hrycrt

Architecture School //
Brief Portfolio

Harry Court

Master of Architecture //
Oxford School of Architecture

RIBA Part 2

MArchD Year 1 //
Just Another Brick in the Wall

Figure 1.01 // Initial Concept Proposal Visual

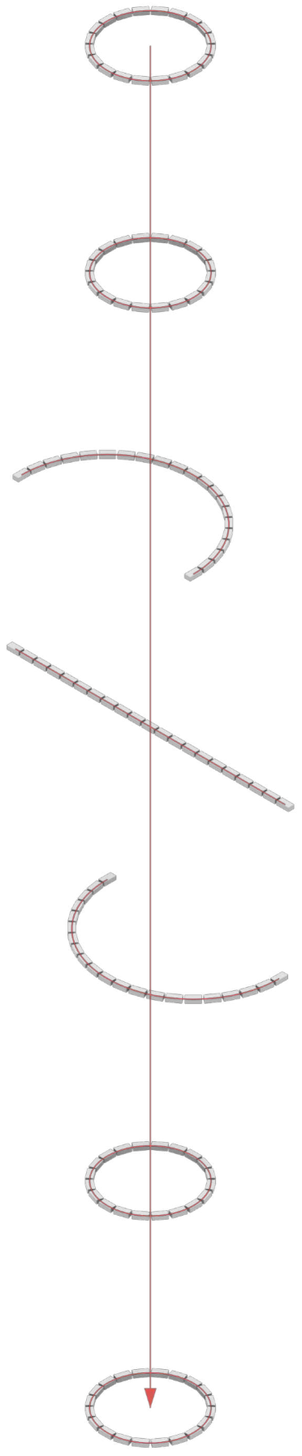


Figure 1.02 // Proof of Concept Test Model

For my first-year project, I developed a design language based on the concept of an unravelling brick column. While exploring masonry as a material, I considered its inherent rigidity and unnatural qualities. I wanted to challenge the conventional constraints of working with this material and push its design boundaries.

The concept draws from the compressive nature of brick and mortar, while also acknowledging that cement has no tensile strength unless reinforced. This limitation meant that each row of bricks needed to be supported by the one beneath it, gradually morphing the form into a naturally flowing structure.

The column is designed to revolve around a central point, ensuring its centre of gravity remains consistent. This approach helps prevent structural failure by maintaining balance and avoiding any imbalance in the form.

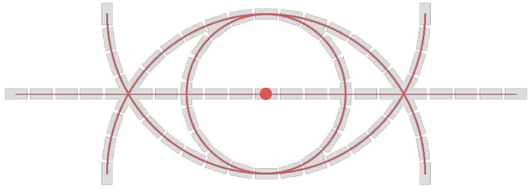


Figure 1.03 // Iteration 01 - Volumetric

Figure 1.04 // Iteration 02 - Column to Arch

Figure 1.05 // Iteration 03 - Varied Colonnade

Figure 1.06 // Iteration 04 - Balanced Colonnade

Figure 1.07 // Iteration 05 - Colonnade in Context

Figure 1.08 // Iteration 06 - Framing the View

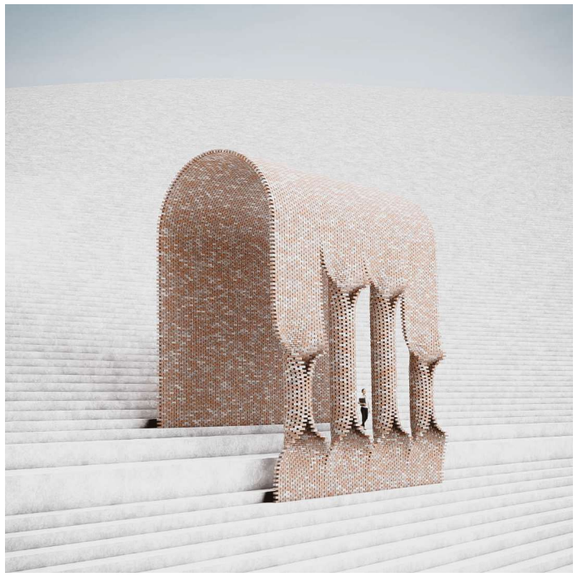


Figure 1.09 // Iteration 07 - Adjusting Sight Lines

Figure 1.10 // Iteration 08 - Creating Experience

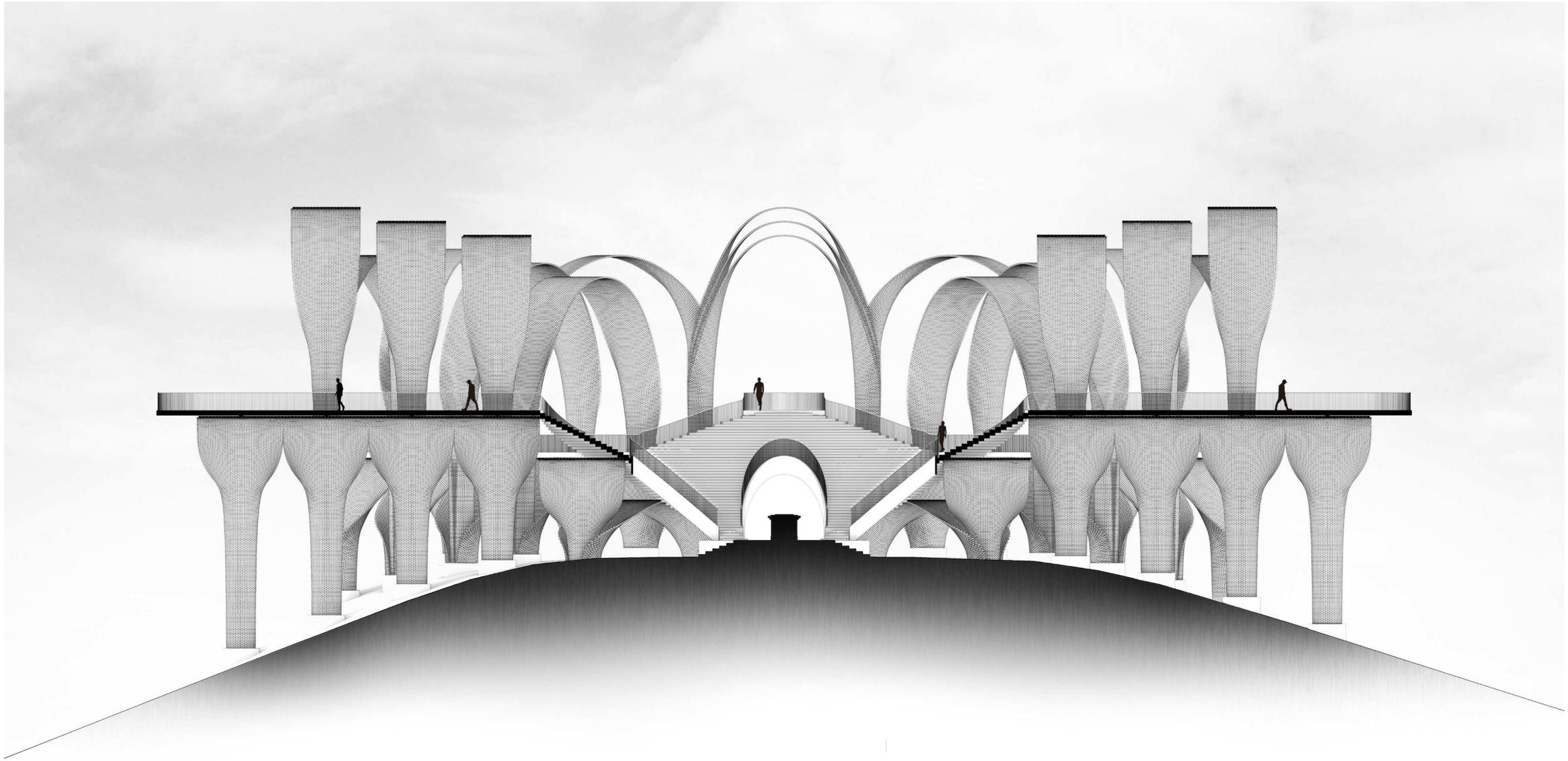


Figure 1.11 // Final Design - Proposed Section

Set at the summit of the Malvern Beacon, the highest point on the Malvern Hills, my final project celebrates the hill's natural beauty and historical significance. Rising to 425 meters above sea level, the Beacon offers breathtaking panoramic views of the Severn Valley, the Cotswolds, the Black Mountains, and beyond. It has long been a place of inspiration and discovery, cherished for its geology, ecology, and its historical role as a signalling point in times of national importance, such as during the Spanish Armada.

At the heart of the design is the existing toposcope, a circular marker identifying the distant landmarks visible from the peak. The new pavilion extends this feature into an architectural experience. A series of unravelling arches spiral outward from the toposcope, forming dynamic pathways and viewing platforms. Each platform is carefully oriented to align with the key locations highlighted on the toposcope, creating framed views that guide visitors' gaze across the landscape.

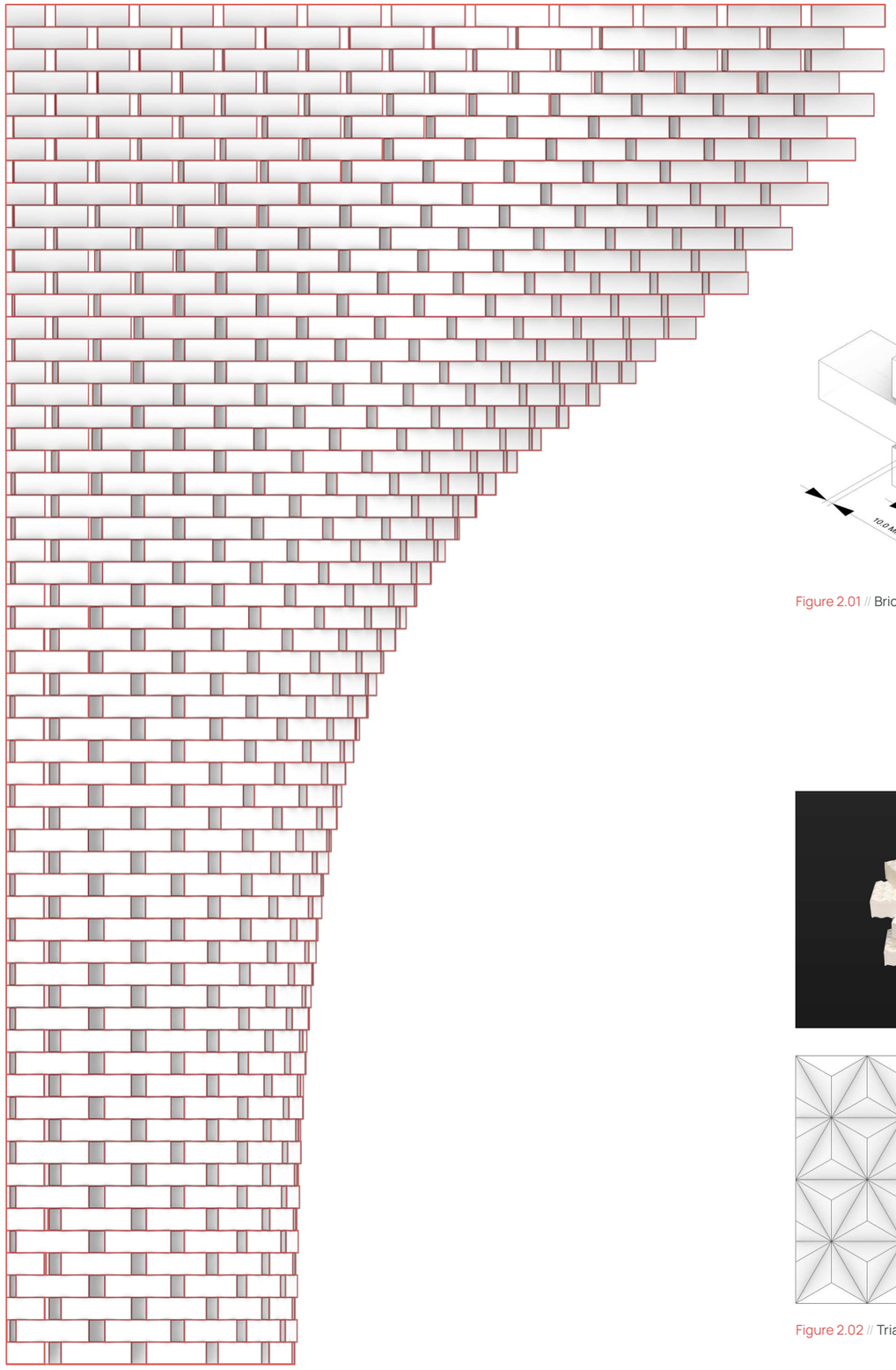
The arches are designed to resemble the form of a lit beacon, paying homage to the hill's historical role in the signalling network. At night, integrated lighting transforms the pavilion into a glowing feature visible from the surrounding valleys, re-establishing its identity as a guiding light.

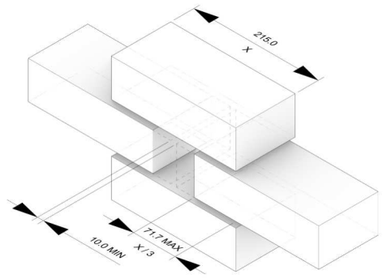
This project blends architecture with the natural and historical character of the Malvern Hills, creating a space for exploration, reflection, and connection. It celebrates the interplay between structure and landscape, offering visitors a deeper engagement with the hill's unique heritage and spectacular vistas.

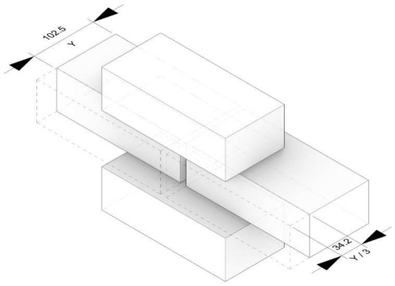
Figure 1.12 // Final Design - Proposed Visual

MArchD Year 2 //

A Game of Brick







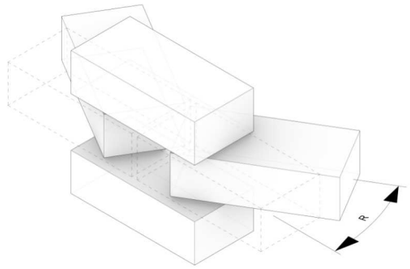


Figure 2.01 // Brick Transformations and Limitations

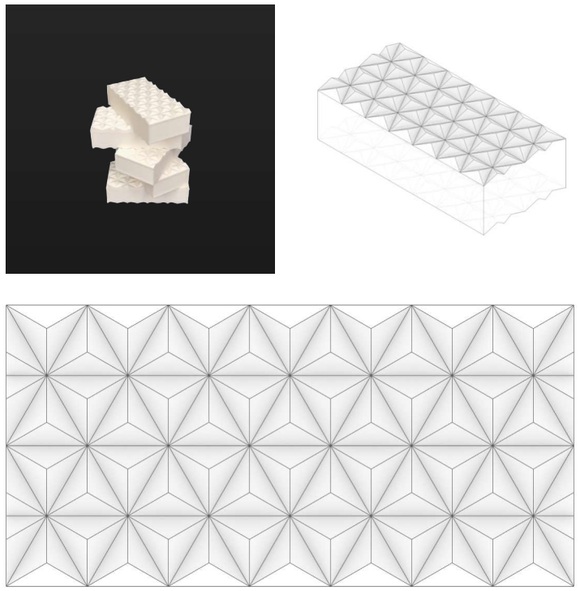


Figure 2.02 // Triangular Grid Brick

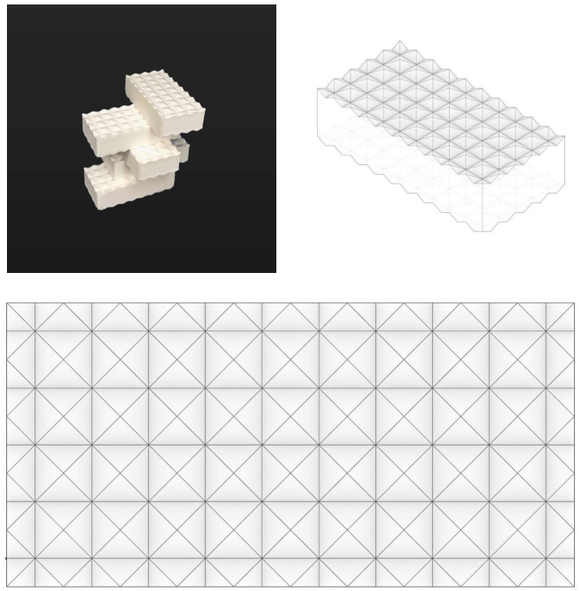


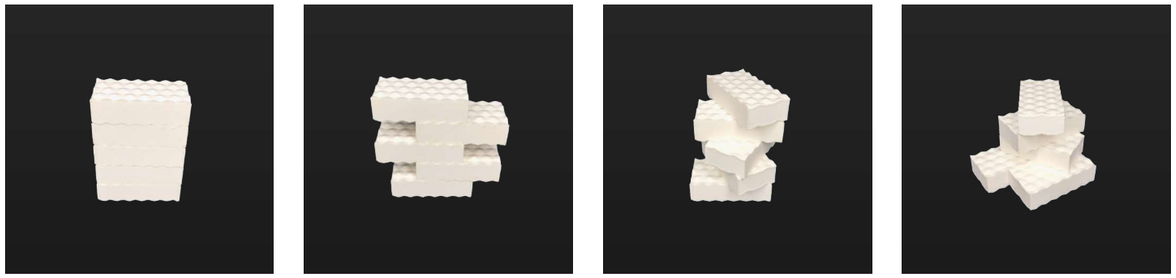
Figure 2.03 // Square Grid Brick

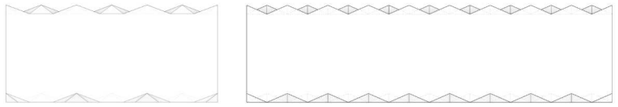
In my second year, I decided to further explore masonry structures, building upon the foundation of my first-year work. However, I wanted to approach the concept from a different perspective, challenging myself to rethink traditional methods. My goal was to recreate the design language I had developed in my first year, but this time without relying on mortar. This decision was motivated by two key factors: environmental sustainability and inclusive in construction practices.

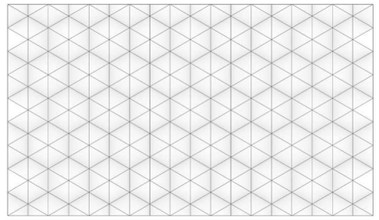
By eliminating mortar, I aimed to reduce the environmental impact associated with its production and use, which often involves significant carbon emissions. This approach aligned with my growing interest in sustainable architecture and finding innovative ways to minimise the ecological footprint of building materials and techniques.

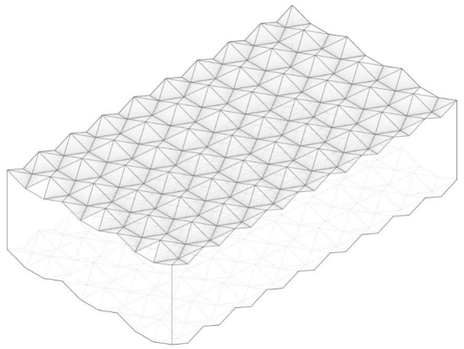
Additionally, I was intrigued by the idea of making masonry more accessible to a broader audience. Traditional bricklaying requires a certain level of expertise and training, but by removing the reliance on mortar, I hoped to simplify the process. This could open up opportunities for individuals without formal training in construction to engage in the art of building with bricks, potentially inspiring new creative and practical applications.

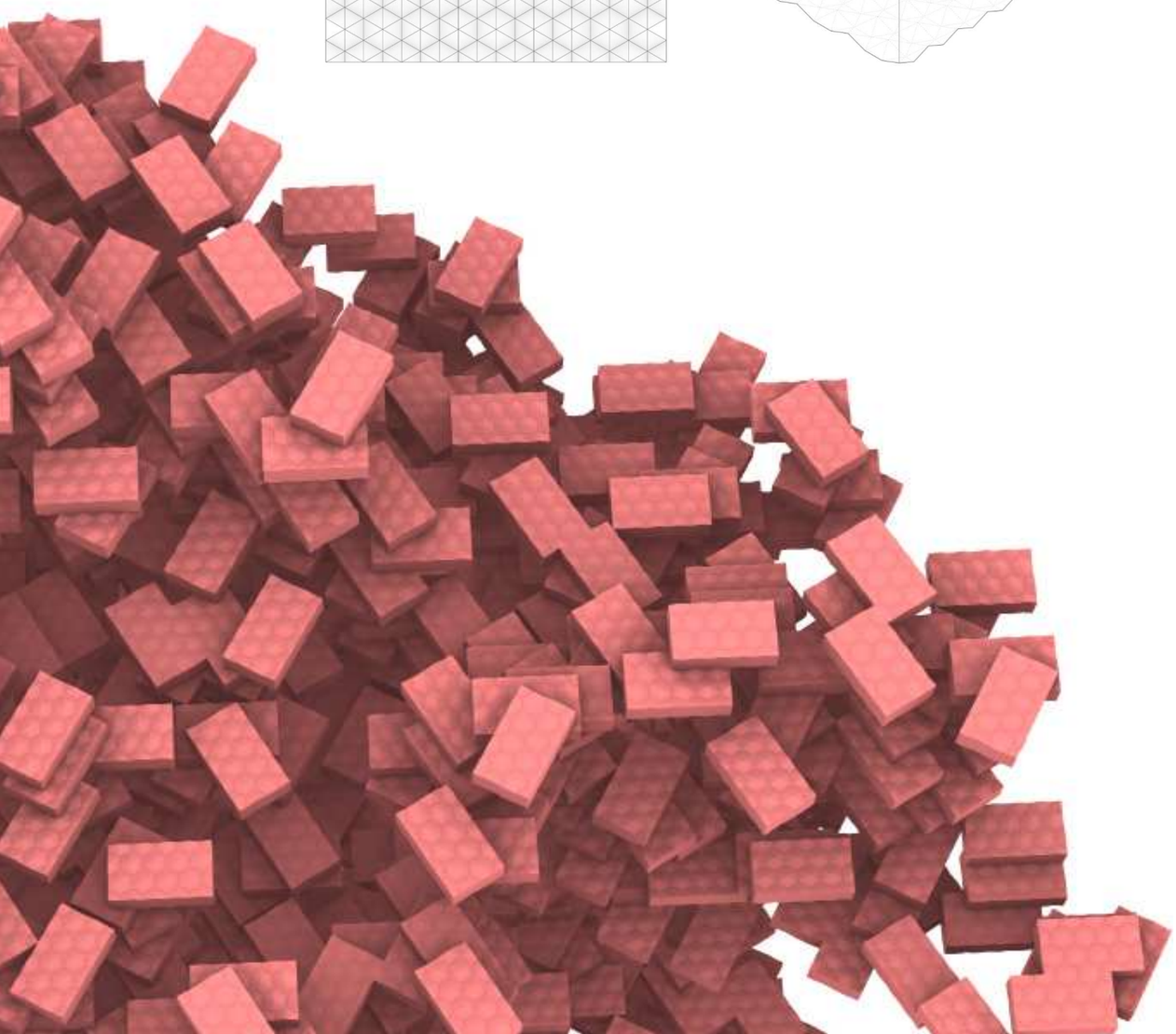
This project became an exploration of alternative techniques, focusing on interlocking systems, friction-fit methods, or modular designs that could achieve stability and strength without the need for traditional binding materials. It allowed me to push the boundaries of conventional masonry and experiment with new ways to merge design, sustainability, and accessibility.











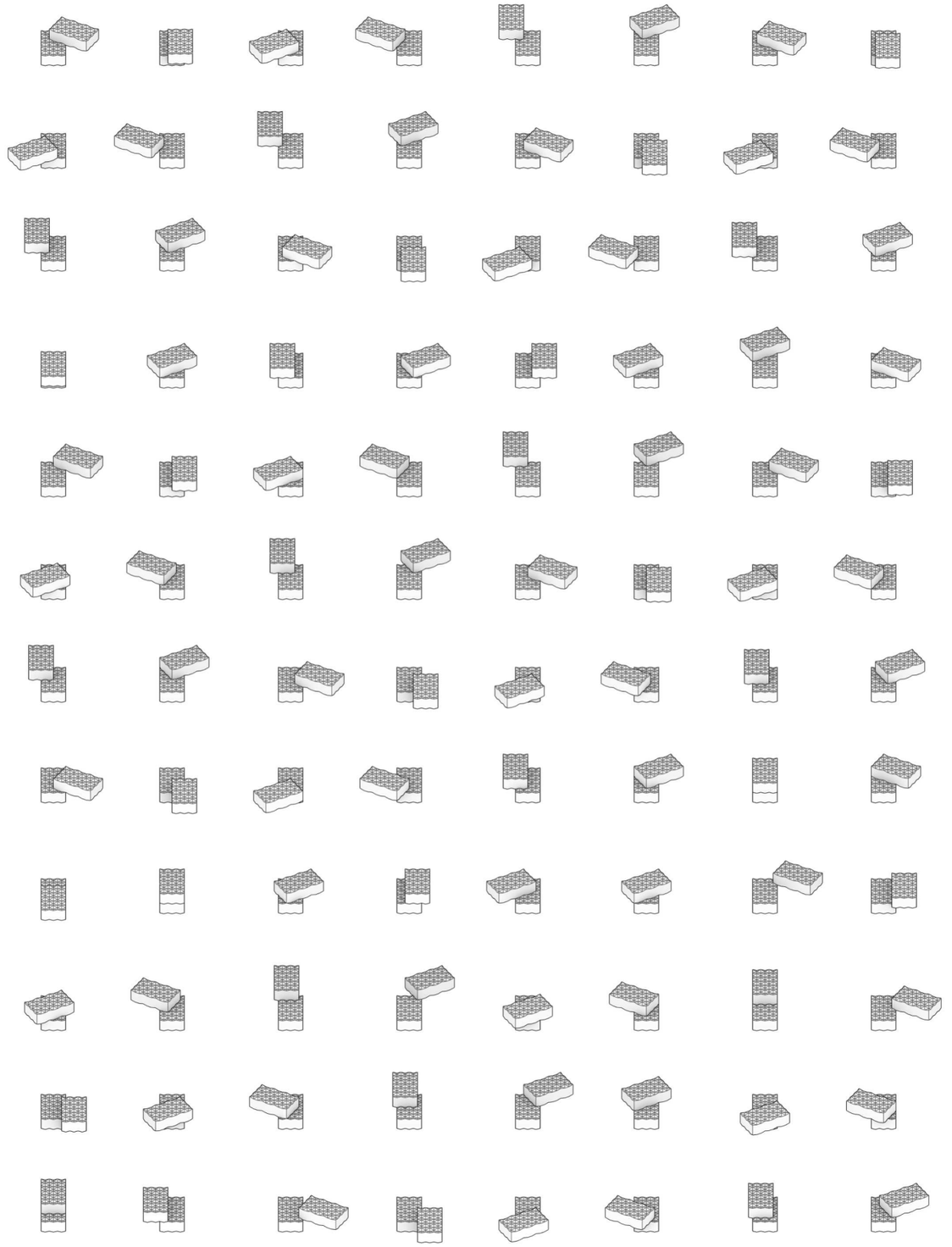


Figure 2.04 // Hexagonal Brick Possible Connections

Figure 2.05 // Iteration 01 - Maximum Bricks Per Course - 50

Figure 2.06 // Iteration 02 - Maximum Bricks Per Course - 20

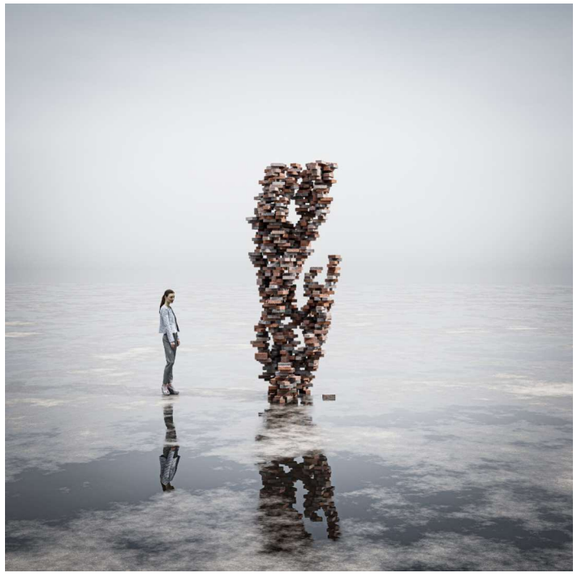


Figure 2.07 // Iteration 03 - Maximum Bricks Per Course - 10

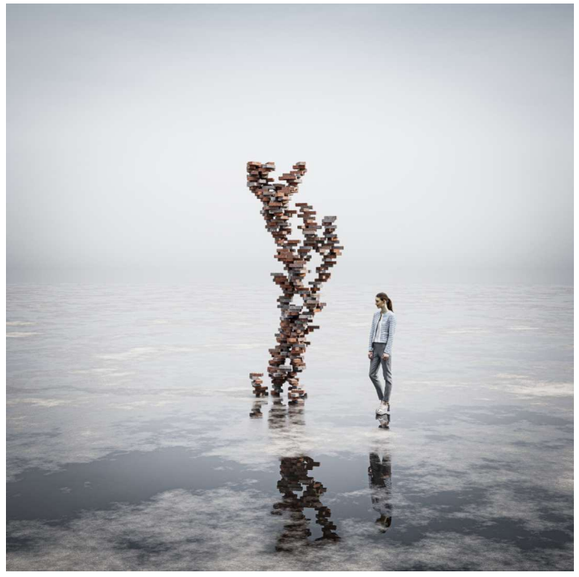


Figure 2.08 // Iteration 04 - Maximum Bricks Per Course - 5

Figure 2.09 // Iteration 05 - Maximum Bricks Per Course - Adaptive

Figure 2.10 // Iteration 06 - Maximum Bricks Per Course - Adaptive

While digitising the connection logic between my components, I thought more deeply about how a structure composed of these elements would be assembled. This required careful consideration of spatial and structural constraints. For instance, I ensured no components intersected and that bricks were placed only in available spaces, maintaining the design's integrity. Additionally, each brick had to be positioned above another to ensure stability.

The script evolved into a dynamic simulation, visualising how components would aggregate within a predefined geometry, strictly following system rules. Watching the simulation revealed its iterative nature, resembling Conway's Game of Life, a cellular automaton where simple rules create complex patterns.

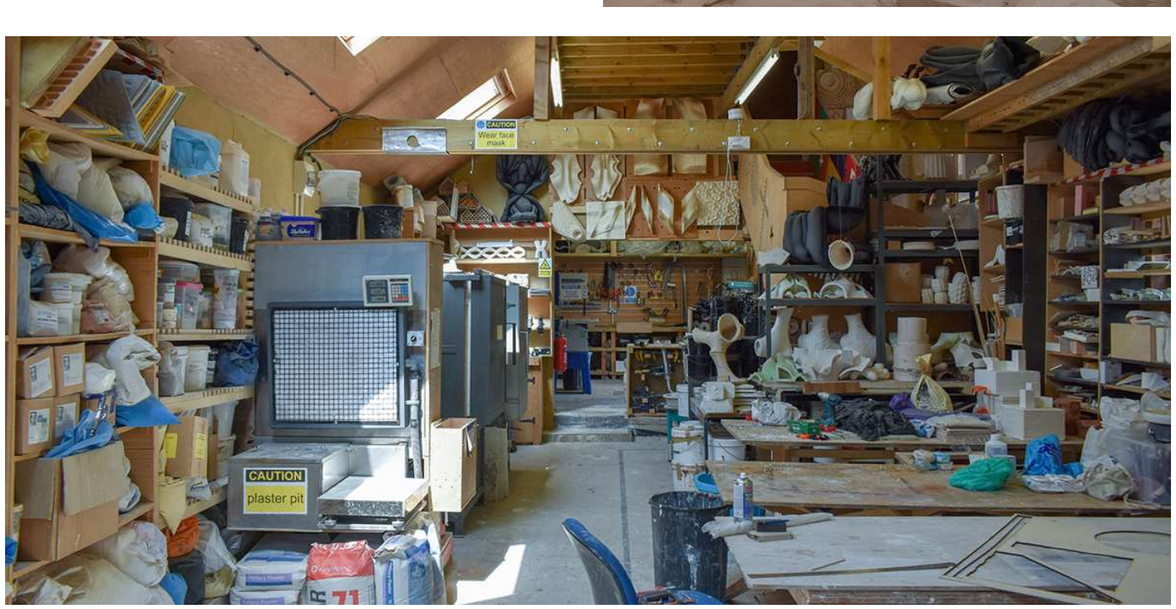
This resemblance inspired me to imagine the construction process as a collaborative, interactive experience. What if the system became a game? A framework where residents and craftsmen actively participate, shaping their environment through play. Gamifying the process could transform building into a communal activity, blending creativity and strategy while fostering a deeper connection to the structures they inhabit.

Grymsdyke Farm serves as an inspiring site for architectural projects, combining a rural setting with state-of-the-art facilities to foster experimentation and innovation in design. Situated in Buckinghamshire, this unique research and fabrication hub offers an ideal environment for exploring new approaches to architecture, materials, and construction techniques.

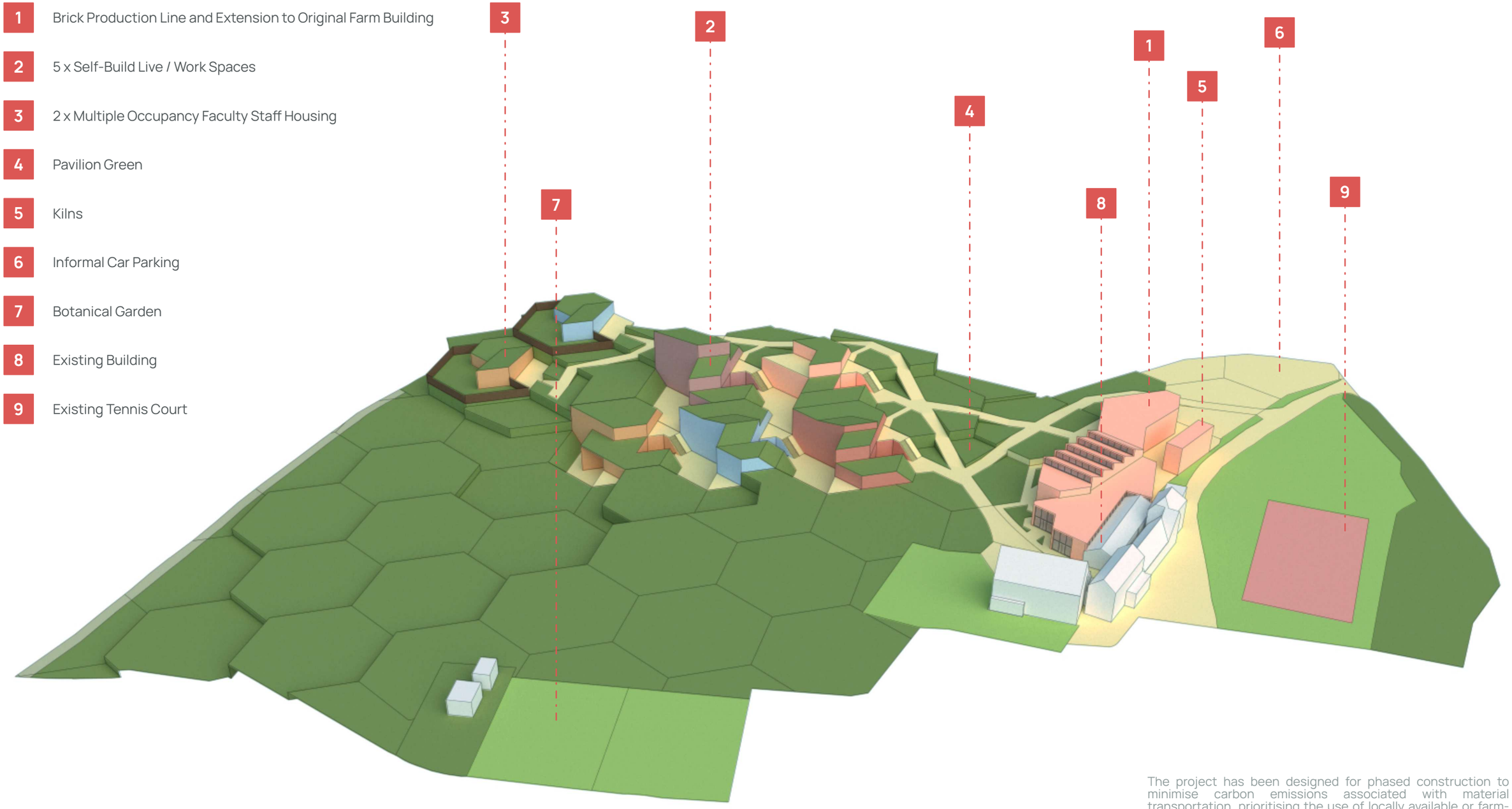
The farm's workshops are equipped with advanced tools, including CNC machines, 3D printers, and ceramic kilns, enabling hands-on prototyping and material testing. This infrastructure supports projects that merge traditional craftsmanship with cutting-edge digital fabrication.

Its remote, pastoral surroundings provide a serene backdrop that encourages creative thinking, while the collaborative atmosphere brings together architects, designers, and researchers to work on interdisciplinary projects. With a focus on sustainability and innovation, Grymsdyke Farm is a place where architectural ideas are developed into tangible outcomes, bridging the gap between concept and construction.

This combination of resources and environment makes Grymsdyke Farm an unparalleled site for pushing the boundaries of architectural practice.



1. Brick Production Line and Extension to Original Farm Building
2. 5 x Self-Build Live / Work Spaces
3. 2 x Multiple Occupancy Faculty Staff Housing
4. Pavilion Green
5. Kilns
6. Informal Car Parking
7. Botanical Garden
8. Existing Building
9. Existing Tennis Court



The project has been designed for phased construction to minimise carbon emissions associated with material transportation, prioritising the use of locally available or farm-grown materials. Significant earthworks will be undertaken, starting with excavating the site's clay, which will be re-purposed to produce bricks formed and fired on-site. These bricks use a previously showcased interlocking hexagonal grid system that requires no mortar, further reducing carbon emissions by minimising additional material use and simplifying the construction process.

For insulation, the project incorporates hempcrete bricks of the same form, with the hemp cultivated in the farm's existing botanic garden. Additionally, timber sourced from the surrounding area will be utilised as a structural material, further enhancing the project's commitment to sustainability and resource efficiency.

Figure 2.11 // Step 01 - Dig and Collect

Figure 2.12 // Step 02 - Separate Large Rocks

Figure 2.13 // Step 03 - Dilute and Refine

Figure 2.14 // Step 04 - Drain Refined Mixture

Figure 2.15 // Step 05 - Clean and Construct Mold

Figure 2.16 // Step 06 - Add Sand and Knead

Figure 2.17 // Step 07 - Throw Mixture Into Mold

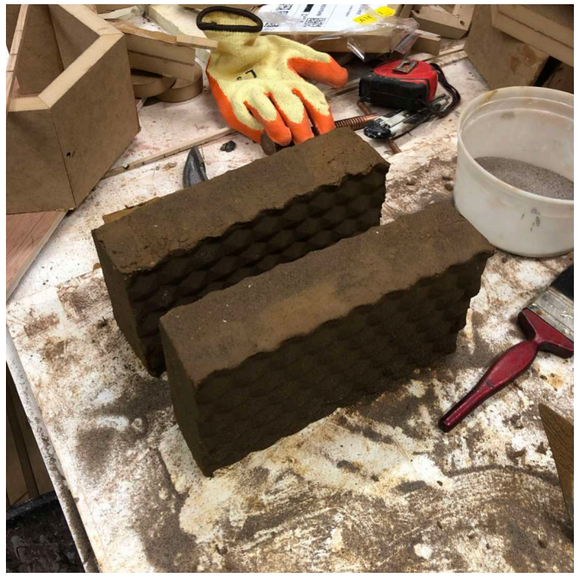


Figure 2.18 // Step 08 - Remove Pressed Bricks

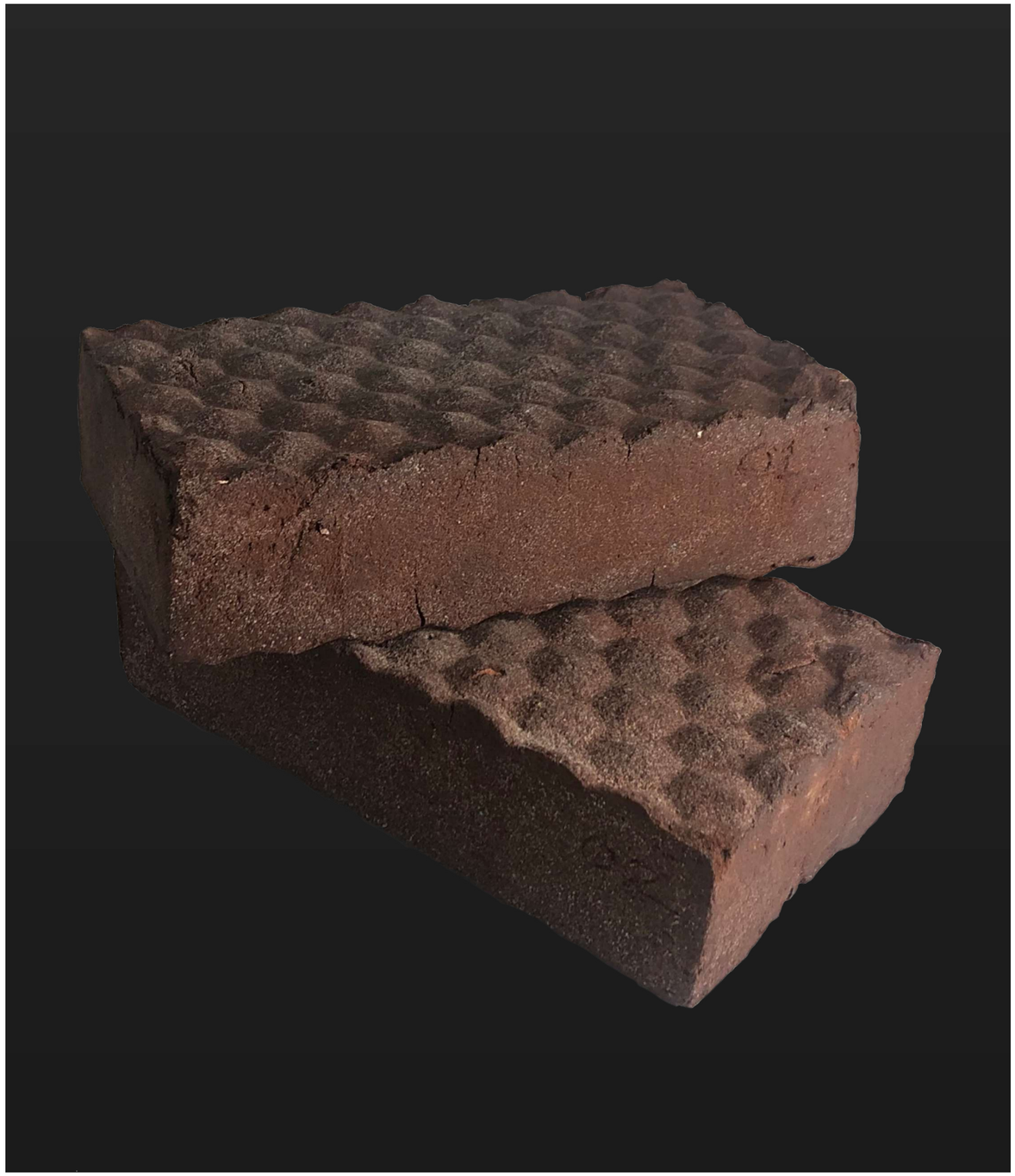


Figure 2.19 // Successful Brick Connection

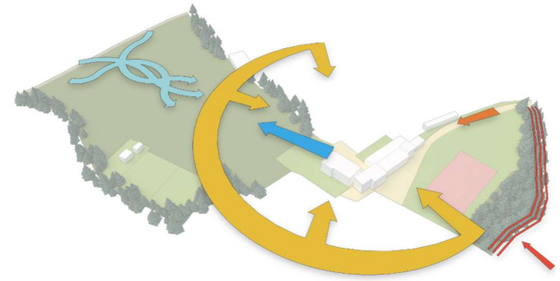
Figure 2.20 // Step 07 - Successful Firing

Figure 2.21 // Step 07 - Unsuccessful Firing

01 Accommodation rooms oriented to receive early morning sun.

02 Kitchen and living areas oriented to receive mid day to evening sun.

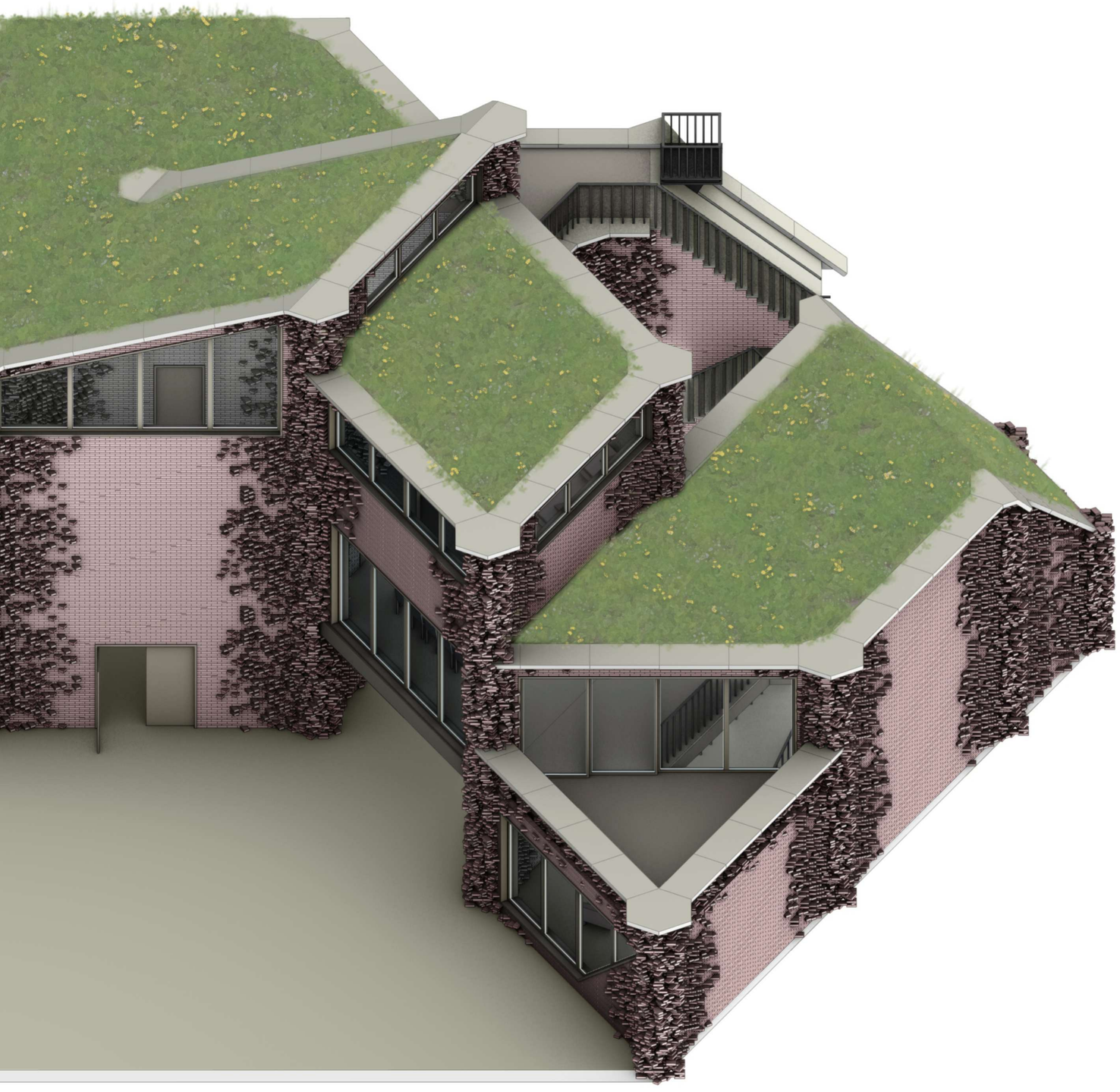
03 Workshop oriented to receive majority of daylight hours sun.



04 Many angles aims to dissipate the prevailing wind.

05 All frontage oriented towards view over Chiltern Hills.

06 No frontage oriented towards main road to reduce ambient noise.

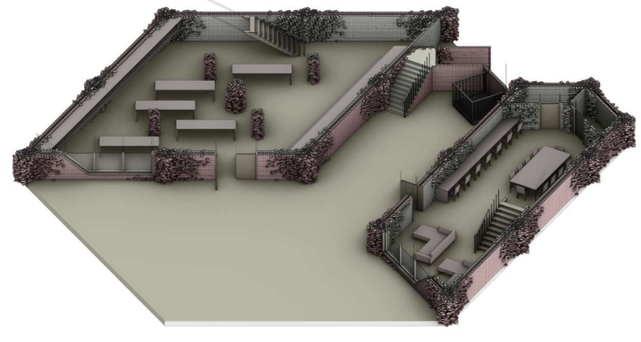


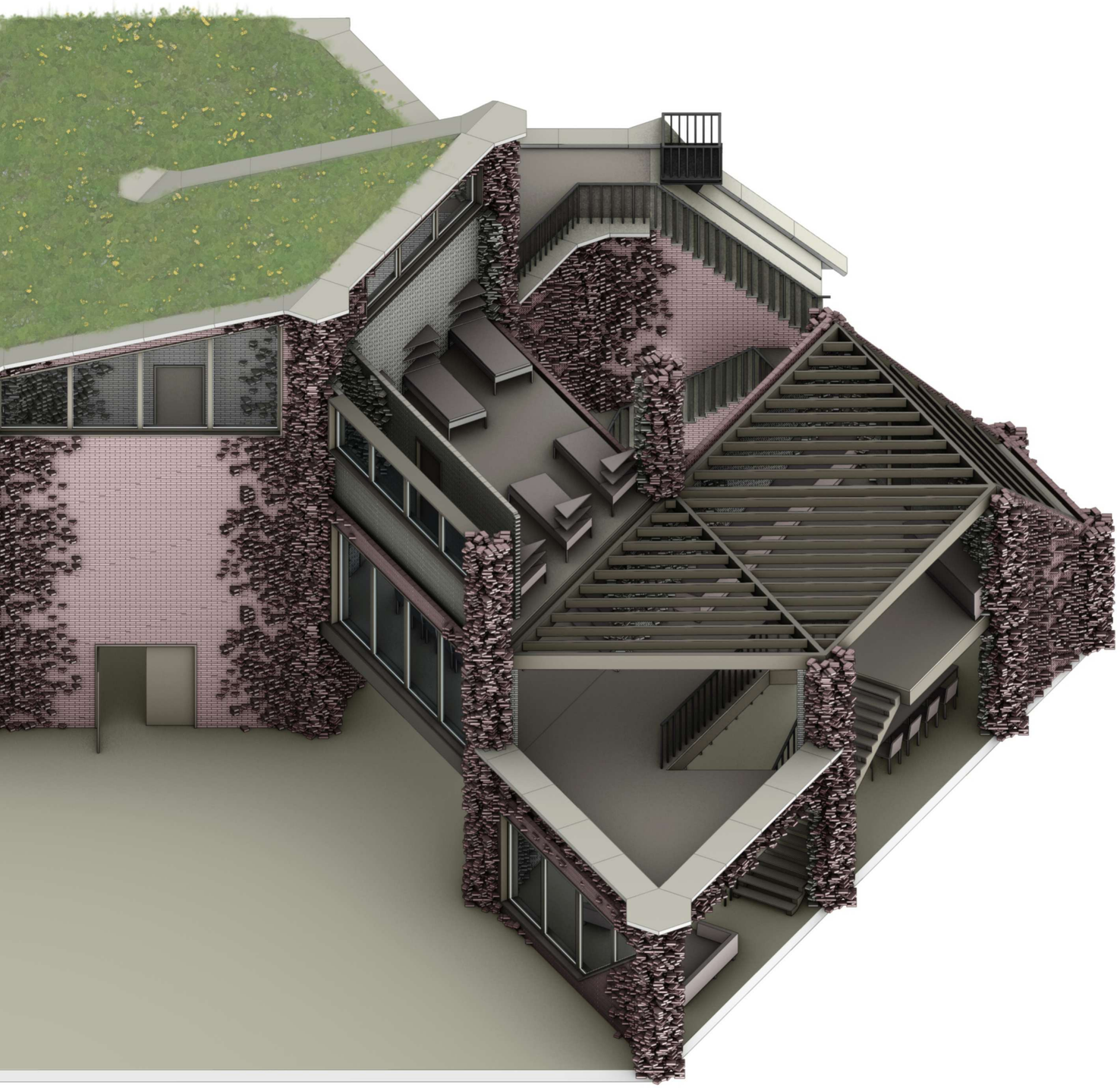
01 // Green Roof

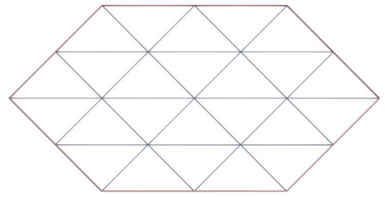
01 // First Floor
- Workshop
- Kitchen
- Dining Room

00 // Ground Floor
- Workshop
- Kitchen
- Dining Room

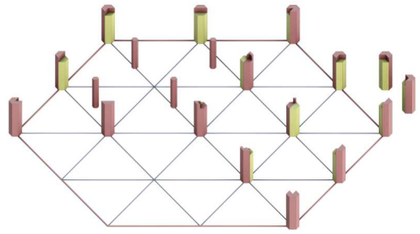
B1 // Basement
- Workshop
- Studio
- Snug



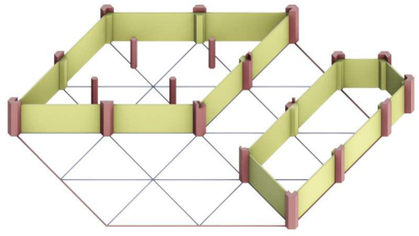




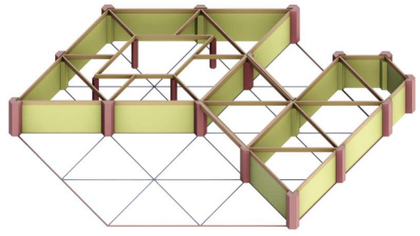
01 // Structural Grid



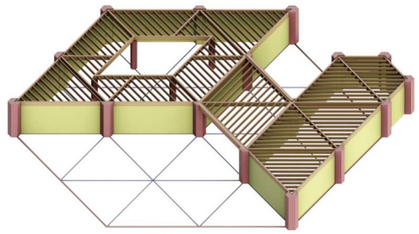
02 // Column Layout



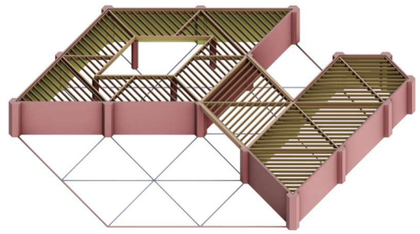
03 // Insulating Hempcrete Layer



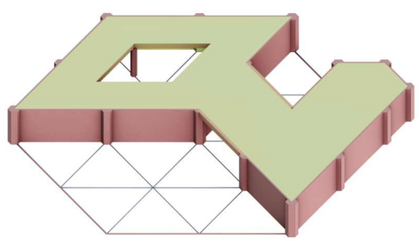
04 // Structural Timber Frame



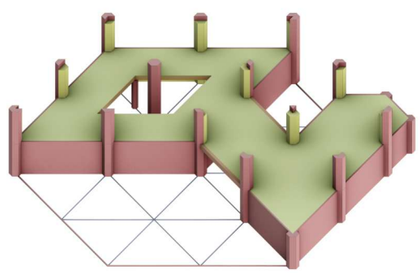
05 // Timber Floor Joists



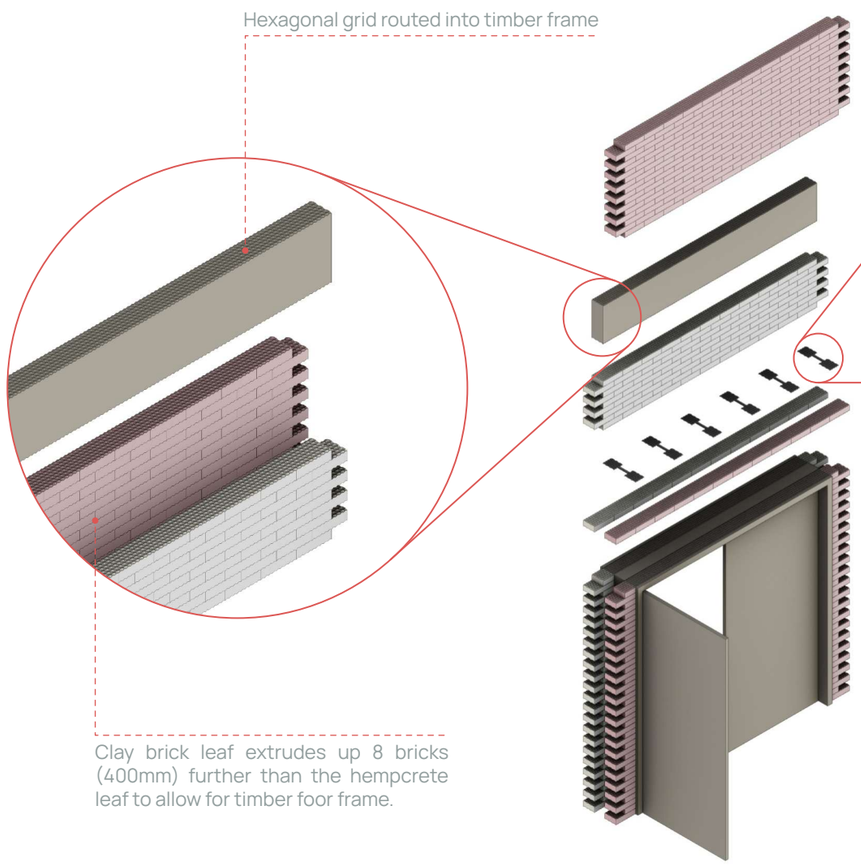
06 // Clay Brick External Layer

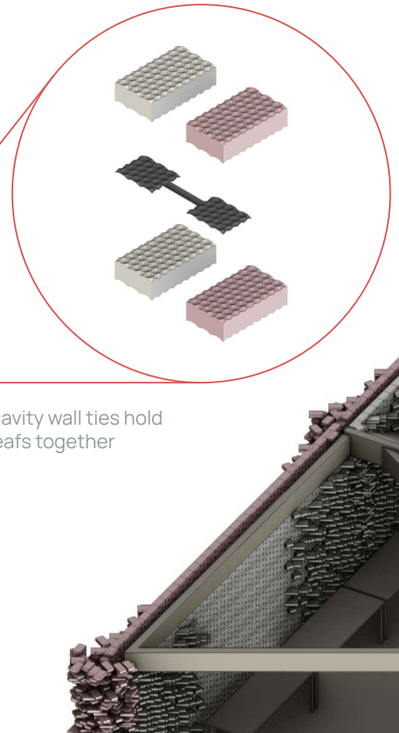


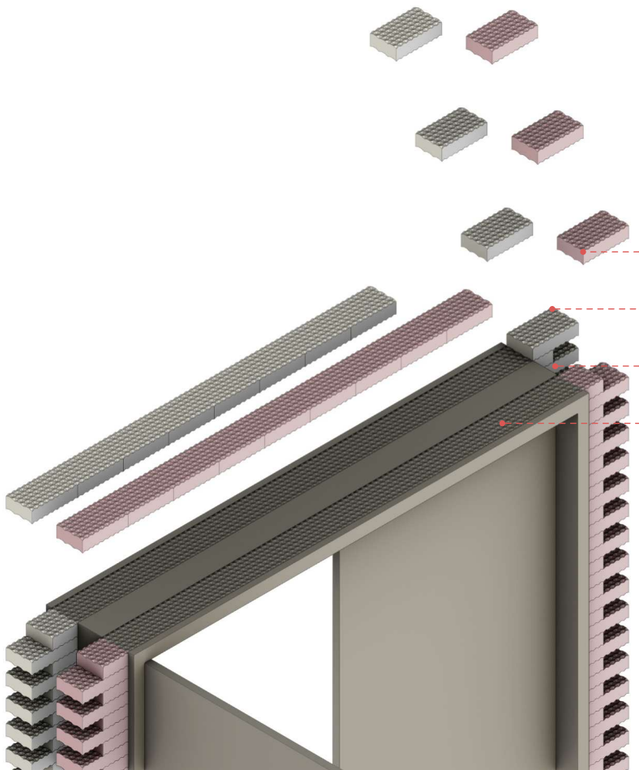
07 // Floor Panels



08 // First Floor Columns







Cavity Wall Benefits

- Reduces weight on foundations
- Greater sound insulations
- Good thermal insulation (air reduces heat transition)
- Economically cheaper than other solid constructions

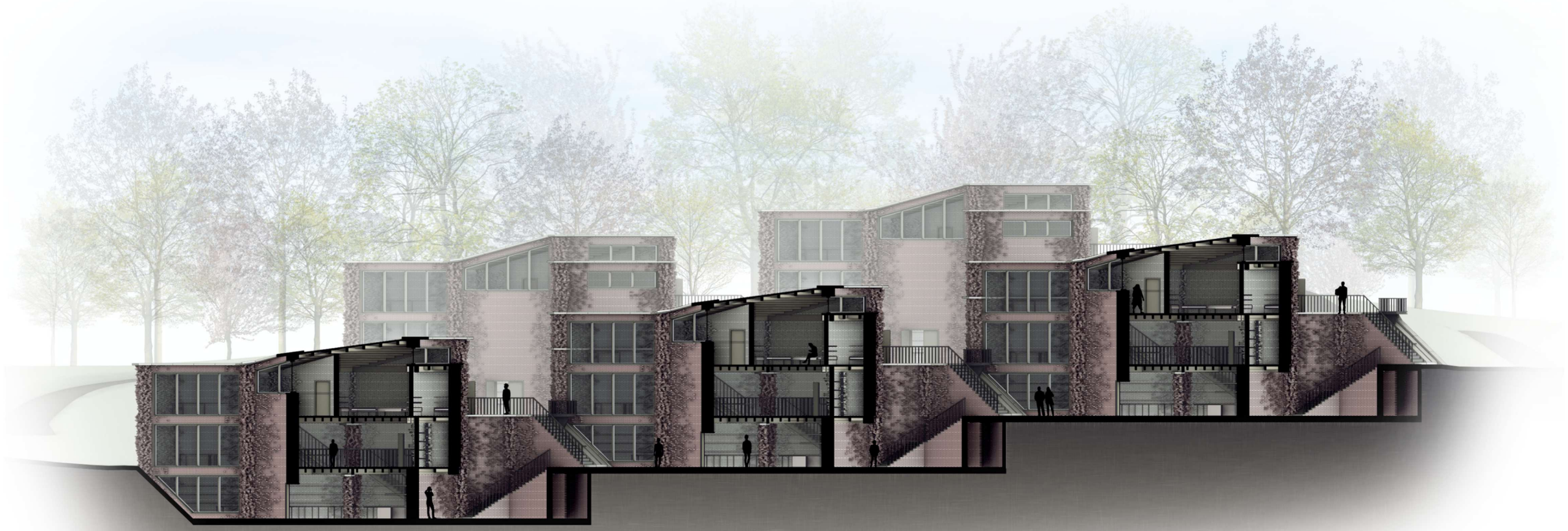


Figure 2.22 // Final Design - Proposed Live / Work Spaces Section

Figure 2.23 // The Construction Process

Figure 2.24 // Pavillion Green