

Earth and Stone

Oliver Campbell - 26383376
ARC3003 2425

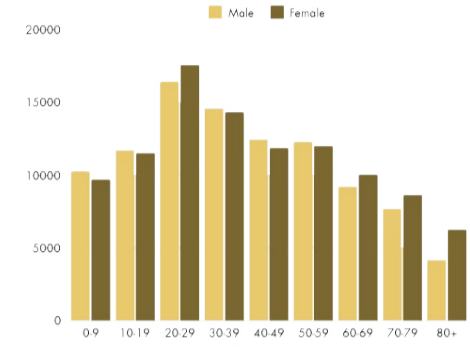
LinkedIn [linkedin.com/in/oliver-campbell-3ab0b9261](https://www.linkedin.com/in/oliver-campbell-3ab0b9261)

Concept Brief

This project seeks to create a structure that illustrates connections between unlikely pairings to create a dynamic design that is also suitable for the chosen site, in order to bring a primarily unknown culture to educate the nearby community about contrasting design strategies, and how it can be usefully adapted for the UK.

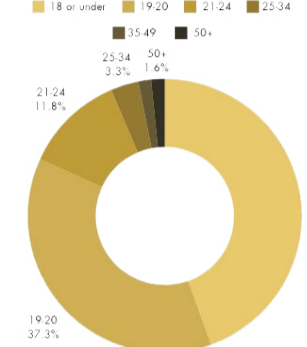
With this, I find earthen and desert architecture to be rich in art, culture and specialised mechanisms to survive the harsh desert heat, however to re-purpose these elements, desert architectural practices could present how art can be integrated into design and educate others how this art was created, whilst merging these styles with UK culture, to present a contrasting way of existing in the world to the UK, and utilising passive and active desert architectural elements as sustainability efforts to make the structure more environmentally friendly.

Age



Age varies little mostly having to cater to the middle aged, however the high number of young adults may show a higher acceptance of change in the design of Norwich with this desert design.

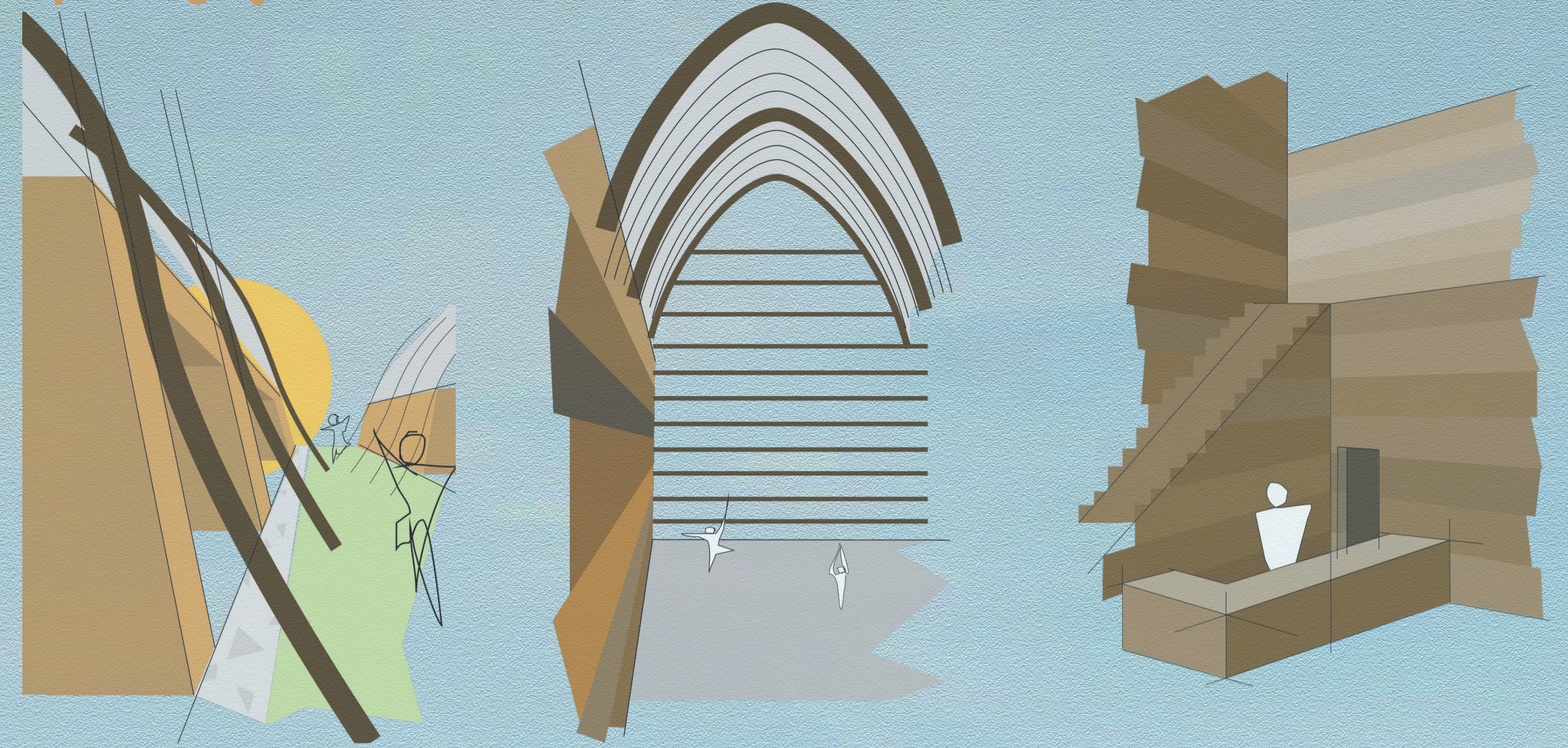
Age of Arts Student



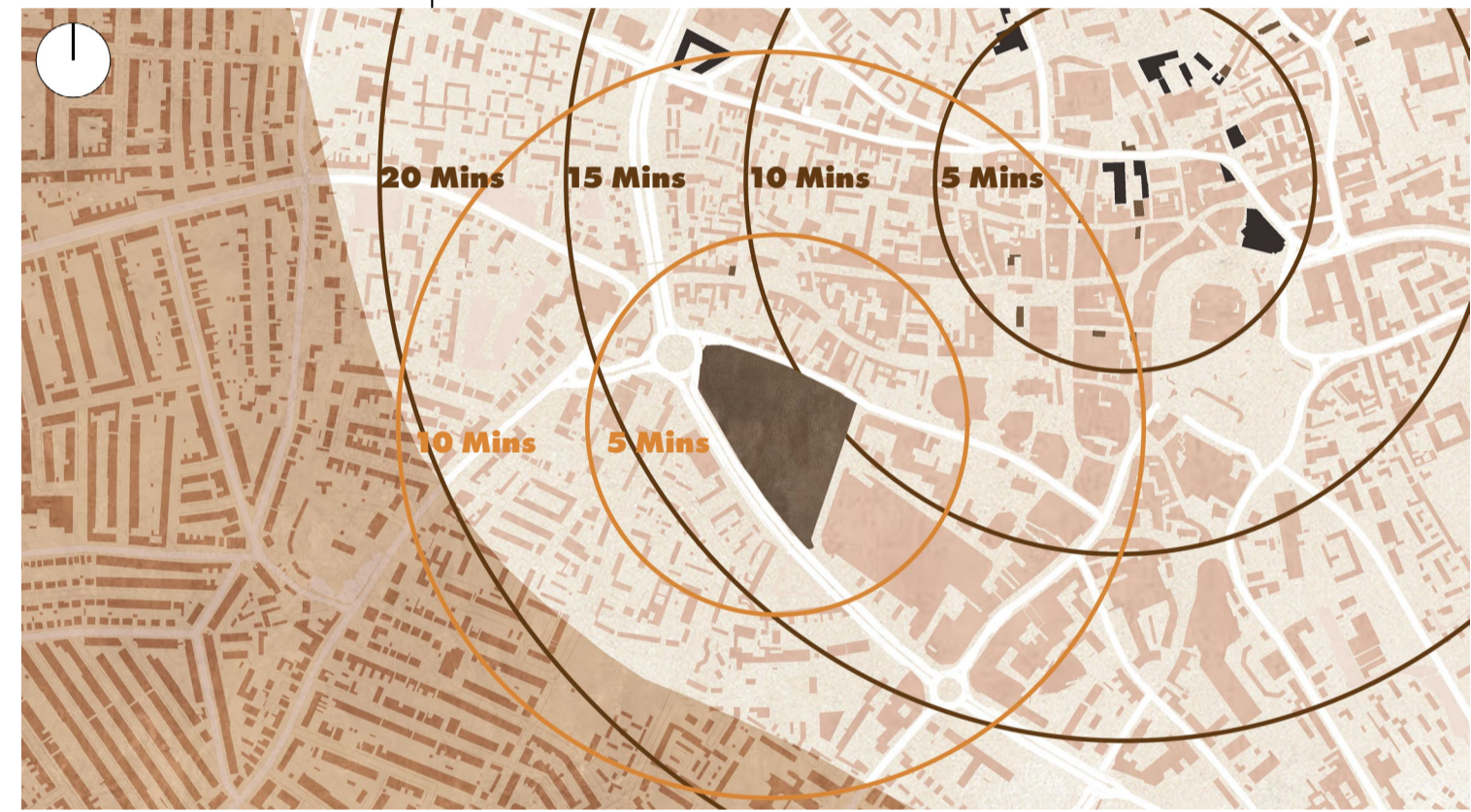
Many of the arts students of the city are younger adults, however this building is not just for university students, so the design should focus on the older generations and children who do not have a space to create art



Concept Imagery



Art Space Distance from Residential - 1:10000



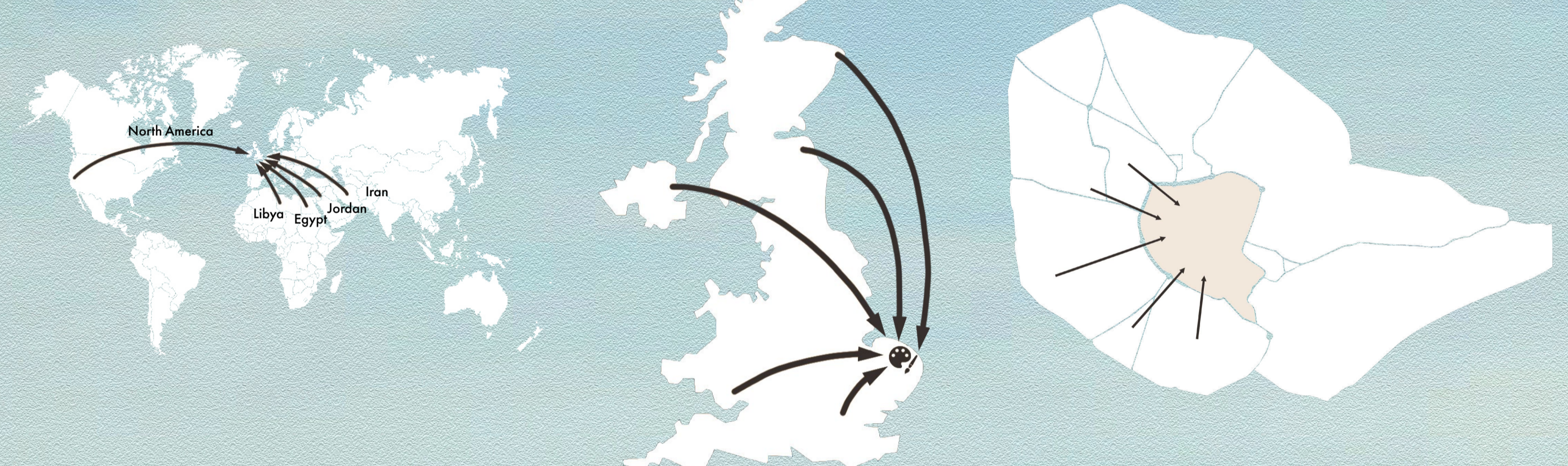
- Norwich University of the Arts Buildings
- Site
- Spaces That Incorporate Art
- Start of Residential Area
- Walking Distance from Site
- Walking Distance from Existing Art Central Zone

Art Route Developed by Design



This Visual is to illustrate the art route of Norwich created from this design beginning at the site and progressing through the city visiting key art spaces in walking distance.

Scale Analysis



- ### Global Scale:
- Bringing eastern sustainable design practices and elements to the UK.
 - The sustainability elements mean the slow heating of the climate impacts the users less.

- ### Country Scale:
- Implementation of desert architectural design that is not widely used in the UK.
 - Cements Norwich as an artistic hub outside of London.

- ### City Scale:
- Connect the residential communities more physically and culturally with the art, only found in the city centre at the moment.
 - To create a route of art through Norwich.

Historical Sites



- Intricate stone elements
- Monumental design
- Connections to power and religion
- High up the hierarchy of architecture

Modern Designs



- More purposeful singular and angular forms
- Supporting structures are visible in some designs
- More modern materiality of glass and steel
- Less intricate elements and more broad strokes

Historical Sites

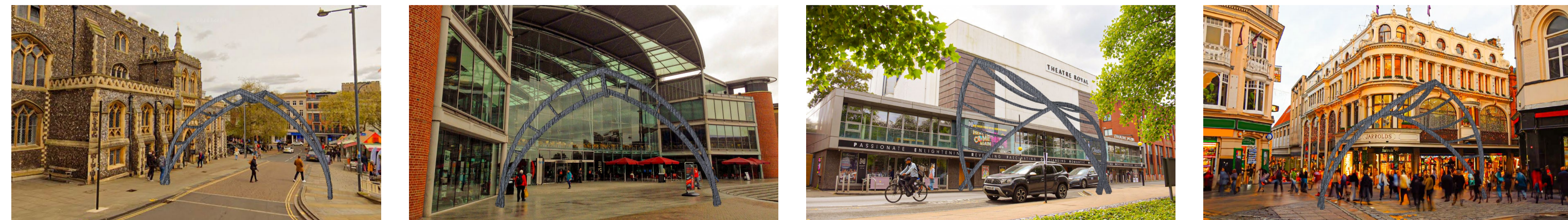


- Monumental Massing
- Diagonal wall
- Column vertical elements
- Natural roofing forms

Modern Designs



- Curving wall forms
- Thick vertical forms
- Dynamic roofing forms
- Incorporation to natural elements

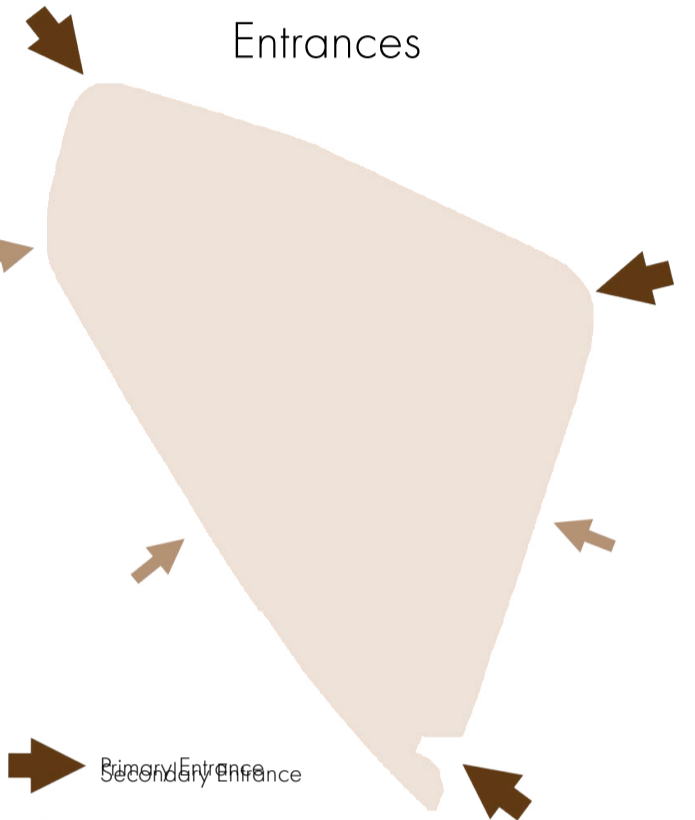
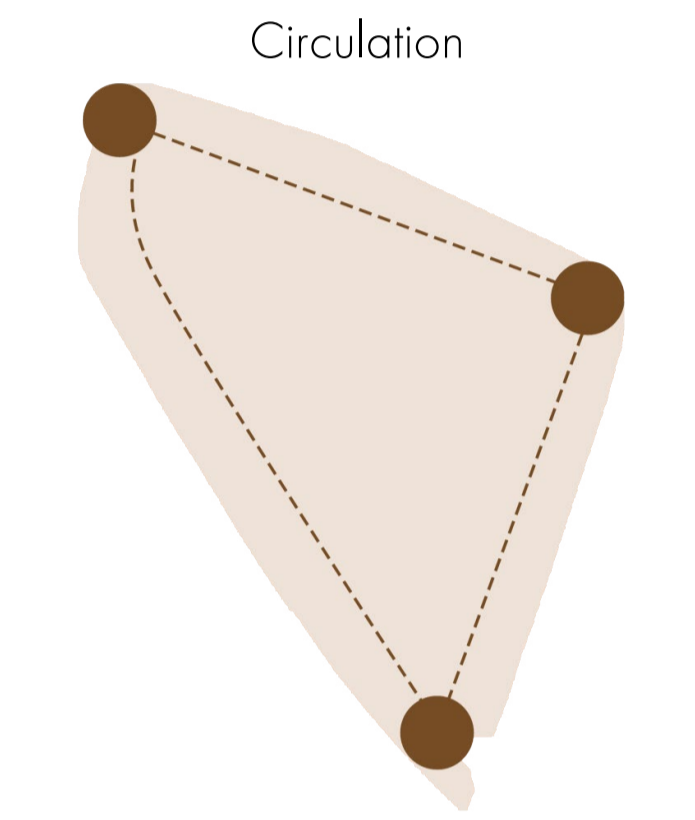
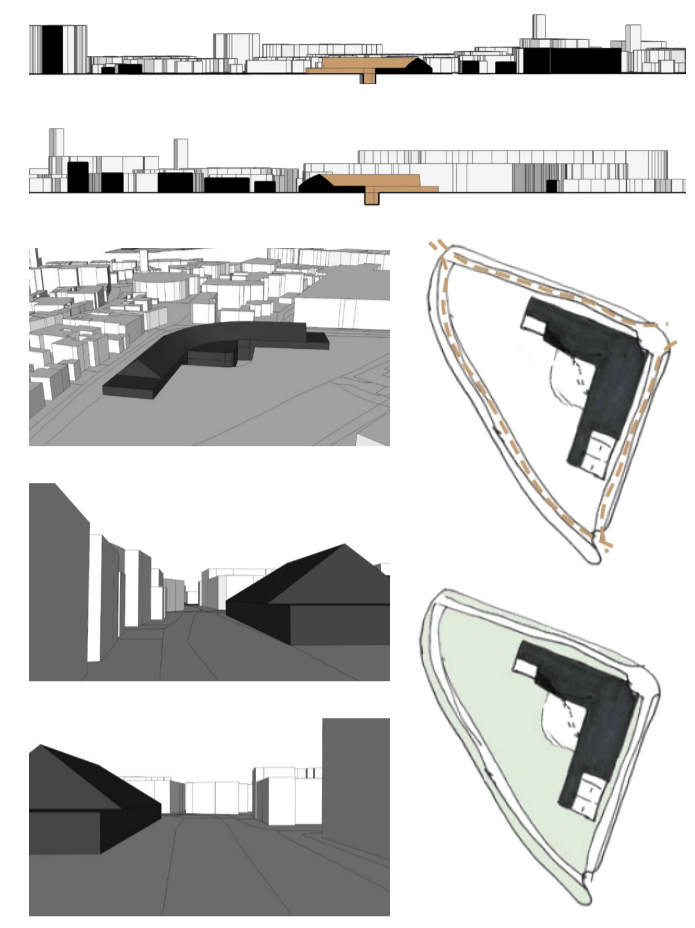
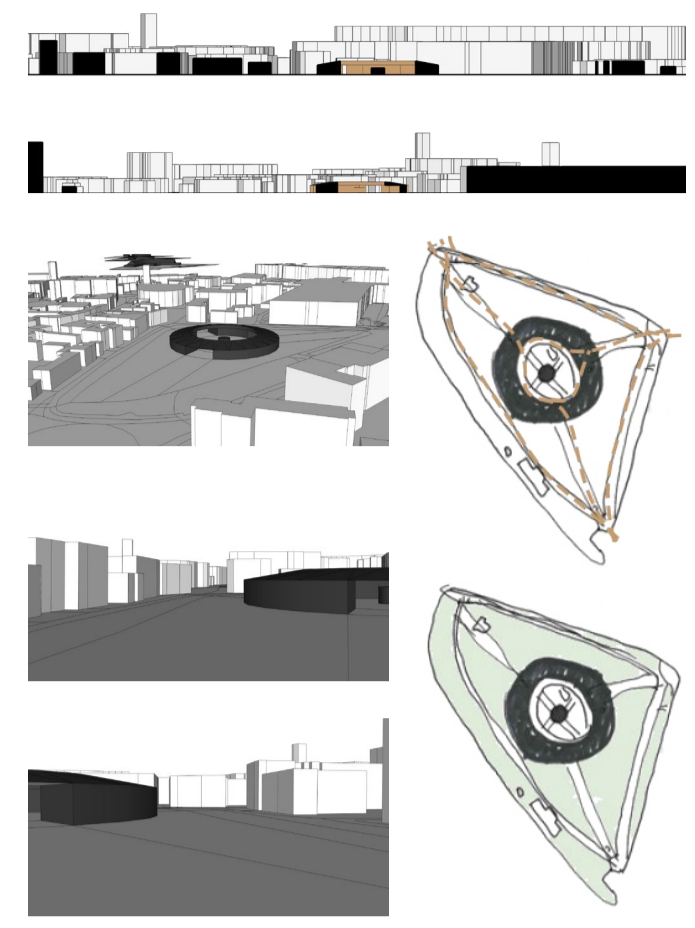
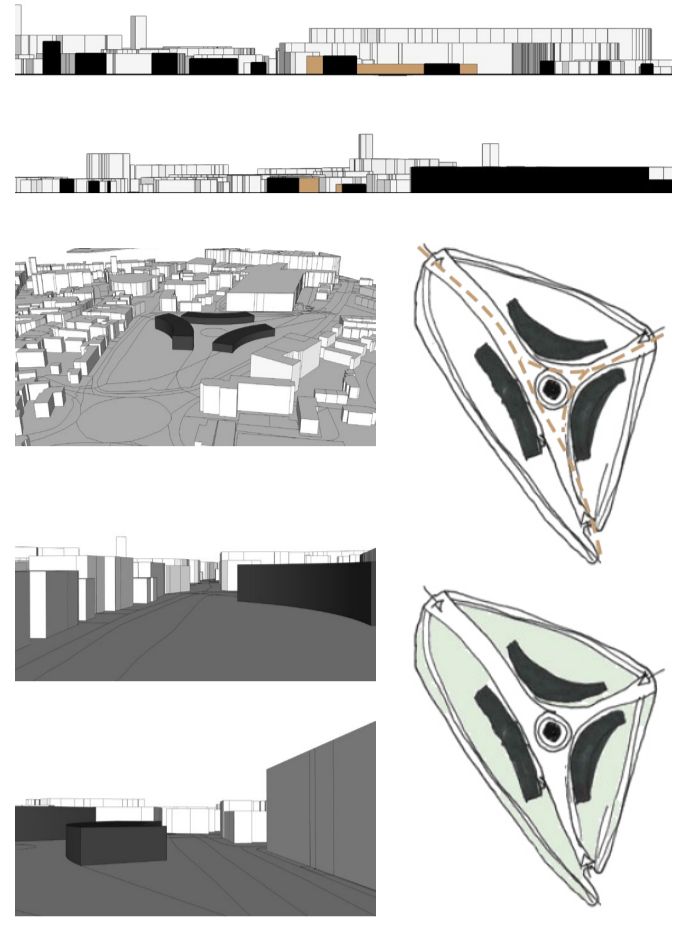


Site Zoning

This design accentuates the idea that the buildings can follow the circulation through the centre of the park.

This design illustrates the idea of natural form shapes and a main central space of the community.

This design follows the lines of the site and opens up the central space as more of a park for more activities.



Site - 1:1000

1. Main Structure
2. Park Space
3. Children's Area
4. Green Sloped Seating
5. Calm Seating Area
6. Parking



Trees

- Strong for climbing
- Non-toxic
- Suitable for sandy land



Oak



Maple



Willow

Children's Playground 1:500

This area is specialised for children, holding a green space for relaxation and mental and physical wellbeing, separated from the larger main park space with seating for children or parents. There are rammed earth walls with a small slide and swing set incorporated for children to play around and a large cylindrical rammed earth structure and slide to be used as an escape from sun and as a quieter space, inspired by nearby old city walls. The use of rammed earth connects this layout back to the main design and to its themes of using natural yet solid materiality from the desert.



Trees

- Strong on slope
- Good for shading
- Noise Insulation



Western red cedar



Spruce



White Maple

Green Sloped Seat 1:500

This area is more open for use due to its sloped nature. It is a good space for relaxation and eating for low amounts of times like picnics and eating lunches on lunch break. It could also be used as a seating area with shows, activities or movies being shown in the larger park area, such as sports days, matches, circuses and if a temporary screen is put up between the trees, cinema nights. This could be a way to bring in money to the site by charging for tickets. The slope and wall of trees at the top also provide acoustic insulation from the nearby road to the South West of the site.



Trees

- Small rooted
- Smaller
- Less damage to pavement



Cherry Blossom



Dwarf Maple



Dogwood

Calm Seating Area 1:500

This area is specified as a seated route through a simple garden. It is designed for a more calm atmosphere separated from the more active open park area. This space is populated with seating constructed from rammed earth and timber planks to connect this design to the main structure and its desert architectural motifs. The route is also made from natural organic forms to connect to the natural materiality of the design and biophilia of the park. This space is placed closest to the parking to allow easy access to seating for the elderly, acoustically protected by the old city wall.



Roof

- Contrasts grounded forms with light and tall structure
- Mirrors Norwich Cathedral arches
- Glazing allows ventilation and natural light
- Prevents claustrophobic interior

First-Floor

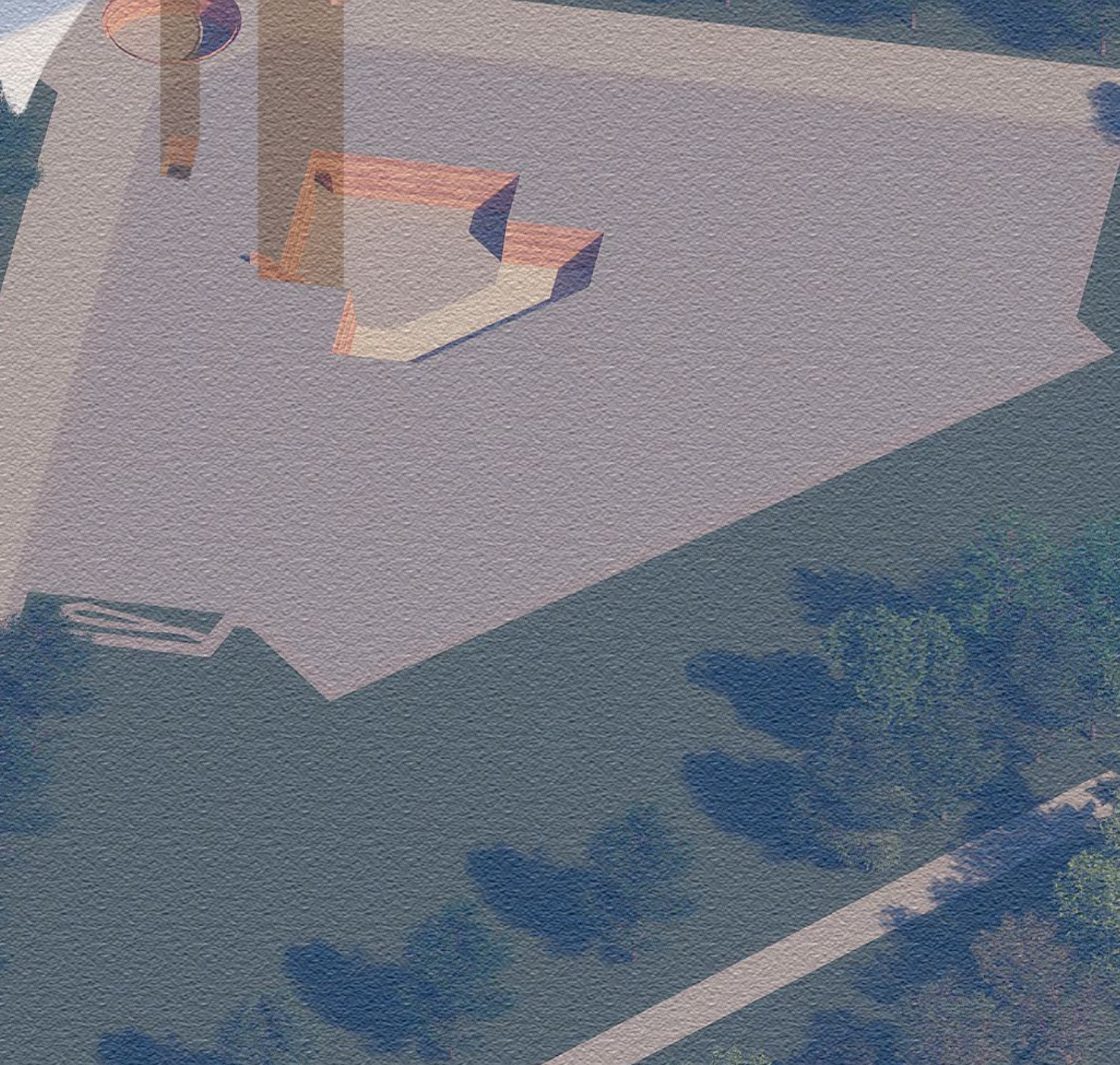
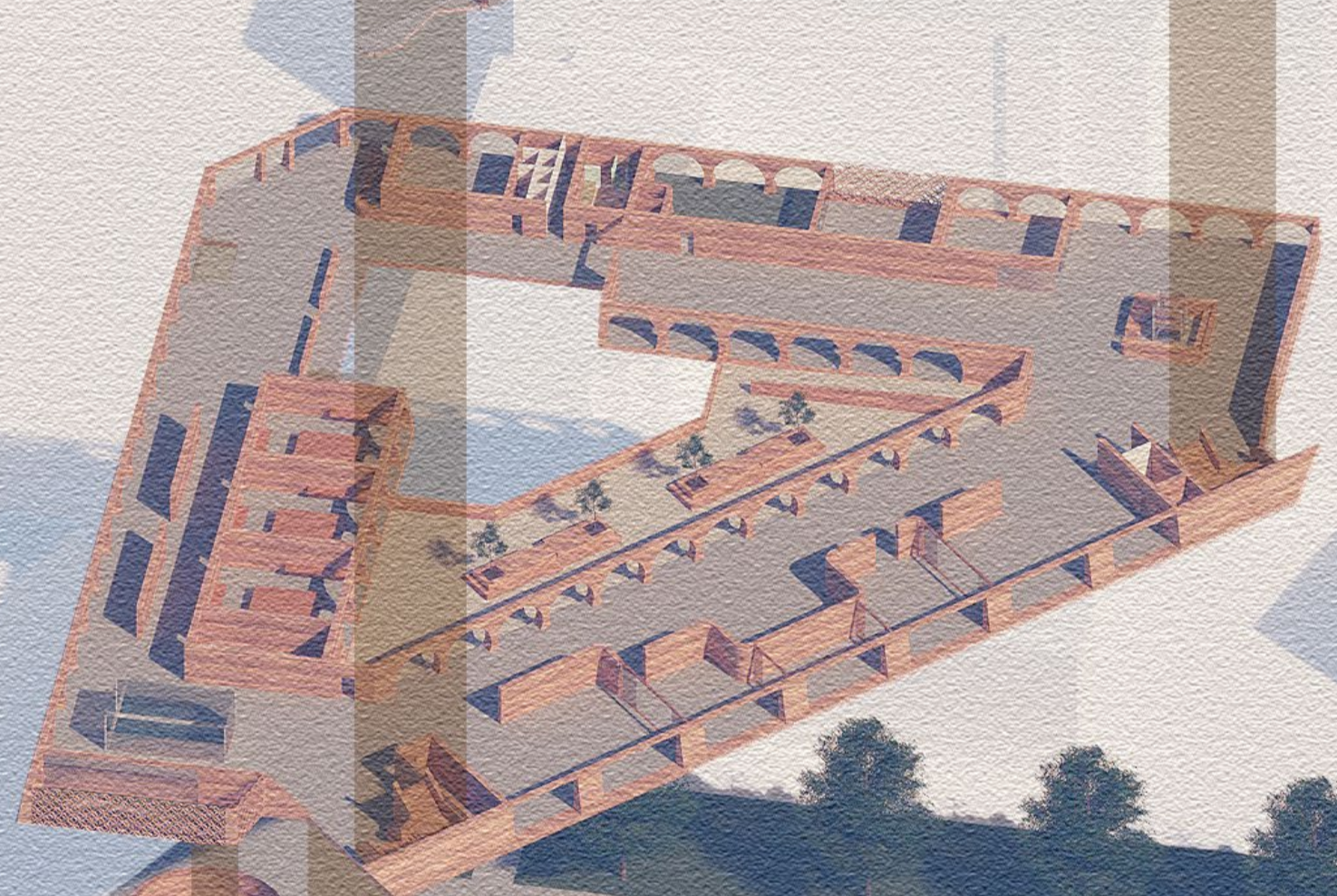
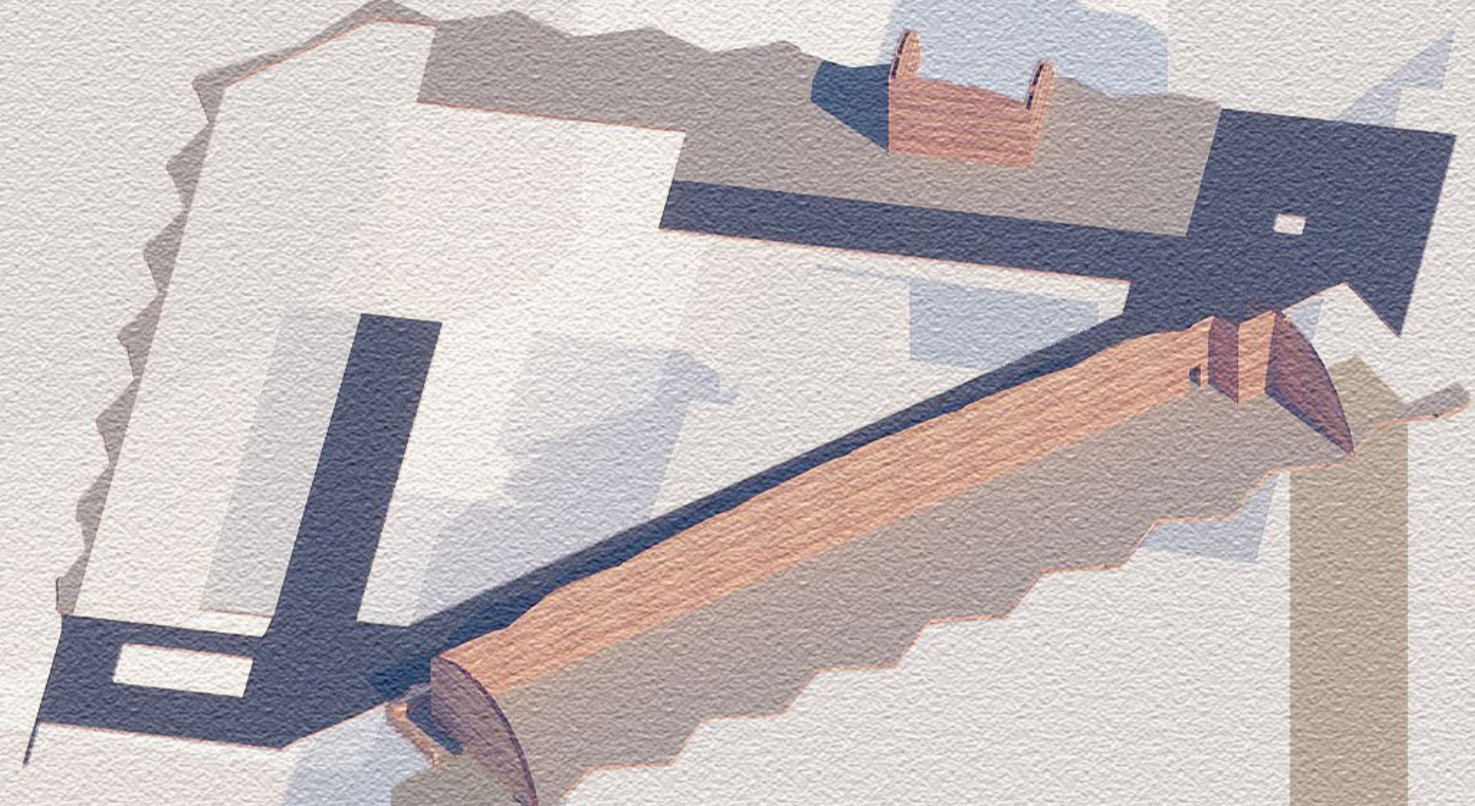
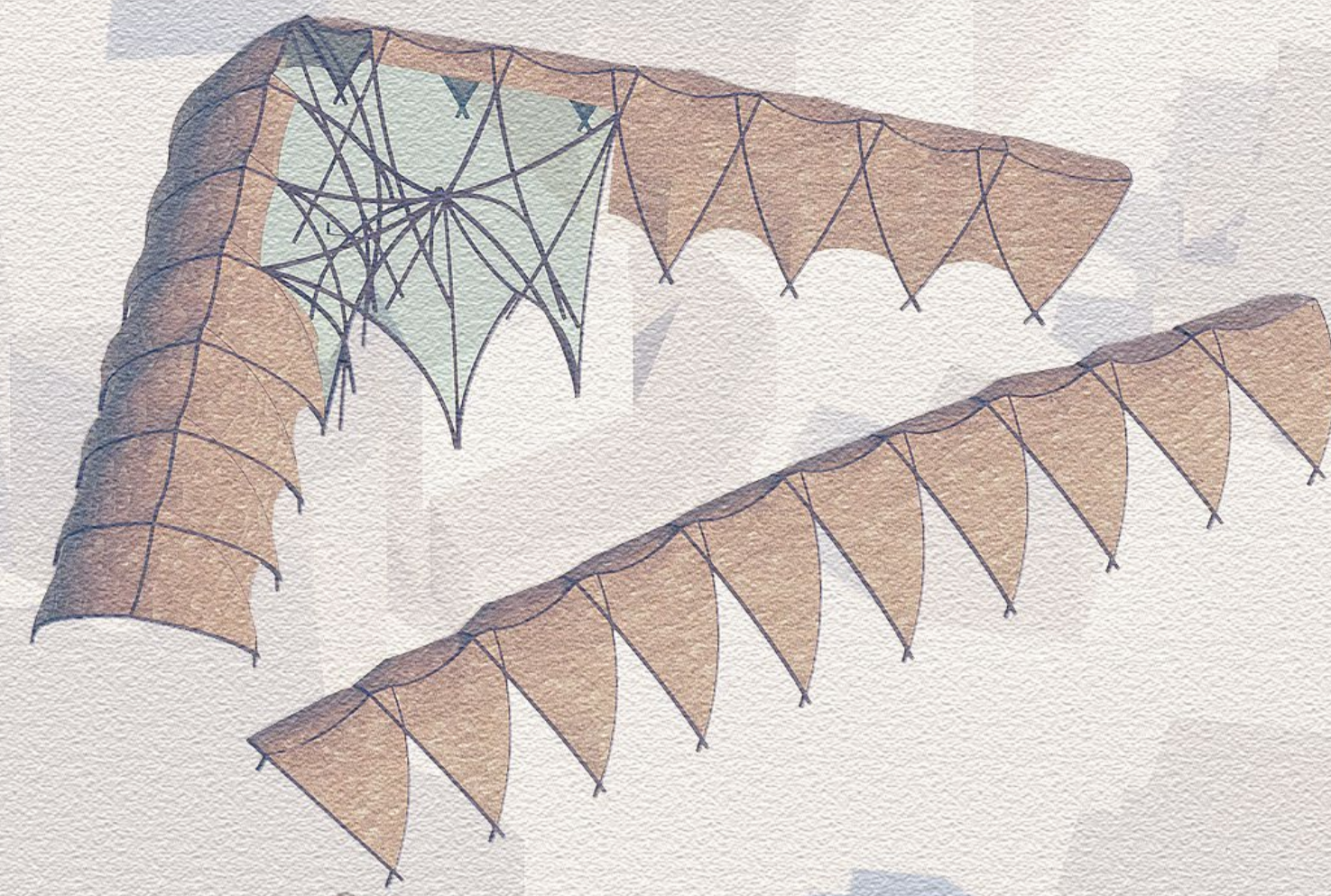
- Connects ground floor materiality with monumental height of the roof
- Space for more open and large events

Ground-Floor

- Heavy, thick and strong materiality illustrates a structure that is grounded, almost of the earth itself
- Thick facade emphasised by recessed windows
- Slanted walls illustrate weight of the ceiling and strength of the walls

Basement-Floor

- Mirrors building into ground of vernacular earth designs
- Uses thermal mass of the ground
- Sensory experience of cave-like interior
- Supplies earth for wall structures



Roof Structure



Thatch Finish

Thatch is being used in the roof design due to its vernacular use in both desert and East Anglian culture. It is an effective insulation and a natural resource that can be found locally from farms. The natural aspect also connects to the use of natural materials that are effective in providing a space with suitable temperatures.



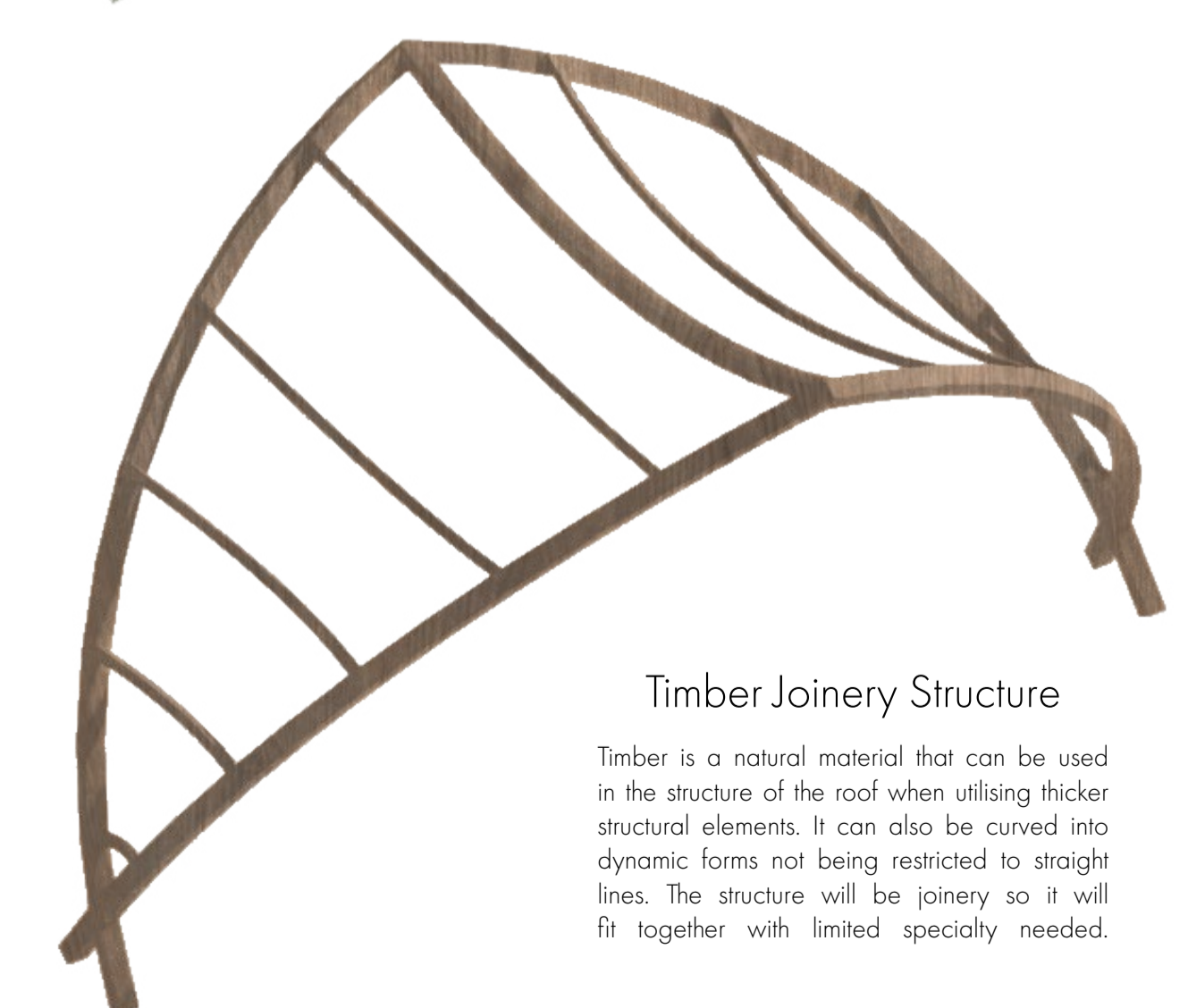
Waterproof layer and Air Gap

Waterproof layer protects the interior and the rest of the structure from any moisture from the outside. A batted air gap also provides insulation and allows a place for moisture to escape.



Rolled Insulation

Insulation keeps the interior at a stable temperature, however rolled insulation must be used due to the curved form of the roof as board insulation is flat. In addition sheep's wool could be used for a more natural alternative.

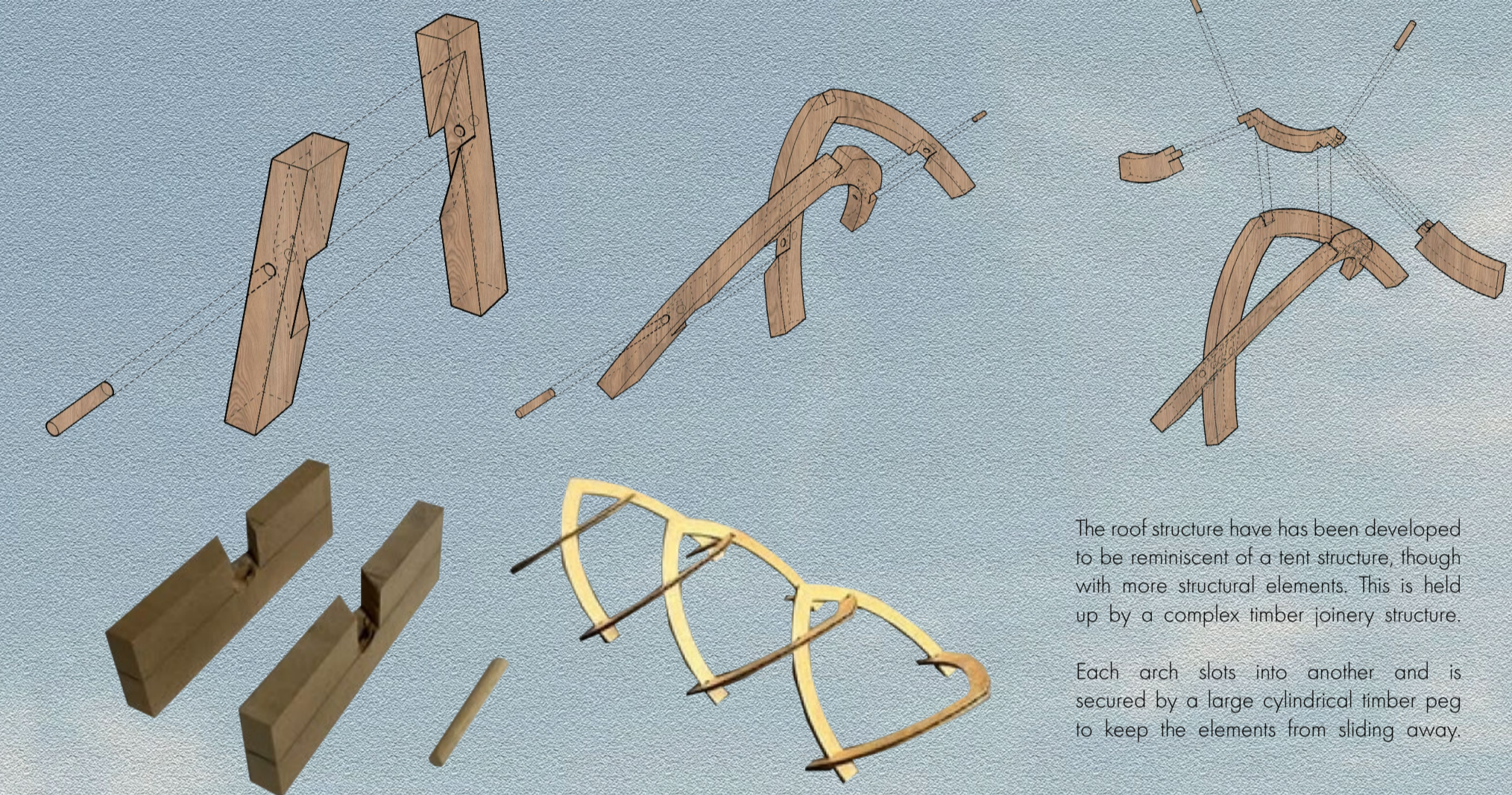


Timber Joinery Structure

Timber is a natural material that can be used in the structure of the roof when utilising thicker structural elements. It can also be curved into dynamic forms not being restricted to straight lines. The structure will be joinery so it will fit together with limited specialty needed.



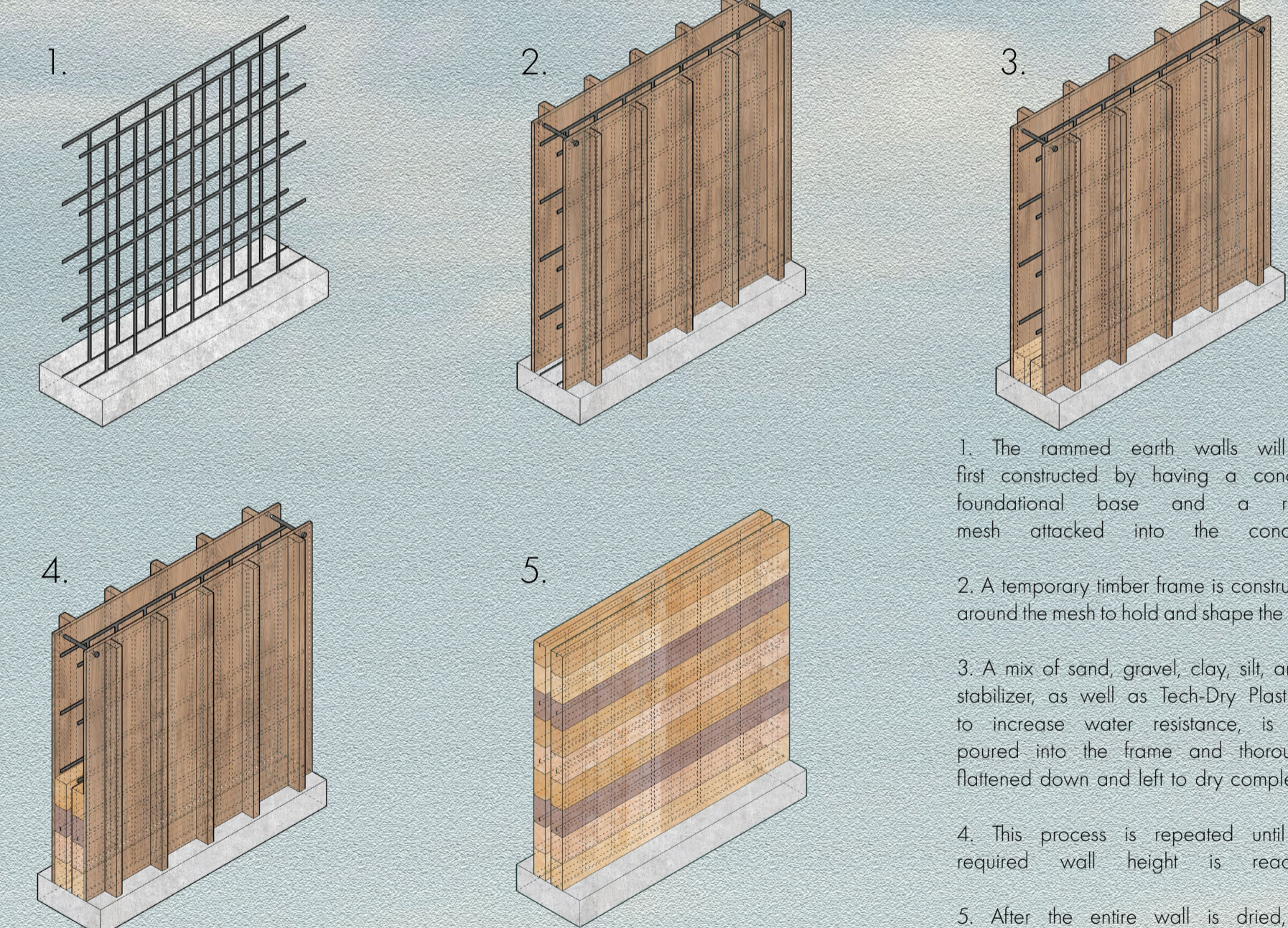
Timber Structure Joinery



The roof structure has been developed to be reminiscent of a tent structure, though with more structural elements. This is held up by a complex timber joinery structure.

Each arch slots into another and is secured by a large cylindrical timber peg to keep the elements from sliding away.

Rammed Earth Construction



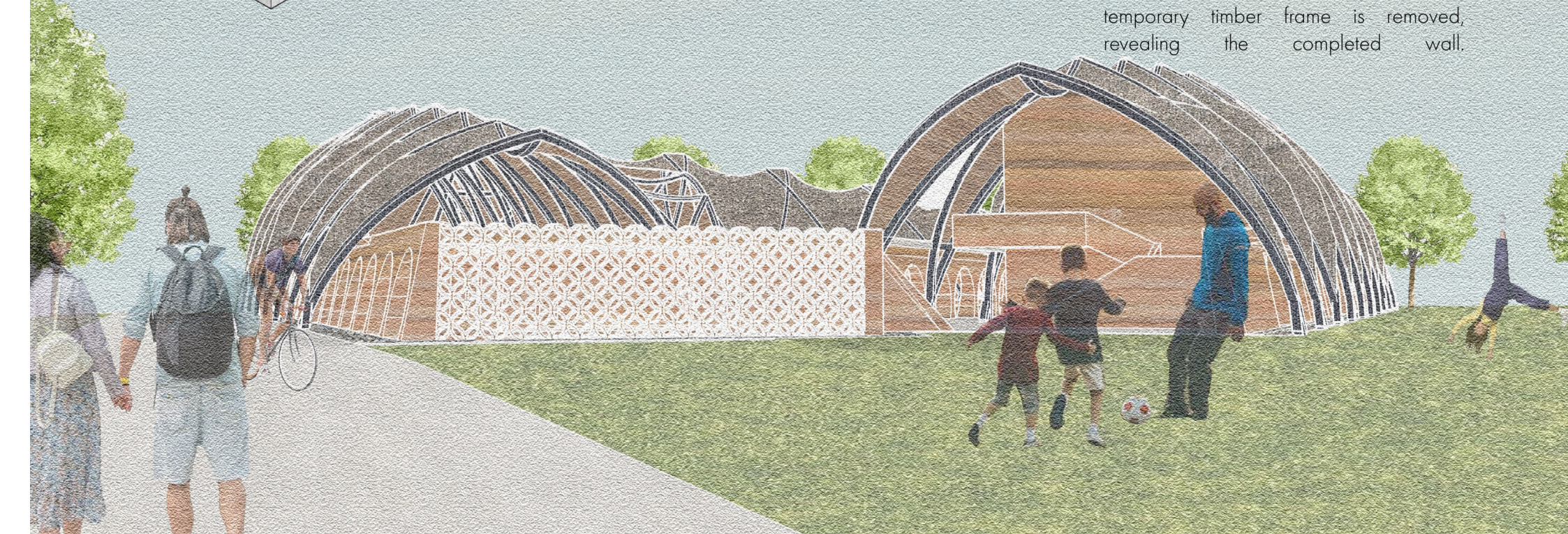
1. The rammed earth walls will be first constructed by having a concrete foundational base and a rebar mesh attached into the concrete.

2. A temporary timber frame is constructed around the mesh to hold and shape the wall.

3. A mix of sand, gravel, clay, silt, and a stabilizer, as well as Tech-Dry Plasticure to increase water resistance, is then poured into the frame and thoroughly flattened down and left to dry completely.

4. This process is repeated until the required wall height is reached.

5. After the entire wall is dried, the temporary timber frame is removed, revealing the completed wall.





Materiality



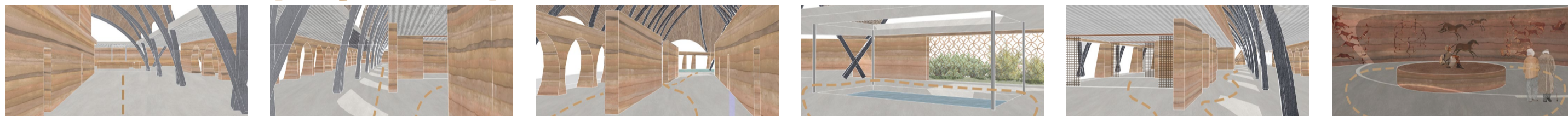
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| <p>Rammed Earth</p> <ul style="list-style-type: none"> Thermal mass Locally obtainable Sustainable Used in desert architecture | <p>Charred Timber</p> <ul style="list-style-type: none"> Structural Locally obtainable Sustainable Burned connects to the desert | <p>Lined Limecrete</p> <ul style="list-style-type: none"> Thermal mass Directional texture for interior Embodied carbon reduced compared to concrete | <p>Polished Concrete</p> <ul style="list-style-type: none"> Thermal mass Smooth for feet and wheelchairs Smooth contrasts with rammed earth and limecrete textures | <p>Slate</p> <ul style="list-style-type: none"> Resistant to both water and fire Long Lasting Natural texture Found in Norfolk | <p>Thatch</p> <ul style="list-style-type: none"> Efficient Insulator Used in UK and desert design Sustainable Locally obtainable |
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Form Development

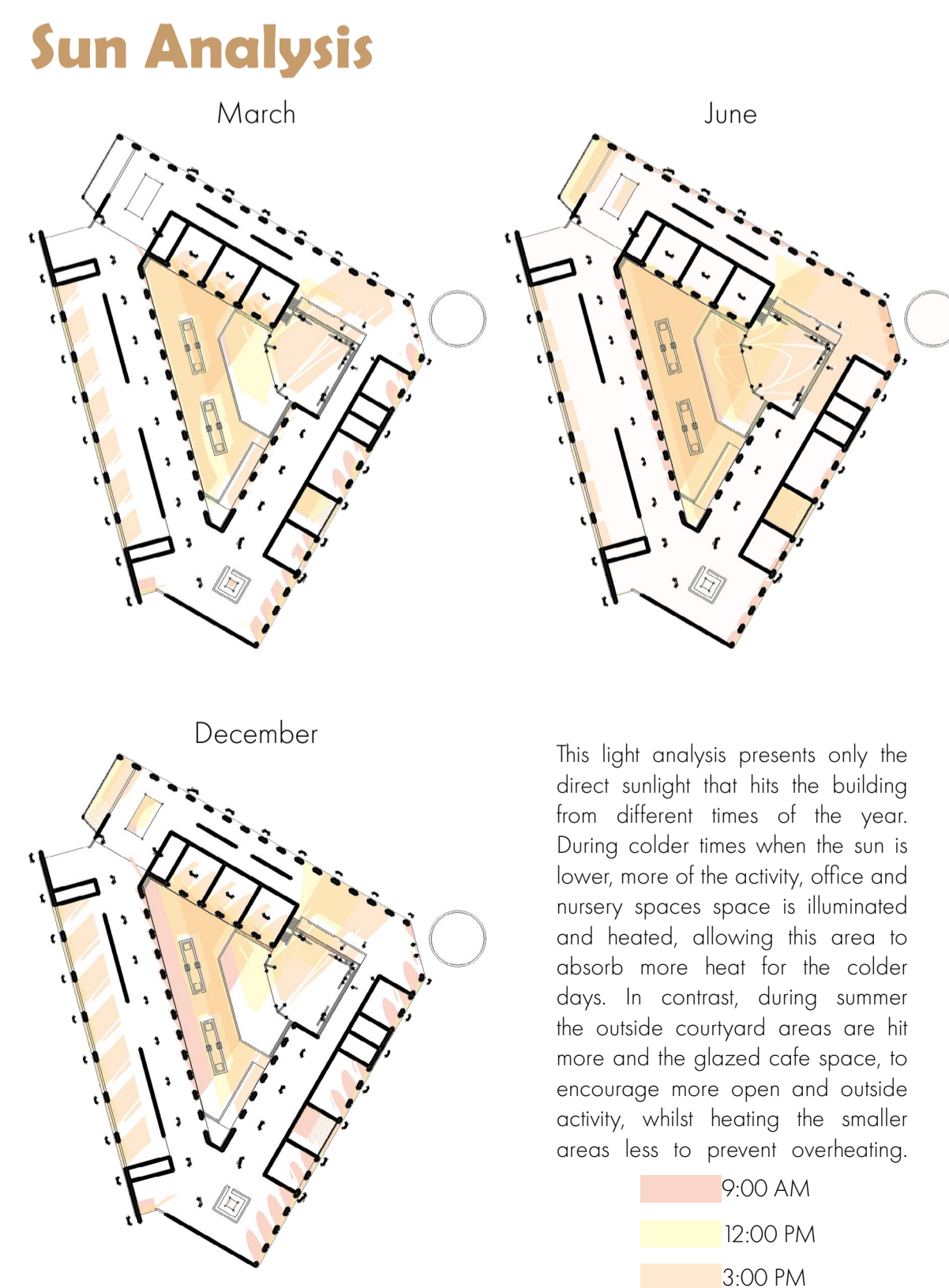
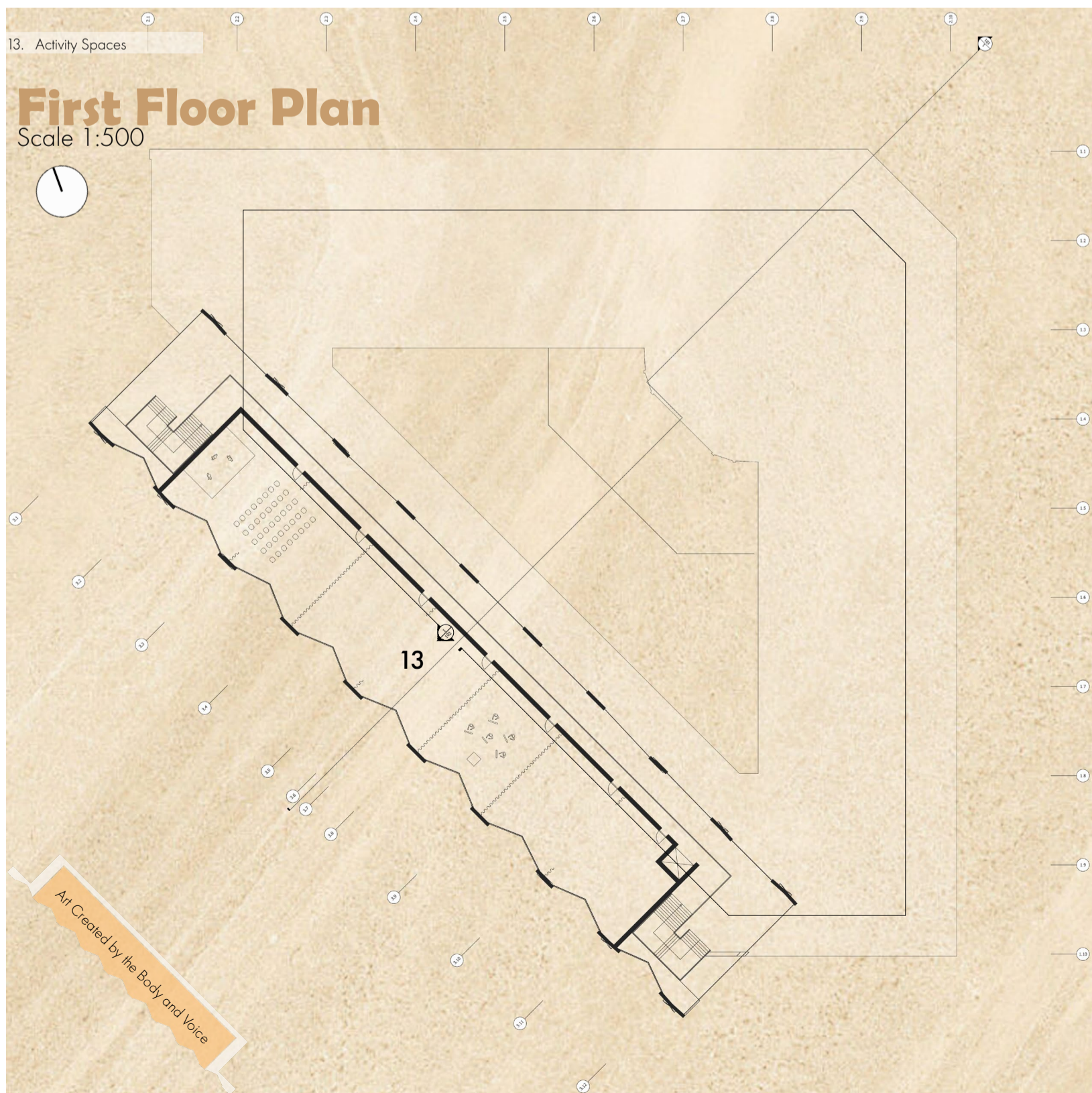


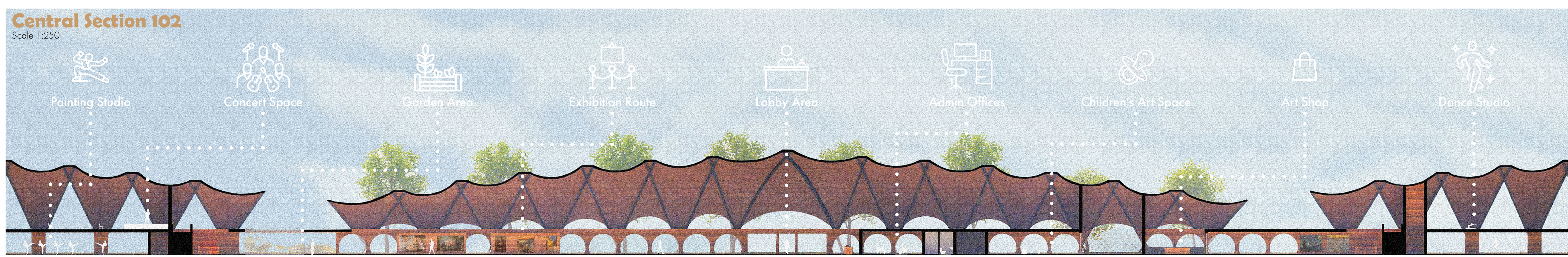
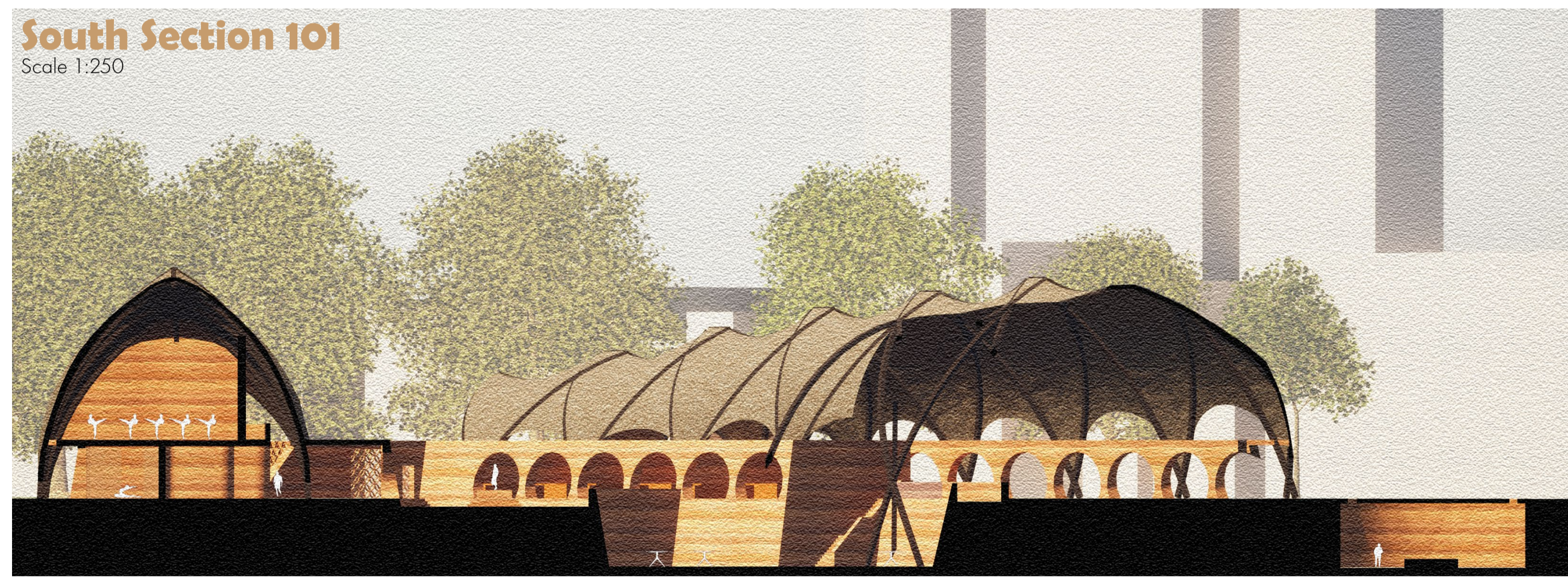
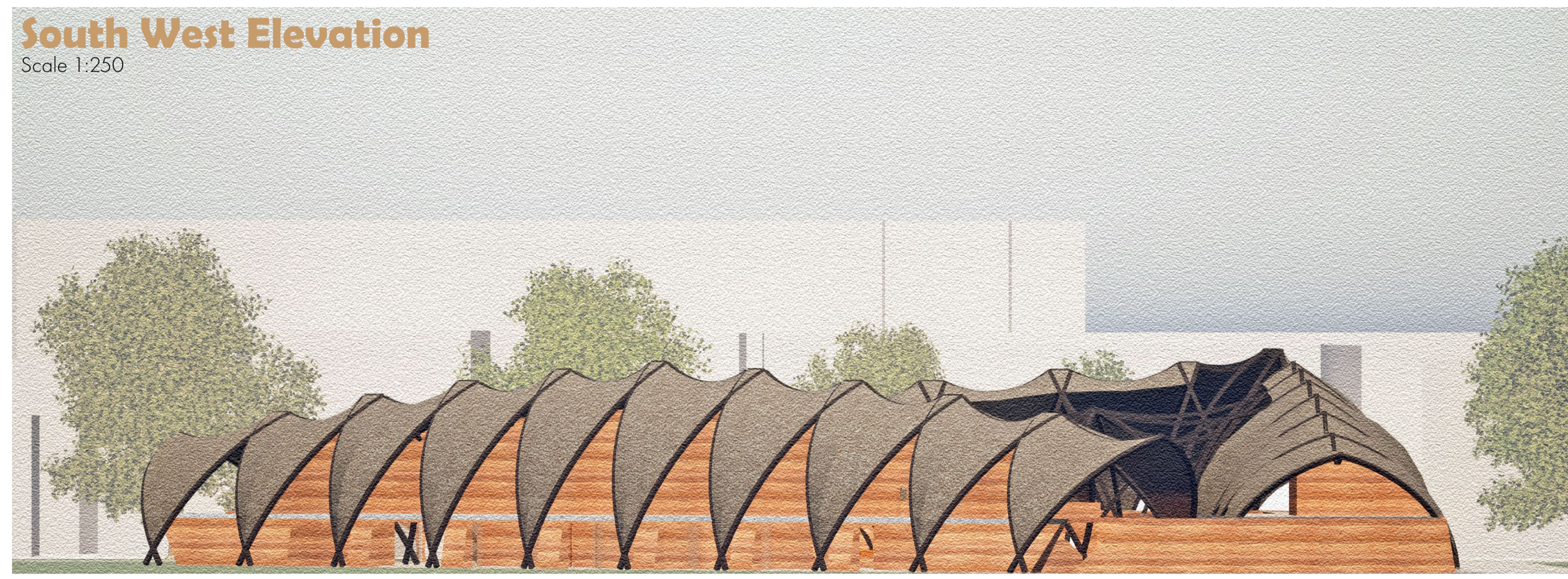
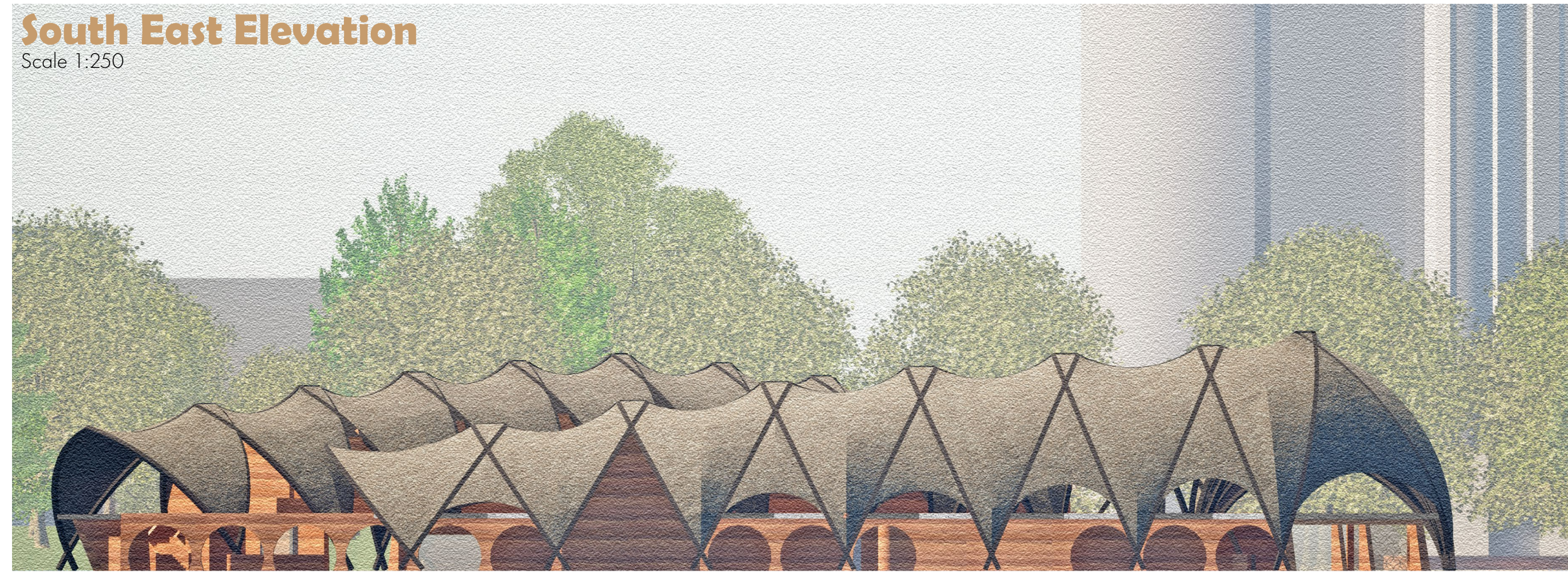
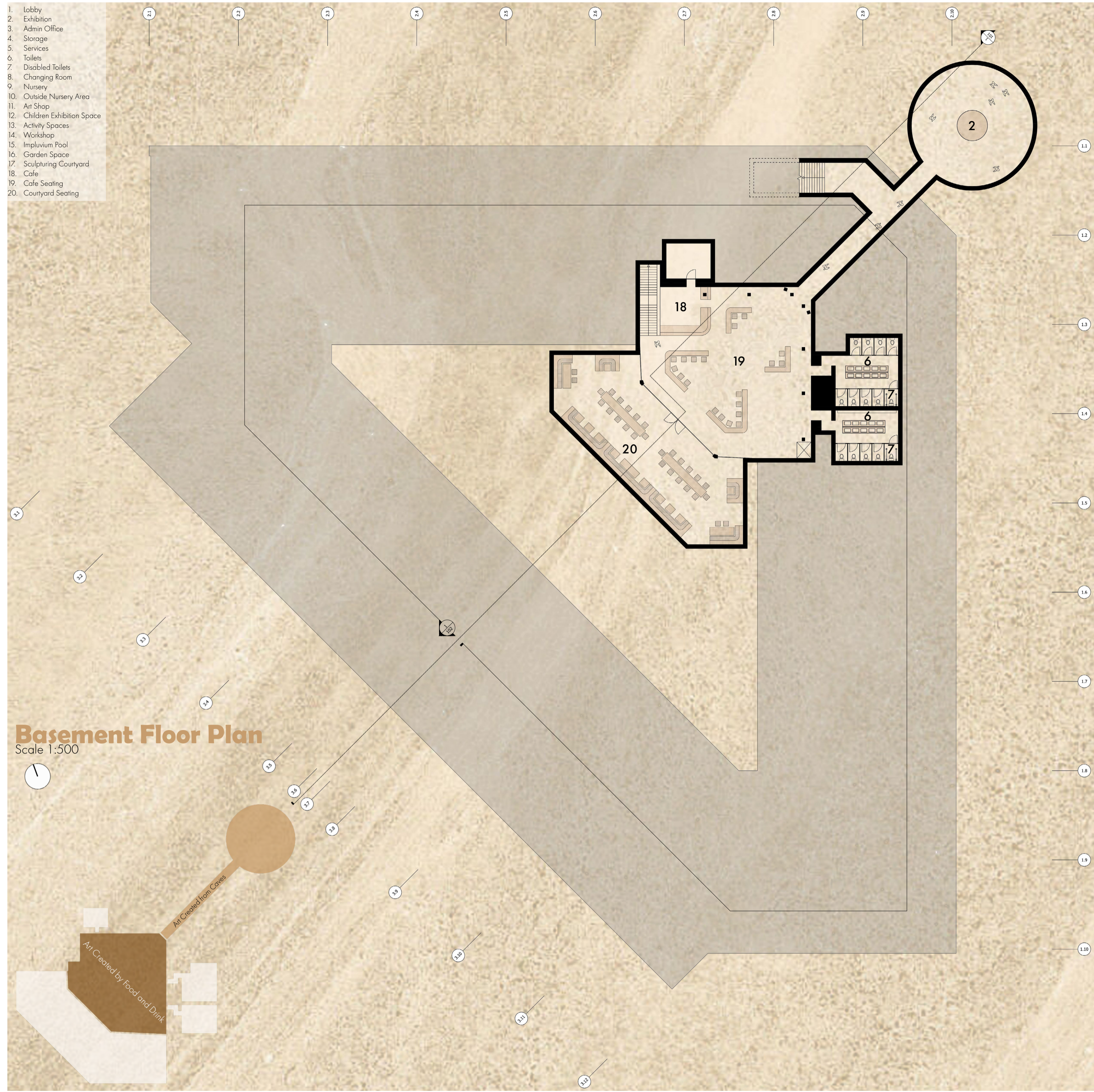
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| <p>Form Following Site</p> <p>Form to follow the parameter of the site to allow walkways around the site to follow the building.</p> | <p>Give Field Space</p> <p>Open up the green space to provide biophilic properties and allow the community to still use the park.</p> | <p>Access to Field</p> <p>Shorten sides to allow easy access into the large green space.</p> | <p>Tent Roof Form</p> <p>Incorporate the dynamic roof design to give the structure height and monumentality.</p> | <p>Dig into the Ground</p> <p>Incorporate design into the ground for thermal mass, visual connection to the desert and use the earth to construct the walls.</p> | <p>Encase a Courtyard</p> <p>Connect the sides to create a courtyard, a staple of design, also adding more spaces for workshops and views to the park.</p> |
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Exhibition Display Concept

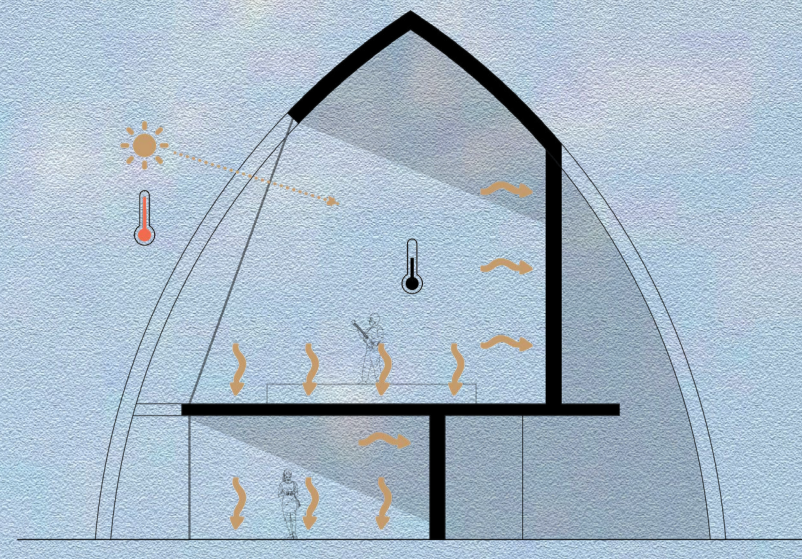


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| <p>Two Sided Exhibition</p> <p>Single hallway doesn't allow many opportunities for exhibition.</p> | <p>Separated Exhibition</p> <p>Middle wall separates the space but allows more exhibition area.</p> | <p>Criss Cross Exhibition</p> <p>Split middle walls allow more exhibition space with better circulation.</p> | <p>Natural Surroundings</p> <p>Circular zone to see exhibition on walls, views of the greenery and the water impluvium element.</p> | <p>Exhibition-Activity Split</p> <p>Broken walls separate walkway exhibition and the workshop spaces without officially separating them.</p> | <p>Cyclical Exhibition</p> <p>Circular element allows art on walls to be observed with a central element being viewed at all times.</p> |
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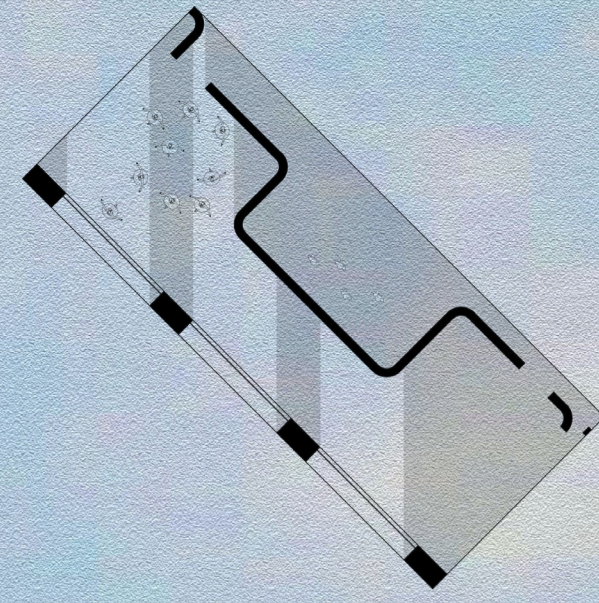


Sustainable Elements of the Project



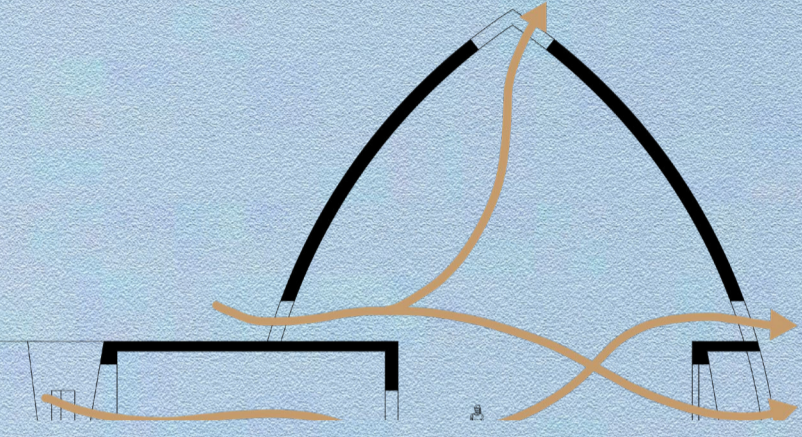
Thermal Mass

Thermal mass of local and natural materials to absorb heat and regulate temperature of interior spaces.



Orientation

Orientation to create shadow for cooling or in non-desert environments orient so heat can go into the building.



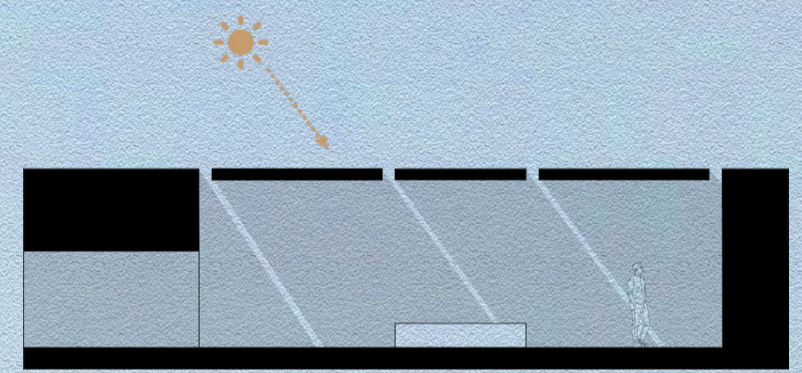
Ventilation

Ventilation to cool the room and give the interior spaces fresh air from the outside.



Jali

The Jali controls light and the heat from the sun for temperature control, as well as allowing ventilation without letting in too much wind.



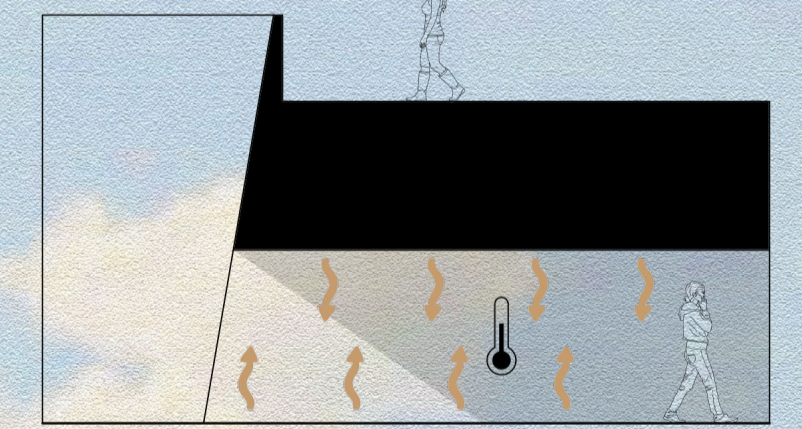
Light Wells

Light wells let in sunlight for lighting up a space naturally but also means less heat is brought into the space from the sun.



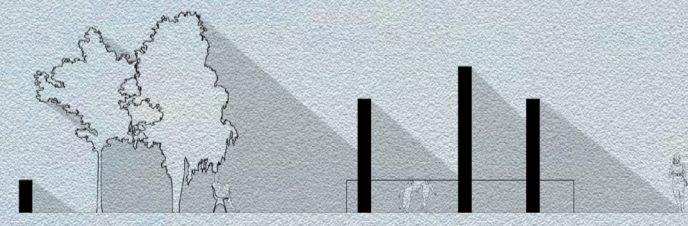
Impluvium

Impluviums are a pool of water in central zones used to store water, however in a modern city it would be more useful as a natural Centre piece for a calm area.



Built into the Ground

Building into the ground allows easy natural cooling of the rooms due to thermal mass, also uses the local materials and provides materials for external building.

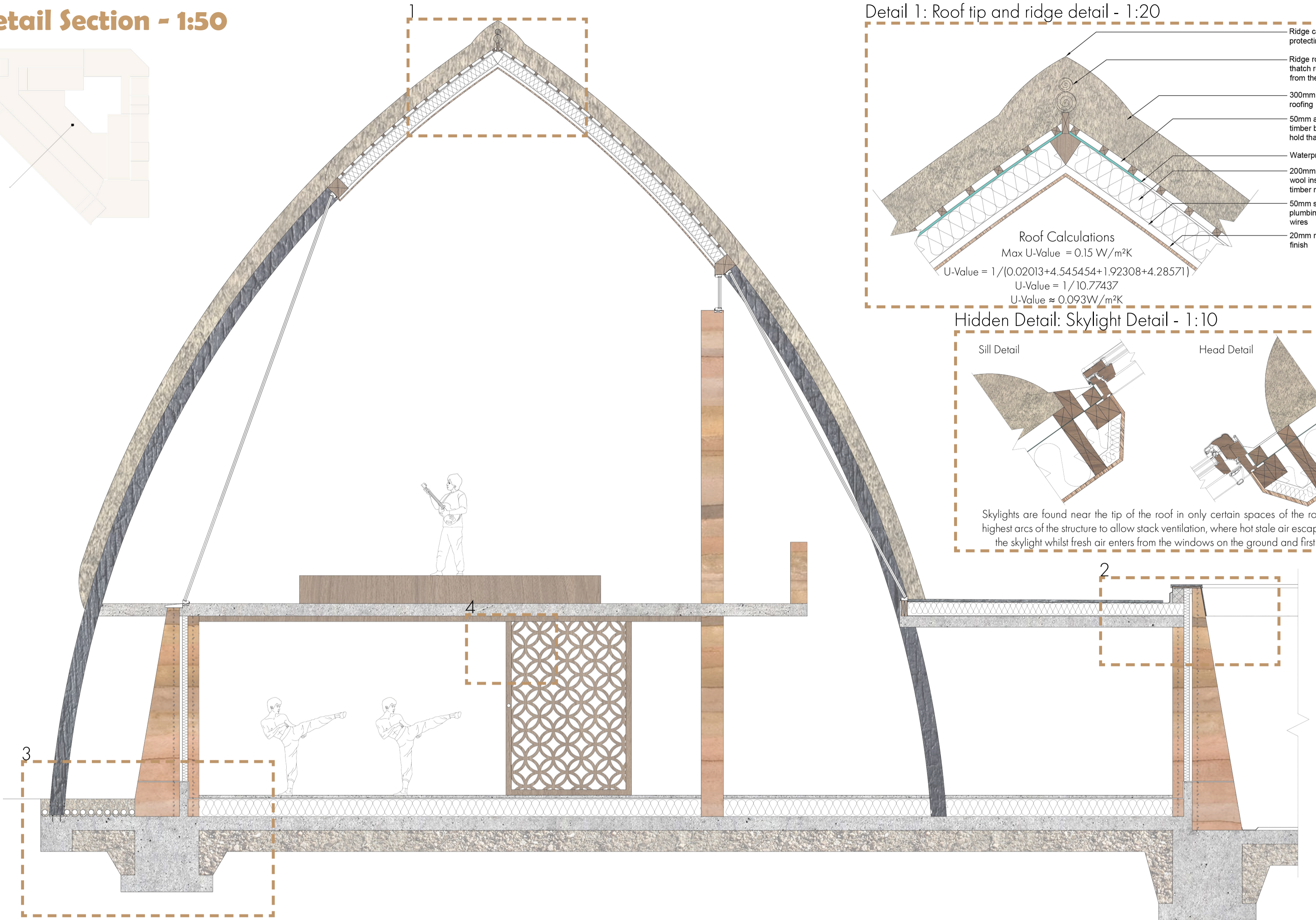
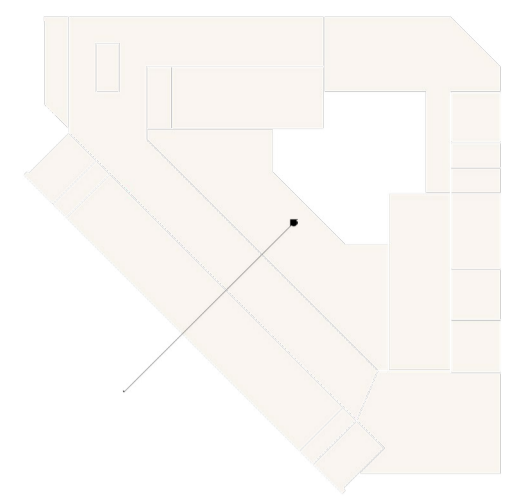


Natural Shading

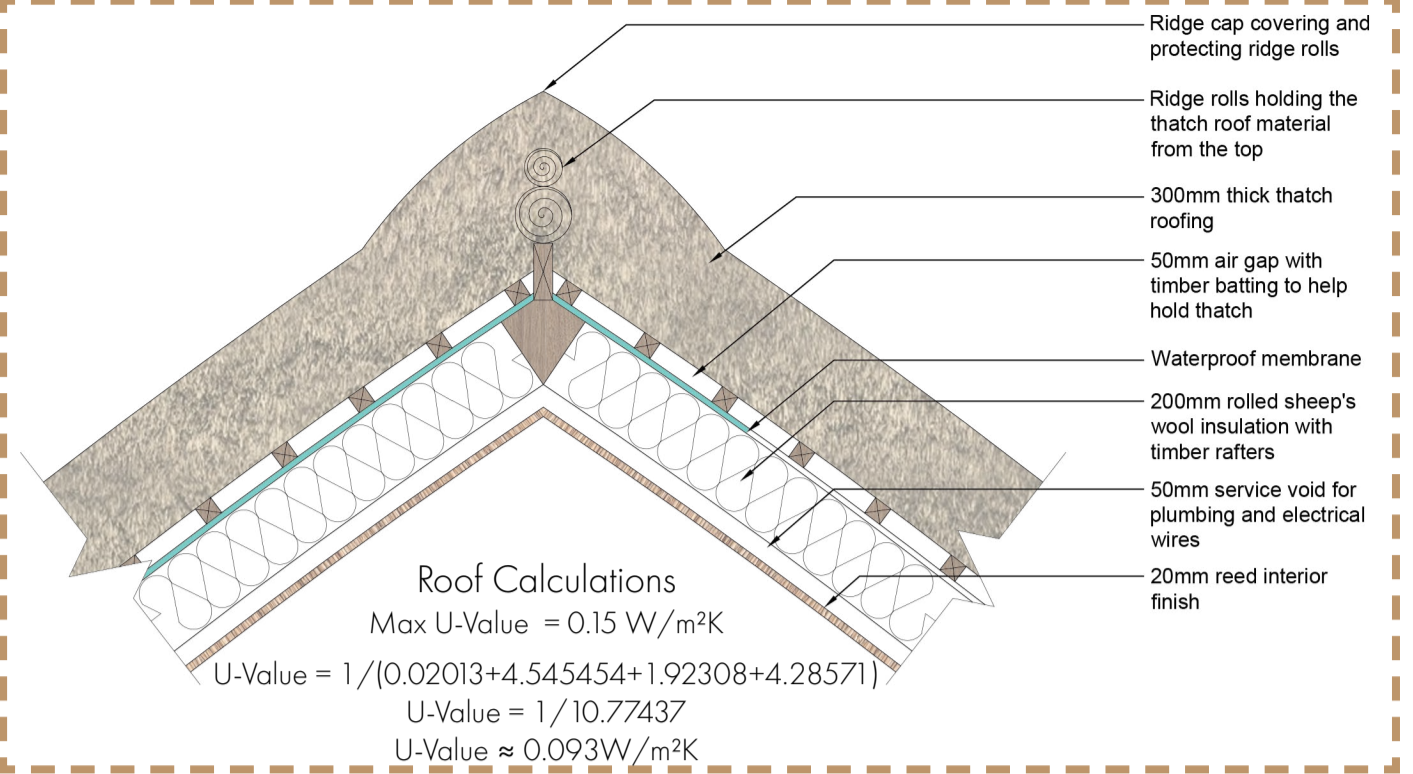
Vegetations provides passive free shading to help cool areas during the summer, and due to the leaves falling during the winter, this way of shading does not cool the design in the colder months.



Detail Section - 1:50

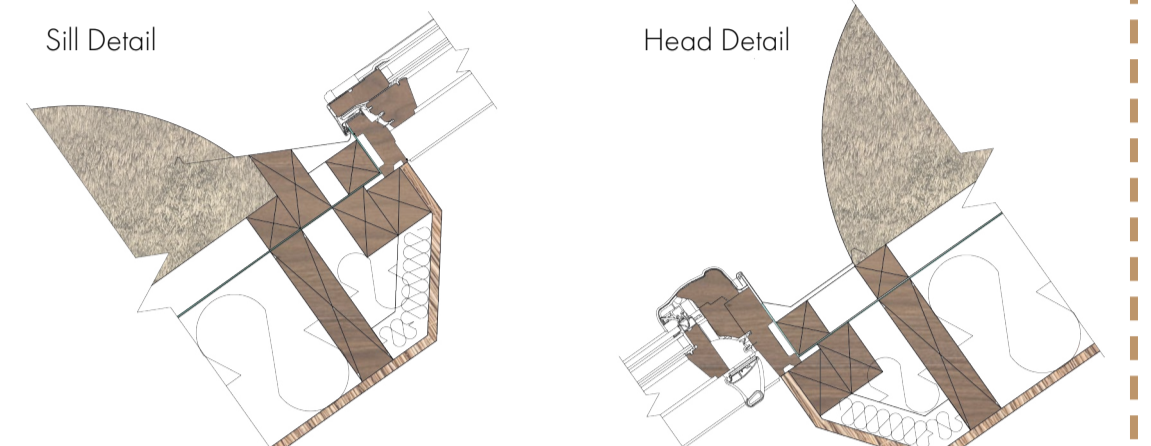


Detail 1: Roof tip and ridge detail - 1:20



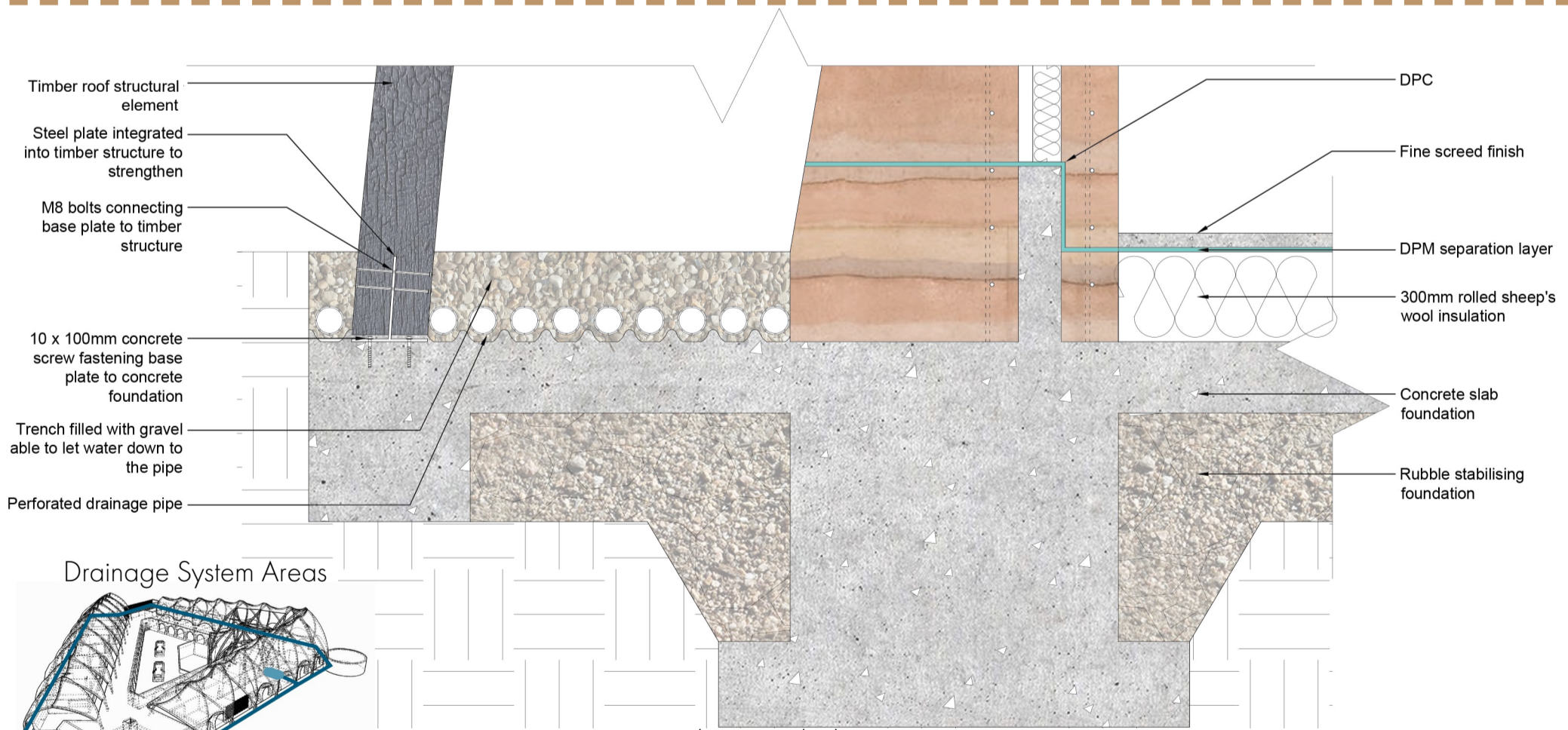
Roof Calculations
 Max U-Value = 0.15 W/m²K
 $U-Value = 1 / (0.02013 + 4.545454 + 1.92308 + 4.28571)$
 $U-Value = 1 / 10.77437$
 $U-Value = 0.0933 W/m²K$

Hidden Detail: Skylight Detail - 1:10



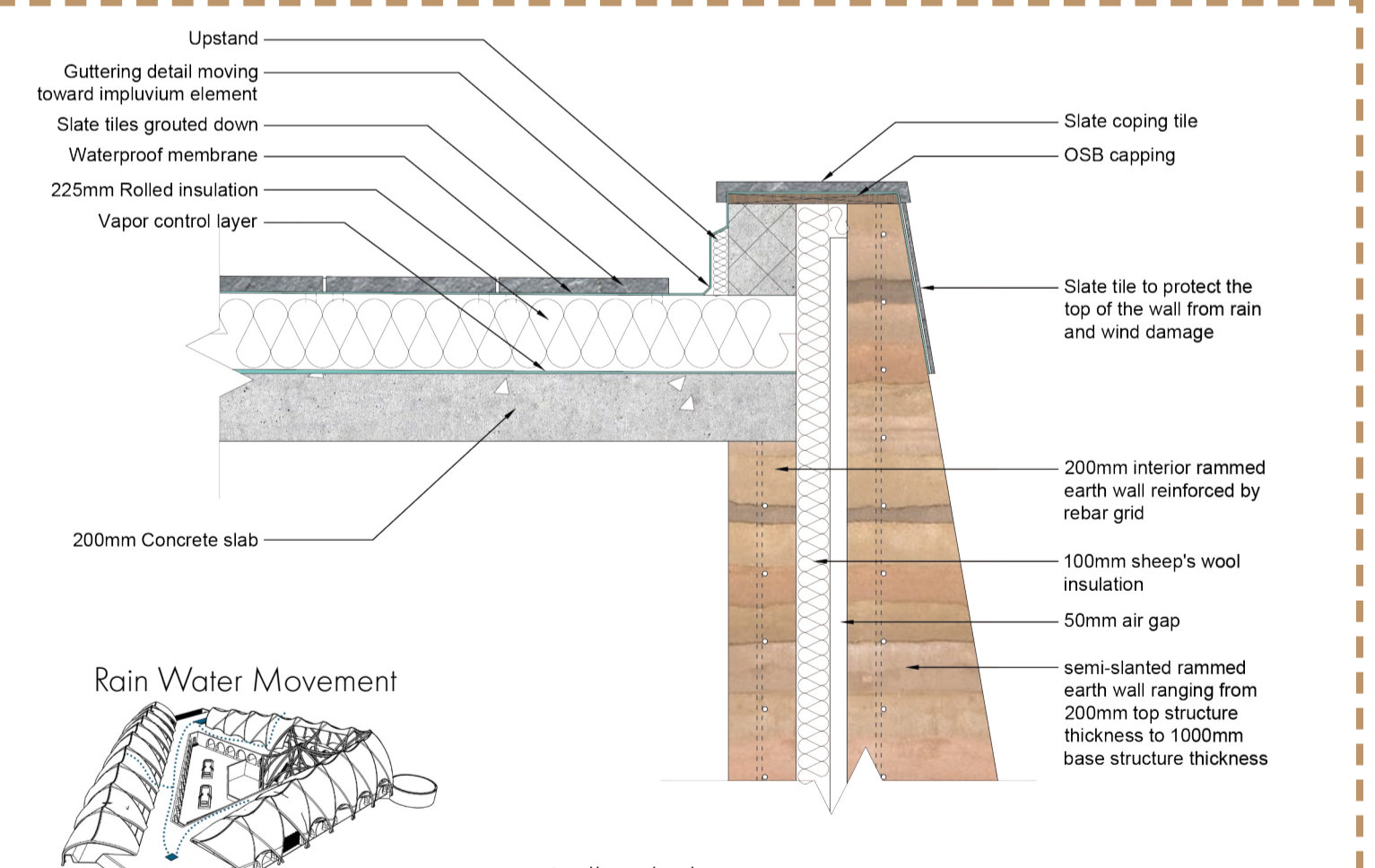
Skylights are found near the tip of the roof in only certain spaces of the roof in the highest arcs of the structure to allow stack ventilation, where hot stale air escaping from the skylight whilst fresh air enters from the windows on the ground and first floor.

Detail 3: Foundation and ground drainage - 1:20



Foundation Calculations
 Max U-Value = 0.22 W/m²K
 $U-Value = 1 / (0.10345 + 6.81818 + 0.08889 + 0.25641)$
 $U-Value = 1 / 7.26693$
 $U-Value = 0.138 W/m²K$

Detail 2: Slightly slanted roof, gutter and wall - 1:20



Wall Calculations
 Max U-Value = 0.18 W/m²K
 $U-Value = 1 / (0.2857 + 4.54545 + 1.92308 + 0.2857)$
 $U-Value = 1 / 7.03994$
 $U-Value = 0.142 W/m²K$

Detail 4: Sliding jali screens - 1:5

