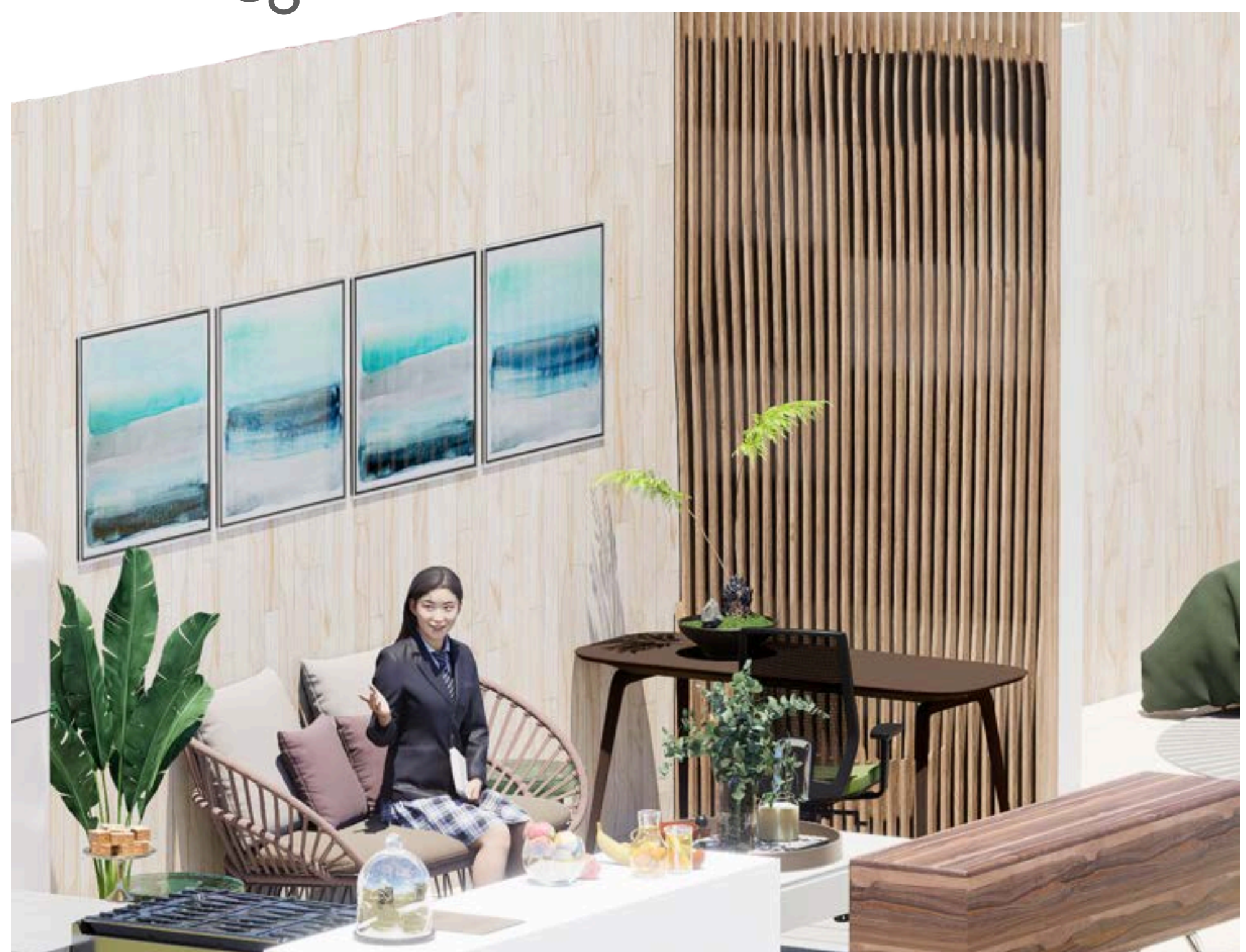
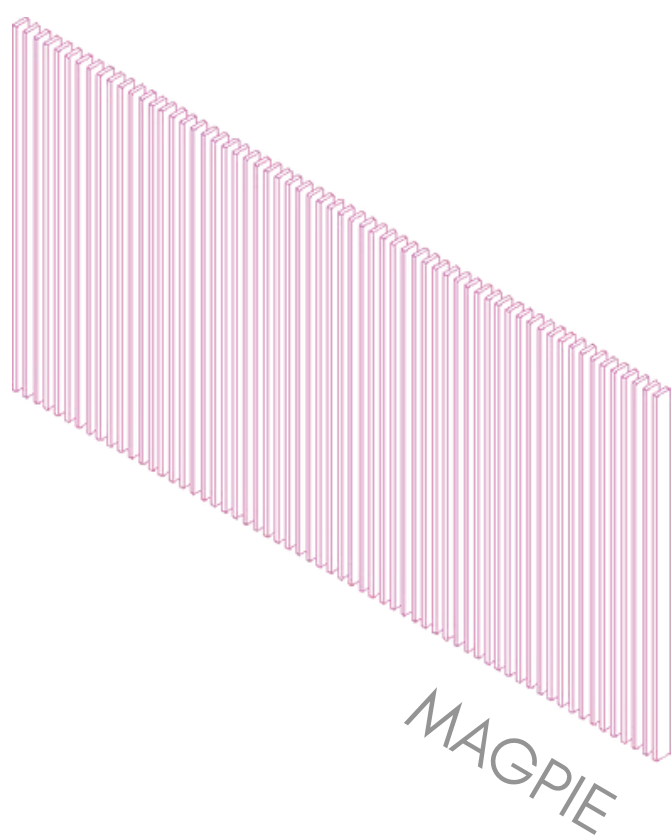


Modular, but not monotonous.

Users:

- All user types
- Private zone

Facade type:



UNITS

4 BEDS + KITCHEN + DINING + BATH



INTERIOR ELEMENTS

- Four private bedrooms with shared living and dining space
- Compact kitchen with durable, easy to clean finishes
- Wood slat and CNC panels for warmth and identity
- Tall windows and a soft neutral palette for a calm atmosphere

Size:

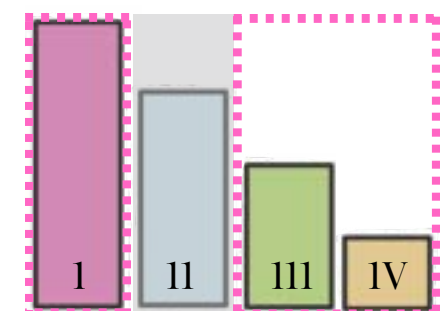
3.66 m (w) x 12.21 m (l) x 3.45 m (h)

3.66 m (w) x 3.05 m (l) x 3.45 m (h)

3.66 m (w) x 6.10 m (l) x 3.45 m (h)



Module: I + III + IV

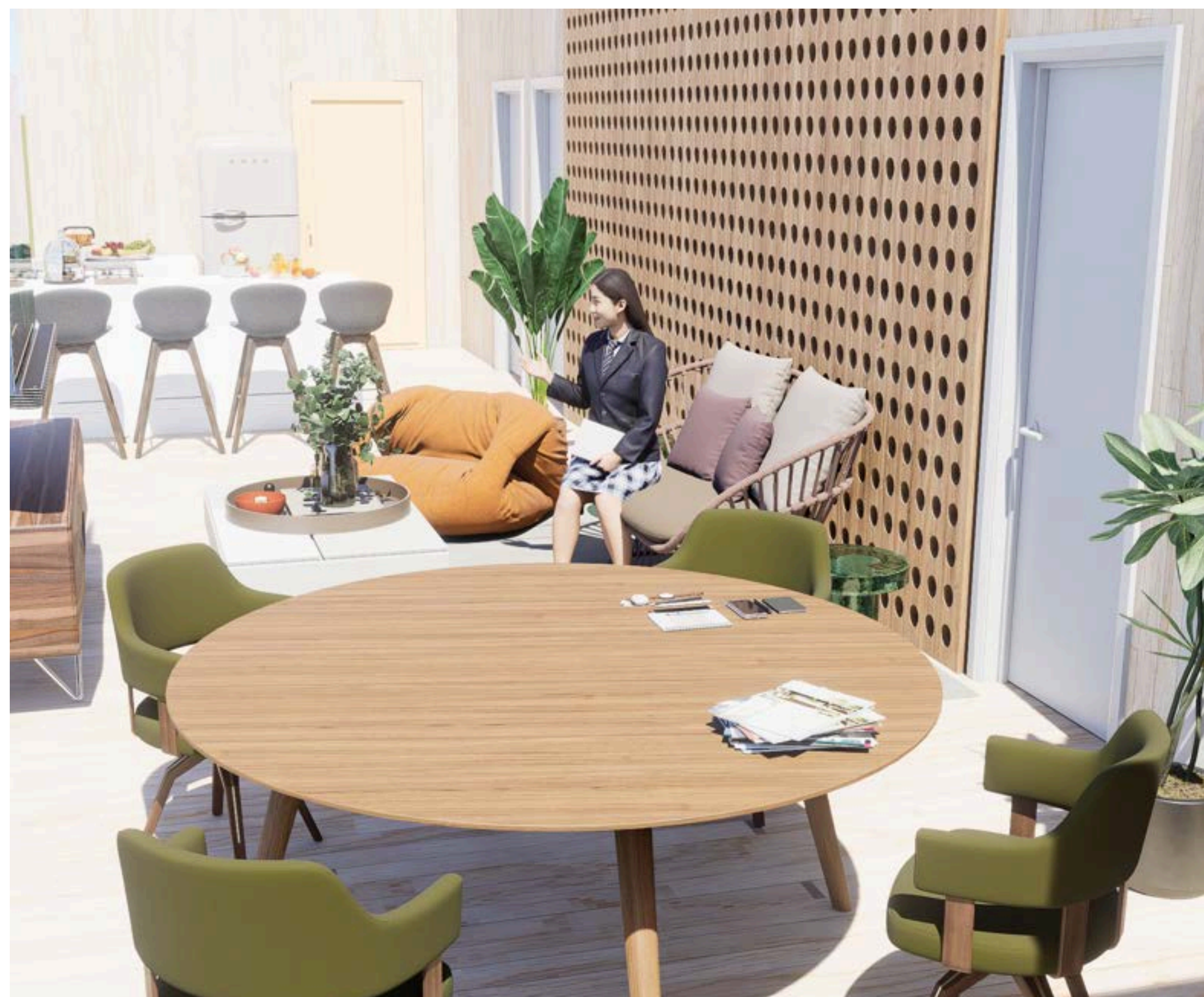
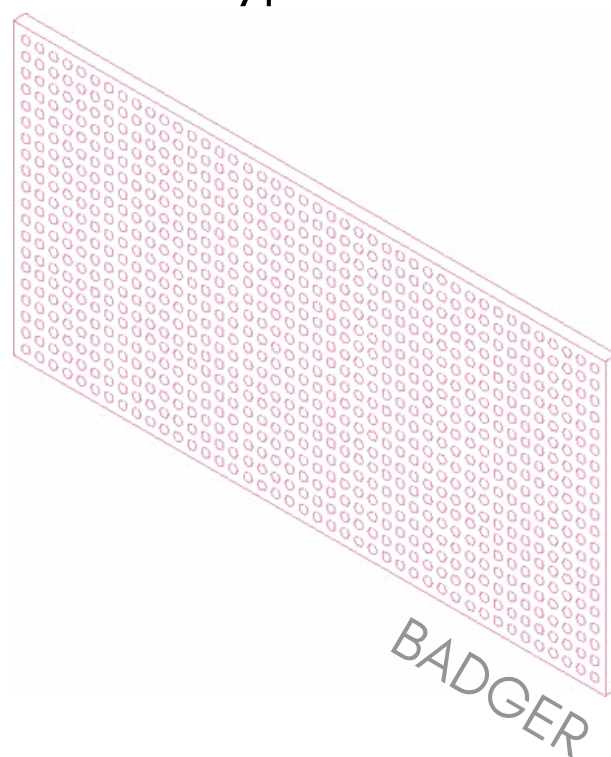


A place to unwind that actually feels like yours

Users:

- All user types
- Public zone

Facade type:



Small moments of home, even far from home.

MODULES





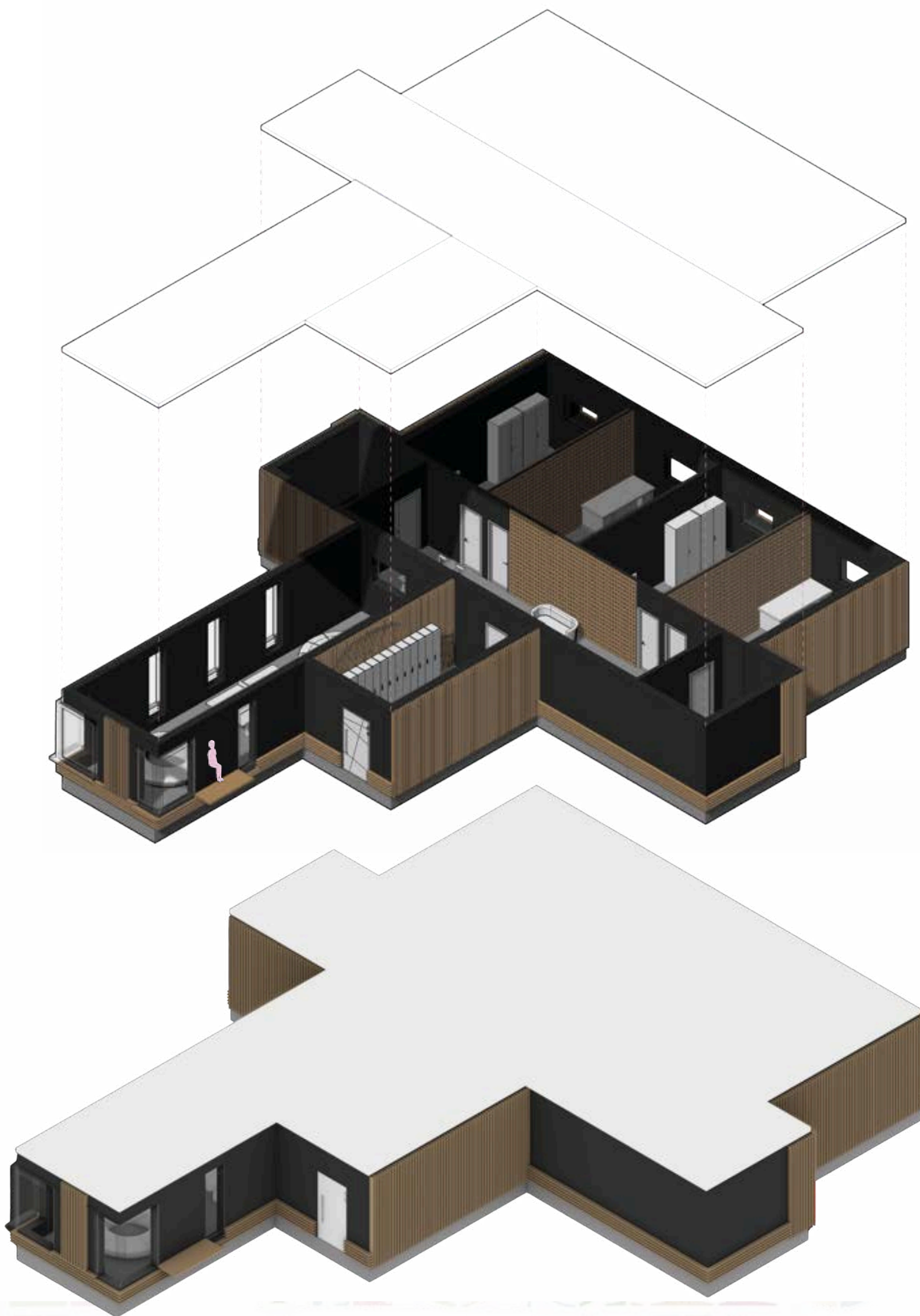
VOLUMETRIC PREFAB REMOTE HOUSING

CHAPTER FIVE



CONFIGURATION ONE

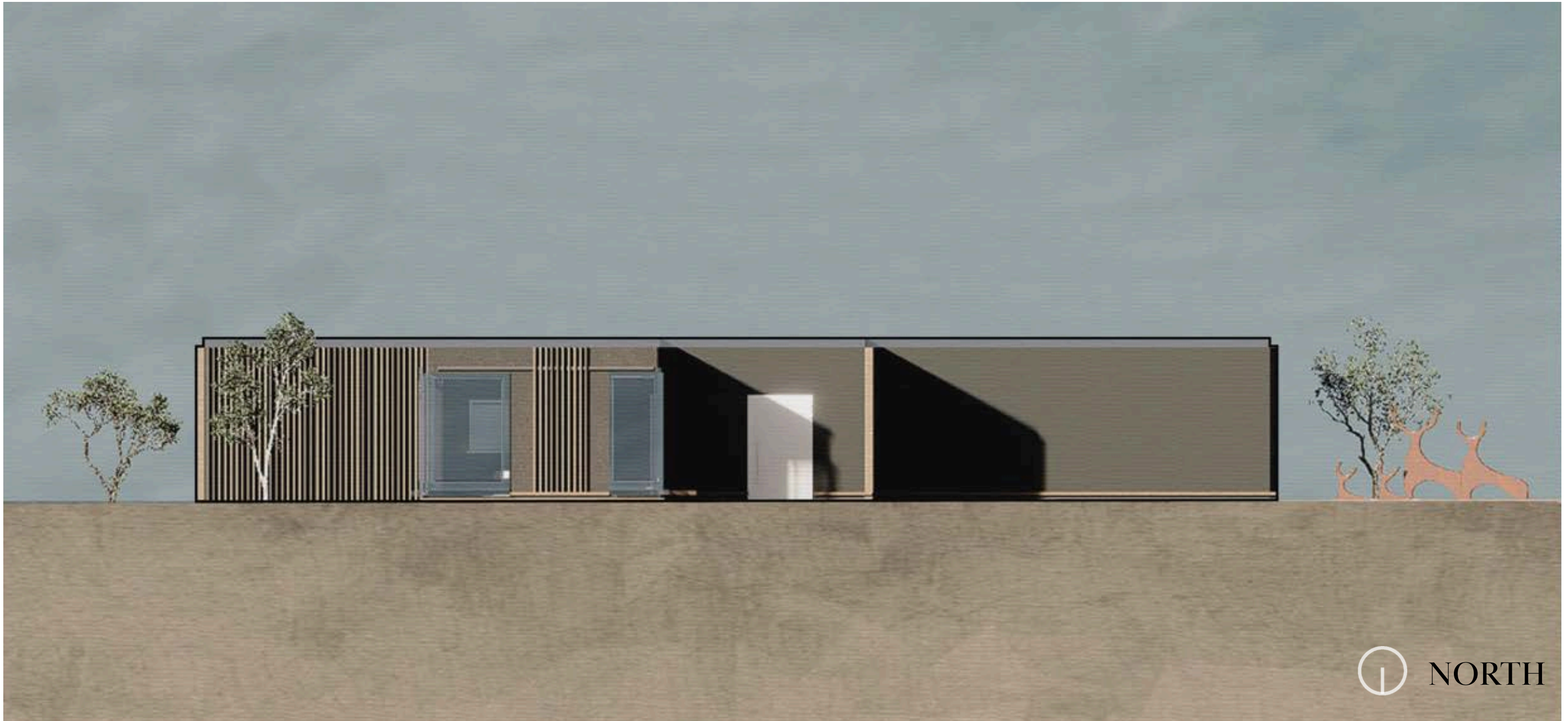
ONE STORY BUILDING



Configuration One illustrates how a single story building is formed by combining the modules into a clear, efficient layout. The plan organizes private rooms, shared spaces, and circulation into one continuous level, creating an accessible and easy to navigate environment. The exploded view highlights how the roof and envelope assemble over the modular interior, showing the clarity and buildability of the system.

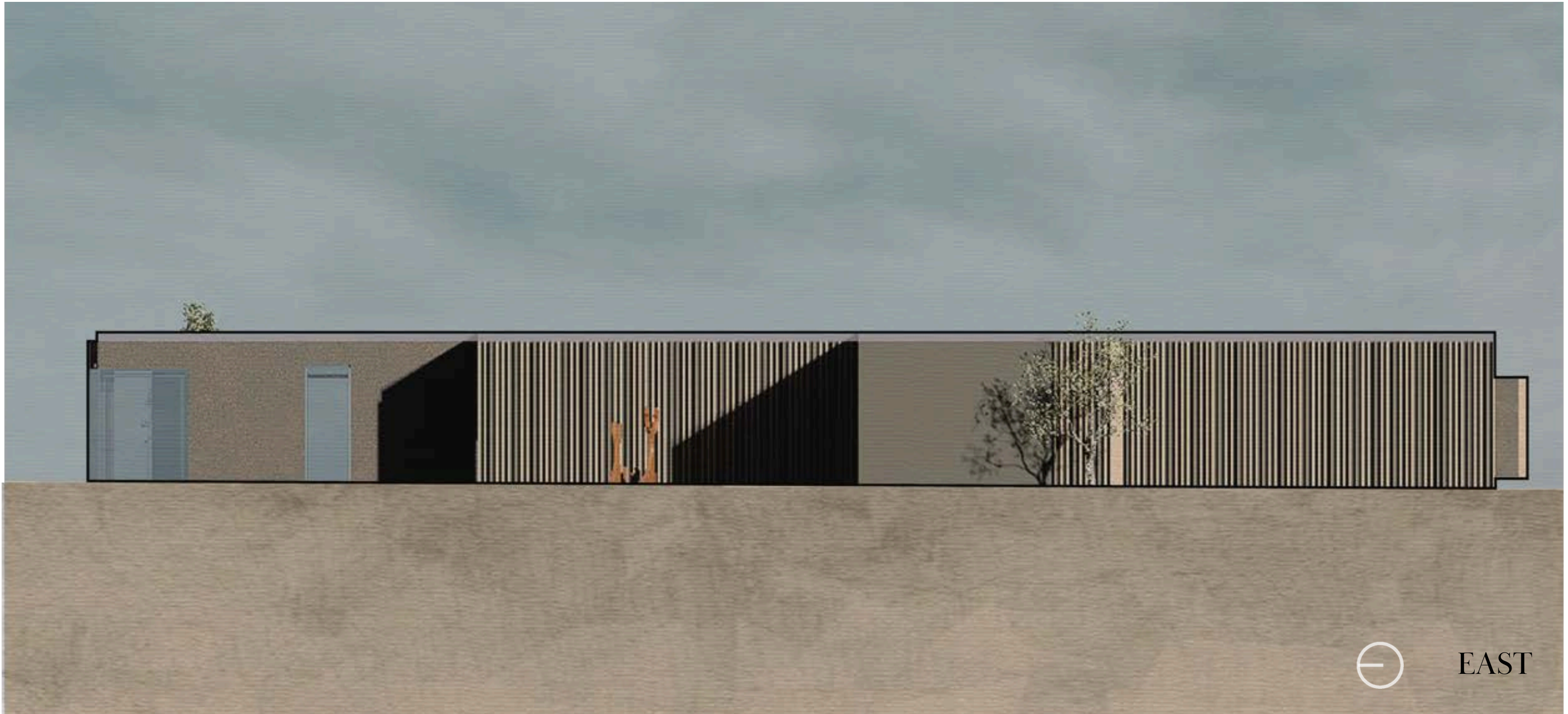
CONFIGURATION ONE

ONE STORY BUILDING



CONFIGURATION ONE

ONE STORY BUILDING



VOLUMETRIC PREFAB REMOTE HOUSING

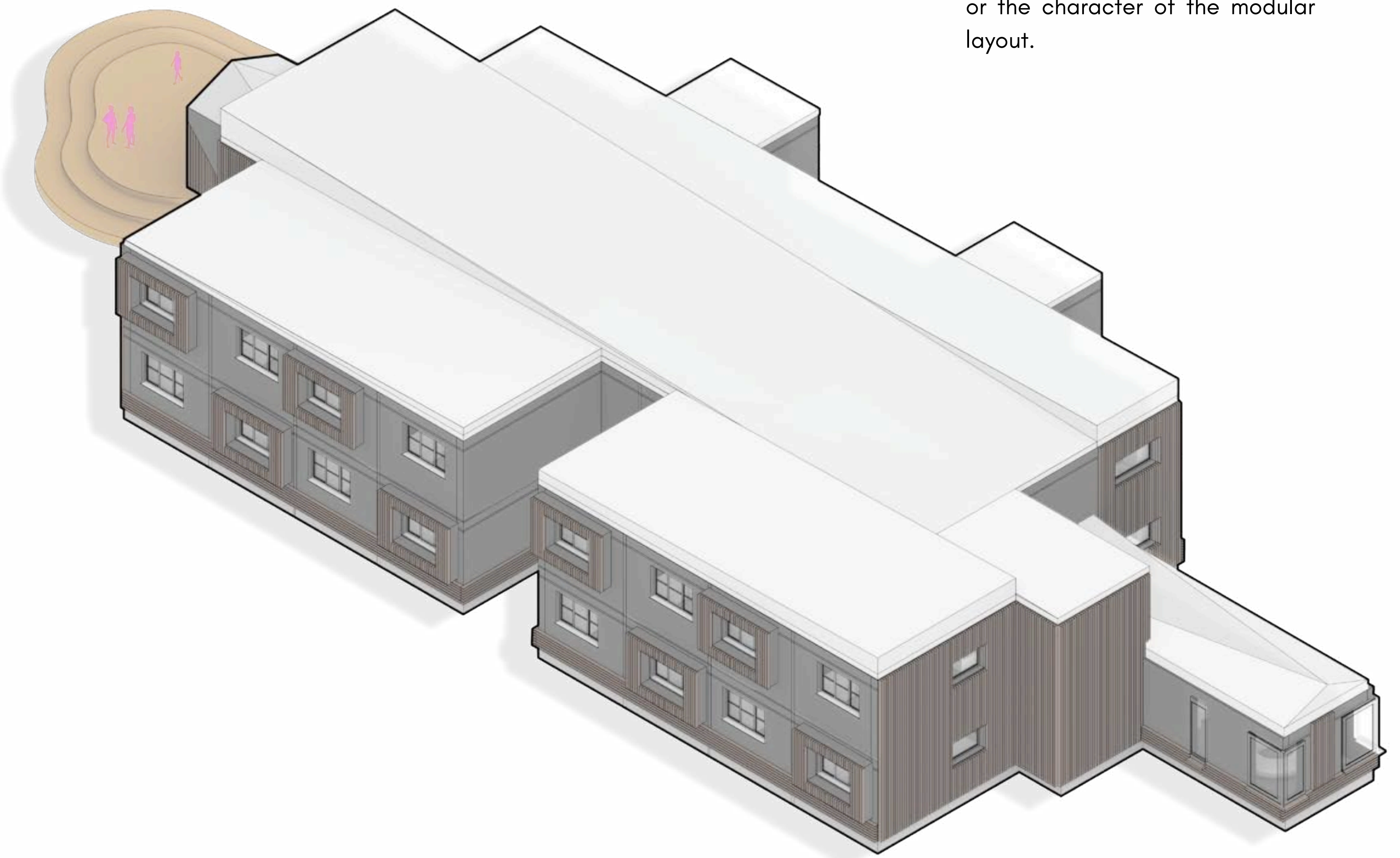
CHAPTER SIX



CONFIGURATION TWO

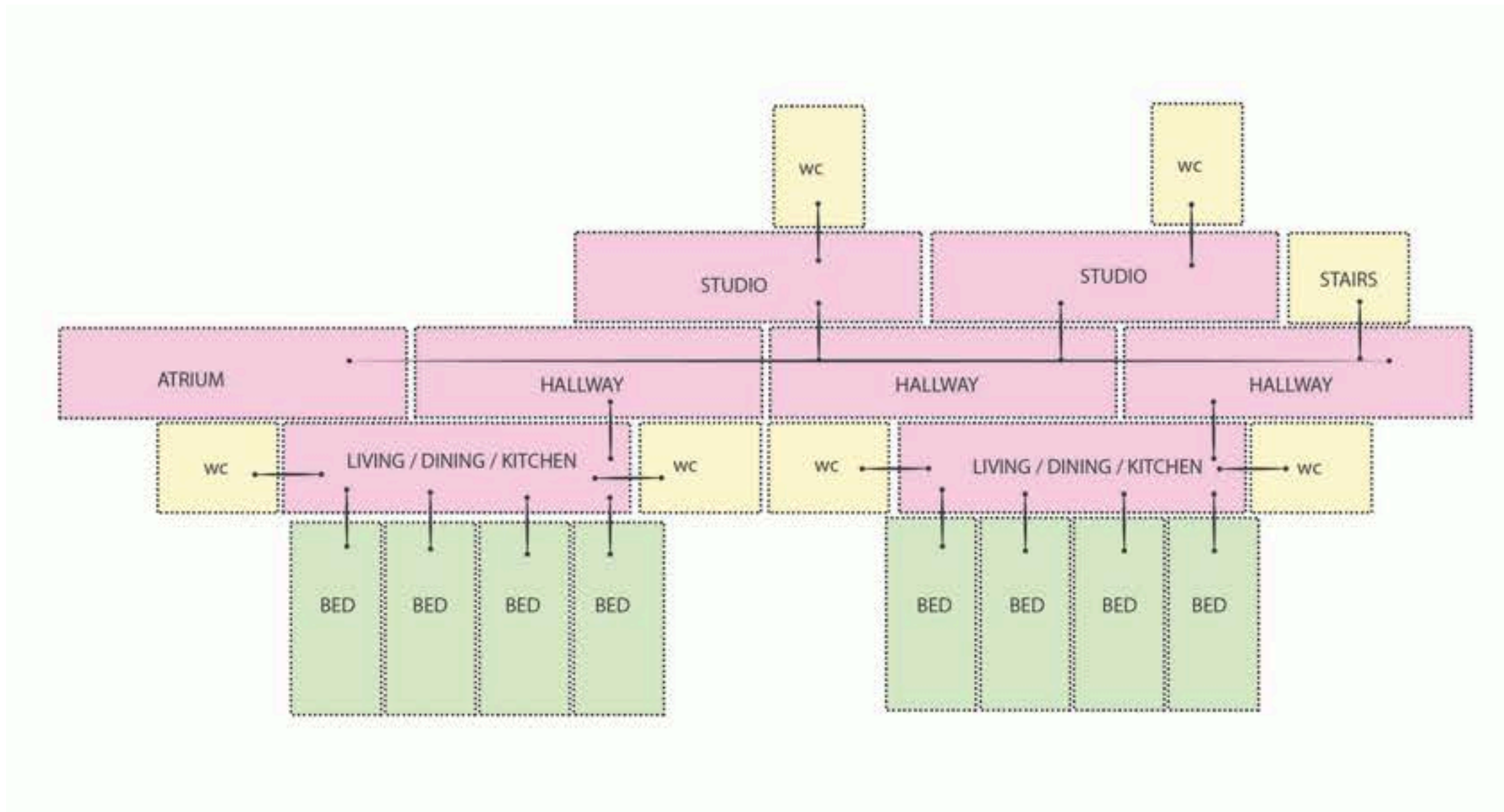
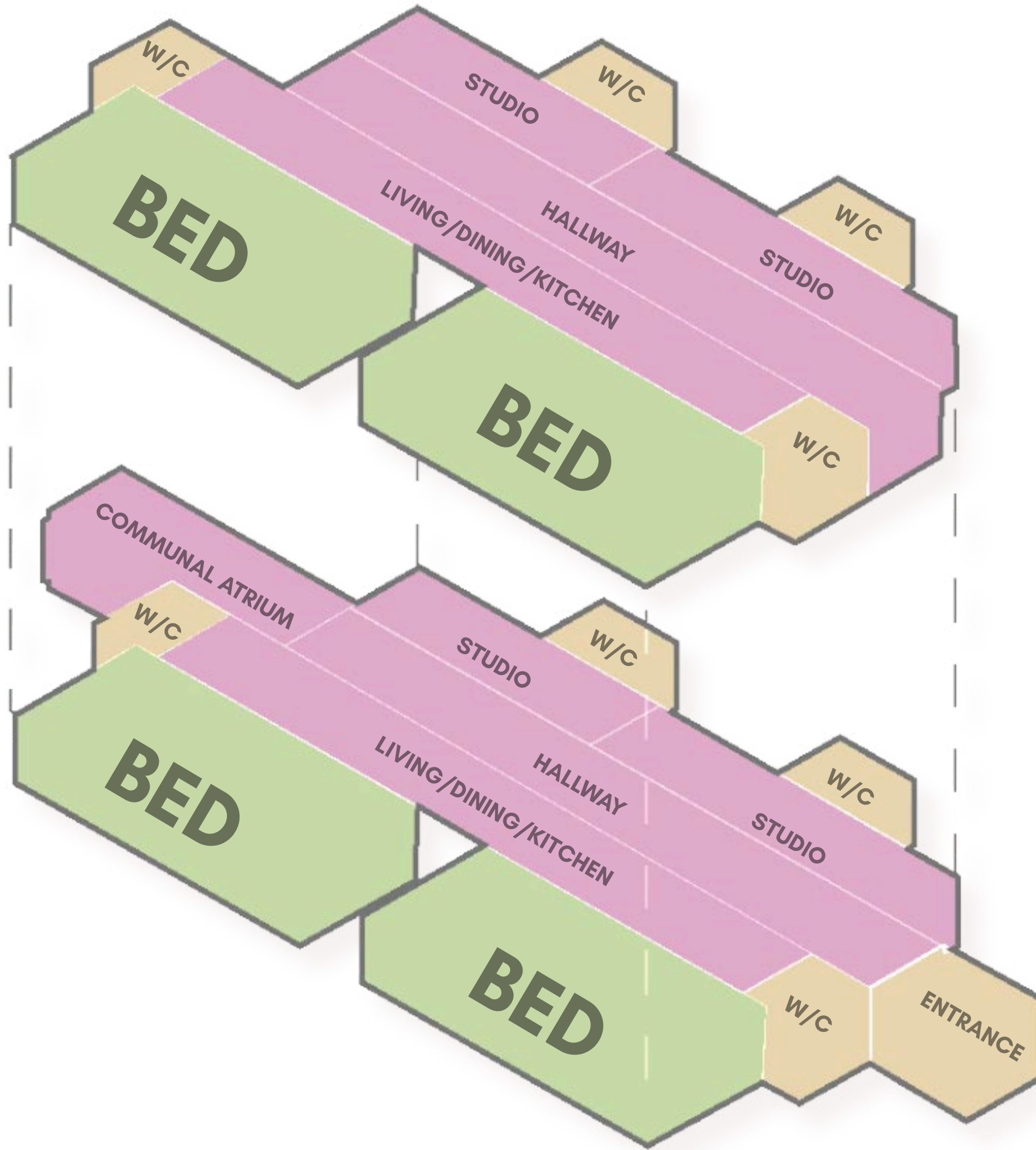
TWO STORY BUILDING

Configuration Two shows the system expanded into a two-story building, stacking modules to increase capacity while keeping the circulation logical and compact. Vertical connections and shared spaces are integrated seamlessly, allowing the design to grow without losing clarity, efficiency, or the character of the modular layout.



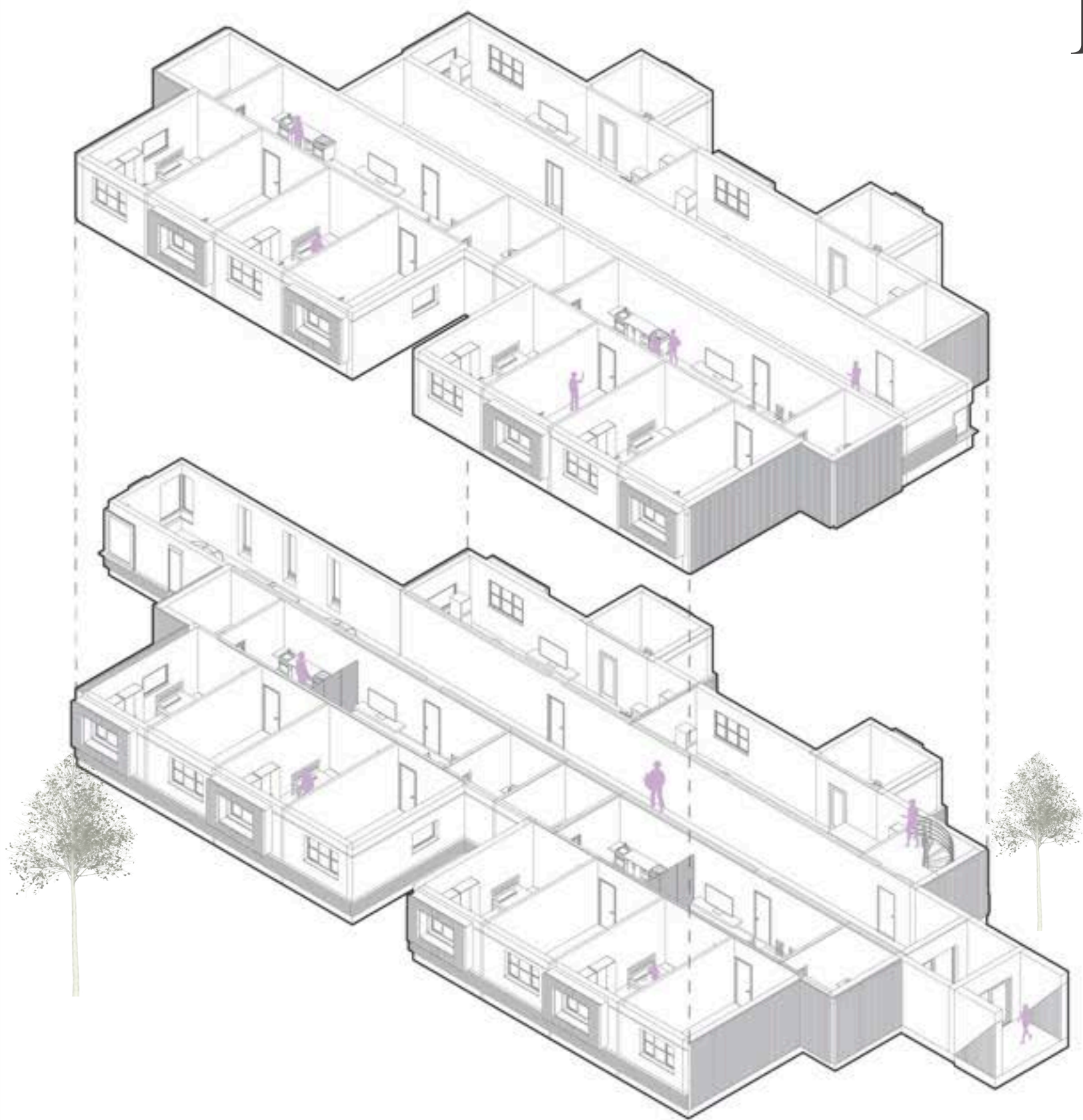
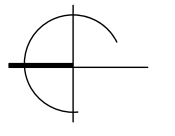
PROGRAM

APARTMENT STYLE



PLAN LOGIC

APARTMENT STYLE



2ND FLOOR

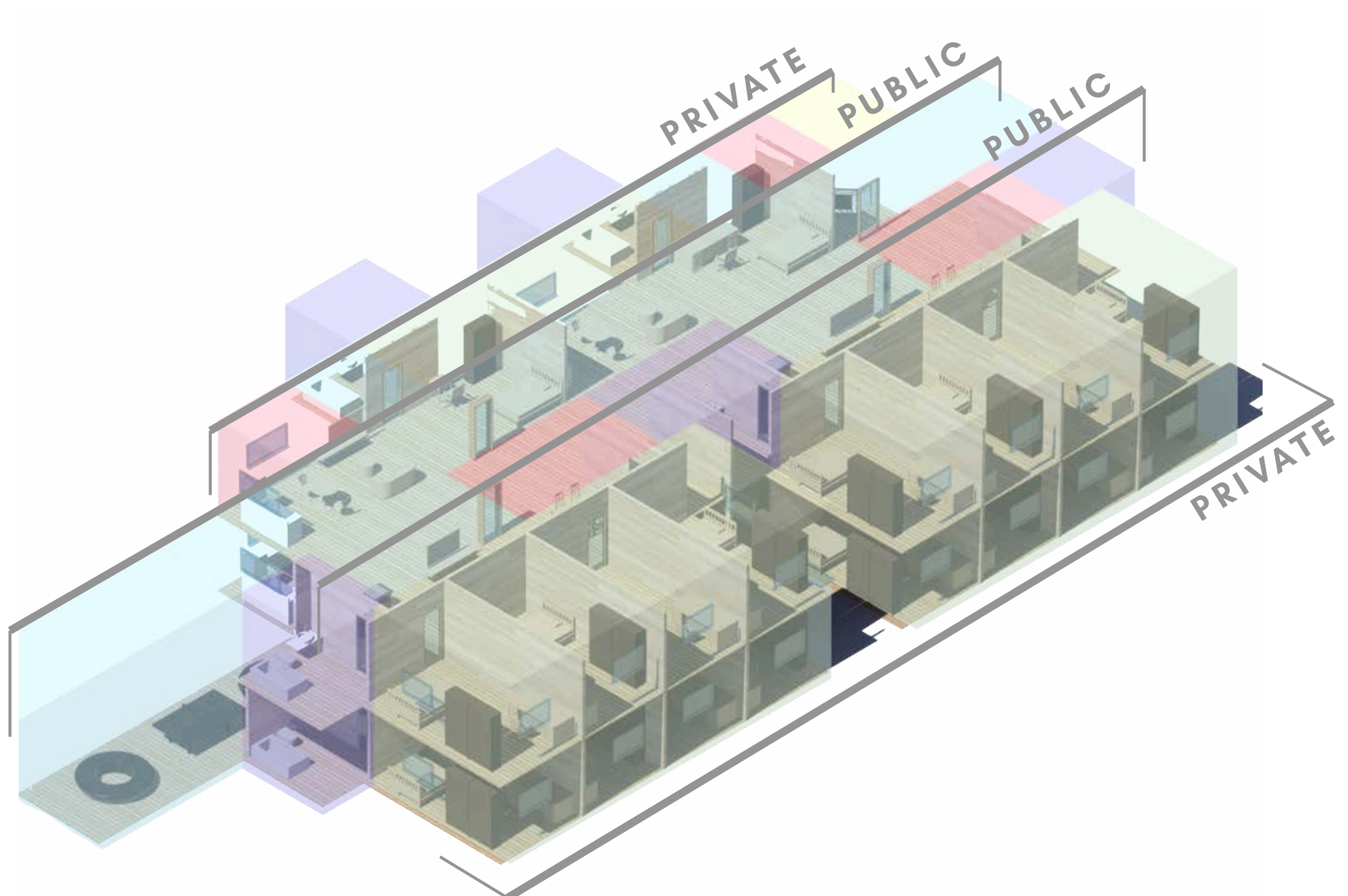


1ST FLOOR

FLOOR PLANS



PUBLIC / PRIVATE LAYOUT



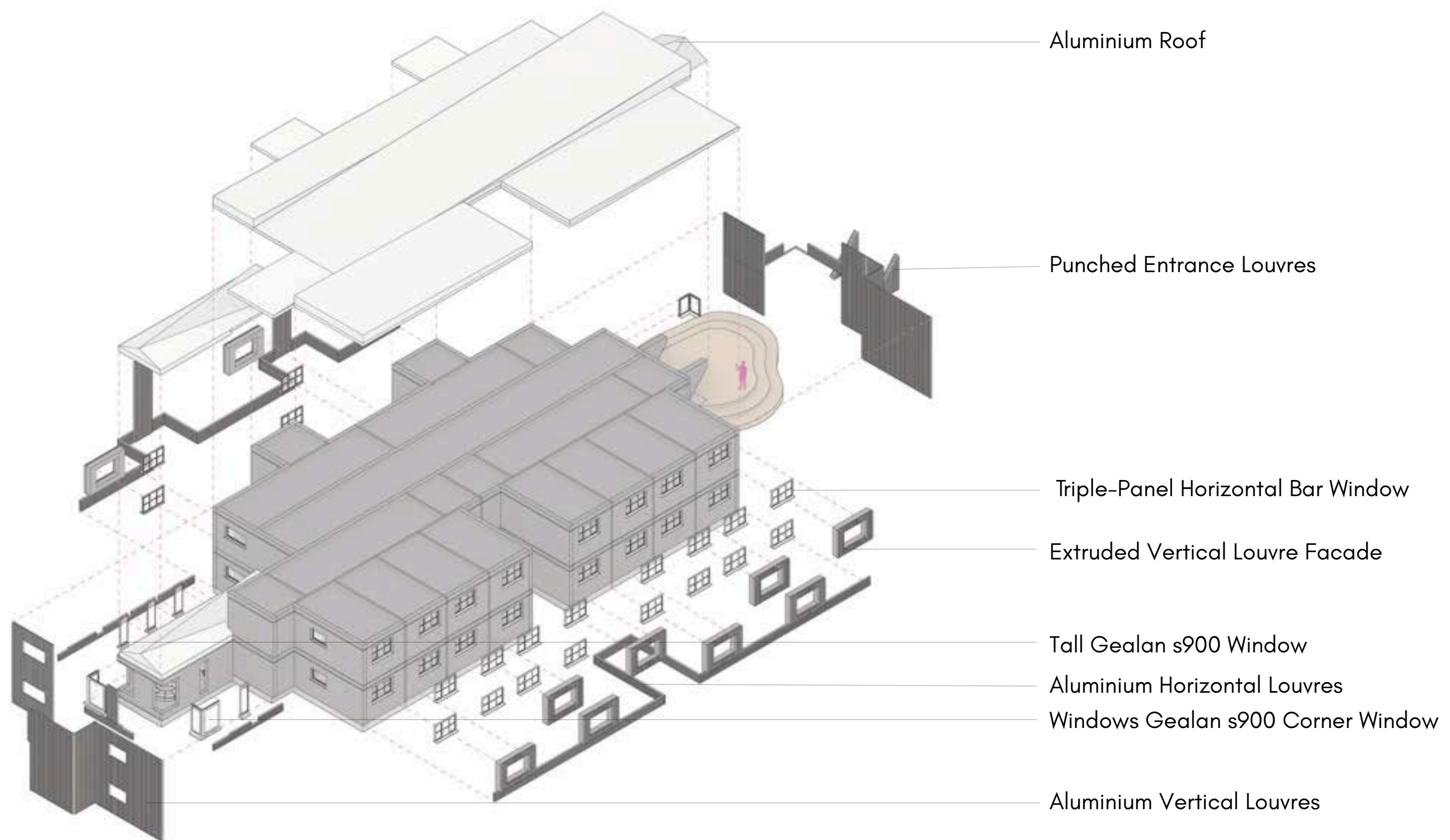
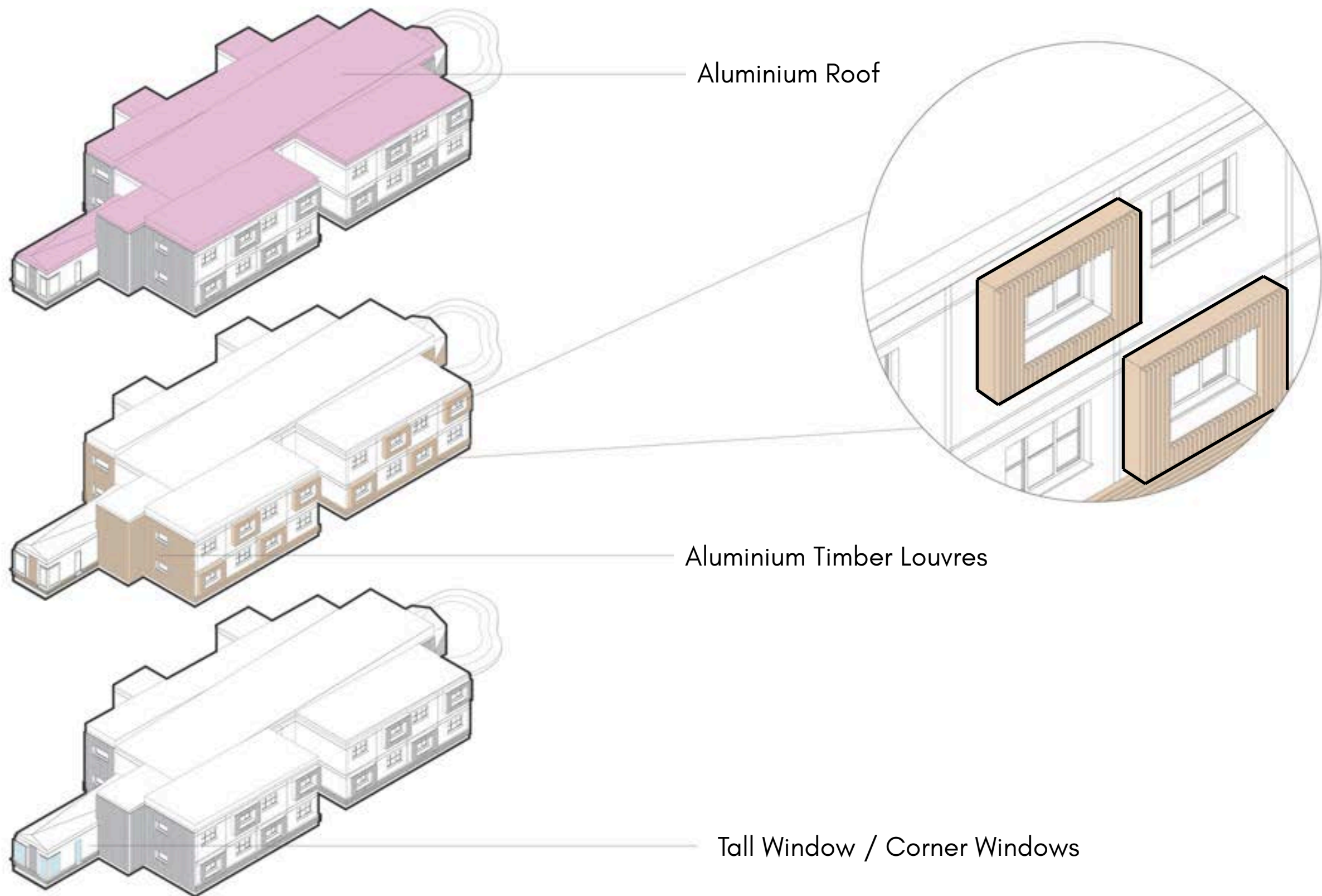
Public spaces are organized through the center for easy circulation and community interaction, while private rooms shift to the perimeter to maintain quiet and comfort. The stacked modular layout keeps movement intuitive and preserves clear boundaries between shared and personal zones.

Legend:

BATH
BED
KITCHEN
REC
STAIRS



EXTERIOR SYSTEM OVERVIEW



SECTION A



SECTION B



ELEVATIONS



ELEVATIONS



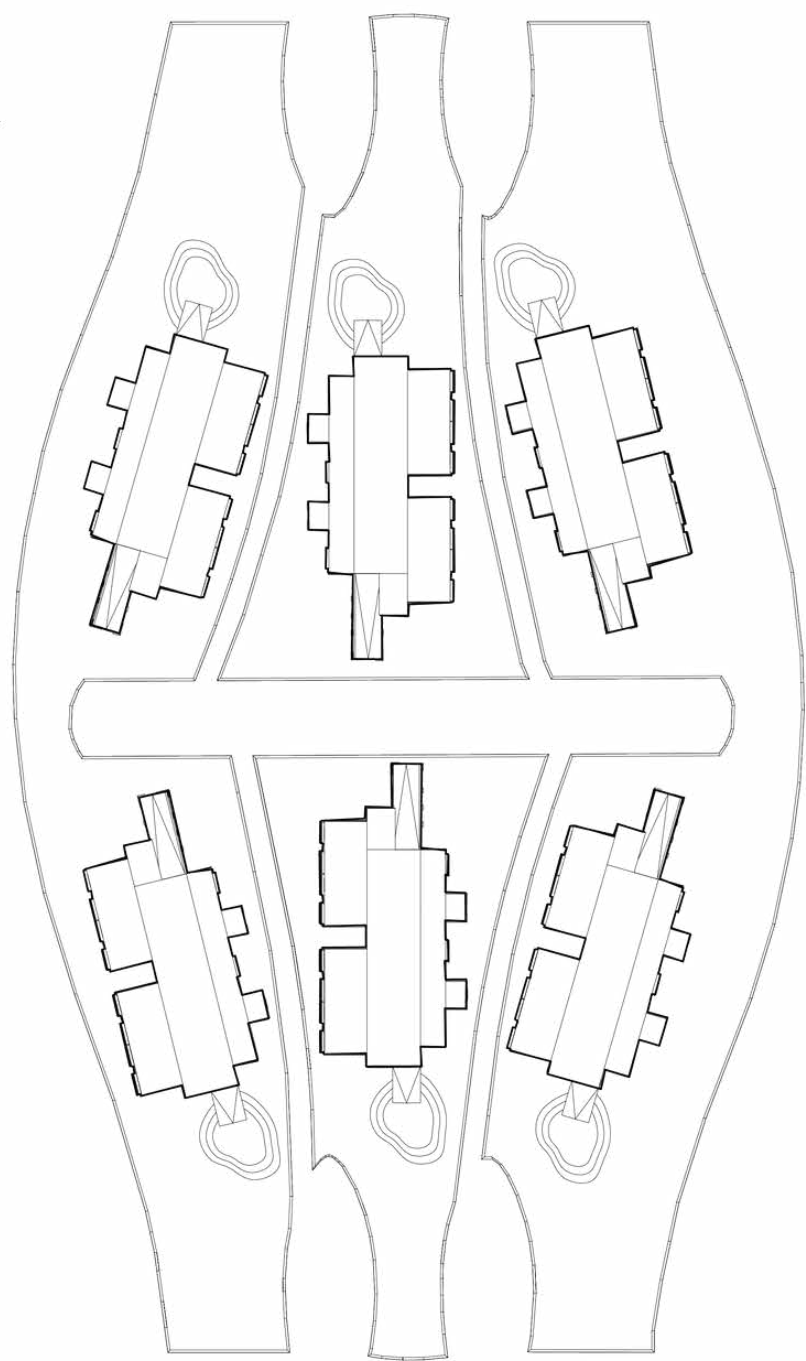
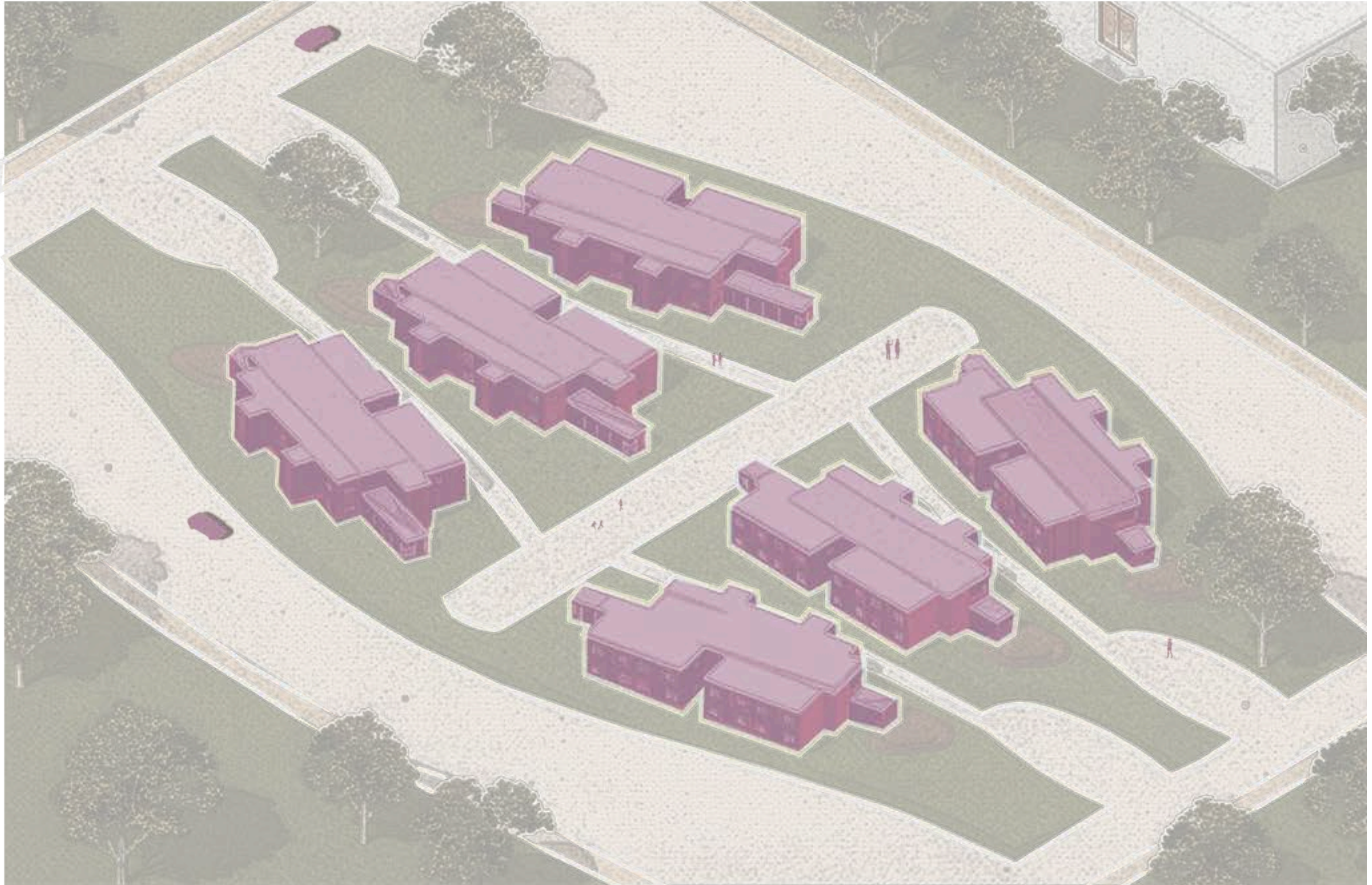


VOLUMETRIC PREFAB REMOTE HOUSING

CHAPTER SEVEN

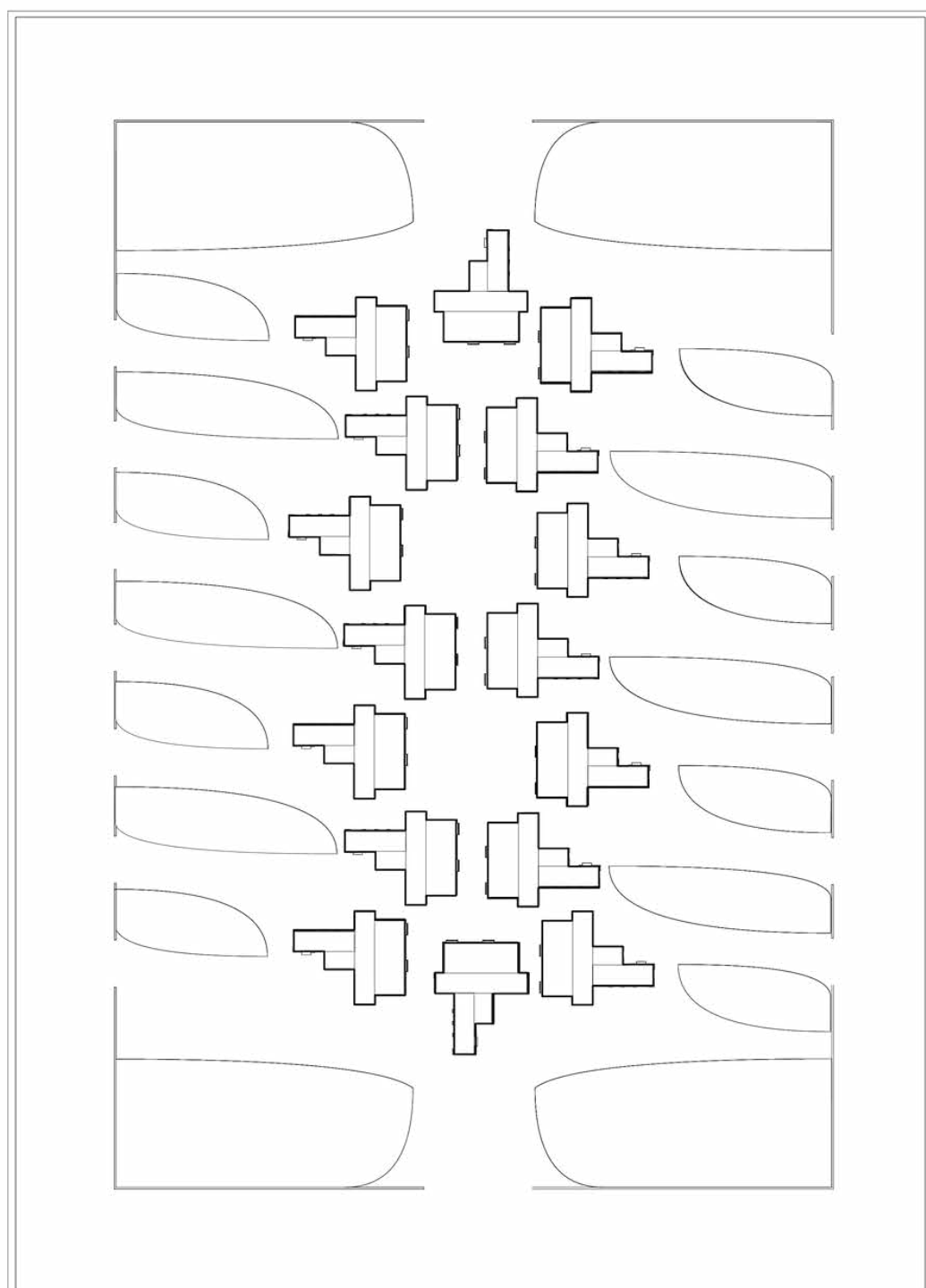
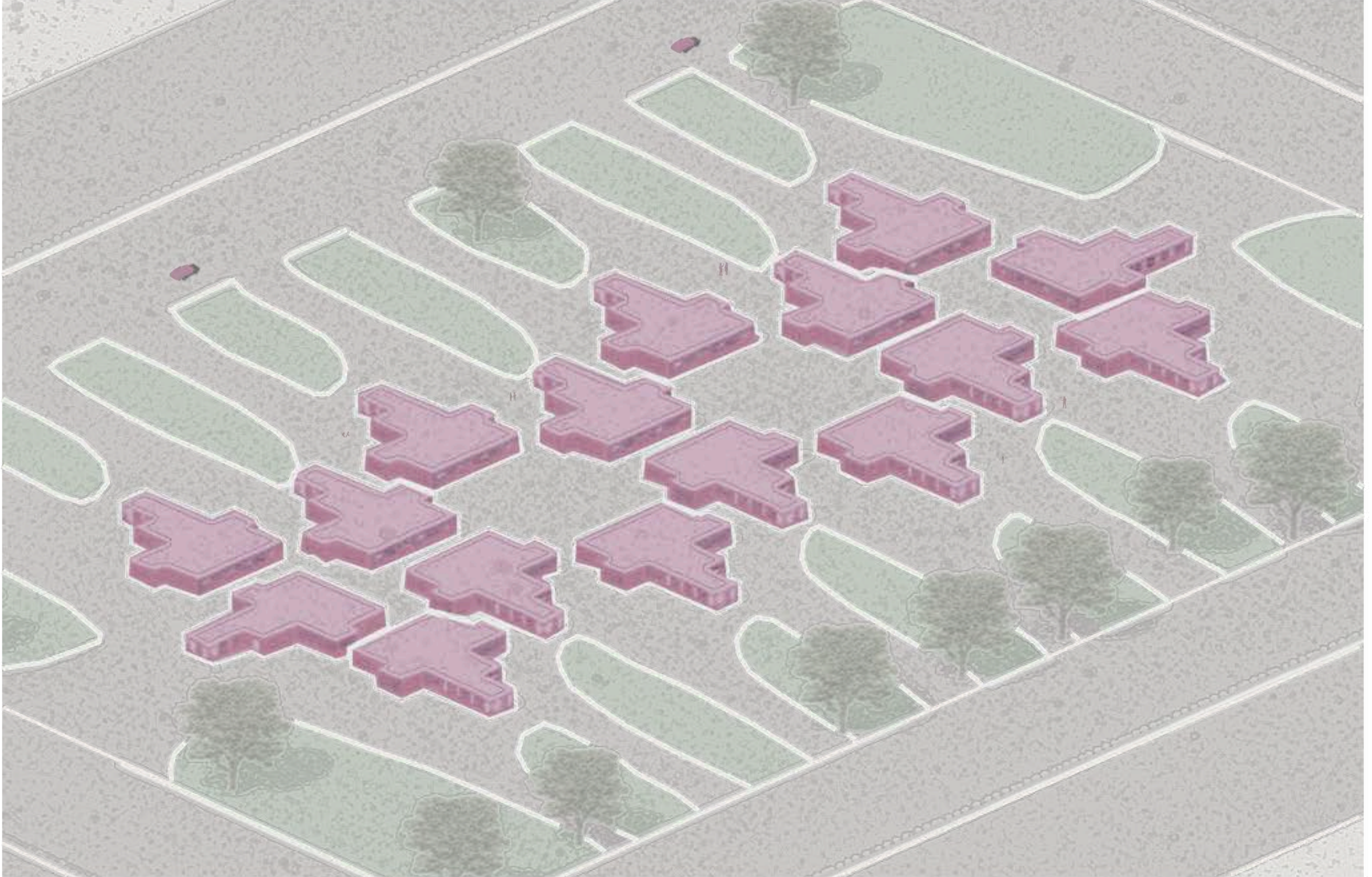
LAYOUTS

COURTYARD



This courtyard layout organizes the modular units around shared green spaces, creating small community rooms in the landscape. The arrangement encourages casual interaction, outdoor gathering, and a stronger sense of belonging for residents who spend long periods of time on site. Curved paths guide movement through the community and soften the overall layout, while generous setbacks between buildings provide privacy, daylight, and comfortable outdoor zones. This configuration works well for camps that want a more social and connected environment without losing individual space.

LINEAR / CLUSTERED



This layout combines a simple linear street framework with clustered groups of modules, creating small neighborhood pockets within the larger camp. The linear structure provides clear and efficient circulation for vehicles and pedestrians, while the clusters introduce moments of community by bringing units together around shared outdoor spaces. This arrangement supports a balance between privacy and interaction, giving residents their own space while still allowing for casual social connection. The modular clusters can also expand or contract easily, making the layout adaptable to changing workforce numbers or shifting site conditions. Overall, this configuration provides order, clarity, and flexibility while still feeling human and community oriented.

VOLUMETRIC PREFAB REMOTE HOUSING

EXTERIOR RENDERS











WINTER





Naamveer Sond & Maryam Khalid

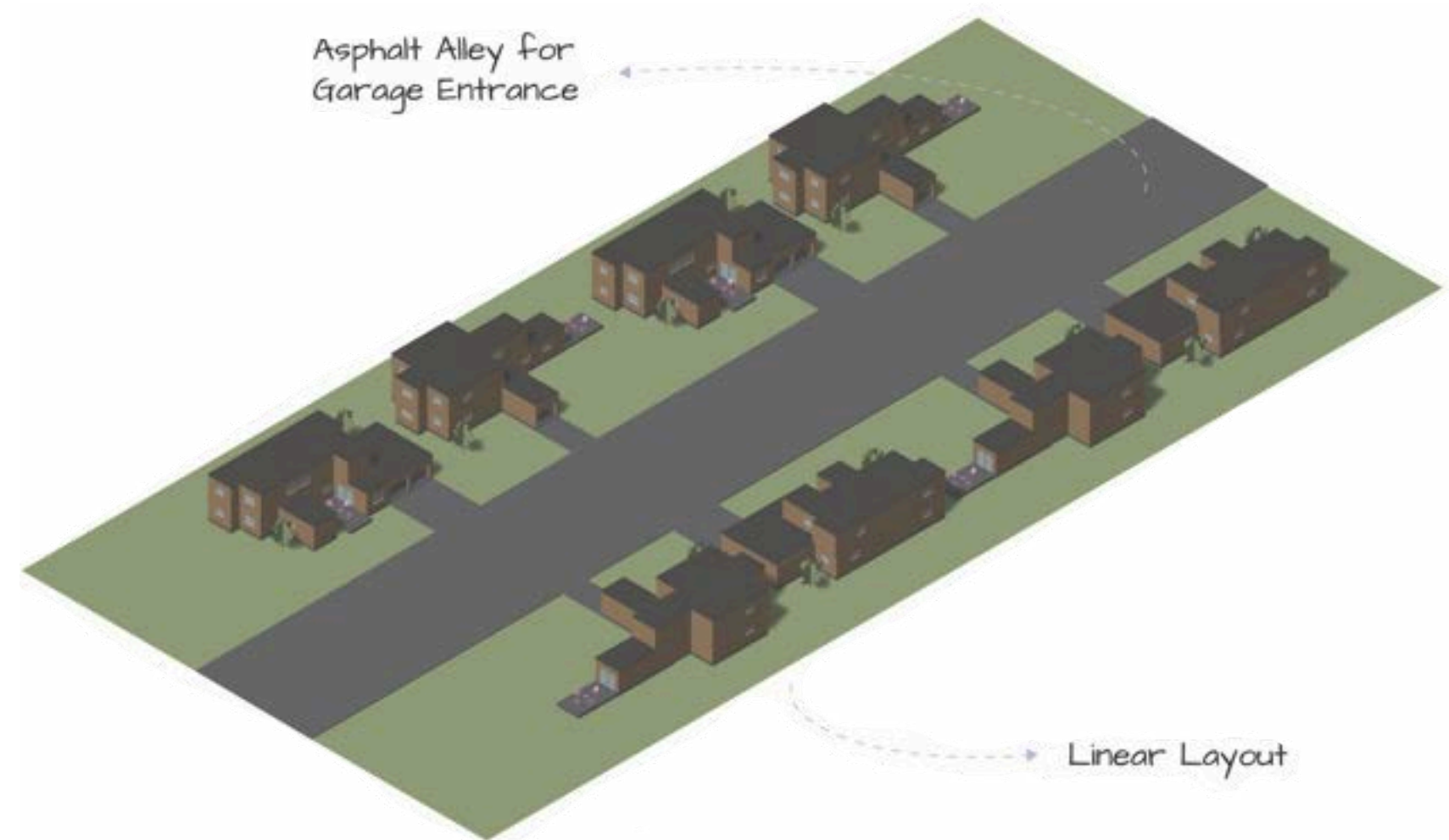
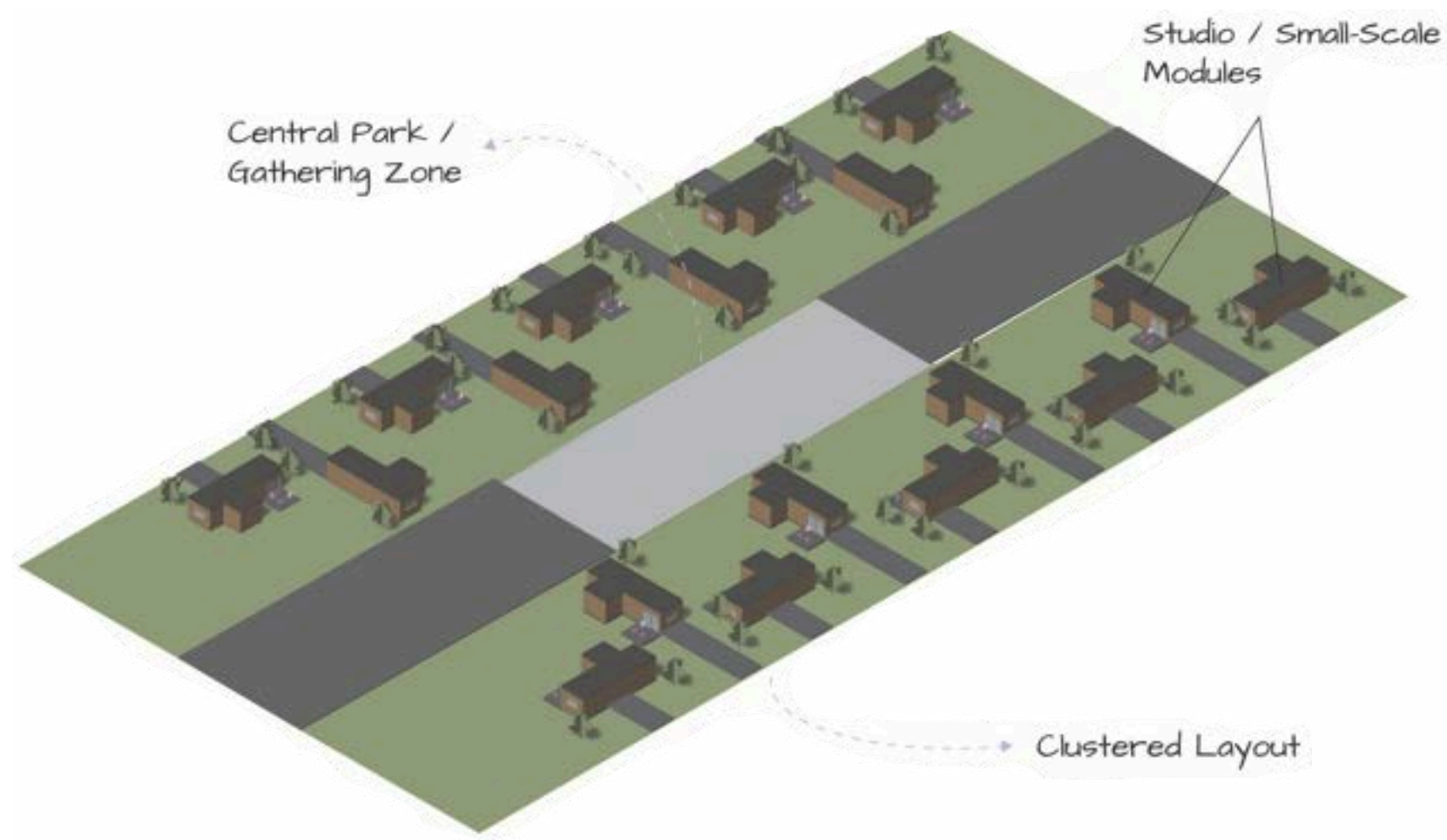




VOLUMETRIC PREFAB REMOTE HOUSING

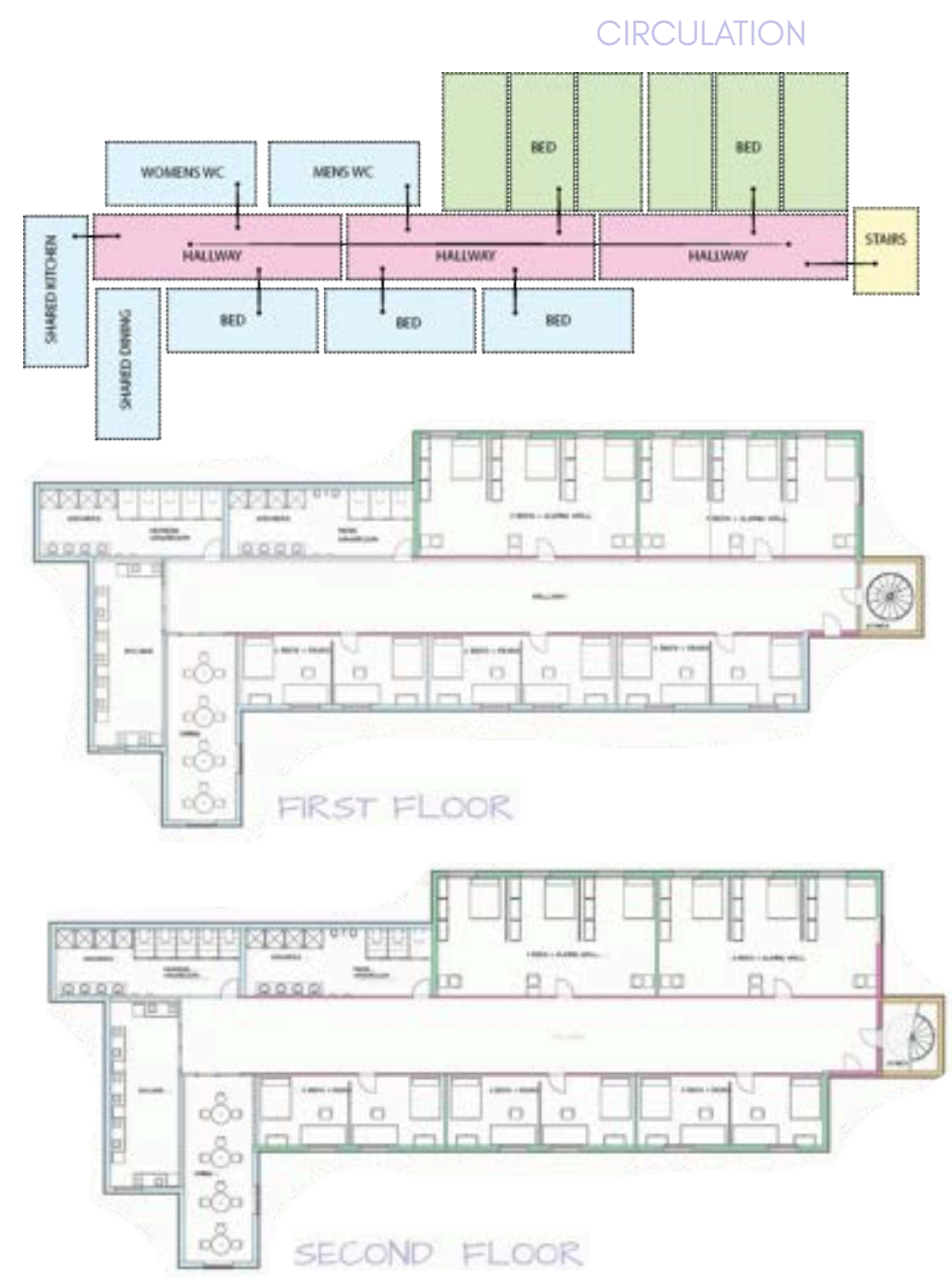
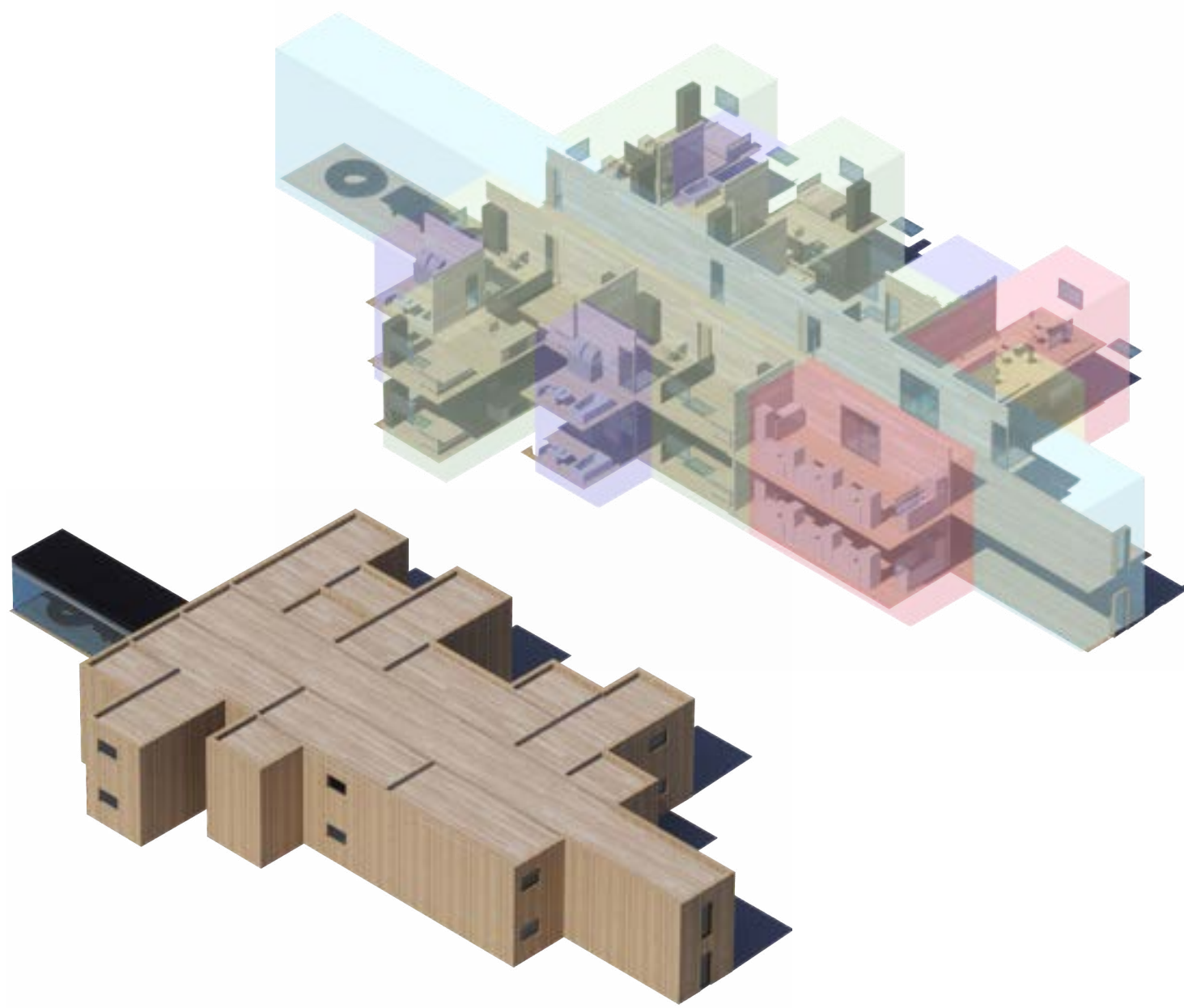
APPENDIX

Site Configurations



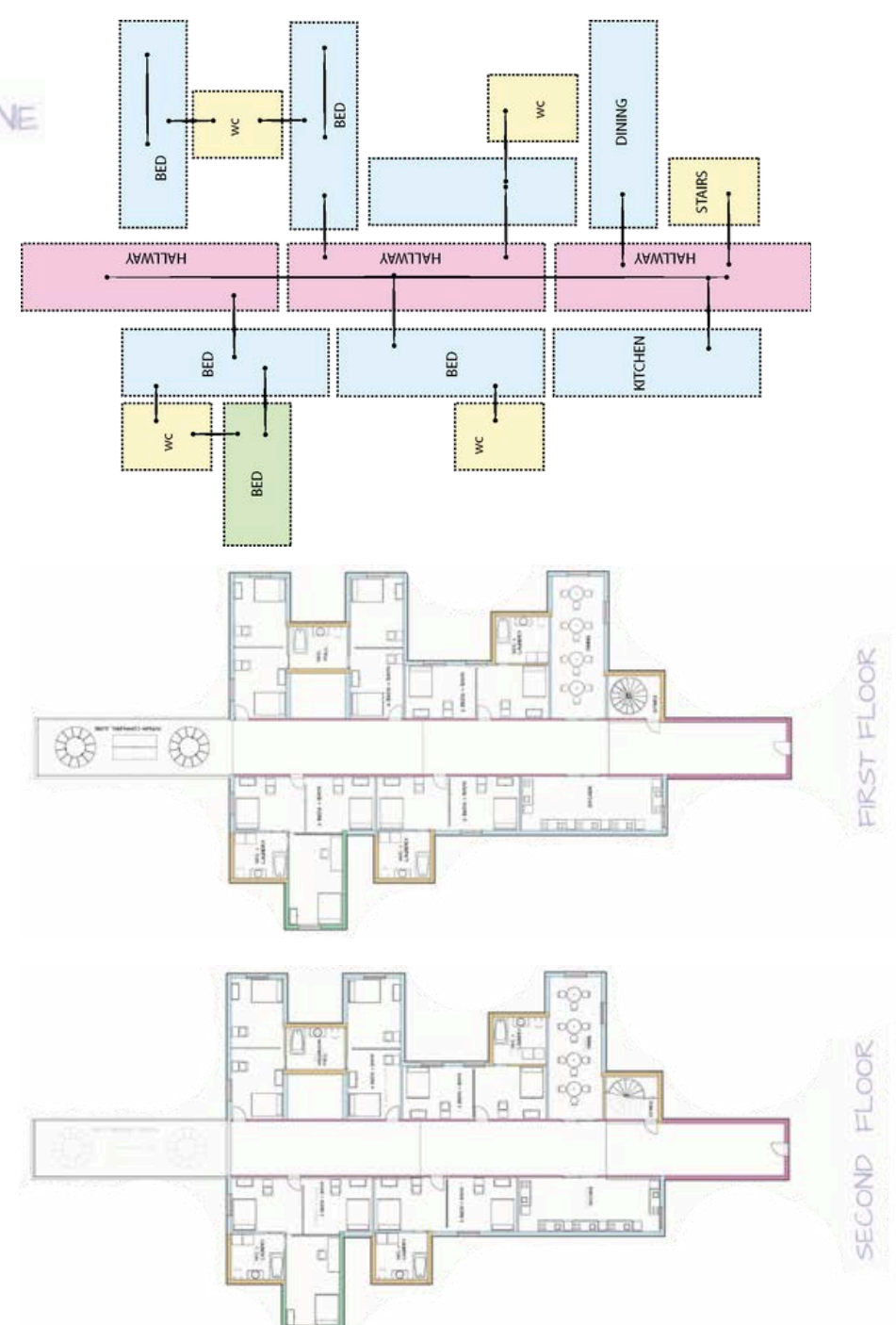
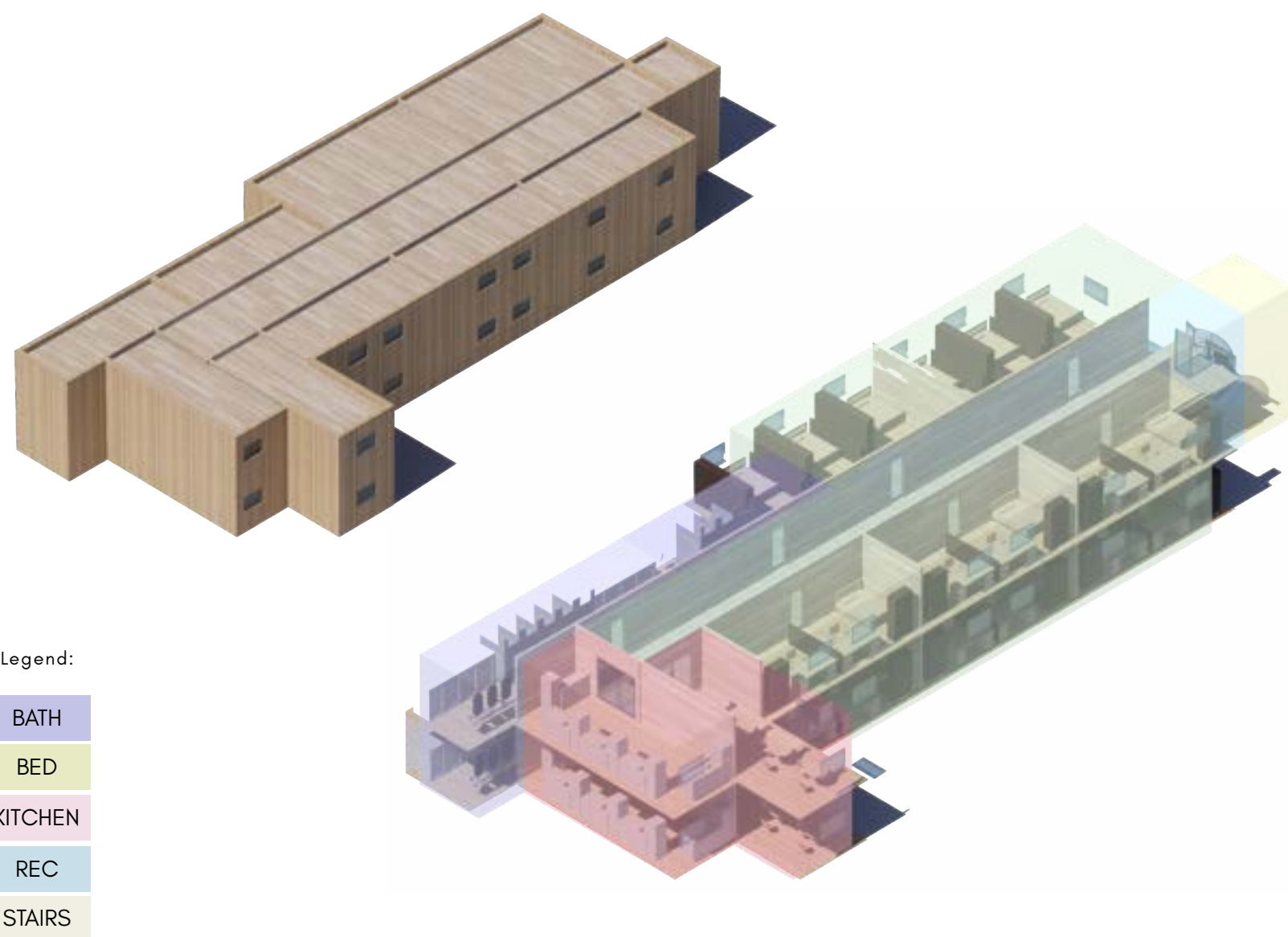
Configuration 2

DORM STYLE 3 BEDS, SHARED WASHROOM+SHARED KITCHEN+SHARED DINING



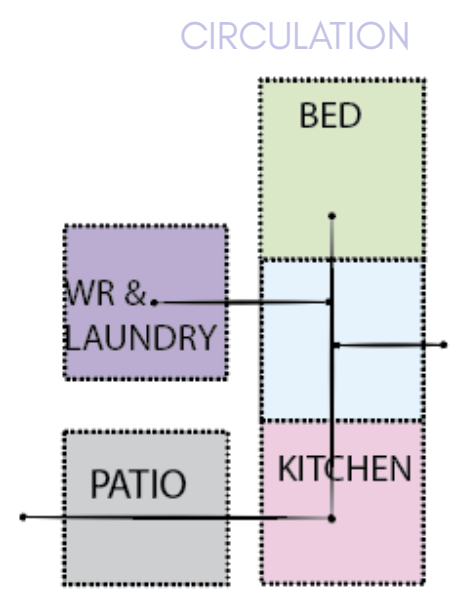
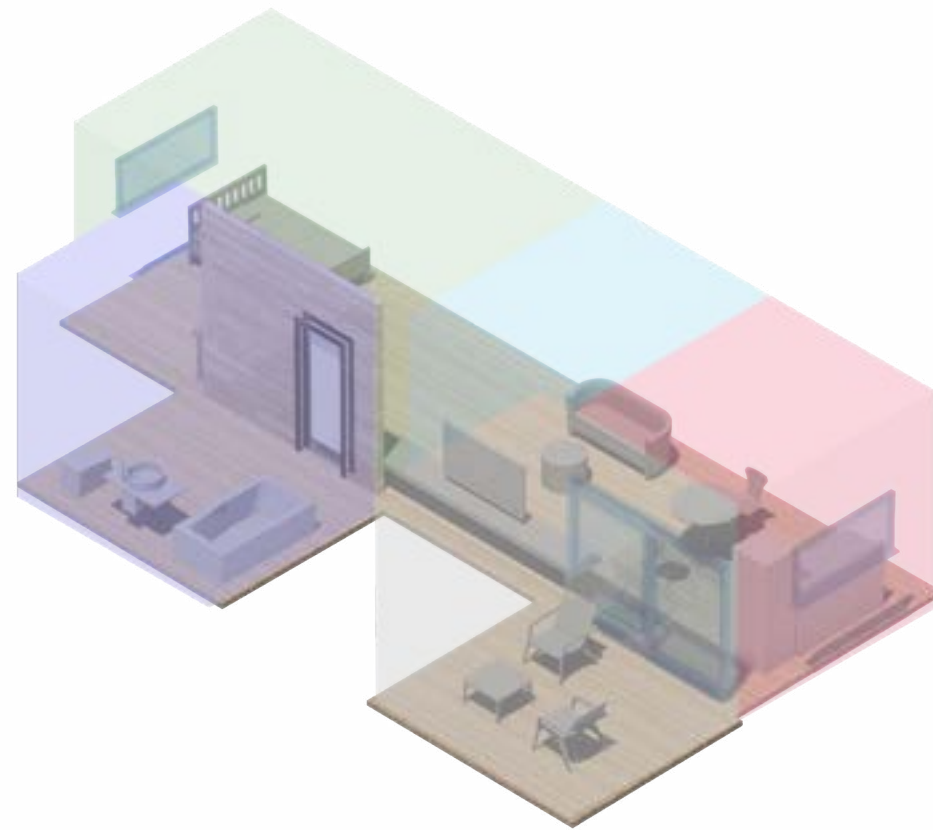
Configuration 3

DORM STYLE 4 BEDS WITH BATH+SHARED KITCHEN+SHARED DINING+ATRIUM COMMUNAL ZONE





Single or 2 people (studio)

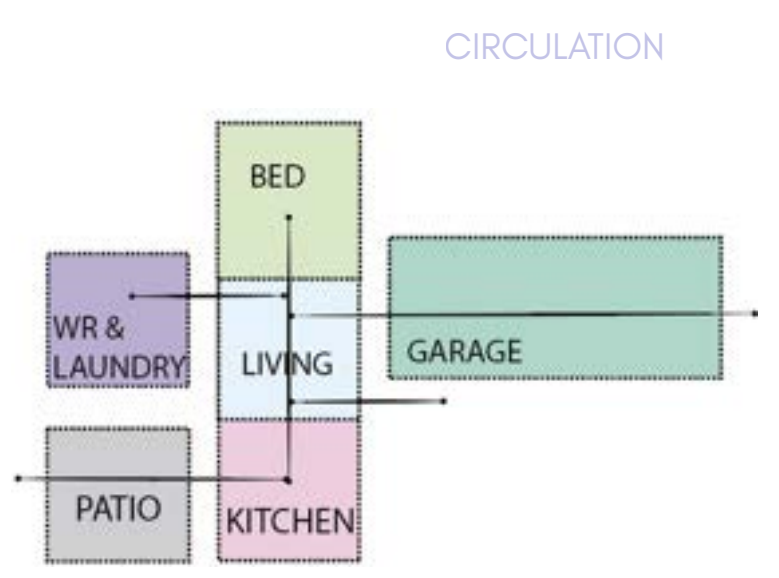
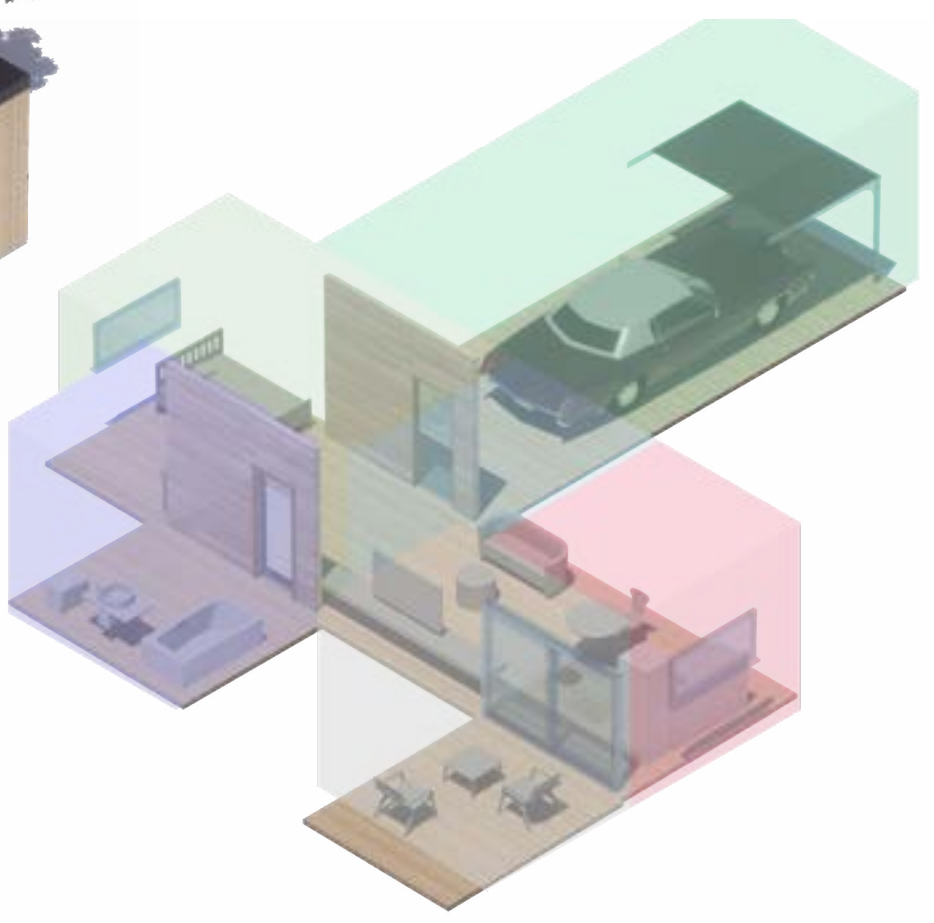


1 floor

- Legend:
- BATH
 - BED
 - KITCHEN
 - REC
 - STAIRS



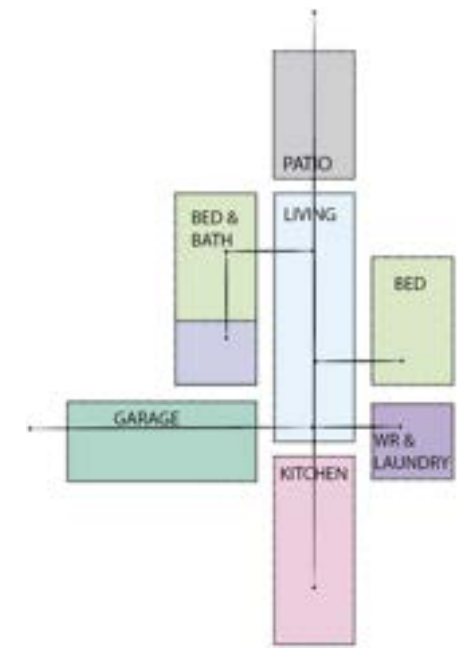
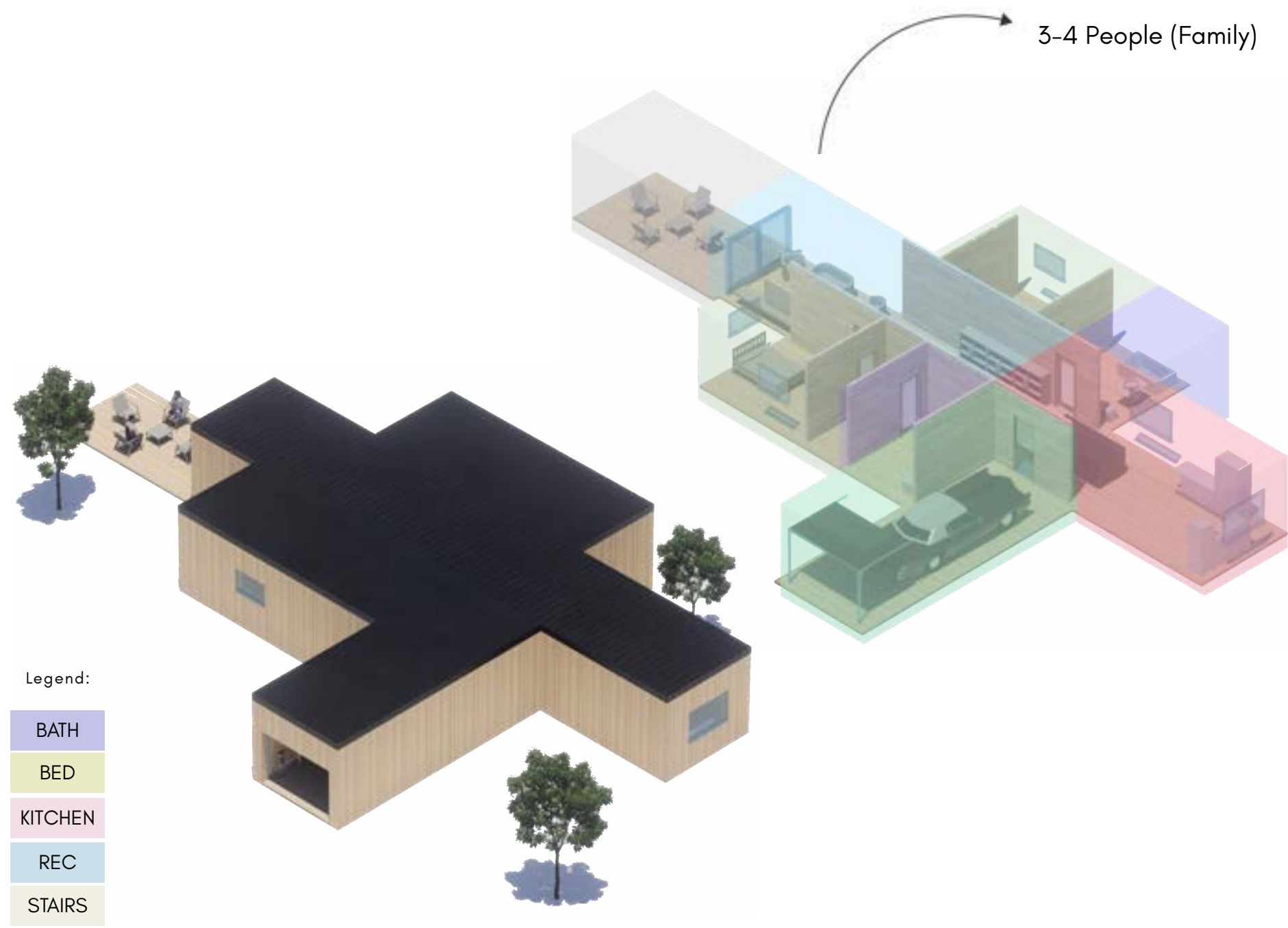
Lux Studio



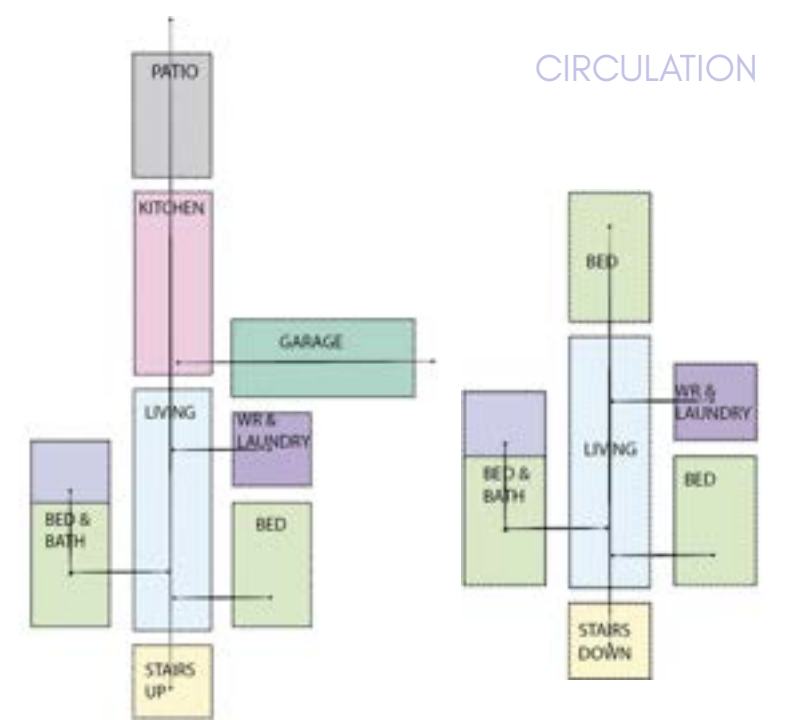
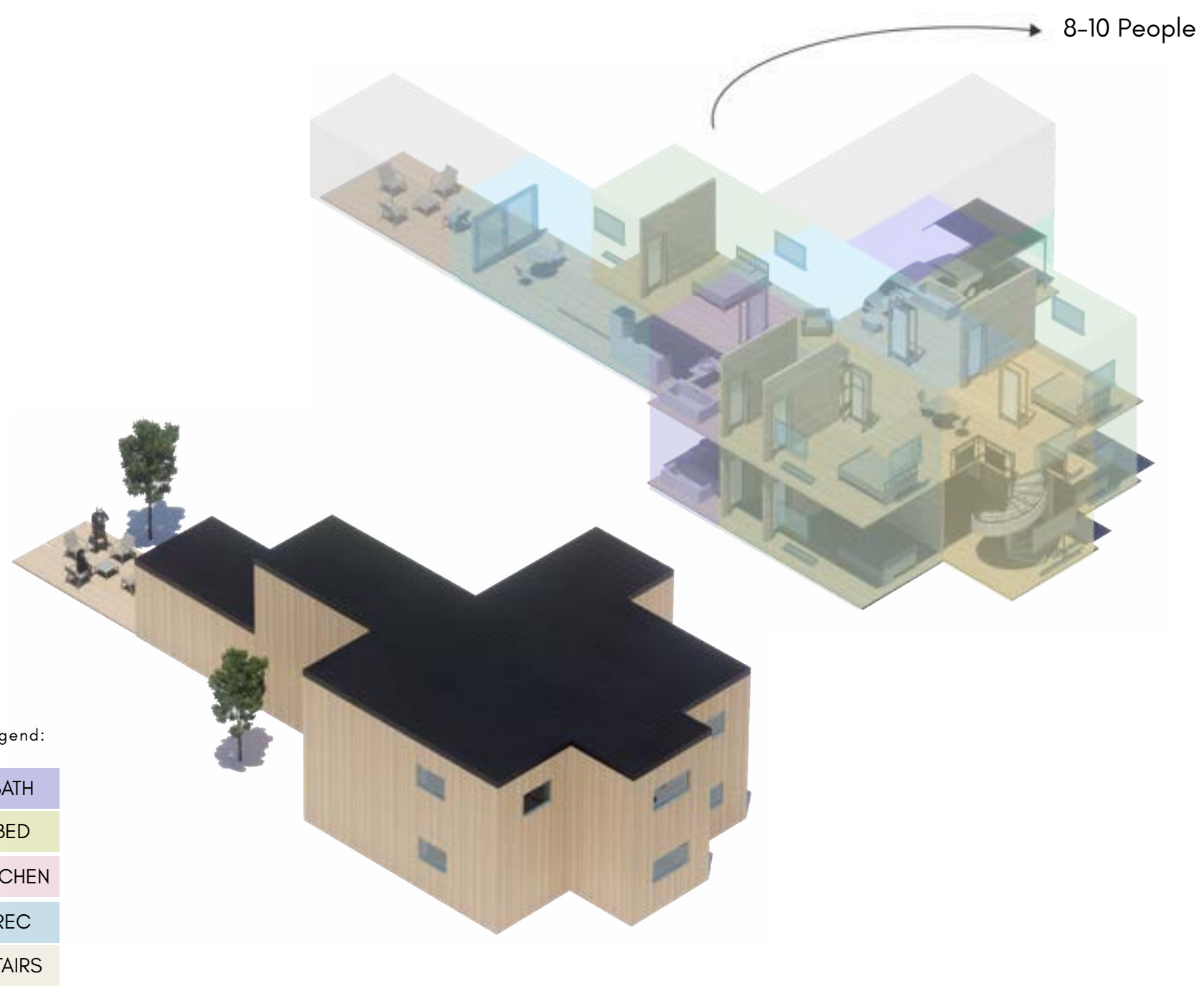
1 Floor

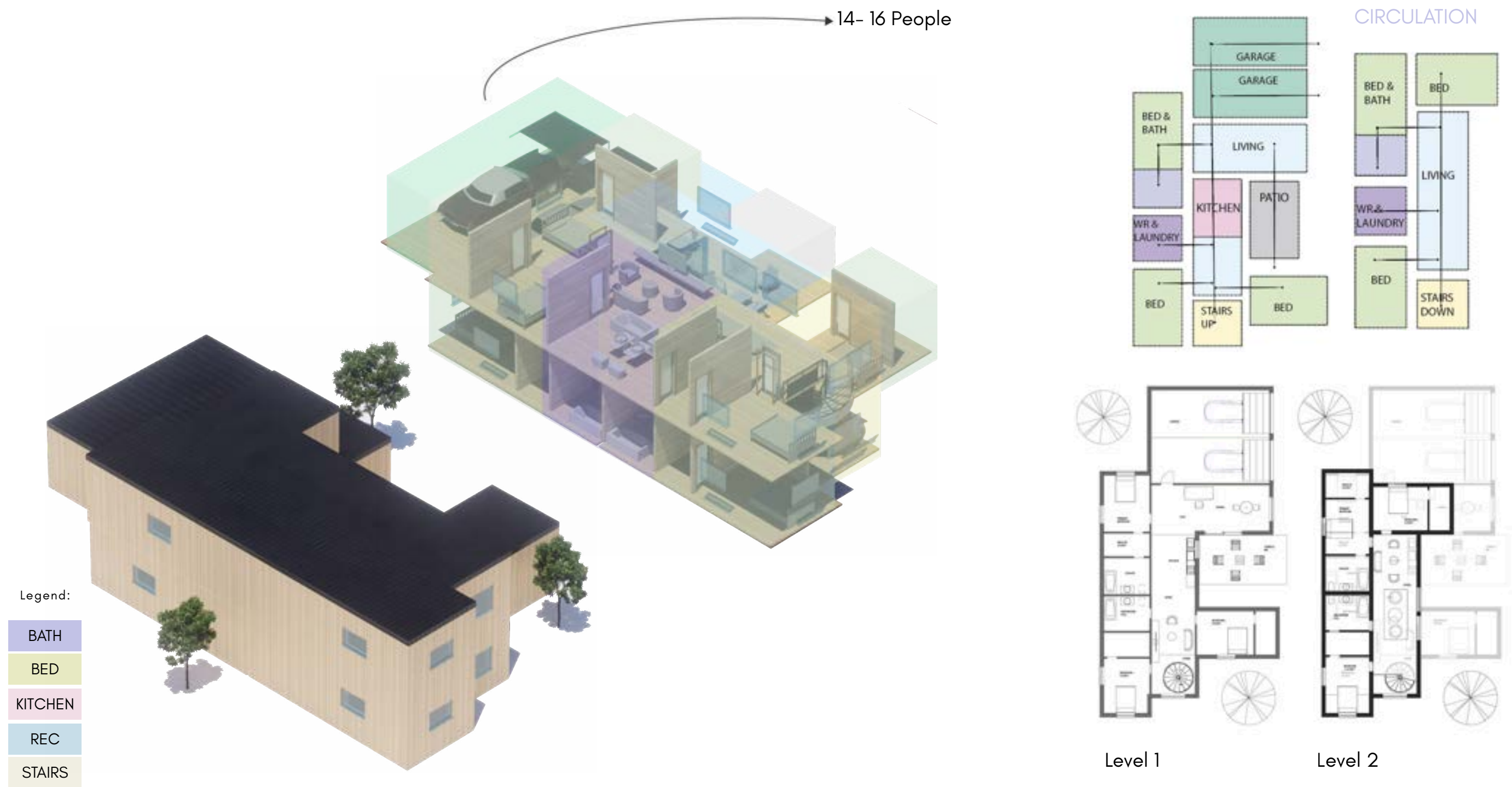
- Legend:
- BATH
 - BED
 - KITCHEN
 - REC
 - STAIRS





1 Floor



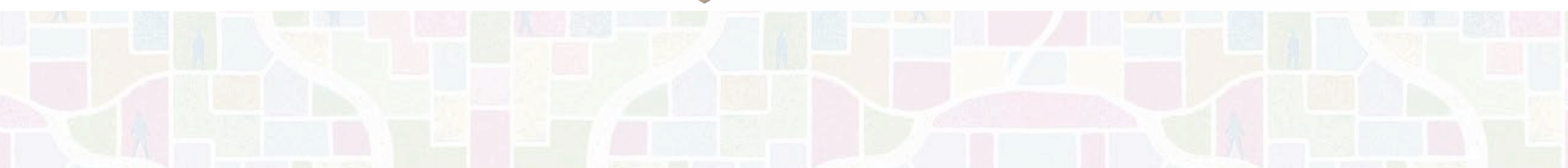


- Housing located in communities that are geographically isolated from regional service centres, with limited, seasonal, or costly access to goods, skilled trades, and public services, which meaningfully affects design, construction, operations, and maintenance.

Configurations

How to classify "remote"

- Remote, limited or seasonal road access, long travel times to services
- Supply chain, high freight cost, infrequent deliveries, limited storage
- Utilities, off-grid or constrained power, water, sewage, and connectivity
- Workforce, scarce local trades, expensive mobilization and accommodation
- Climate and terrain, conditions that complicate transport



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