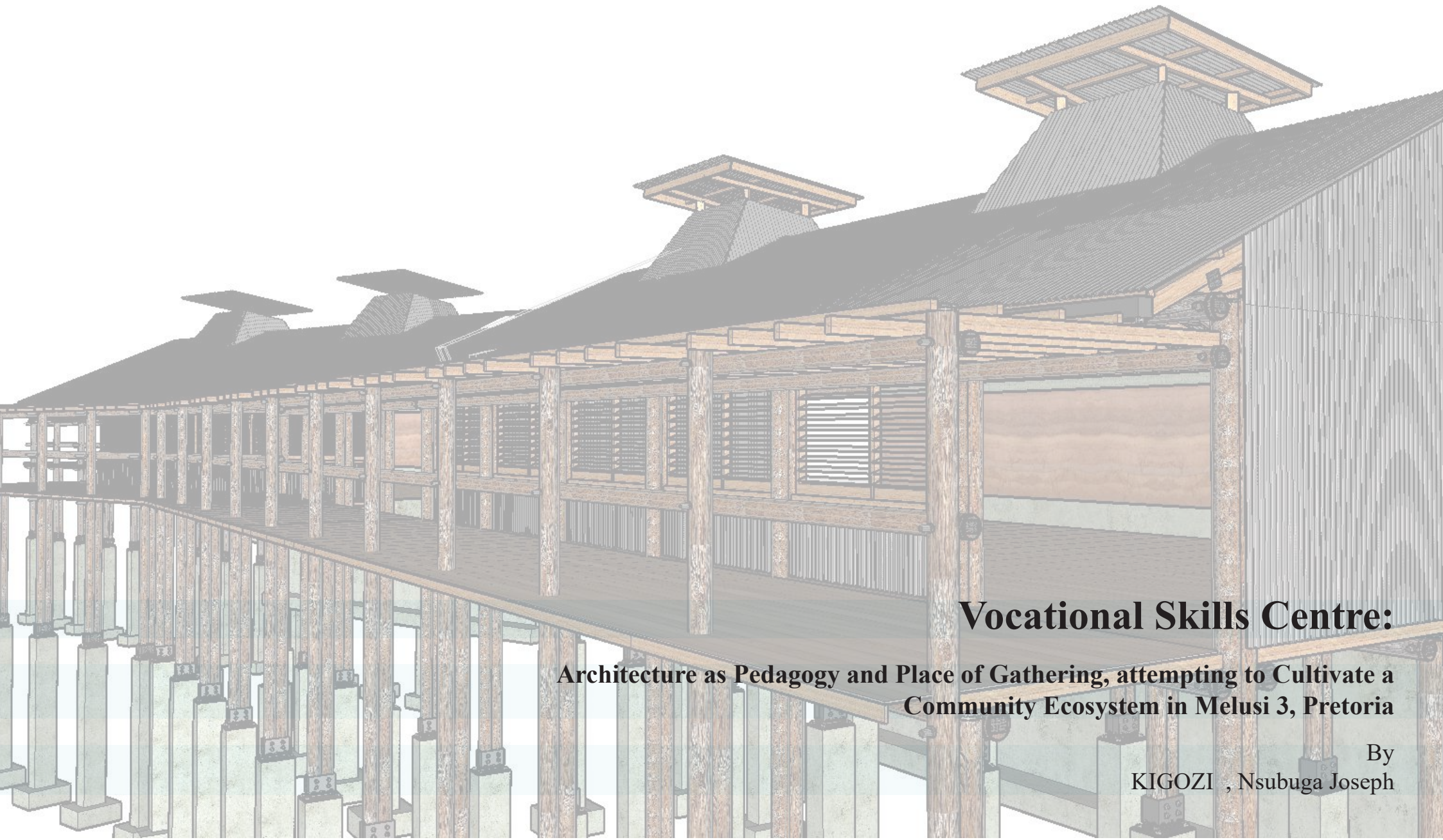




Vocational Skills Centre:

Architecture as Pedagogy and Place of Gathering, attempting to Cultivate a Community Ecosystem in Melusi 3, Pretoria

By
KIGOZI , Nsubuga Joseph

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Melusi 3, Pretoria**

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Submitted in fulfilment of the requirements for the degree

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in the

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(Department of Architecture)

at the

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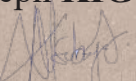
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Date of Submission: 10th October 2025

Declaration:

I declare that this dissertation is entirely my own work and does not include any plagiarised material. All sources consulted to compile this document have been properly referenced.

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Signature: 

Date: 08th November 2025

Keywords: *The third teacher, Thirdspace, third place, place-making, adaptability, learning spaces, vocational skills training, regenerative practices, resilient spaces*



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Fig 2: It takes a village to raise a child (author, 2025).

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Abstract:

Through architectural adaptability and resilience, residents of informal settlements can unlock environmental potential, improving socio-economic and ecological situations and opportunities to support themselves within their context. This dissertation investigates how regenerative and regional practices can support vocational teaching through architectural place-making and architecture as a third teacher, serving as a Thirdspace in the informal settlement of Melusi, Pretoria. A vocational skills centre, integrated within the community physically, ecologically, and socially, can potentially create an environment that passively teaches the residents of Melusi 3 informal settlement, while also supporting their active learning, sharing, and growth of their vocational skills. The design of the vocational skills centre aims to create opportunities for residents to build agency within the community by supporting them in acquiring marketable skills that can also be used to improve the conditions within their immediate and broader community contexts. An appreciation of the community's potential and needs is synthesised through analysing the site, community engagement information, lessons from case studies and precedent buildings, together with theoretical explorations of architectural resilience, architectural adaptability, and the concept of the third teacher, in the proposed design. The proposed design aims to demonstrate that architecture can passively teach, support active learning, and ultimately contribute to the improvement of socio-economic and ecological conditions in informal settlements, thereby enhancing the overall conditions in these settings.

Key Words:

The third teacher, Thirdspace, third place, place-making, adaptability, learning spaces, vocational skills training, regenerative practices, resilient spaces

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1. Introduction

In the heart of the Melusi 3 neighbourhood, the most recent extension of the informal settlement of Melusi in Pretoria, South Africa, lies an abandoned sand quarry and its banks – a silent testament and scar to the area's industrial past. This dissertation proposes transforming this dormant site into a vocational training centre. This reimagines the site as a dynamic educational environment that serves not only as a place of learning but also as a catalyst for community engagement and cultural expression.

The Melusi Vocational Training Centre offers an opportunity to re-imagine architecture as an agent of empowerment, education and community integration. This theoretical framework unites multiple architectural ideas: architecture as a place of teaching and learning, informal vernacular responses, and economic, civic, and ecological resilience and adaptability to establish a cohesive vision of the project. More specifically, the dissertation explores the concept of architecture as a third teacher, -space, and -place, while also investigating ecological resilience and adaptability by means of tectonics, detailing, and modular construction. The approach prioritises functionality, legibility, cultural grounding, and material engagement as educational tools for both users and builders who are also part of the user group in that informal urban area.

Urban informality, climate resistance, and education for sustainable development are emerging issues worldwide. The rapid growth of urban areas, particularly the informal settlements, has increased due to the movement of people from rural areas and other countries, in search of opportunities. These settlements are characterised by inadequate infrastructure, including community facilities, a lack of formal education opportunities, and poor environmental resilience. (UN-Habitat, 2020).

The urban areas in South Africa are not immune to characterisation that stems from urbanisation. The youth, particularly those in the informal settlements, struggle with unemployment due to a lack of skills.

In Pretoria, several informal settlements have grown on the outskirts of the central business district. The fastest-growing of them is the Melusi Informal settlement, situated to the Northwest of the inner city.

Following the completion of their studies, young people between the ages of 18 and 35 often struggle to secure jobs that enable them to earn a living and support their families. According to the international economic statistics website, “Trading Economics”, the Youth Unemployment Rate in South Africa in the second quarter of 2025 stood 62.20 per cent, with an average rate of 56.54 per cent from 2013 until 2025.(Trading Economics, 2025:online). While Stats South Africa estimates youth unemployment (aged 15-34 years), at 32.9% (StatsSA. 2024:online) Youth unemployment in South Africa presents one of the most pressing socio-economic challenges of a post-apartheid era. Its impact extends far beyond individual loss of income, as it is deeply entwined with cycles of poverty, inequality, and social exclusion (Cloete, 2015:516). The relationship between unemployment and poverty is one of “bi-directional casualty”: unemployment perpetuates poverty, while poverty itself reinforces unemployment (Cloete, 2015:516). Poverty in this sense is not simply the absence of resources, but the outcome of unequal social and economic relationships characterised by power imbalances, stigmatisation, and systemic exclusion from opportunities.

Work occupies a central role in human life, both psychologically and socially. It provides structure, purpose, recognition, and identity, while also connecting individuals to their communities (Cloete, 2015:517). Theologically and culturally, work and employment are regarded as intrinsic to human dignity and well-being. When work is absent, individuals experience not only material deprivation but also deep psychological harm. Research indicates that unemployment is associated with declining self-esteem, depression, anxiety, and a sense of meaninglessness, with particularly acute effects among young people who have never entered the job market and therefore lack financial and institutional support (Cloete, 2015:517).

The consequences of youth unemployment ripple outward into the broader social fabric. At a personal level, young people may experience feelings of powerlessness, self-estrangement, and isolation (Cloete, 2015:518). At a collective level, persistent unemployment fuels crime, social instability, and the erosion of human capital. Families and communities are destabilised, while young people increasingly view education as futile when it does not translate into work. The rise of the so-called “waithood”, which Dr Anita Cloete, Professor of Theology and Missiology, describes as the prolonged and uncertain transition from youth to adulthood (Cloete, 2015:520). “Waithood” further undermines aspirations for the future, as many young South Africans are forced to live in the present, focused on survival rather than long-term growth (Cloete, 2015:519).

Youth unemployment is not an individual misfortune but a structural and collective problem. It reflects and reproduces inequality, separating the “haves” from the “have-nots” through distorted power relations and systemic exclusion (Cloete, 2015:517). Its effects compromise both personal dignity and national development, posing a profound threat to social cohesion. (Cloete, 2015:519). Addressing this crisis therefore requires not only economic interventions but also educational and spatial strategies that restore agency, foster inclusion and equip young people with meaningful skills for sustainable livelihoods.

1.2 Theoretical Lenses and Research Question

In summary informal settlements present many of South African youths with several problems such as poor and lack of access to education, infrastructure, and amenities. However, within the same context, lies the potential to catalytically contribute towards solutions to their problems.

Panday, et al. (2012: 95-140) point out that education is central to the development of the youth. According to Graham and Mlatsheni (2015:51-59), one of the possible ways to address youth unemployment is to strengthen support for young people who do not access formal post-secondary education.

A local organisation, the Melusi Youth Development Organisation (MYDO), was set up to support the youth in their development. Under the leadership of MYDO's founder, Hlakudi, the organisation seeks to expand its impact in the informal settlement, with a focus on Melusi 3 since it lacks infrastructure. (Manna, 2024). For this dissertation project, the MYDO serves as the hypothetical client.

Central to my approach is the Reggio Emilia notion of architecture as a “Third Teacher.” (Edwards, C. et al., 2011) Loris Malaguzzi, the founder of Reggio Emilia schools, explains how the learning environment plays a vital role in making learning meaningful. Malaguzzi terms this idea the “Third teacher” or a physical space that facilitates “principles of children’s thinking, questioning, and curiosity” (Biermeier, 2015: online), which posits the environment as the “third teacher”, emphasising that thoughtfully designed spaces can significantly influence learning outcomes.

Complementing this is Homi Bhabha’s concept of the “Third Space”, first developed in “The Location of Culture” (1994). Third Space refers to the interstitial spaces where hybrid identities and cultures emerge (1994: 37-38). In the context of Melusi 3, a community rich in cultural diversity and resilience, the vocational centre is envisioned as a “Third Space” –a place where traditional knowledge and contemporary skills intersect, fostering innovation and inclusivity.

Furthermore, the project draws inspiration from “The Great Good Place” (1989) by Ray Oldenburg. Oldenburg’s idea of the “Third Place” highlights the importance of informal public gathering spaces in fostering community ties. By incorporating communal areas such as open workshops, gardens and social hubs, the centre aims to become a central node in the community’s social fabric, promoting interaction beyond the confines of formal education.

From the preceding local challenges and the possibilities offered by the notions of the third teacher, -place, and -space, the research question reads:

How can regenerative and regional practices assist vocational teaching through architecture as a third teacher, space and place in the informal settlement of Melusi, in Pretoria?

From this research question, the project aims to develop a vocational skills centre, that not only facilitates learning but provide infrastructure that actively assists in teaching and is adaptive to community gathering and the hybrid meeting between the formal and informal.

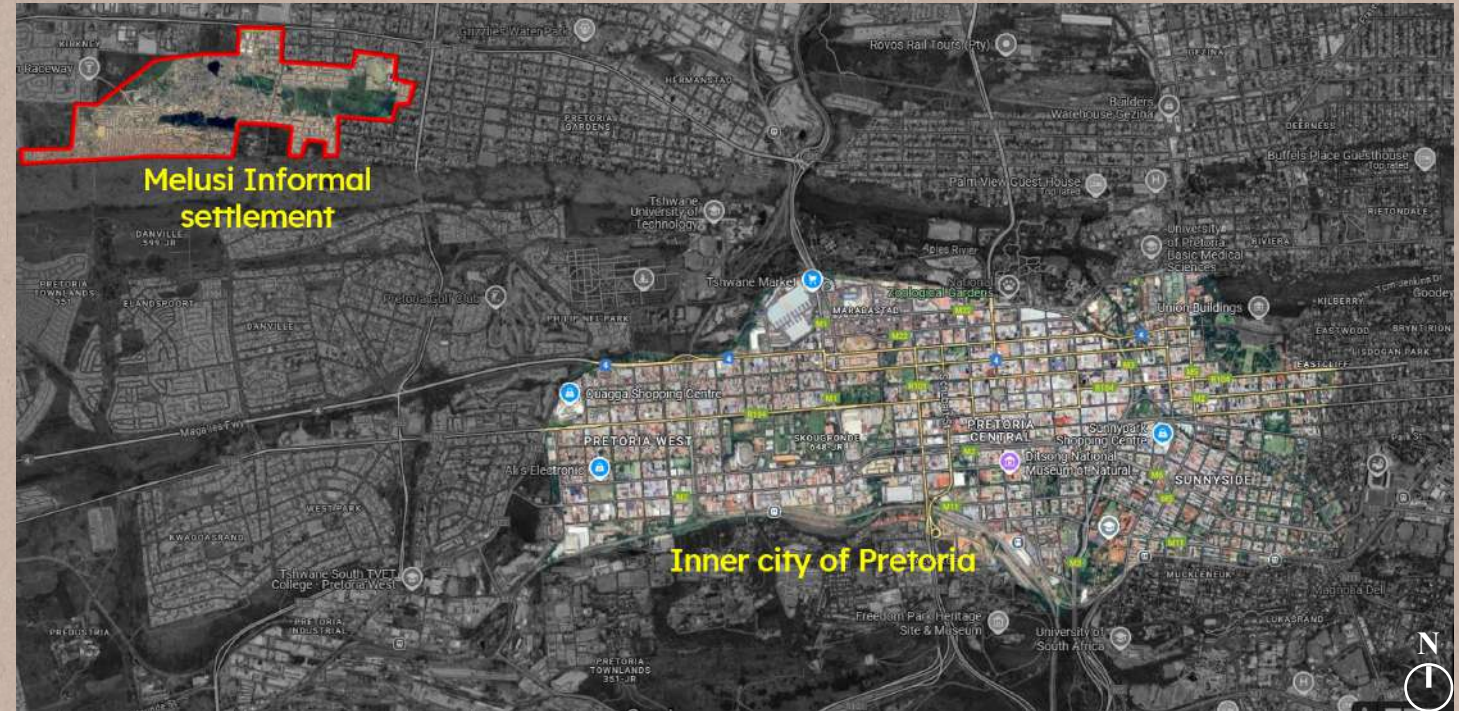


Fig 3: :Site location Northwest of the inner city of Pretoria (Google Earth edited by Author).



Fig 4: The three parts of the Melusi Informal settlement (Google Earth, edited by Author).

1.3 From Theory to Architectural Assemblage

Addressing regenerative construction and regional practices in the design of the vocational school, the project also aims towards interactions which go beyond the confines of formal education. The cultural dimension of architecture, which together with the ethical dimension of architecture, are emphasised in Kenneth Frampton's tectonic theory, through the material act of building (Frampton, 1995; 2016). In this project, the construction process itself becomes a pedagogical method: local community members engage in vocational training by participating in the building's assemblage. Marco Frascari's articulation of the detail as a meeting point between construction and construing (Frascari, 1984) resonates here: each joint, material connection and spatial threshold is a site where thinking and making converge. The architecture functions as 'third teacher', conveying knowledge through its very construction.

In its practical mode, the project aims to use modular timber (sourced from the local environment, such as eucalyptus tree plantations) components which enables construction by low-skilled workers and promotes scalability, reparability and accessibility. However, modularity in this context transcends efficiency: it becomes a tectonic language of social inclusion. Echoing Chad Schwartz and Frascari, the modular joint is both physical and conceptual, a site of learning and interpretation (Schwartz, 2017).

These visible joints make the project legible, demonstrating methods of assembly and allowing the architecture to respond directly to its users.

Detailing, often misunderstood as a purely technical exercise, is reframed as a core architectural gesture. As Doan (2012) and Frampton argue, details embody the cultural and ethical position of the architect. Edward Ford's multiple readings of the detail –as a joint, abstraction, motif and subversion –open space for expressive variability (Ford, 2011). Whether highlighting material transitions or concealing complexity to emphasise spatial qualities, the detail becomes a site of storytelling and engagement.

The building's material language of timber juxtaposed with the corrugated steel sheets legacy of the informal settlement root the project in its context. Its human-scaled modules respond to the informal settlement's scale, promoting inclusivity and dignity. In Frampton's terms the tectonic response resists the commodification of architecture, enabling place-based, critical regional design.

By weaving together these theoretical frameworks-the "Third teacher", "Third Space" and "Third Place" and Kenneth Frampton's tectonic theory, -this dissertation explores how architectural design can transcend conventional paradigms. It investigates how spaces can be intentionally crafted to not only impart vocational skills but also nurture community identity, resilience and empowerment with the unique socio-cultural landscape of the Melusi 3 neighbourhood. It also positions the vocational training centre not merely as a school, but as a living didactic project that teaches through making, opens itself to the community and roots its meaning in detail. Tectonics, detailing modularity and socio-spatial theory converge to shape an architecture of empathy,

participation and transformation.

This dissertation seeks to show how the environment can be a third teacher through the application regenerative architecture can optimise the conditions in the informal settlement of Melusi, in Pretoria North, to contribute towards the learning, sharing and growing of vocational skills of Melusi residents while increasing their resilience through the challenges that prevail in the settlement.

This dissertation is laid out in the following way:

Chapters 2-4 ground the project within its site, theory and program considerations

Chapter 5 explains the design process

Chapter 6 shows the technical report

Chapter 7 is a reflection on the dissertation.

1.4 Conclusion

Investigations into the potential of skills development within the Melusi context inform the design process of the Melusi Vocational Skills Centre, which will be run by MYDO in collaboration with the Melusi 3 community. Through teaching and sharing of knowledge, young people can learn and apply vocational skills that will enable them to earn a living. Based on the Third Teacher theory, the vocational skills centre aims to facilitate passive engagement in teaching, as it supports the active learning of vocational skills. Rooted in the principles of architectural adaptability, resilience, and regenerative design, the centre is designed to be responsive to the environment and the community's needs.

Three key ideas guide the design of the vocational skills centre. These include: -vernacular synergy, ecological edges, and regenerative modularity. The program for the centre includes administrative space, service spaces, workshop spaces and supportive outdoor spaces. Lessons drawn from desktop studies, precedent studies, theoretical explorations and the site, south of the old quarry dam in Melusi 3, informed the design process. The research employs a multi-modal methodology that combines the use of qualitative and observational techniques. In the face of constraints, adaptations to the methodology are made to achieve flexibility in support of the research. It consists of the following:

- i. Desktop studies through literature reviews and archival research, to establish the foundational knowledge on Melusi and contextualise it within a historical, geographical, socio-cultural, and theoretical framework.
- ii. Site immersion, observational fieldwork, and physical engagement with the site to collect experiential and spatial qualities of the site.
- iii. Qualitative interviews with willing participants through informal dialogues on the site to obtain stakeholder views and their lived experiences.
- iv. Photographic survey and analytical sketching to visually document the site forces and fields of vision. Textures, materials, spatial conditions, and uses are captured, with permission, through the use of photographs.

Where permission for photography was not granted, freehand sketching, spatial mapping and reflective drawing are presented.

2. Site Analysis

In *Pattern Language*, Christopher Alexander, Sara Ishikawa, and Murray Silverstein (1979:xiii) hold that architectural solutions should derive from a deep observation of the physical environment, and their effect on how people live; integrating not just structure, but culture, movement, and everyday use. Building on Alexander et al, the design stems from an intimate understanding of a place's physical and cultural fabric. In response, it is essential to engage with the site on an intimate level to identify the qualities that can be learned and enhanced for a responsive outcome.

Entering an informal settlement in Pretoria as a black male from Kampala, Uganda, it was essential to maintain an open and unbiased mind. Intimate engagement with the site without any prejudices was important because I wanted to learn what it could teach (me) based on what is already there.

This chapter presents a descriptive and phenomenological study of the site in Melusi, informing the design stages. Elements of the site and existing relationships are unpacked and interpreted. Understanding of the site is intricately connected to the issues of placemaking and youth unemployment. The architectural solution attempts to draw from lessons and insights gathered from the site. The purpose of the site analysis is to lay the groundwork for developing a relevant architectural solution that is rooted in place, responding to the site's opportunities and constraints.

2.1 Context and evolution

One of the key observations from the imagery below is that paths were already in existence before the settlement was established. As such, access was important in the evolution of Melusi.

Google Earth imagery shows the evolution of Melusi from Melusi I, to Melusi 2 and eventually to Melusi 3.

With access to the site, other elements that supported the existence of the settlements followed.

This site is important because it is one of the fastest growing informal settlements in Pretoria. There are lessons that can be learned from how it has grown in the context of Pretoria.

The organic growth of the settlement, with little to no government interference, is particularly interesting. Here, residents created places of dwelling in a previously uninhabitable space, without formal urban planning, instead responding to the need for shelter and existing desire lines.



Fig. 5: The area around the quarry dam, dated 2004, before the Informal settlement formed (Google Earth).



Fig. 6: The first settlement shelters of Melusi in Melusi I, by 2007. (Google Earth).



Fig. 7: The first settlement shelters of Melusi II, by 2013. (Google Earth).



Fig. 8: The first settlement shelters of Melusi III, by 2015. (Google Earth).



Fig. 9: Westward expansion of Melusi III, by 2016. (Google Earth).



Fig. 10: Northward expansion of Melusi III, by end of 2016. (Google Earth).

The materials employed in building the settlement demonstrate innovation – most materials are adapted from their primary uses for building homes and sourced from construction site waste or collected from materials regarded as useless and discarded.



Fig. 11: Eastward expansion of Melusi III, North of the quarry dam, by 2013. (Google Earth).



Fig. 12: Northward expansion of Melusi III, further North of the quarry dam. (Google Earth).



Fig. 13: Present-day Melusi Informal settlement in 2025 (Google Earth).

2.2 Immediate Site Context

The proposed site for the Melusi Vocational Skills Centre lies on the northern edge of Melusi 3, adjacent to an old sand quarry dam that has been abandoned for several years. The land stretches along an east–west axis and is narrow in width, averaging about thirty-five metres from north to south. The ground slopes gently from south to north on the eastern side, becoming steeper toward the middle and eastern edge where the quarry begins.



Fig. 14: Site: The Southern edge of the old quarry dam. (Google Earth, edited by Author).

The quarry still holds water, with reeds and rubbish accumulating along its edges, while other sections have dried out and are now covered by shrubs and grass. Tall eucalyptus trees are scattered across the site, offering occasional shade and a sense of enclosure amid the rough, uneven terrain.

Access to the site is mainly from the west, through a narrow and uneven gravel road that connects it to the rest of the settlement. Like many streets in Melusi, this road suffers from poor drainage. After heavy rain, pools of water and mud make sections difficult to use, especially for pedestrians. There is also potential for pedestrian access from the east, which would link the site more directly to the quarry edge and nearby dwellings. At both the western and eastern edges, open dumping of waste is common, with small heaps of unsorted household rubbish and building debris marking informal entry points.



Fig. 15a.

Although the area shows signs of neglect, it remains one of the few uninhabited and open pieces of land within the township. This makes it a valuable opportunity for development without the need for resettlement. The site feels like an in-between zone; a part of the community yet not fully claimed, which carries both traces of the past and possibilities for renewal.

From this setting, walking through the surrounding neighbourhood reveals the everyday rhythms of life in Melusi: how people use paths, edges, and gathering points to give shape and meaning to the place; how informal activities like trading, hairdressing, or games of Ludo create social energy; and how each fence, yard, and street expresses a unique character within the larger settlement. These observations form the foundation for understanding how the Vocational Skills Centre could grow from the logic of existing community life, as both a place of learning and a shared ground for gathering.



Fig. 15b.



Fig. 15d.



Fig. 15e.



Fig. 15c.



Fig. 15f.



Fig. 15g.

Fig. 15 a-g: Neighbourhood character: A walk through Melusi (Author).

Observations:

Walking through Melusi 3, you get a clear sense of how people use space. The settlement lacks a formal and fixed plan. Movement happens along paths that have formed naturally over time, cutting between homes and small shops. Some paths are busy and full of life: kids running, music playing, people selling fruit, snacks, or hair products. Others are quieter, where people sit outside their shacks, watch the day go by, or greet you as you pass. I quickly realise that each street or path has its own character, depending on what happens there and who gathers around.

I identified three main types of spaces: paths, edges, and nodes. The paths are where people walk and interact; the edges are thresholds, sometimes marked by a fence, a wall, or even just a line of stones; and the nodes are the small gathering spots: a tree with shade, a tuckshop corner, or a yard where people come together. These spaces shift depending on the time of day: mornings are slower, afternoons are busy, and by evening, some corners come alive with music or chatter while others go completely quiet.

During my walks, I noticed how Ludo has become a big part of daily life, for young and old. You see it everywhere, a group of friends huddled around a small board, cheering and arguing, with others standing close, following each move. The game typically takes place under some kind of shelter, such as a corrugated iron roof, a tree canopy, or a homemade shade structure. Players often balance the board on whatever is available, a crate, a bench, or a drum, and arrange the space around them almost like a small outdoor living room. It's not just about the game; it's about being together, passing time, and having fun.



Fig. 16a: Neighbourhood character: Residents of Melusi playing a board game called 'Ludo' (Author).



Fig. 17: Neighbourhood character: Residents of Melusi resting on a crate under the shelter of a tree by a shop (Author).



Fig. 16b: Neighbourhood character: Residents of Melusi playing a board game called 'Ludo' (Author).



Fig. 18a.



Fig. 18b.

Fig. 18: Neighbourhood character: Hair dressing saloon kiosk with a sewing machine. This is a common type of kiosk in the settlement.

Hairdressing is another strong social activity, mostly among young women. Small informal salons appear wherever there is enough space, whether outside a shack, under a zinc roof, or in a makeshift extension. These are lively spaces, filled with conversation, laughter, and gossip. Someone might be plaiting hair while another mixes the relaxer, and a third person sits by, watching and chatting. It is in these spots that information, trends, and community news circulate; they are small but important hubs of connection.

As I moved along the paths, some residents just looked on quietly, others smiled or waved, and a few called me over to talk. Many conversations began through the fence, a mere thin layer separating the inside from the outside. The fences themselves tell stories. They are made from all sorts of things: wire mesh, bits of wood, scrap metal, old advertising boards, or even stacked blocks. They do not really cut people off from the street but rather mark the edge of one's home. Because everyone builds with what they have, no two fences look the same, which means no two streets look the same either. Each stretch of Melusi 3 feels slightly different: one street bright with painted zinc sheets, another with open yards and children playing, another more enclosed and private.

In general, Melusi 3 may feel like any other informal settlements around Pretoria: a mix of hardship and vibrancy, improvisation and pride. There is a constant negotiation between public and private space, where the street and the home often overlap. Social life spills outside; someone fixes a car on the roadside, someone else cooks on an open fire, and children play near the drainage ditch. Even though it may appear chaotic at first, the place has its own logic, shaped over years of living and adapting.

This everyday activity gives the township its identity. People are inventive with materials and generous with space, turning the smallest patches of shade or open ground into places of gathering, learning, and exchange. For a project like the Melusi Vocational Skills Centre, this kind of informal use of space is not just background context — it's a lesson. It shows how architecture in such a setting needs to listen, adapt, and grow out of what people already do.

Casual Conversation on Site

Walking through the narrow, uneven footpaths of Melusi 3 township, I immediately become aware of the intricate layers of life that pulse through its informal fabric. The rhythmic clink of a hammer against a rusted gate, the hum of conversations blending with children’s laughter and the distant hum of taxis along the main road. The township, with its patchwork of corrugated iron, reclaimed timber, and repurposed materials, forms a living architecture that serves as a testament to the community’s resourcefulness and resilience.

Among the voices encountered, one belonged to a local fence-repair artisan, a man whose small workspace, demarcated by offcuts of wire and salvaged tools, spoke with quiet pride about his skill. Over the years, he had learned to mend, strengthen, and rebuild the fragile boundaries that define people’s homes and provide identity. “If there was a place,” he said with some paraphrasing on my side, “where I could teach others, not just fix things, but show them how to make a living with their hands, I would do it.” His vision was not merely economic; it reflected a desire to pass down knowledge as a form of empowerment, a way to repair more than fences.

A street or two away, a local builder sat outside his half-constructed room, his tone was more cautious, shaped by experience. “I have tried to teach before,” he explained, “but most people come thinking they will get paid the same day. They want money, not the skill.” Acknowledging some linguistic clarities in my rewording again, it seemed that his frustration revealed a deeper social tension: between survival and learning, between the immediacy of need and the long-term promise of knowledge. I thought that behind the reservation, there might perhaps be a space or system where learning could be valued as much as earning, where teaching could regain its dignity and purpose.



Fig. 19 a-b: Neighbourhood character: Fence materials, overhead shelter and floor finish material. (Author).

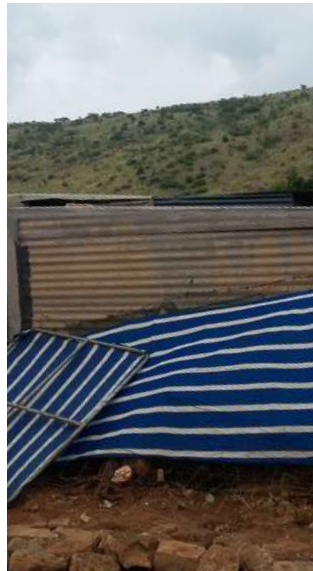


Fig. 20a. Fig. 20b. Fig. 20c.
Fig. 20 a-c: Neighbourhood character: Ongoing construction in the Melusi. (Author).

A mother, balancing a toddler on her hip, spoke about the old quarry dam, a remnant of the area's past, now filled with stagnant water and overgrown reeds. "The dam is dangerous," she said, eyes tracing the steep descent to the water edge and the open expanse beyond the informal dwellings. "Children play there all the time. It should be fenced off or maybe made safe for them." Her comment carried both concern and maybe imagination, a recognition that the township's neglected spaces could hold potential if reimagined responsibly.

Nearby, a resident proudly gestured toward his newly fenced yard, the metal panels glinting in the sunlight. "I saved for months to buy this fence," he said. "Now people notice my home, it looks proper." I understood that his fence is more than a boundary; it is an act of self-definition, a way of claiming dignity within the informal. Another resident voice there concerns over the scarcity of water in the area, stating that they make use of a centralised water system through the use of JOJO tanks at water collection points (Fig 21).

These scattered voices spoke to aspirations, frustrations, and quiet dreams. One could sense a shared undercurrent: a desire for spaces of learning that are grounded in daily life, where skills are exchanged, stories are told, and dignity is restored through participation.

Imagining from the rhythm of these encounters, one might also hear the voices of others in Melusi 3: an elder who once worked in construction reminiscing about how apprenticeships used to be about respect and patience; a young woman who braids hair under a shade structure, dreaming of a small salon where she could teach others her craft; or a group of youth, curious but uncertain, who wish for a place where they could learn without being judged or dismissed for what they do not yet know.

Together, these narratives reveal that architecture, in this context, must begin by listening, by recognising that teaching and learning already exist informally within the township's everyday exchanges.



Fig. 21a.



Fig. 21b.



Fig. 22: Neighbourhood character: Walk through Melusi. (Author).

Fig. 21 a-b: Neighbourhood character: Water collection points using JoJo tanks. (Author).

2.2.2 Site Conditions

The site is elongated along the east – west axis and has a narrow width in the north –south direction averaging to about 35m. To the east, the site slopes south to north at a gradient of 0.3 which gradually decreases to 0.2 in the middle of the site. To the west the site is steep with a slope that averages at 0.4.

The site has narrow vehicular access to the west from the immediate context roads, some of which are narrow and poorly drained. This affects circulation to the site since pools of water make the roads unusable, especially for pedestrians. The only pedestrian access to the site is also to the west, along the vehicular access. There is also potential pedestrian access to the east.

The site has a shrub vegetation with eucalyptus trees scattered around on it.



Fig. 22a.



Fig. 22b.



Fig. 22c.



Fig. 22d.



Fig. 22e.



Fig. 22f.



Fig. 22g.

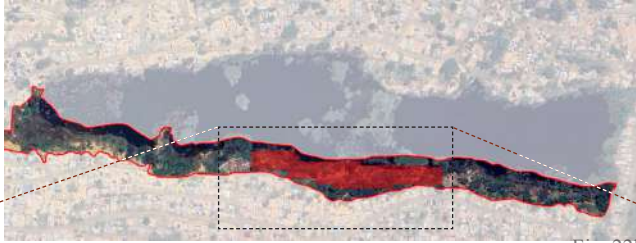


Fig. 22l.

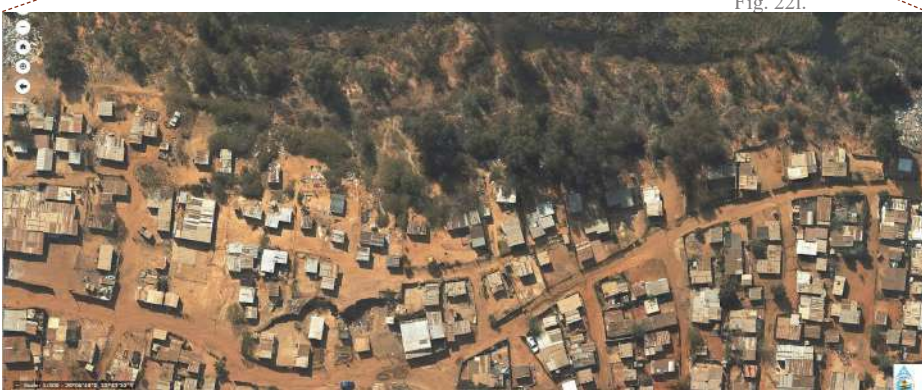


Fig. 22m.



Fig. 22h.



Fig. 22i.



Fig. 22j.



Fig. 22k.

Fig. 22 a-m: (Author).

There were open rubbish dumping sites with unsorted solid waste at both the west and east access points to the site.

The site has unique properties such as an innovative population that needs skill development in an environment that has an old quarry pond with an open space that is narrow and elongated along the east-west axis.



Fig. 23a.



Fig. 23e.



Fig. 23i.



Fig. 23l.



Fig. 23o.



Fig. 23b.



Fig. 22m.



Fig. 23p.



Fig. 23c.



Fig. 23g.



Fig. 23j.



Fig. 23m.



Fig. 23d.



Fig. 23h.



Fig. 23k.



Fig. 23n.



Fig. 23q.

Fig. 23 a-q: Immediate Site Context (Author).



Fig. 24 Site Analysis Drawing (Author).



Fig. 25 Site model showing three influences on the site. Yellow pins representing access to the site, white pins representing vernacular of the site context, green pins representing the vegetative interface between the site and the old quarry dam and the blue pins representing water (Author).

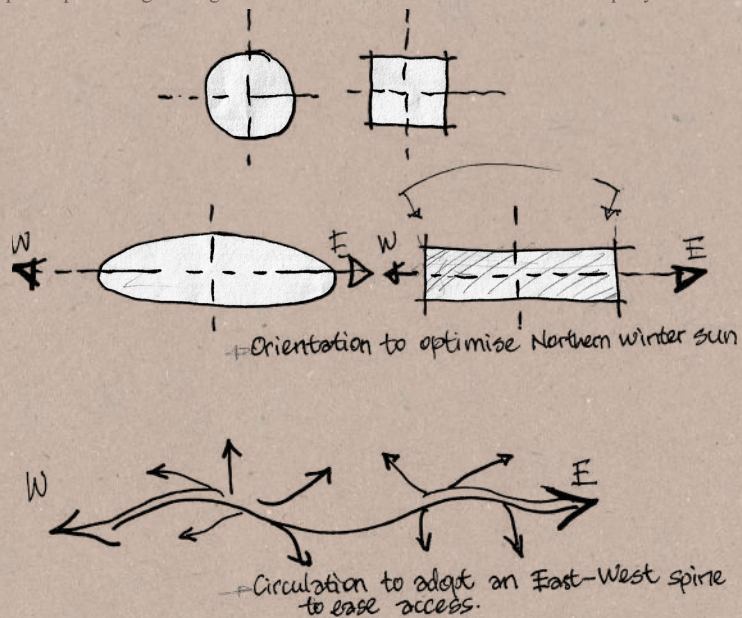


Fig. 26 Orientation and circulation ideas for the site (Author).

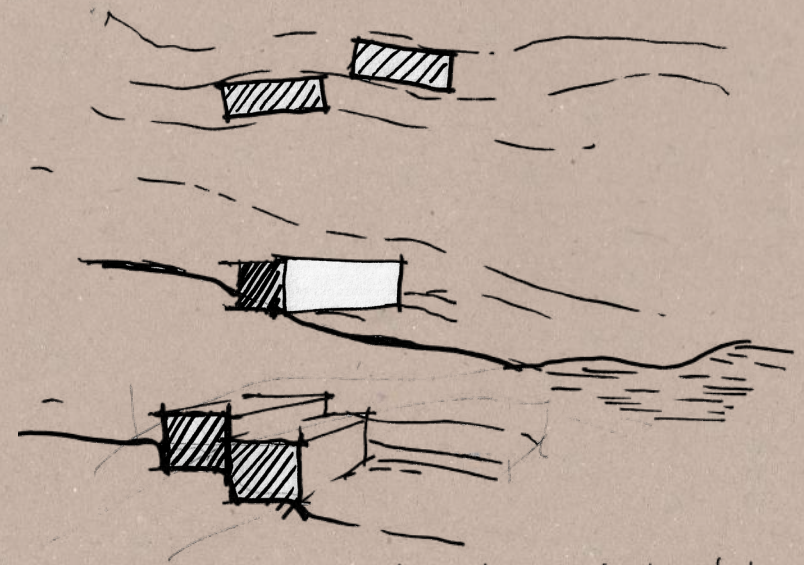
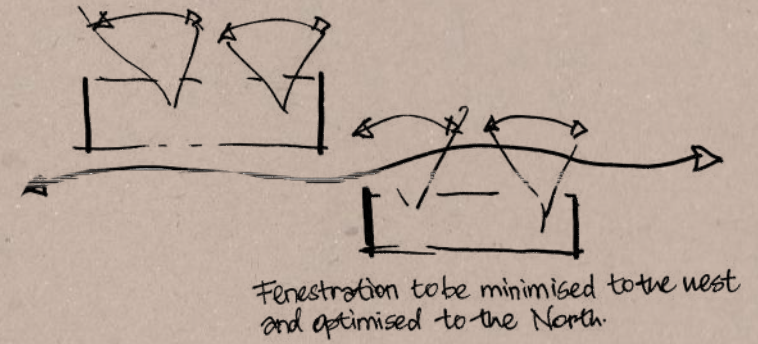
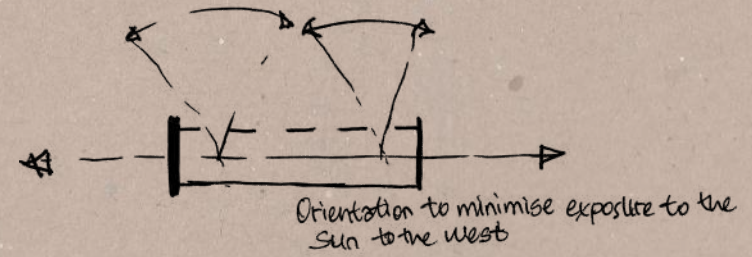


Fig. 27 Further site explorations of site ideas (Author).

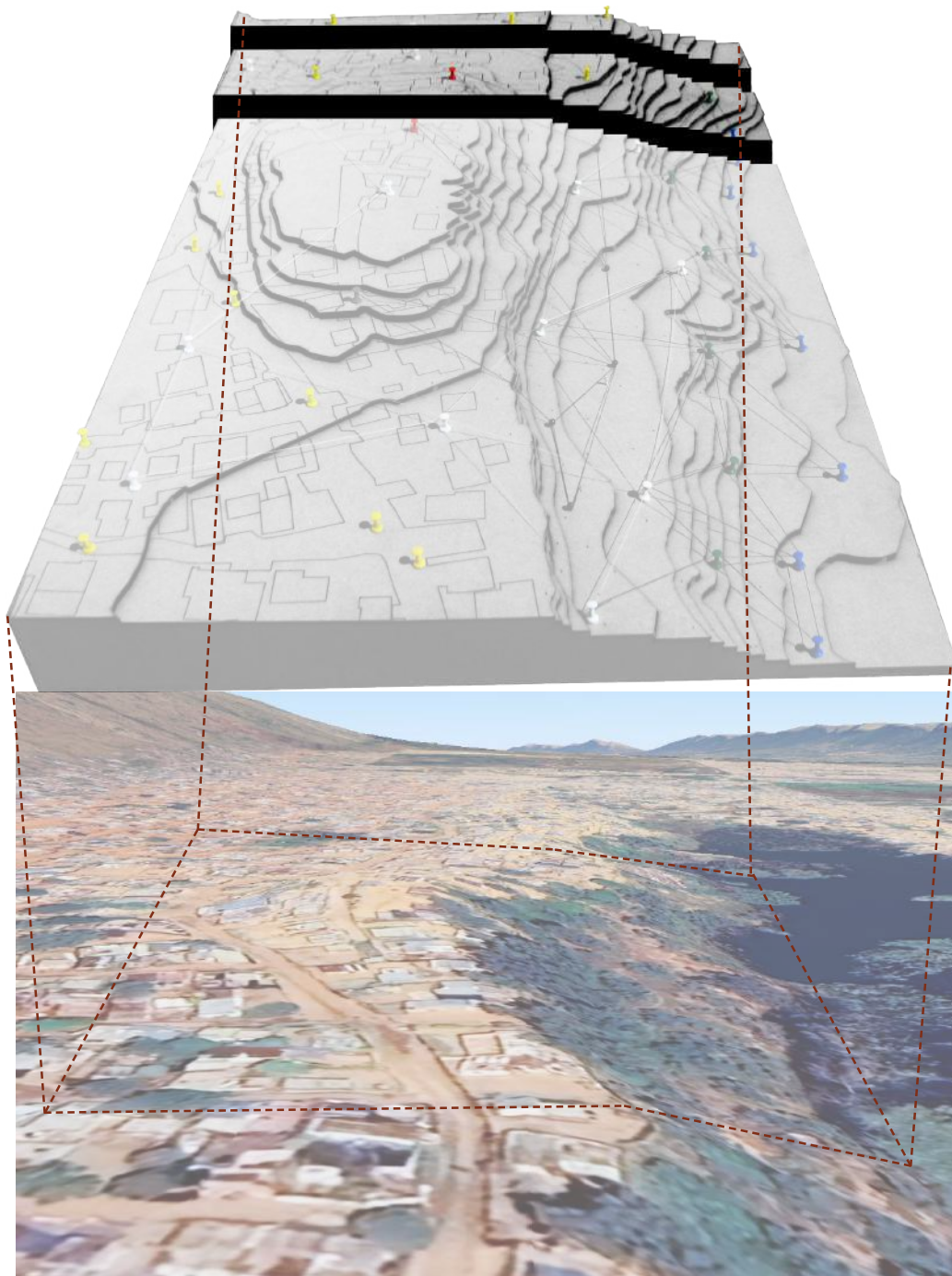


Fig. 28 Section of the site to the west (Author).

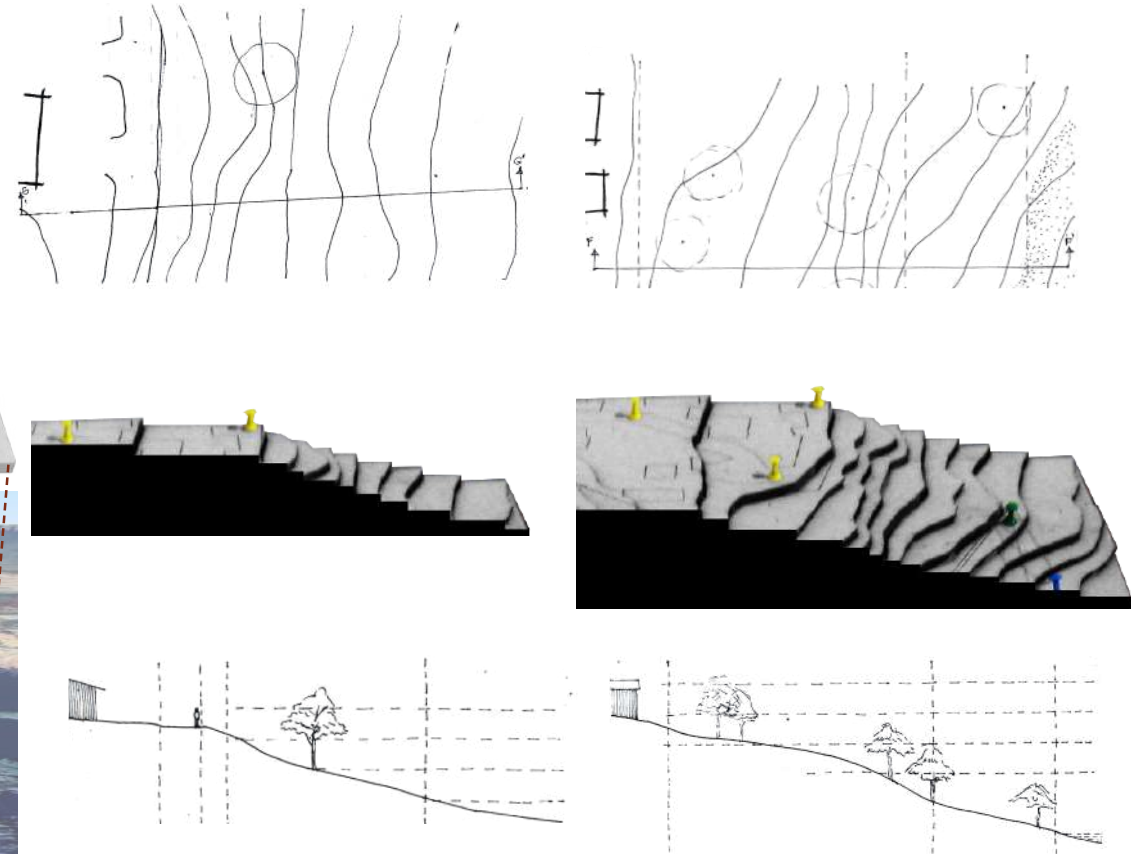


Fig. 29 A gentle slope of the site to the West (Author).

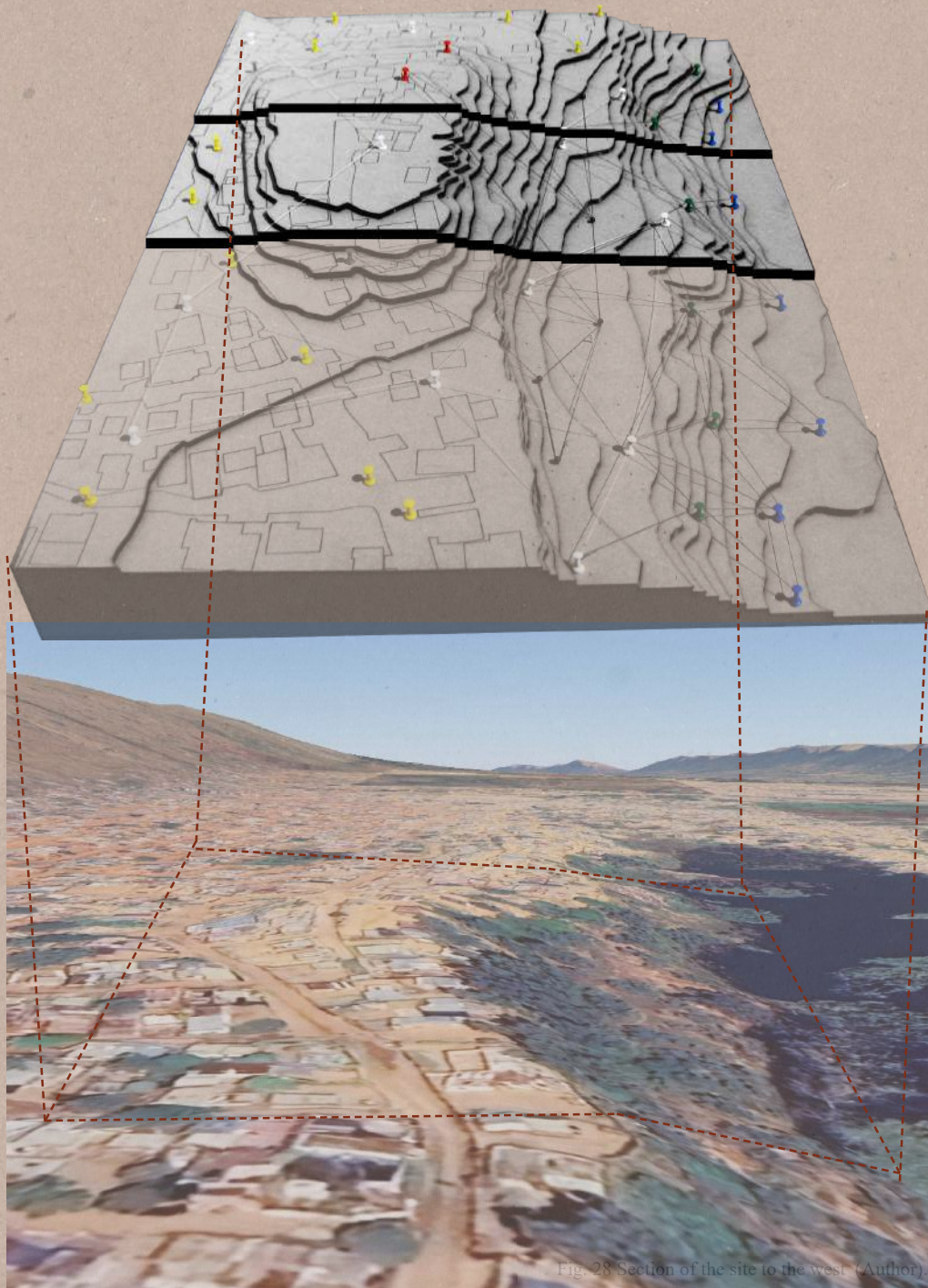


Fig. 28 Section of the site to the west (Author).

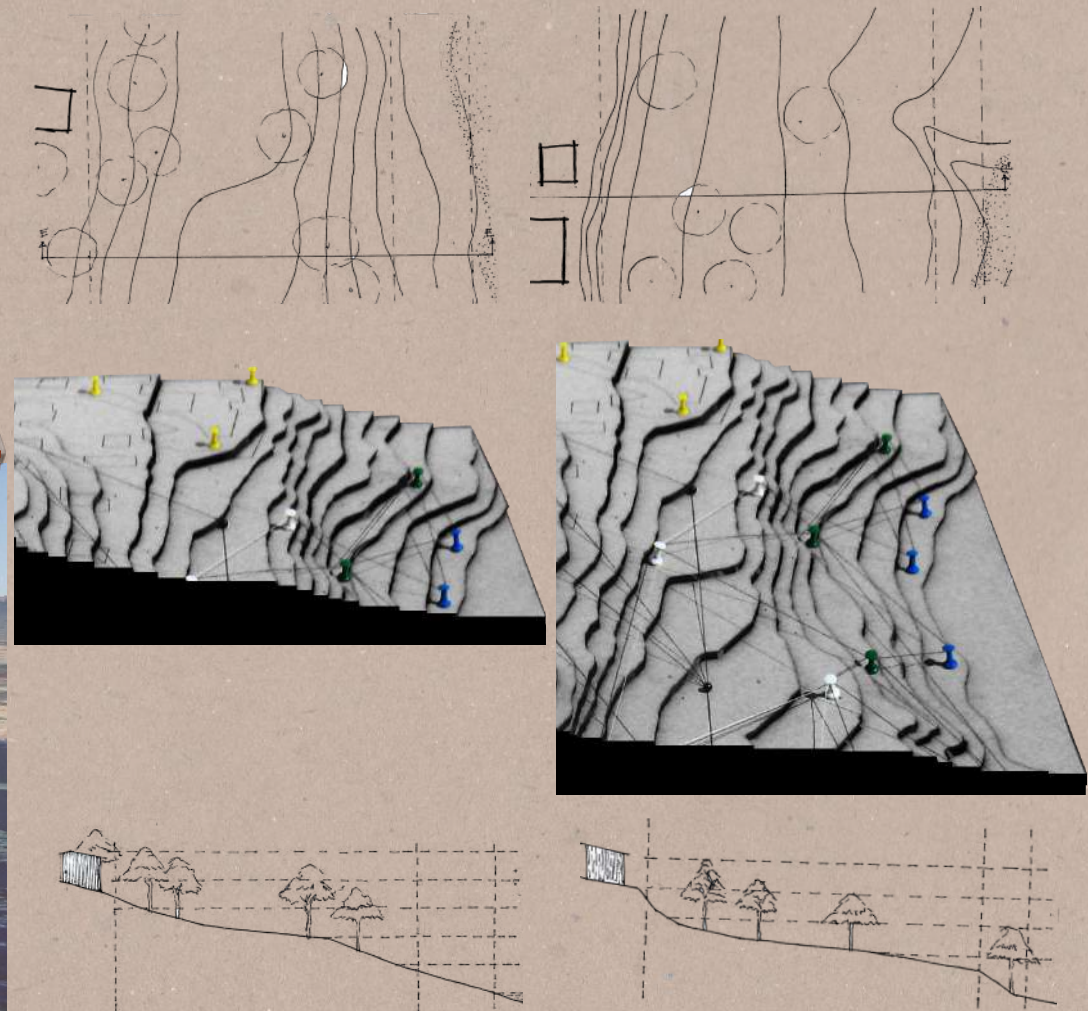


Fig. 30 Section through the centre of the site (Author).

Fig. 31 A gentle slope that (Author).

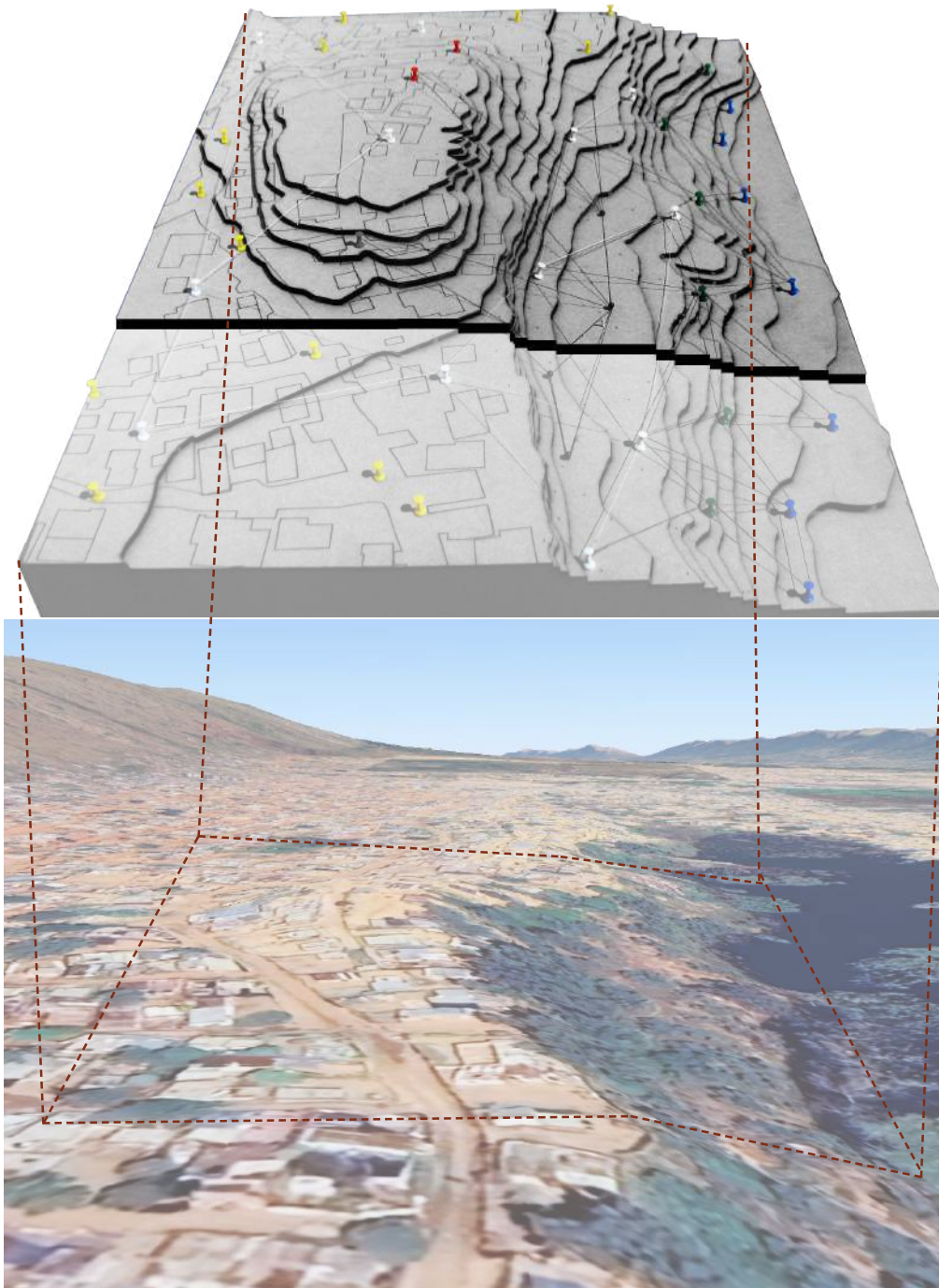


Fig. 32 Section of the site to the east (Author).

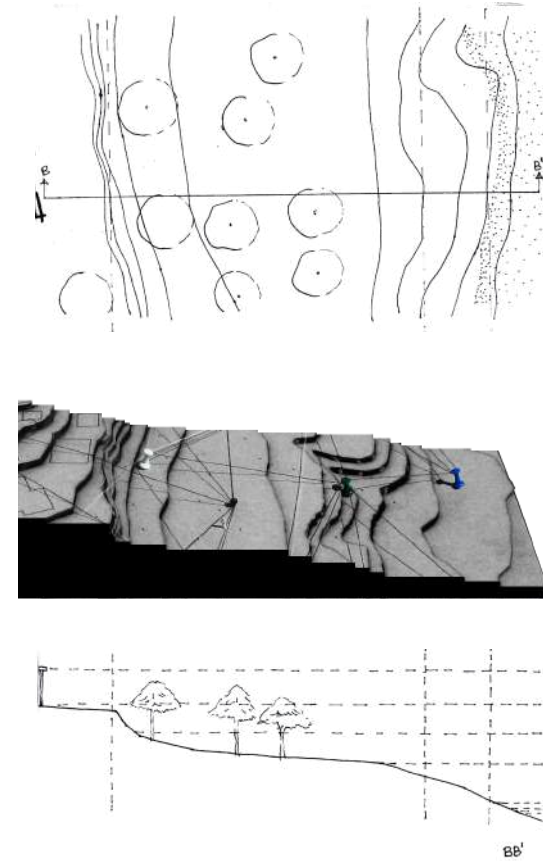


Fig. 33 A steep slope of the site into its centre, where it levels up and gradually drops into the old quarry dam (Author).

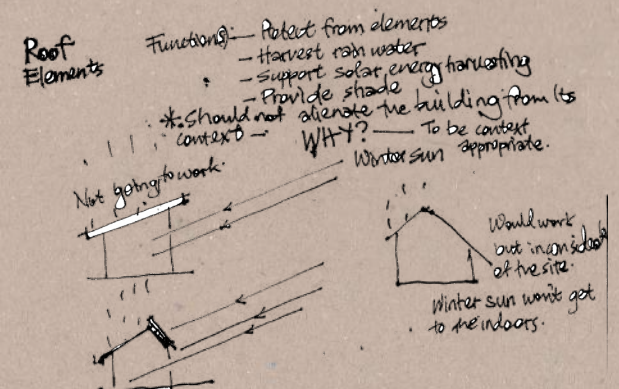
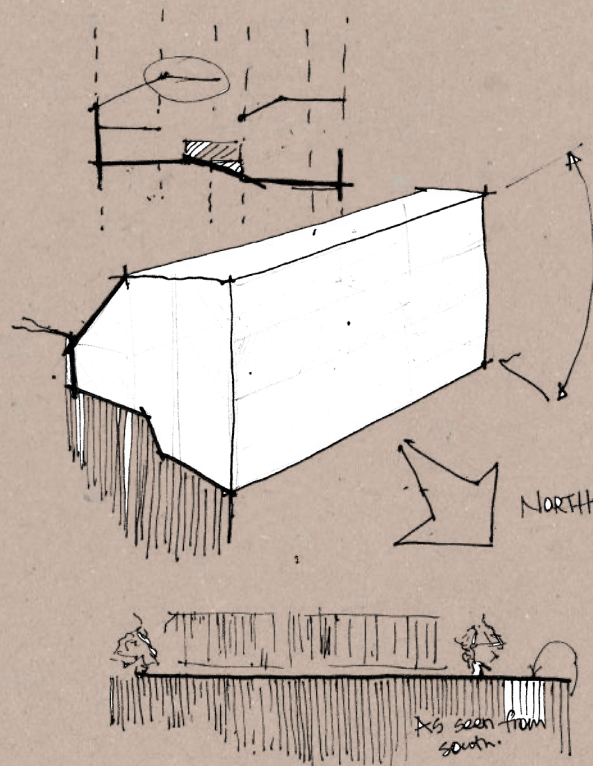
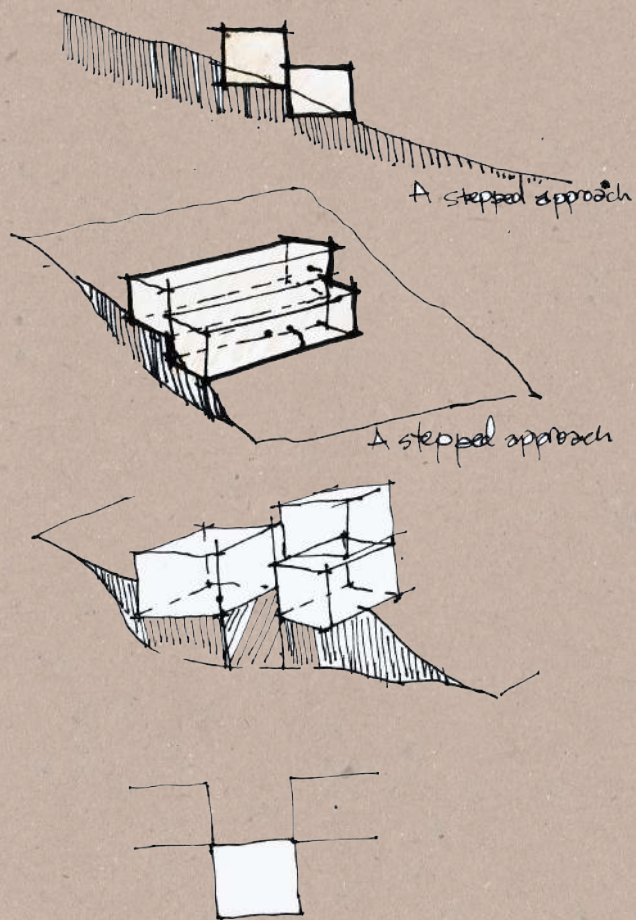


Fig. 34 Initial explorations on approaches to site. (Author).

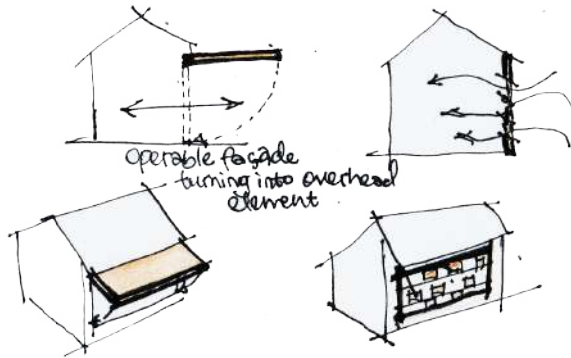
Facades The idea behind the facades is that they should

- aid skills development
- support functionality of space

⇒ The should be adaptable to conditions

How

- Movability
- Foldability
- Visually engaging



SITE The site is linear in nature

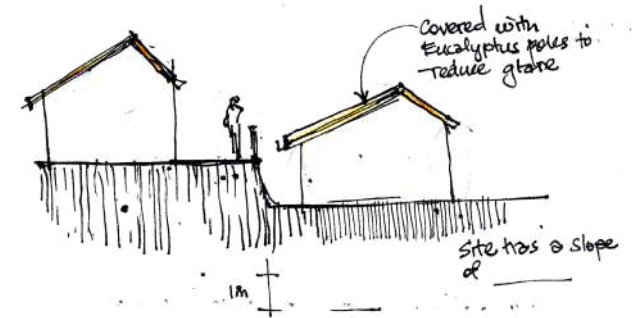
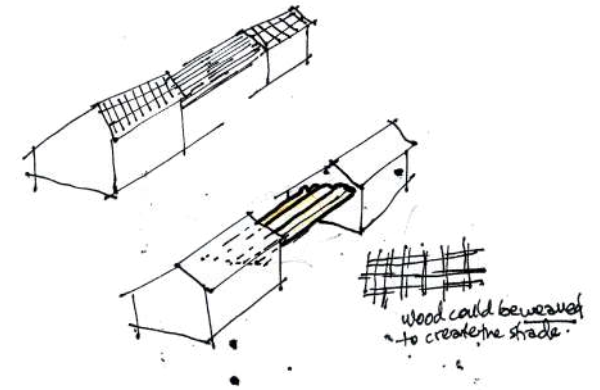
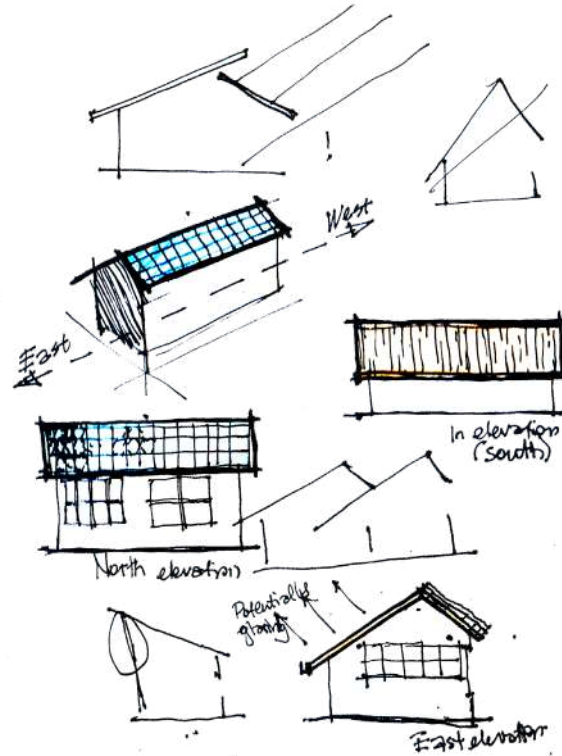
⇒ Any advantage linked to a linear ordering system.



The site is narrow — elongated along the East West axis.



Circulation could be optimised within but must importantly along



Precedents

- Kyobe safari lodge roof — Capacity to improve the existing shacks by reusing the their perforated steel sheets instead of using new ones
- Mustard seed junior school — Cladding of roof with eucalyptus poles

Fig. 35 Initial explorations of facade and roof elements (Author).

3. Towards a Knowledge Architecture: Reimagining the Vocational School in Informal Settlements

Theoretical Discourse

The design of educational spaces in under-resourced urban contexts, such as informal settlements in South Africa, requires a rethinking of architecture not merely as a functional container, but as an active participant in learning, social cohesion, and community development. Traditional educational buildings often prioritise efficiency and pedagogy in isolation, neglecting the wider social and spatial dynamics that shape the learners' experiences. The ecological elements in under-resourced contexts have to be integrated in to the educational spaces to support an integrated existence with nature. To support multiple forms of learning, the educational spaces require adaptability considerations. In contrast, the concepts of the Third Teacher (Reggio Emilia), third place (Oldenburg, 1999), and Thirdspace (Soja, 1996) provide a theoretical framework for understanding architecture as both a pedagogical and civic agent.

Drawing on Pezzetti's (2020) notion of "knowledge architecture", schools can be designed as hybrid spaces that support learning through interaction, sensory engagement, and community integration. The Reggio Emilia framework positions space as a co-educator, emphasising that learning emerges from the relational and physical qualities of the environment, rather than from instruction alone. Similarly, Oldenburg's third place highlights the social dimension of the built environments, emphasising inclusivity, permeability, and conviviality as essential qualities for fostering community cohesion. Soja's Thirdspace complements these theories by foregrounding the hybrid, cultural and psychological dimensions of spatial experience, where the material and symbiotic intersect in lived experience (Soja, 1996; Maaran and Ray, 2015). These theories inform the design approach for the vocational training centre in Melusi 3, where community engagement, adaptability and ecological resilience are critical.

This chapter investigates how these theories intersect to inform the design of a vocational training centre in Melusi 3. By integrating the pedagogical role of architecture with the social and cultural dynamics of third places and Thirdspace, the project is conceived as both an educational facility and a community hub. It argues that architecture can cultivate knowledge, civic engagement, and belonging simultaneously, addressing spatial, educational, and social marginalisation within informal settlement contexts.

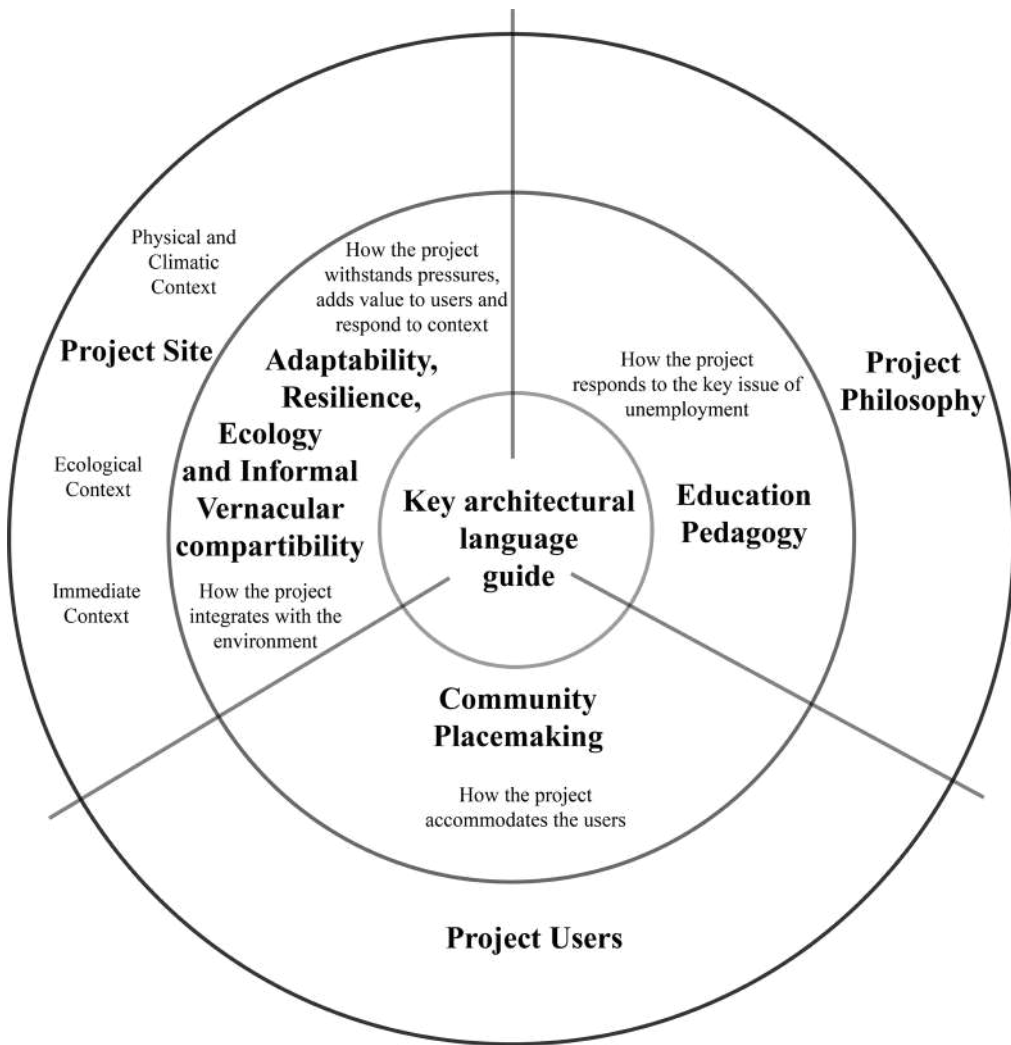


Fig. 36 Theoretical structure of the project (Author).

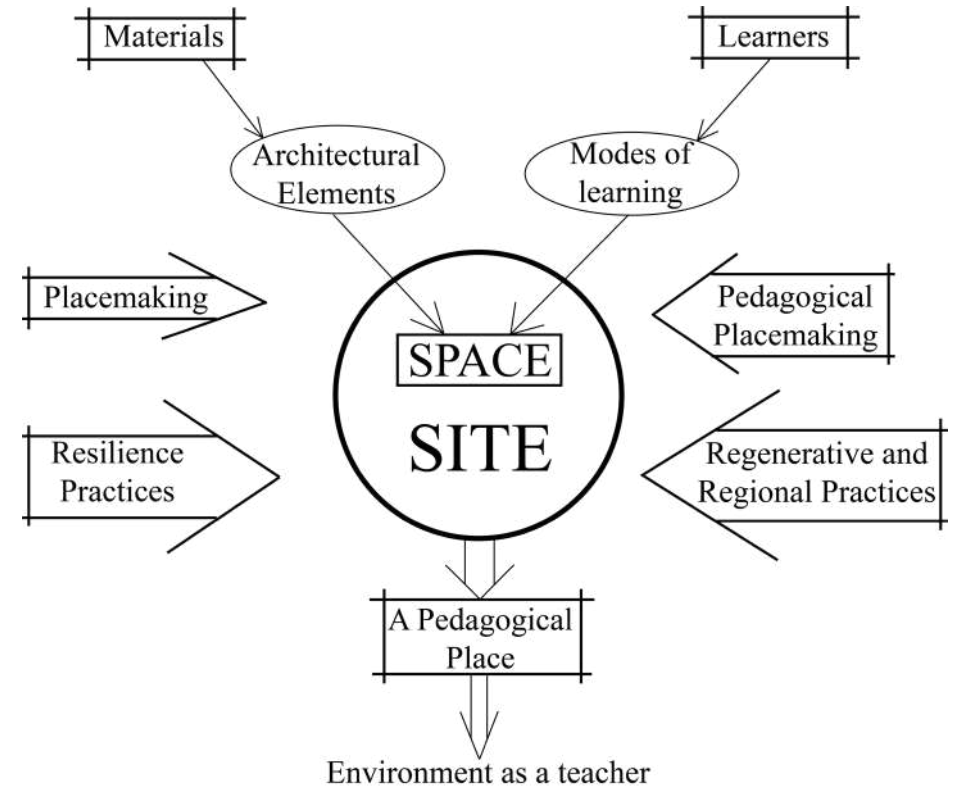


Fig. 37 Theoretical structure of 'environment as teacher' (Author).

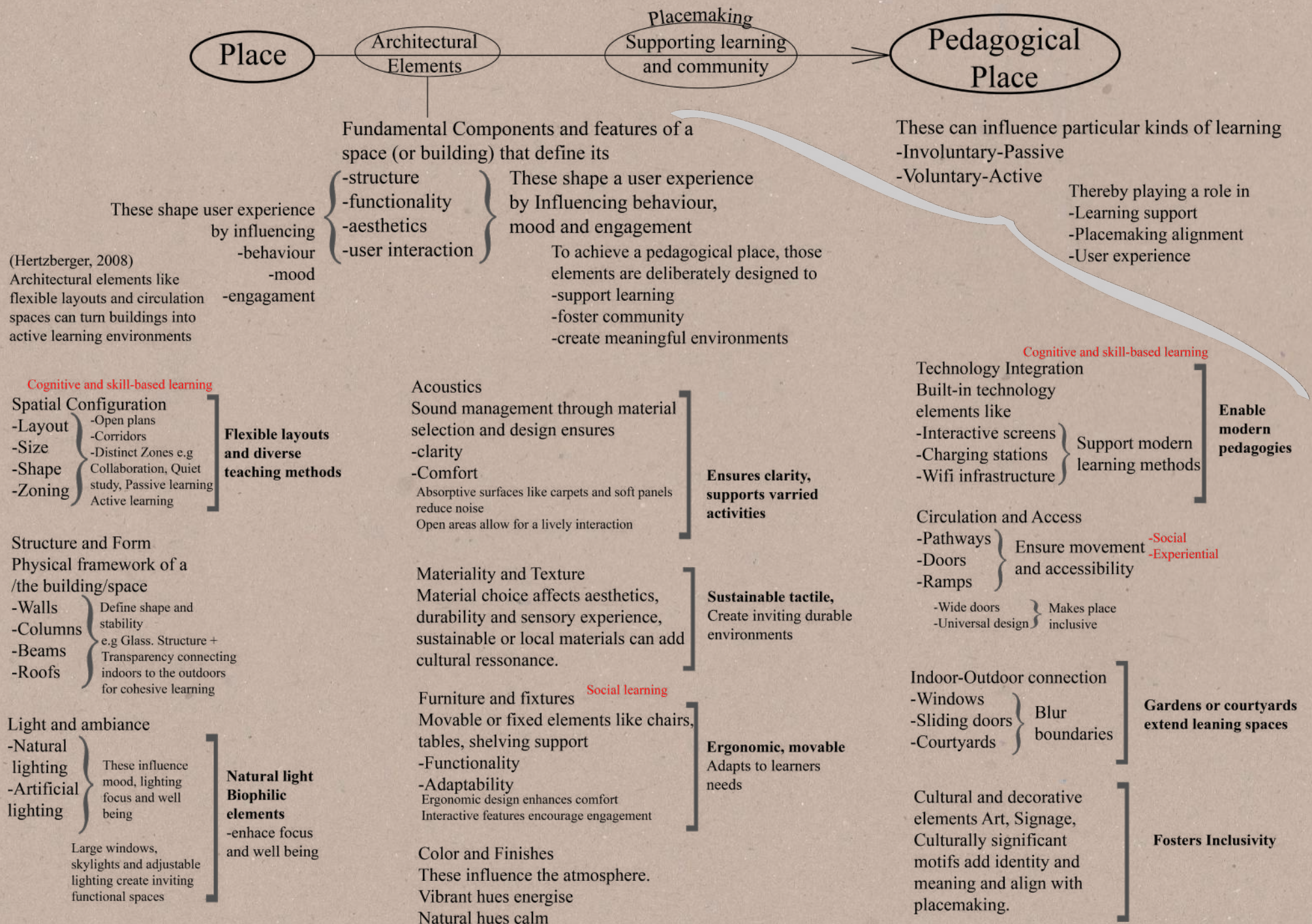


Fig. 38 Turning a place into a pedagogical place (Diagrammed by Author).

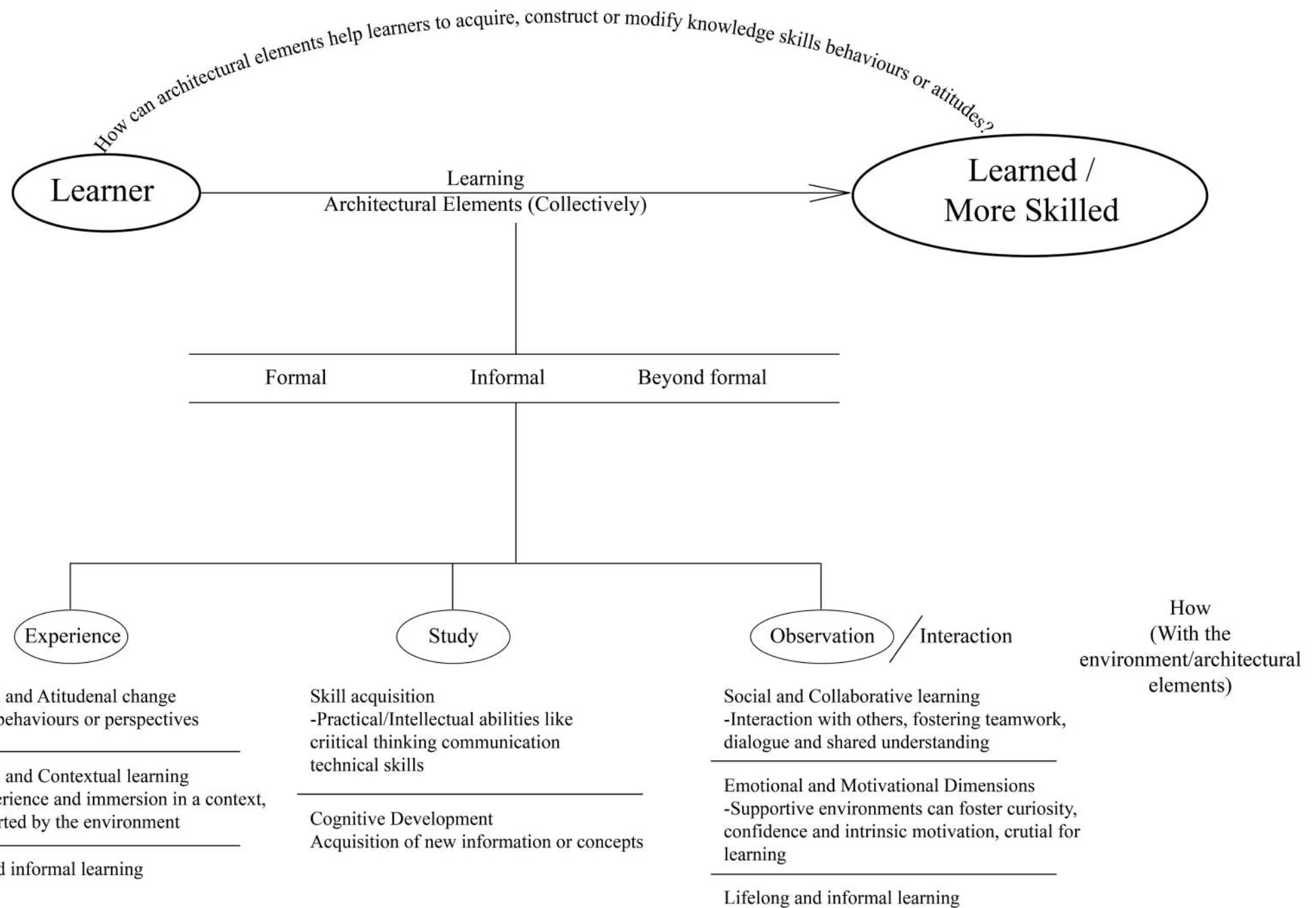


Fig. 39 How architecture is to facilitate a learner towards becoming more learned and more skilled (Diagrammed by Author).

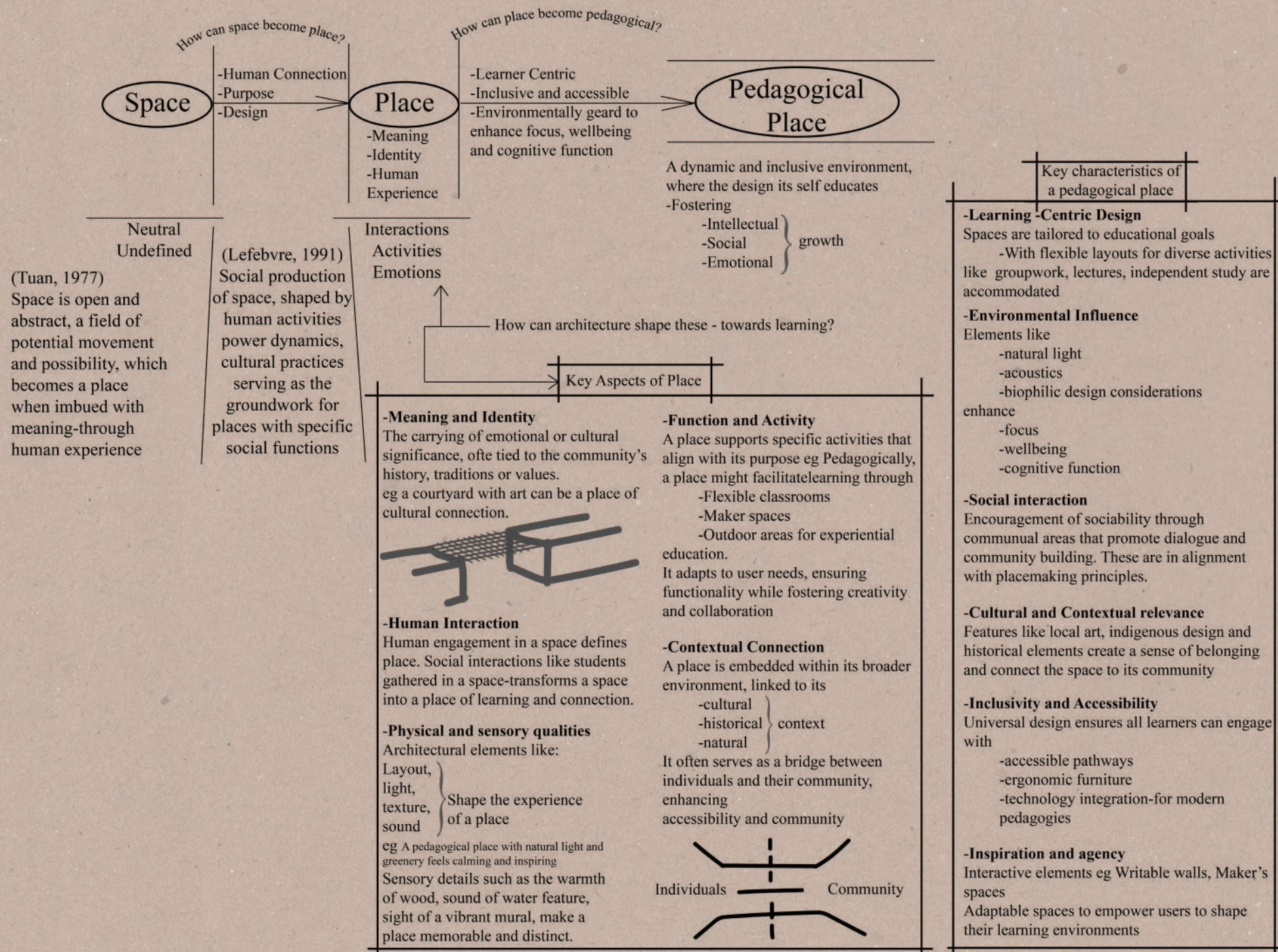


Fig. 40 How Architecture can change a space into a pedagogical place (Author).

3.1 Architecture As Teacher

In South Africa's informal settlements, where access to quality education and spatial infrastructure is often limited, designing a vocational training school requires more than functional buildings. It calls for an architecture that actively participates in the teaching and learning process. Drawing on the Reggio Emilia concept of the Third Teacher, built space becomes a co-educator:- a physical environment that supports knowledge creation through spatial interaction, sensory experiences, and social engagement. Knowledge is not simply information; it is embedded in context, shaped by place, and cultivated through presence and communal exchange. Dense interactive environments foster dialogue, making space a vital medium for knowledge generation and transmission (Pezzetti, 2020:226).

A vocational school can therefore be a “knowledge architecture”, functioning as a node of civic life where multiple uses, disciplines and users intersect to co-create knowledge. Unlike isolated educational buildings, this model integrates learning with community life (Pezzetti, 2020:227). Historical precedents such as Hellenistic gymnasia, medieval cathedral schools and mosque complexes demonstrate how educational institutions were fluidly incorporated within the urban fabric, supporting philosophical discussion, physical training, public events, and cultural rituals (Pezzetti, 2020:227). These spaces blurred the line between education and civic life.

In Melusi 3, knowledge architecture can resist enclosure and encourage permeability and adaptability, and collective belonging (Pezzetti, 2020:227). This was observed on site, at the various nodes along paths, where residents collected to play a game of Ludo, fig(16), further anchoring the theory into the context. Through materiality, rhythms and openness to improvisation, architecture becomes a catalyst for empowerment, inclusion, and identity formation (Pezzetti, 2020:227-228). Taylor (2009:31) highlights that ideal educational environments combine natural, built, and cultural elements to support active learning across body, mind, and spirit, emphasising adaptability, sensory engagement, and community integration.

Investing in such learning environments acknowledges schools as civic anchors. Porous, multi-functional designs allow spaces to serve as cultural centres, workshop venues, community kitchens, or resource hubs, linking education and social upliftment. Architecture that teaches through space, interaction, and shared inhabitation embodies the Third Teacher principles, shaping educational experience through material qualities, spatial rhythms and relational configurations (Pezzetti, 2020:229)

Spaces must support individual reflection, hands-on workshops, and group collaboration. Openness and porosity dissolve boundaries between formal and informal zones, school, and neighbourhood (Pezzetti, 2020:229). Poor spatial articulation risks replicating outdated educational models, ignoring learners' lived realities. By integrating architecture and pedagogy, vocational schools empower communities not only with skills but also with dignity and a sense of belonging.

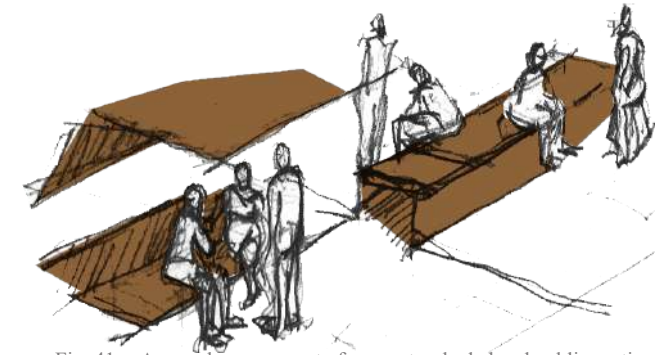


Fig. 41 a A casual engagement of users at a shaded and public seating area along a path.



Fig. 41 b A casual engagement of users at a shaded seating area (in section) that permits a visual connection beyond a boundary through an opening in an architectural element.



Fig. 41 c A casual engagement of users at a public seating area (in section) along a passage, showing how casual conversations can be facilitated, thereby allowing exchange between learners.

Fig. 41 a, b, c
An illustration of spatial configurations where learning can take place passively in a group setting (Author).

International examples, from Denmark's Hellerup School to Melbourne's modular designs, illustrate shifts toward open, flexible learning spaces (Pezzetti, 2020:230). However, flexibility must not equate to spatial blandness. Spaces must resist becoming neutral containers, instead offering textured spatial narratives rooted in local use and identity (Pezzetti, 2020:230-231). As Hertzberger (2008) notes, undifferentiated space may initially feel liberating, but erases exploration, belonging and identity.

Classrooms, yards, workshops, and informal nooks should form a spatial ecology, that supports relational learning through thresholds, scales, and frames. The school can become a miniature city, offering learners their first sustained encounter with architectural space as a means of civic and cultural expression. In township contexts, where informal learning thrives, architecture should align with holistic models, building new spatial types rooted in integration rather than dissolution. Diverse, legible, and emotionally engaging spaces cultivate attentiveness, exploration, and belonging (Pezzetti, 2020:232-233). Architecture becomes a partner in education, shaping perception, attention, and imagination, which provides conditions for holistic growth through enduring spatial principles.

3.2 Architecture as Community Space

Designing a school in Melusi 3 also involves interpreting the community's collective aspirations, turning budgets into economies of care, corridors into spaces of interaction, and classrooms into sites of initiation. Sonja's concept of Thirdspace positions space as fundamental in shaping experience: "space comes first, before seeing things historically or socially" (Soja, 1996:65). Thirdspace is simultaneously real and imagined, concrete and abstract, material, and metaphorical. It shapes how individuals perceive themselves, interact with others and situate their identities. Integrating Soja's Thirdspace with Oldenburg's third place provides a framework for understanding architecture as a social, cultural, and educational mediator.

Lefebvre's (1991:11-12) triad of perceived, conceived, and lived space highlights how space is both socially produced and productive of social practices. Spatial practices transform the environment; representations of space encompass symbolic and conceptual constructs; spaces of representation embody lived experience and social negotiation (Stanek, 2007:463; Soja, 1996:65-67). Lefebvre stresses the contextual, and provisional nature of this framework (1991:40), which allows the study of space as historically and socially situated.

Soja expands this triad into real, imagined, and lived spaces. Real space refers to material environment, imagined space to conceptual and ideological constructs, and lived space to the embodied synthesis of both (Soja, 1996:67-68). Space consolidates place, landscape, architecture, and socio-cultural dimensions (Maran and Ray 2015:2). Place is bounded and observable, while space incorporates psychological, social and cultural layers. Architecture is thus simultaneously material, lived, and interpreted.

Oldenburg's third place complements this by distinguishing home (first place), work (second place), and communal public settings (third place) such as cafés, plazas, and parks (Maran and Ray, 2015:3). Third places function as levelling, inclusive environments, promoting accessibility, social interaction, and cohesion (Sleeman, 2012:37). They possess defining characteristics including neutral ground, levelling of hierarchies, conversation-centred interaction, accessibility, low profile, rootedness, and stress relief (Bosman and Dolley, 2019:2; Oldenburg, 1999:20-42).

Third places foster social capital, civic engagement, and neighbourhood identity (Bosman and Dolley, 2019:3; Meskell-Brocken, 2020:253). They are human-scaled, situated between home and work, and experienced as spaces of legitimacy, comfort, and possibility. These spaces are inclusive and socially interactive (Oldenburg, 1999:262). Designing them requires attention to permeability, accessibility, and adaptability, transforming buildings like libraries or community halls into networks for social dialogue, interaction, and collective healing (Rose, 1997:10; Meskell-Brocken, 2020:249). Informal gatherings and community interactions observed on site exemplify these third place principles.

Soja's Thirdspace emphasises hybridity, where real, imagined, and lived dimensions intersect, highlighting the

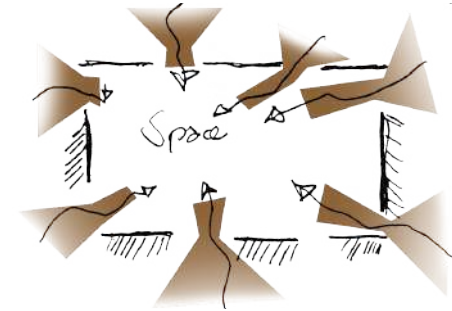


Fig. 42 a An illustration of permeability through enclosing boundaries of a space.

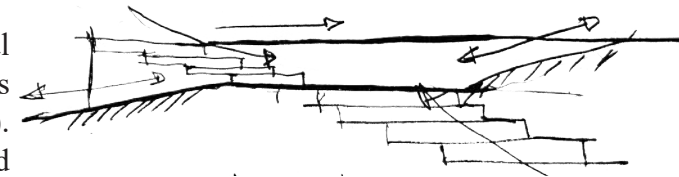


Fig. 42 b An illustration of accessibility to a space.

cultural, psychological, and ideological dimensions of architecture. Markets, plazas, and public squares function simultaneously as real, imagined, and lived spaces, mediating identity, belonging, and social negotiation (Meskell-Brocken, 2020:252-253).

The integration of Oldenburg and Soja demonstrates that third places exist within firstspace, yet they influence both imagined and lived spaces. Architecture must account not only for physical form but also for cultural and psychological flows. Absence or over-regulation of third places disrupts social cohesion and well-being, and thirding space challenges hierarchies and reframes relationships between communities and urban authority (Soja, 1996:126).

Ultimately, designing third places and attending to Thirdspace enables social equity, democratic dialogue, and collective identity. Architecture becomes socially attuned, culturally reflective, and responsive to fluidity of human life. Third places provide tangible sites for everyday sociability, while Thirdspace emphasises the hybrid, psychological, and cultural dimensions through which these spaces are lived, imagined, and re-interpreted. Space always comes first, and the way architects shape it determines possibilities of belonging, community, and identity in the built environment.

3.3 Architectural Adaptability

Youth unemployment rates hover around 39% in Pretoria's informal settlements, such as Melusi. (Stats SA, 2021:12), due to limited access to flexible training infrastructure. In the context of a vocational skills centre in an informal settlement, the idea of adaptability becomes a vital principle that supports an architectural response to the dynamic and evolving socio-economic needs of the residents in the settlement. Adaptability is conceptualised as a temporal process where structures “layer” over time through user interventions (Brand, 1994:12-35). This allows buildings to “evolve” in response to changing requirements. To ensure that the vocational centre remains relevant in response to changes in user demands, such as emerging skill programs or community gatherings, a multi-purpose functional space must be accommodated.

Hertzberger (2008:89) points out the concept of the “polyvalent” form, a structure that is indicative and inviting rather than “determined and imperative”. This concept, in alignment with Reggio Emilia's concept of the third teacher, supports the teaching of resilient resourcefulness and the skill of shaping one's world. The environment then becomes a space where one engages in problem-solving. Hamdi (2004:18) advocates for “the art of the small change”, where adaptability is positioned as a form of participatory placemaking. Hamdi further argues that to achieve effective development in complex contexts, one must start with slight changes that make big differences. Such “small changes” are supported by adaptable architecture, thereby transforming the centre into a living and community-owned asset.

According to Schneider and Till (2007:77), fluctuating group sizes and hybrid functions are inherent in vocational training. To accommodate these fluctuations in group size and hybridity of functions, adaptability must operationalise a spatial strategy of reconfigurable enclosures. This is achievable through the use of non-load-bearing, movable partitions such as sliding screens or wall elements, which allow for the constant redefinition of room sizes. Alexander et al. (1977, Pattern 120: Paths and Goals) suggest that paths should include “goals” – places of pause or activity – thereby blurring the line between mere movement and destination. In my interpretation, paths can become thresholds, not merely passages, but potential sites for impromptu markets, exhibitions, or peer-to-peer learning, which blur the distinction between circulation and destination. To support this, a spatial strategy of multi-functional thresholds needs to be adopted. In this strategy, the in-between spaces can be designed to be active and programmable zones. Another spatial strategy through adaptability is the idea of a modular service core. In this strategy, service elements such as washrooms, kitchens and technical spaces can be designed as modular pods that are clustered. This supports the re-organisation of skill clusters and future expansion, without major structural intervention.

Adaptability forms the architectural manifestation of social and economic resilience. Habraken (1998:32) points out that a “stable base” allows for the “loose fit” of lighter, adaptable elements, creating a balance between grounding and flexibility. While Spacek (2018:78-82) argues that adaptability is critical for both active and passive learning in vocational training environments.

The design of a building that can learn, change, and grow with its users creates a framework for continuous improvement, which empowers users to not only acquire skills within the space but also to actively participate in shaping the space itself. This fosters a profound and lasting sense of ownership and capability.

The material strategies include the use of concrete in foundation footings, retaining and plinth walls, brick in foundation walling, rammed earth, modular timber, corrugated steel sheets, gum poles and plywood in walling and doors. Glass is to be used for openings, to allow for visual connection to the indoors. Some doors and interior partitions are to be movable to support spatial adaptability to different gatherings and functions by supporting a variety of spatial layouts and furniture configurations.

3.4 Ecologically Resilient Architecture

Lyle (1994) terms “regenerative” systems as systems that “restore renew and revitalise their own sources of energy and materials” (Lyle, 1994:10). In the context of the site for the vocational skills centre, resilience within a vulnerable informal settlement is conceptualised as dual capacity: firstly, due to its ability to absorb and adopt to climatic and economic shocks, and secondly, simultaneously regenerating the degraded ecological base on which the community depends.

Ian McHarg provides the foundational methodology in the seminal directive to “design with nature”, arguing that the landscape itself holds the “cues for appropriate human use” (McHarg, 1969:29). This calls for the reading of the site’s topography, hydrology, and solar paths as the key determinants of form. Lyle’s concept of regenerative design points out that human systems ought to function as ecosystems, where “waste” from one process becomes food for another (Lyle, 1994:15). Architecture for the vocational centre should therefore be conceived as an integrated participant in its site’s ecological cycles. In addition to that, Wahl (2016:134) frames this as a socio-ecological challenge, where restoring the land and building community resilience are mutually reinforcing goals. Passive climate control, greywater systems, edible landscapes, and material strategies (rammed earth, corrugated steel, timber) demonstrate ecological and pedagogical integration. Living walls, gardens and shading devices can function as teaching tools. The restoration of the banks of the old quarry pond and building community resilience in Melusi 3 are thus mutually reinforcing goals of the project.

Considering hydrological resilience and the old quarry dam, there is an opportunity for a closed-loop water system. The terrain of the site can be optimised to support stormwater runoff into swales and filtration gardens, allowing for the filtration of water into the ground. This will mitigate erosion and flooding. A designed grey water system can also clean water before it is introduced to the old quarry dam.

For climatic resilience, the design of the built forms and their materiality can be tuned to the solar path to support minimal solar exposure and optimise passive thermal performance. Appropriate shading devices can be incorporated into the respective facades to create a microclimate and facilitate passive ventilation. The walling materials can support thermal resilience using rammed earth, which absorbs daytime heat and releases it at night as part of stabilising the interior temperature of the built forms. This integration of passive systems creates a robust low-cost environmental strategy that is resilient to the power supply failures of the Melusi context.

Architecture can incorporate productive landscapes as integral components, contributing to biological resilience and food security. Between the skills training clusters, structures that support food-bearing vines and raised garden beds can form edible landscapes. These “edible landscapes” serve multiple resilience functions, including the provision of supplementary nutrition, the enhancement of biodiversity, and the management of microclimates through evapotranspiration.

They also offer hands-on training in urban agriculture. This collectively transforms the site from a monofunctional educational precinct into a life-support system.

The ecological ethos of the project is directly manifested in the material selection. The use of rammed earth as part of site excavated soil has a near-zero embodied energy and provides superior thermal mass. Corrugated steel sheets , widely accessible to residents in informal settlement contexts, can be repurposed not only as roofing but also as reflective shading devices and rainwater harvesting surfaces. Gum poles and timber battens harvested sustainably and treated with non-toxic preservatives represent a low-carbon, biodegradable alternative to imported timber and plastics. These materials are integral to the project's regenerative narrative.

In the context of socio-ecological pre-carity, resilience underpins the foundational logic of architectural solutions. Integrating ecological systems of water harvesting, food production, and passive climate control into the very fabric of its spatial experience, the project sets to achieve two critical goals. First, it sets out to build tangible, material resilience to climate and resource pressures, in order to safeguard its users. Secondly, it aims to transform these systems into a continuous, lived curriculum under the third teacher concept. In that case, every rammed earth wall and productive garden becomes a daily lesson in ecological stewardship. This potentially empowers new generations to actively and skilfully regenerative their environment.

3.5 Conclusion

In the context of Melusi 3, notions of Third Teacher, third place and Thirdspace, demonstrate that a vocational training centre can extend beyond technical instruction to become a “knowledge architecture” that actively participates in learning while nurturing community life (Pezzetti, 2020:227-229).

Through the principles of the Third Teacher, spaces within the school can be designed to encourage exploration, collaboration, and reflection, fostering both cognitive and social development. The incorporation of third places, such as communal courtyards, informal gathering zones, and adaptable workshops, mediates between private and public life, promoting inclusivity, social interaction, and civic engagement (Oldenburg, 1999; Bosman and Dolley, 2019). Thirdspace ensures that these interventions are culturally and psychologically resonant, acknowledging hybridity, lived experience, and the symbolic dimensions of place (Soja, 1996; Meskell-Brocken, 2020).

Applied to the Melusi 3 project, this theoretical framework suggests that the vocational centre should operate as a porous, adaptable, and socially integrative infrastructure. Classrooms, workshops, and communal spaces must form a spatial ecology that supports diverse learning modes, while also accommodating community events, gatherings, and informal interactions. The school may become both a site of education and a civic anchor, fostering identity, social cohesion, and a sense of belonging for learners and the wider neighbourhood. The materiality informs the design by shaping the outlook of space and supporting adaptability where the support of multiple functions is required. Thresholds signal transitions out of and into key spaces. This particularly informs the design of overhead elements between key spaces. The project aims to integrate the preceding theoretical discourse to illustrate how architecture can serve as a teacher, mediator, and catalyst for community development, demonstrating that spatial design is inextricably linked to social, cultural, and educational outcomes in under-resourced contexts.

While the material combination is practical towards the creation of spaces that facilitate learning, there are potential challenges of maintenance and social adoption. The users would have to be educated on how to maintain the buildings. On social adoption, the users would have to be facilitated through multiple community engagements where they are guided through the hands on construction, which would foster the social adoption of the materials.

4. Program and Accommodation and Precedents

4.1 Program and Accommodation

The program for this project includes the following:

A gate house, parking spaces, administrative space, culinary skills training space, kitchen and dining space, tailoring skills training space, toilet spaces, a library, a crèche, hair dressing and barber skills training space, electrical and phone repair skills training space and a computer skills training space. In-between the core spaces are transitional spaces that also serve as gathering and exhibition spaces.

Each of these spaces have particular requirements ergonomically in order to function. Sketch explorations were made to further understand the qualities required to be achieved for each space.

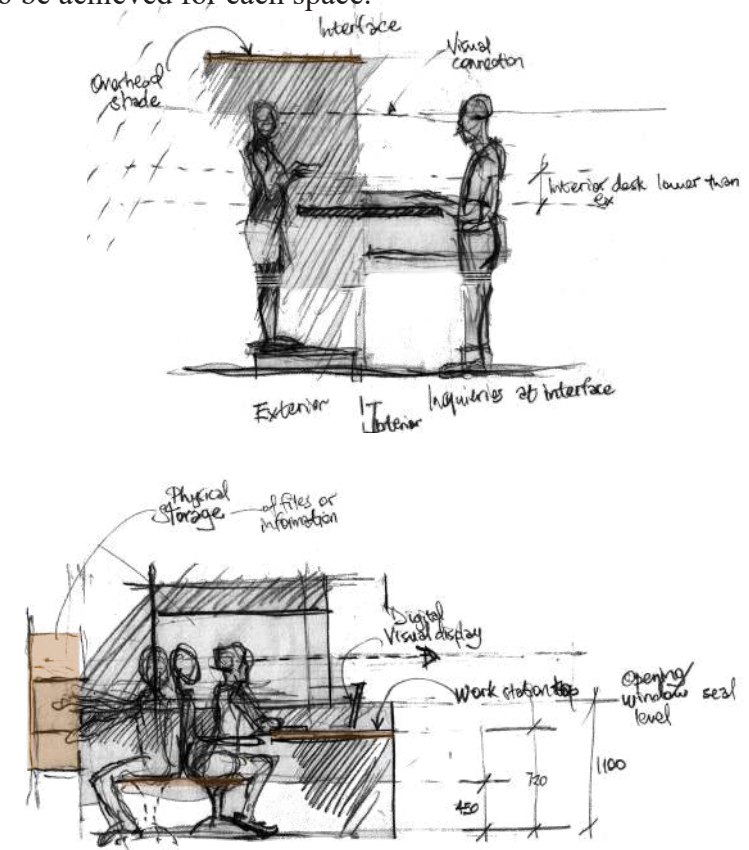
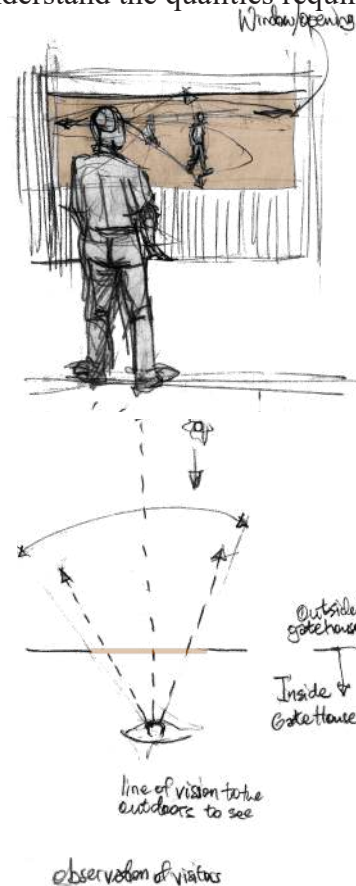
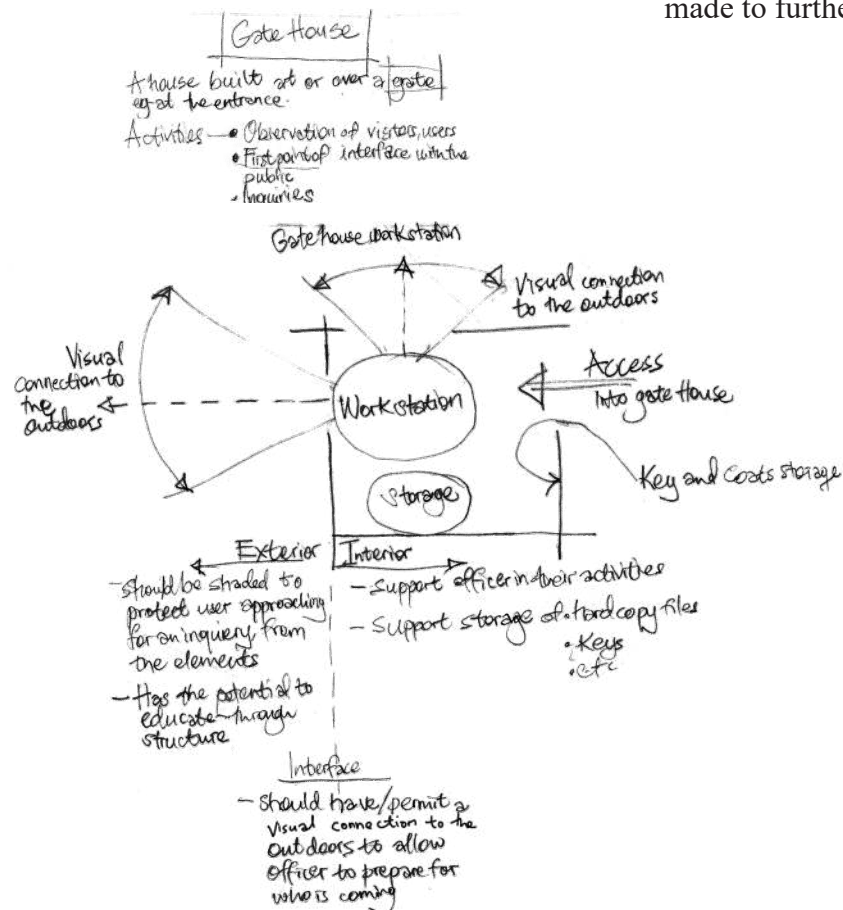


Fig. 43 Exploration of requirements of the gate house space

The Gate House is to serve as an introduction to the project. A visual connection to the outdoors is essential to facilitate the function of monitoring the access to the project. A workstation in this space is necessary to support the computation and monitoring requirements.

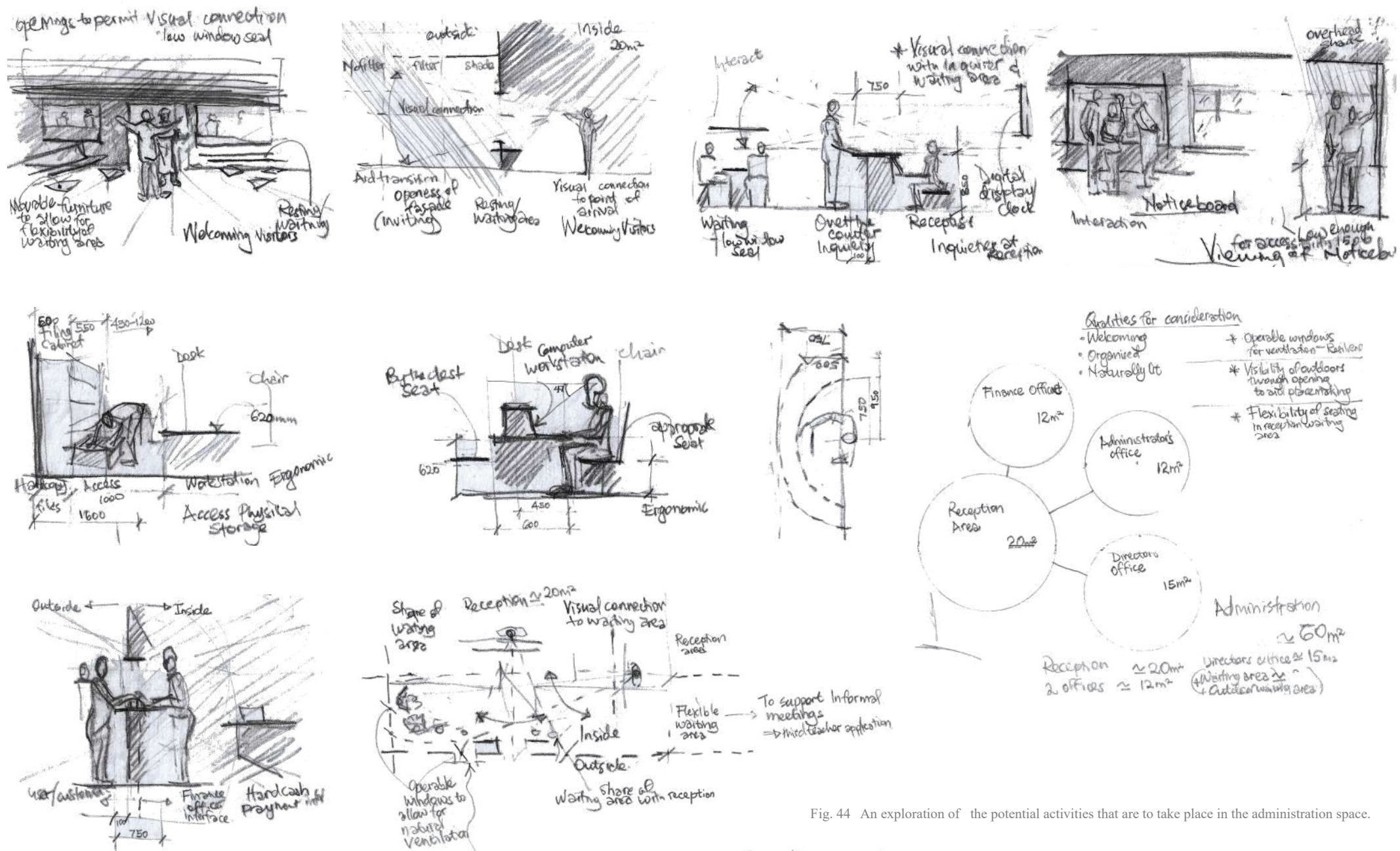


Fig. 44 An exploration of the potential activities that are to take place in the administration space.

The Administration space is to support the administrative function of the Vocational Centre. Office space is essential and has to have a close proximity to the reception space and a meeting area for the formal gathering of administrators of the project

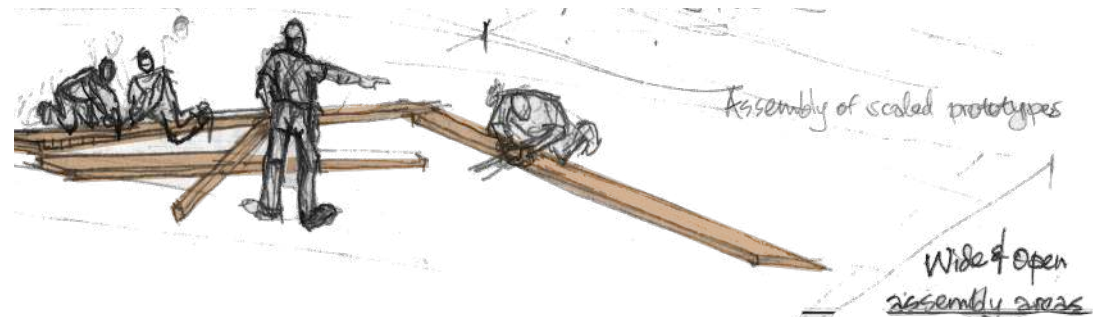
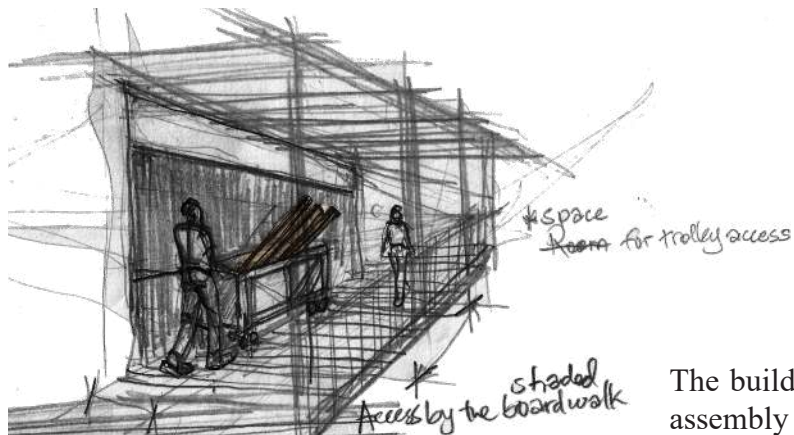
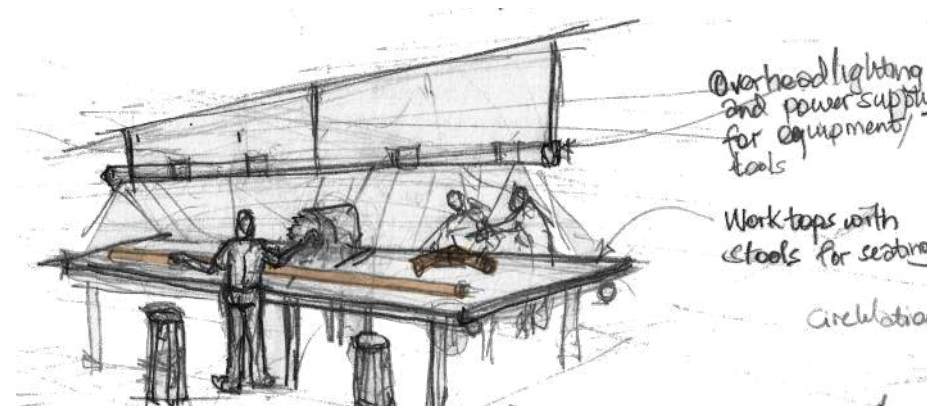
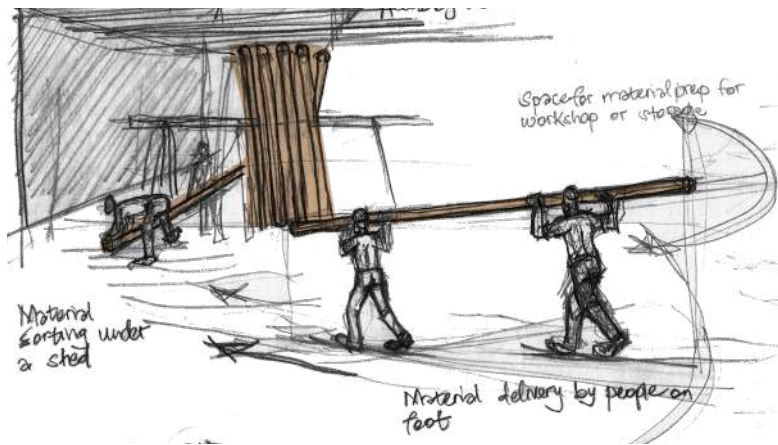
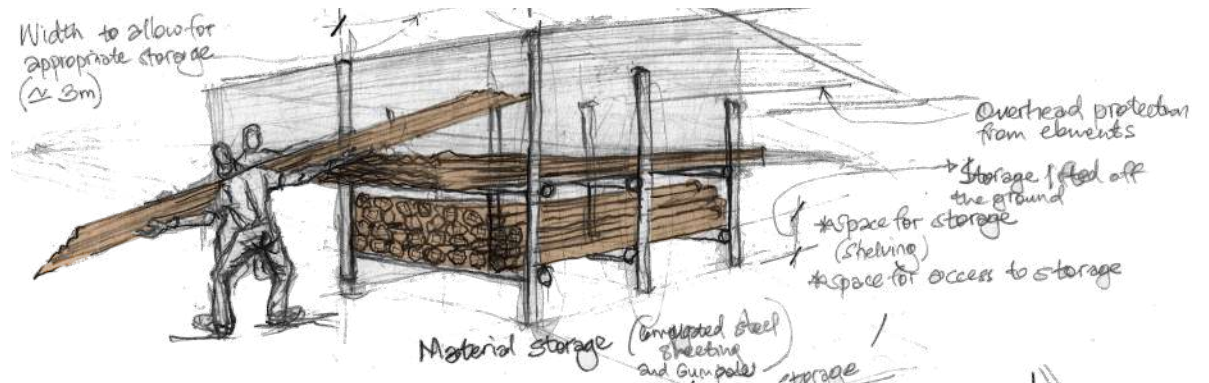
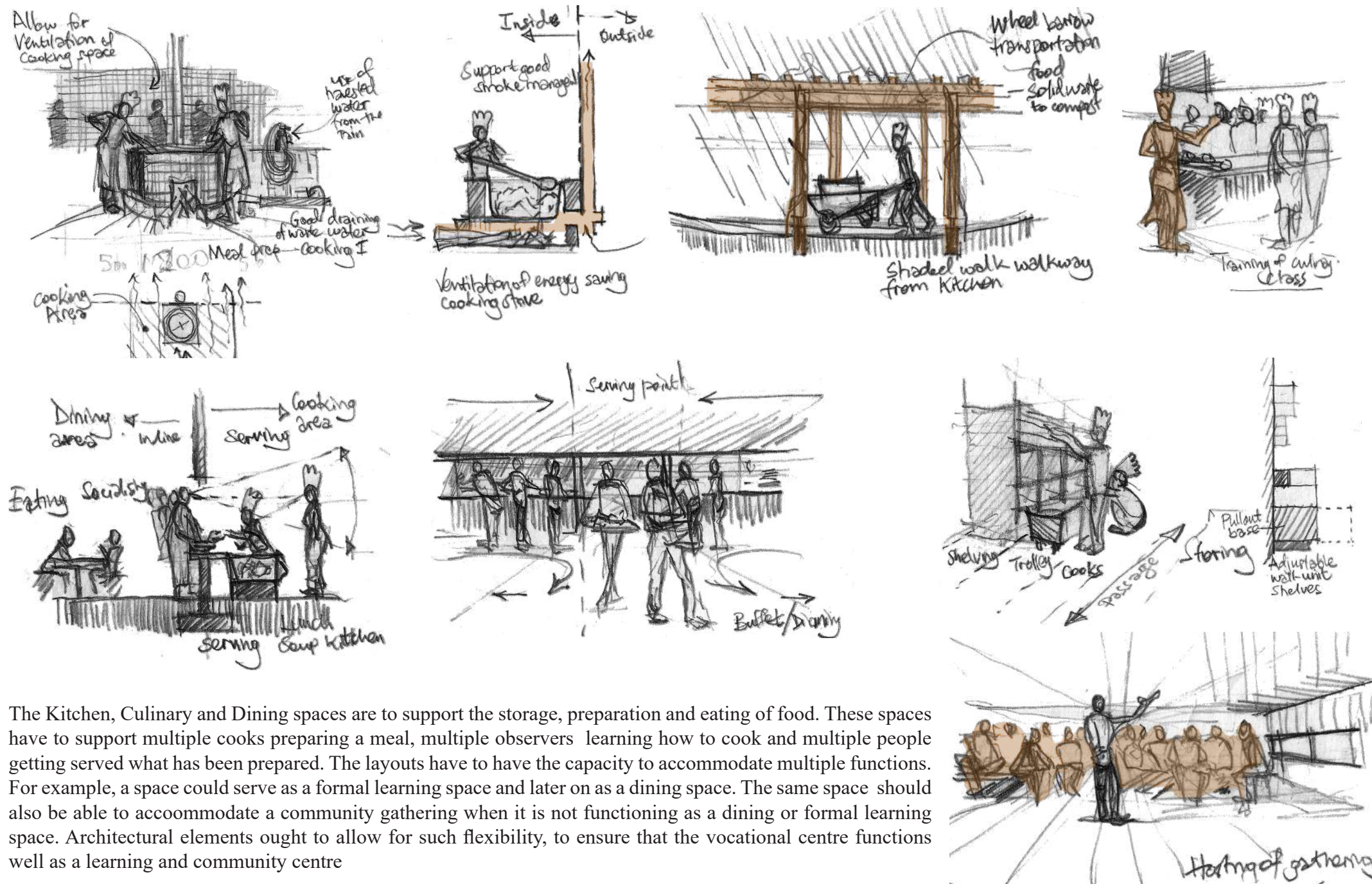


Fig. 45 Exploration of requirements of the building construction space

The building workshop space is to be a key space in the project, considering that it is to host the storage and assembly of the materials that are to be used in the construction of the rest of the project. This space is to accommodate material storage, material assembly space and workshop areas where learners can acquire practical skills through engaging with materials.



The Kitchen, Culinary and Dining spaces are to support the storage, preparation and eating of food. These spaces have to support multiple cooks preparing a meal, multiple observers learning how to cook and multiple people getting served what has been prepared. The layouts have to have the capacity to accommodate multiple functions. For example, a space could serve as a formal learning space and later on as a dining space. The same space should also be able to accommodate a community gathering when it is not functioning as a dining or formal learning space. Architectural elements ought to allow for such flexibility, to ensure that the vocational centre functions well as a learning and community centre

Fig. 46 Exploration of requirements of the cooking and dining spaces

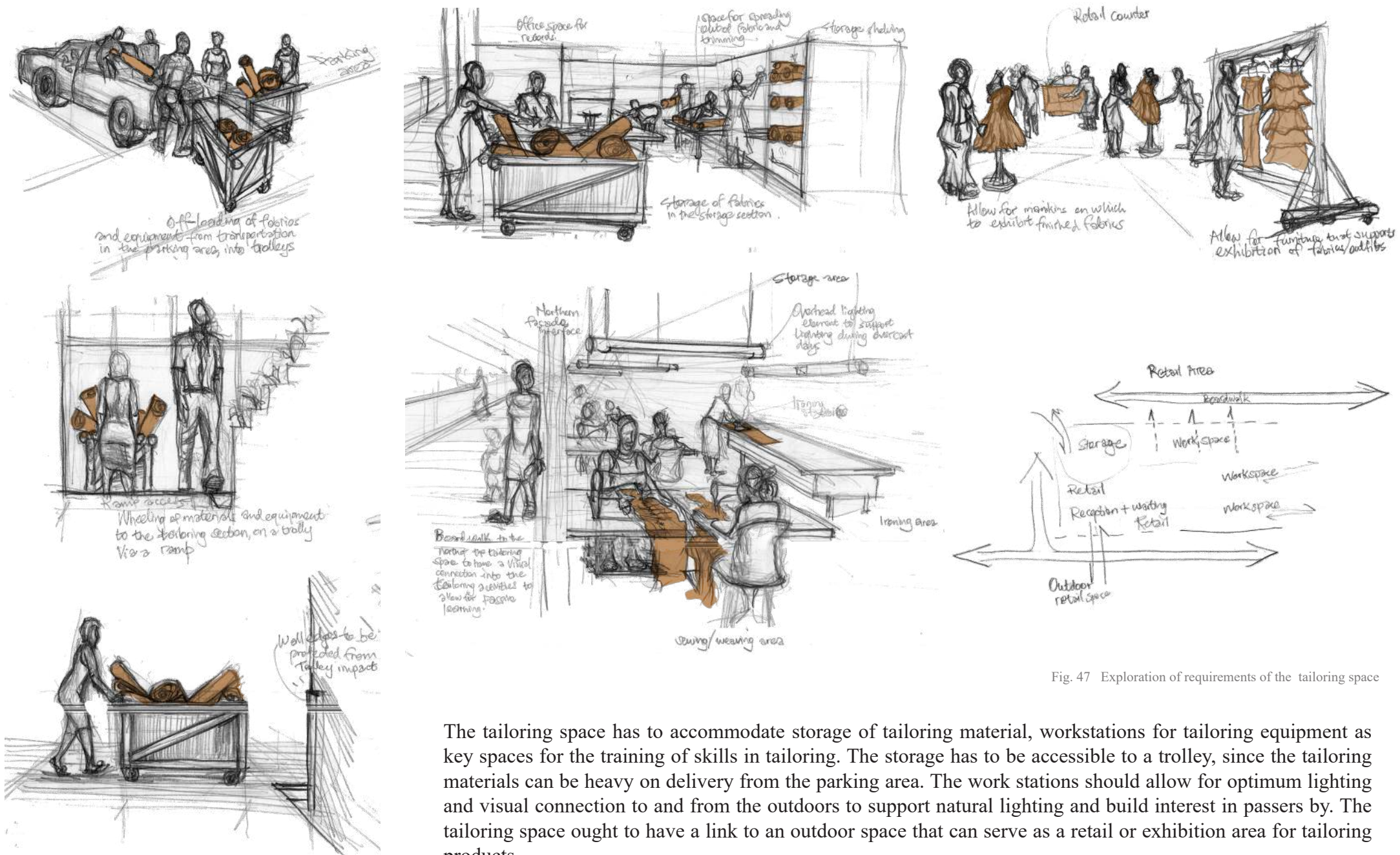
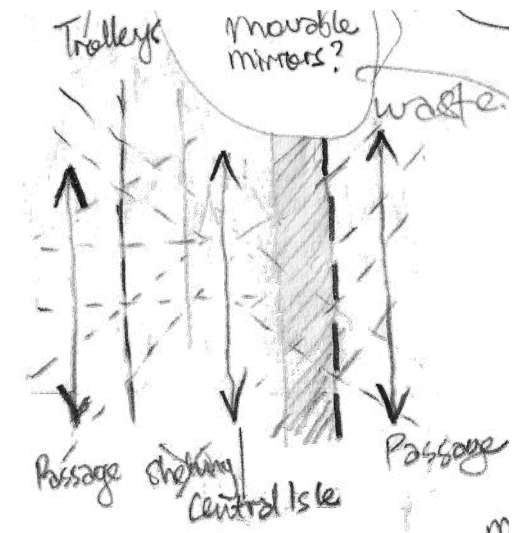
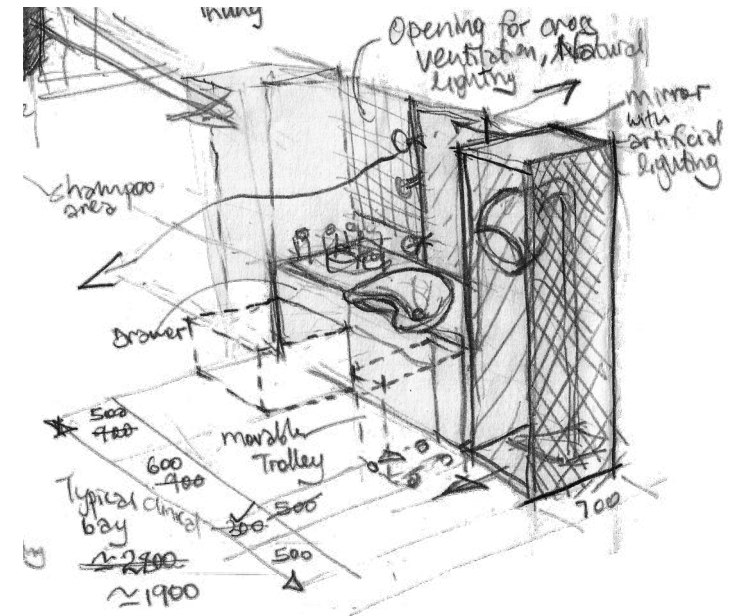
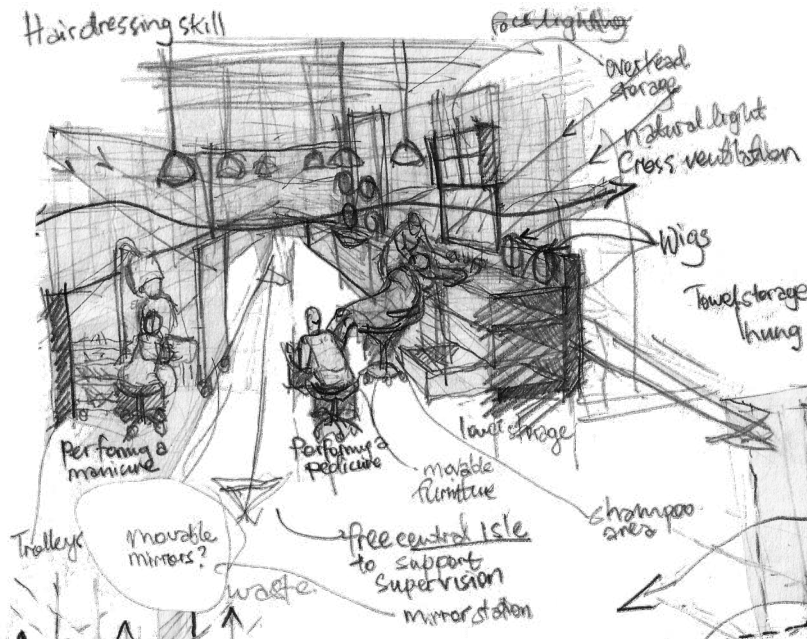


Fig. 47 Exploration of requirements of the tailoring space

The tailoring space has to accommodate storage of tailoring material, workstations for tailoring equipment as key spaces for the training of skills in tailoring. The storage has to be accessible to a trolley, since the tailoring materials can be heavy on delivery from the parking area. The work stations should allow for optimum lighting and visual connection to and from the outdoors to support natural lighting and build interest in passers by. The tailoring space ought to have a link to an outdoor space that can serve as a retail or exhibition area for tailoring products.



The hair dressing space/ barber and cosmetology space is to accommodate storage of hairdressing and barber equipment, hair dressing workstations and have a layout that allows for the efficient circulation of users.

Fig. 48 Exploration of requirements of the hair dressing space

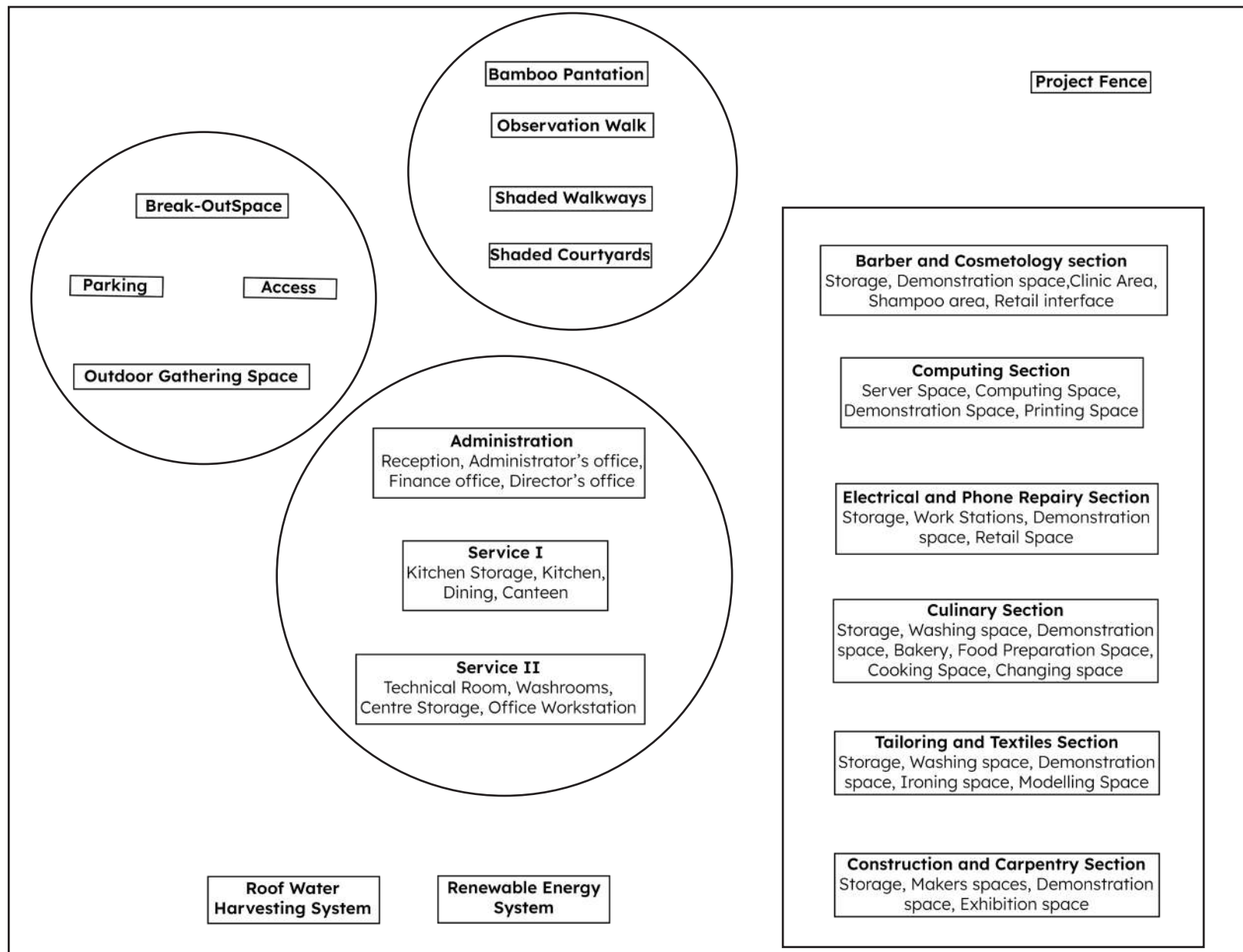


Fig. 49 A summary of the project's spaces

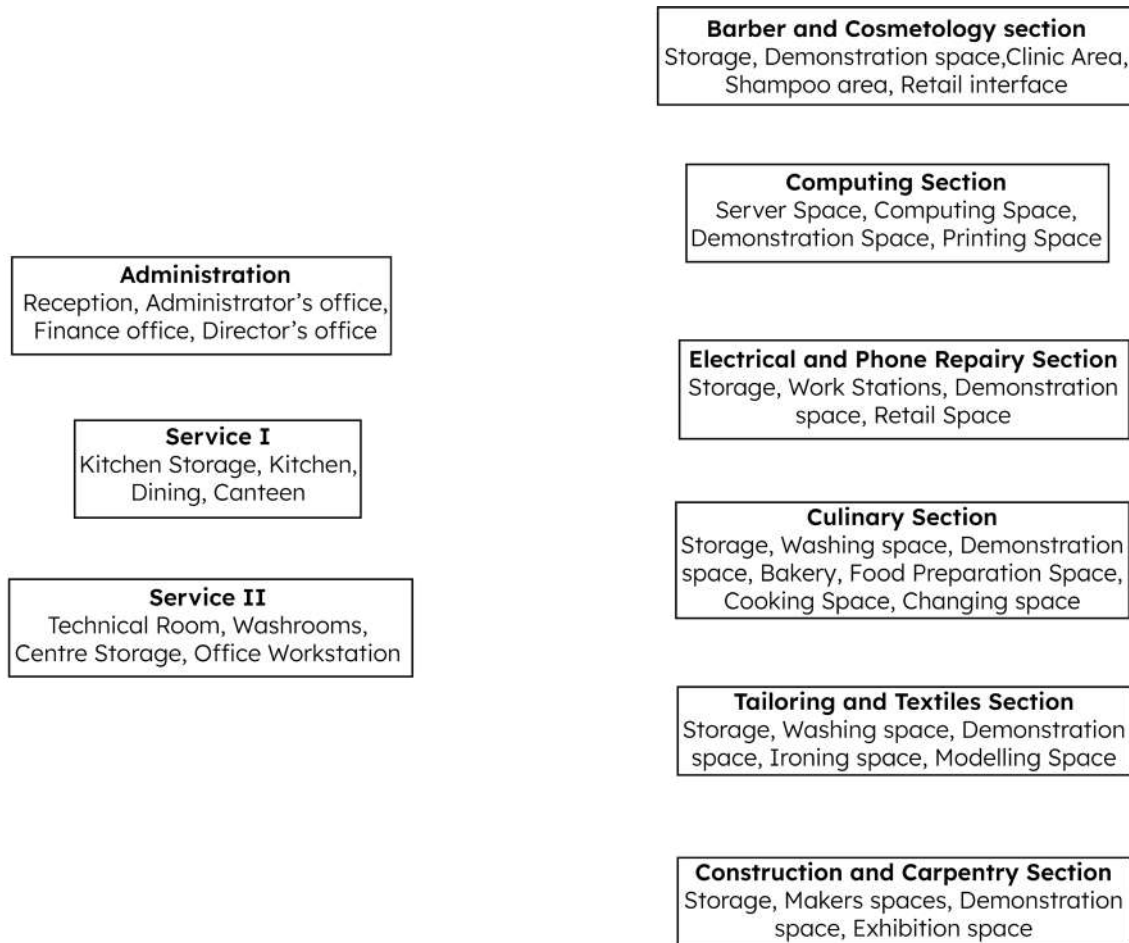


Fig. 50 A summary of the project's programme

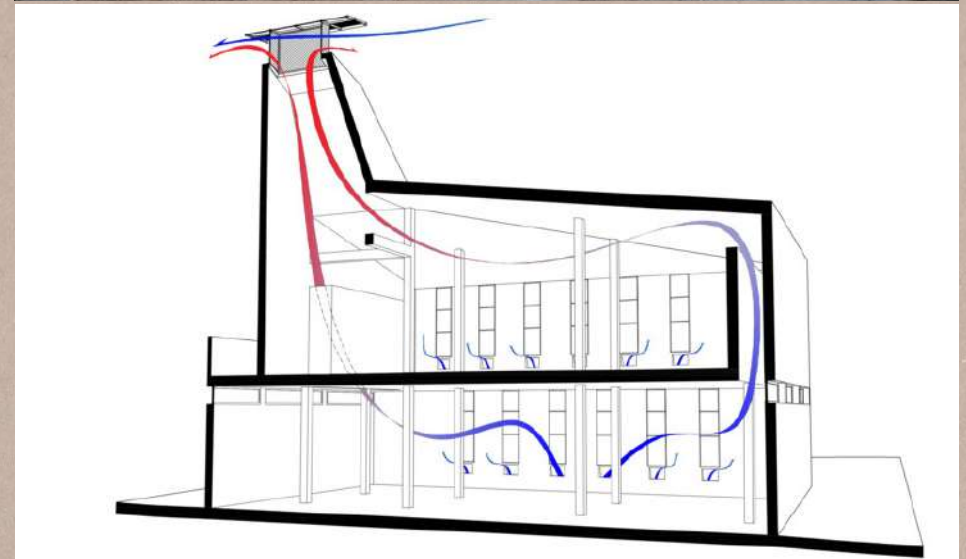


Fig.52 Startup Lions Campus / Kéré Architecture (Kéré Architecture)

From this precedent, passive ventilation is an aspect that can be learned, particularly through the use of the wind catcher as the key element. There is also a good use of space, given the nature of the site. The steps serve as circulation as well as a gathering space for communal activities.

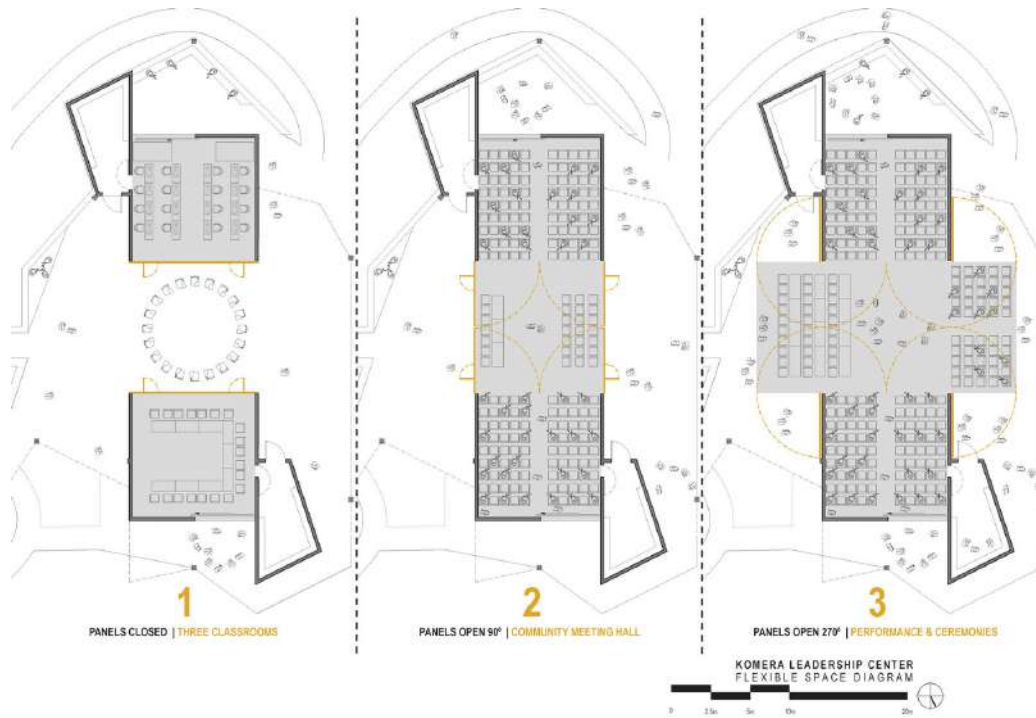


Fig. 51 Komera Leadership Center, BE_Design (Images by Bruce Engel)

From this precedent, architectural elements such as doors are used to partition space as required. This is an aspect of adaptability that can be learned from the project. It enables the project to accommodate different community activities in the same space, a key goal of the vocational centres community spaces.



Fig. 54 Community sewing workshop. (Images by Amairis Ruta).

This is an example of a tailoring space for a community. The lessons drawn from this include the layout of the furniture and how the openings illuminate the work stations

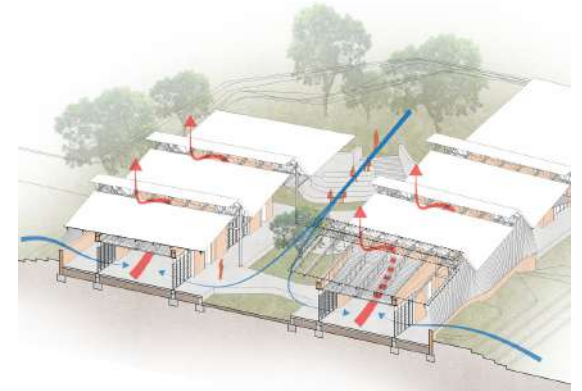
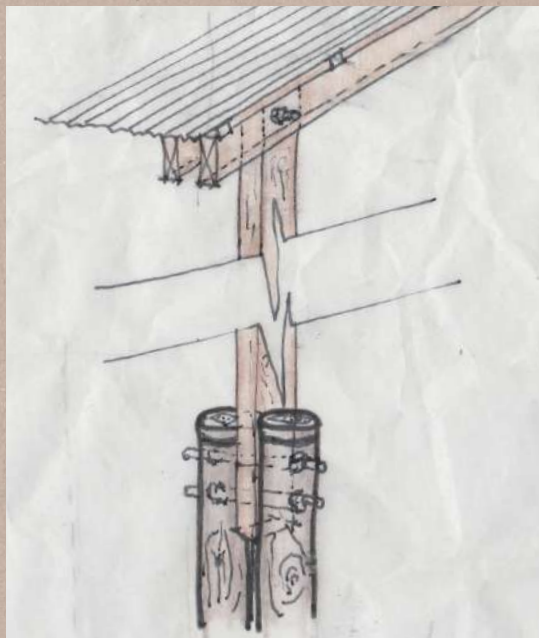


Fig.53 Campus Expansion of Stern Stewart Institute, Burkina Faso, West Africa / Kéré Architecture (Images and Illustration by Kéré Architecture)

From this precedent, architectural elements such as doors are used to partition space as required. This is an aspect of adaptability that can be learned from the project. It enables the project to accommodate different community activities in the same space, a key goal of the vocational centres community spaces.



In this precedent, the use of gum poles stood out as a key structural component of the project. The project could use a structural system where the roof is supported by a series of gum poles and the walls are infills that are not structural.

Fig. 56 Precedent: House Laubsher, Pretoria by Ora Joubert 1996 (Image by J Smit edited by author)



Fig. 55 Mini Explorers kindergarten, Bloemfontein by Smit Architects
(Images by Author)

In this example, lessons drawn include furniture considerations for children and the key layout spaces in a crech. Adaptability through operable walls is also another lesson drawn from the project's children spaces

5. Process

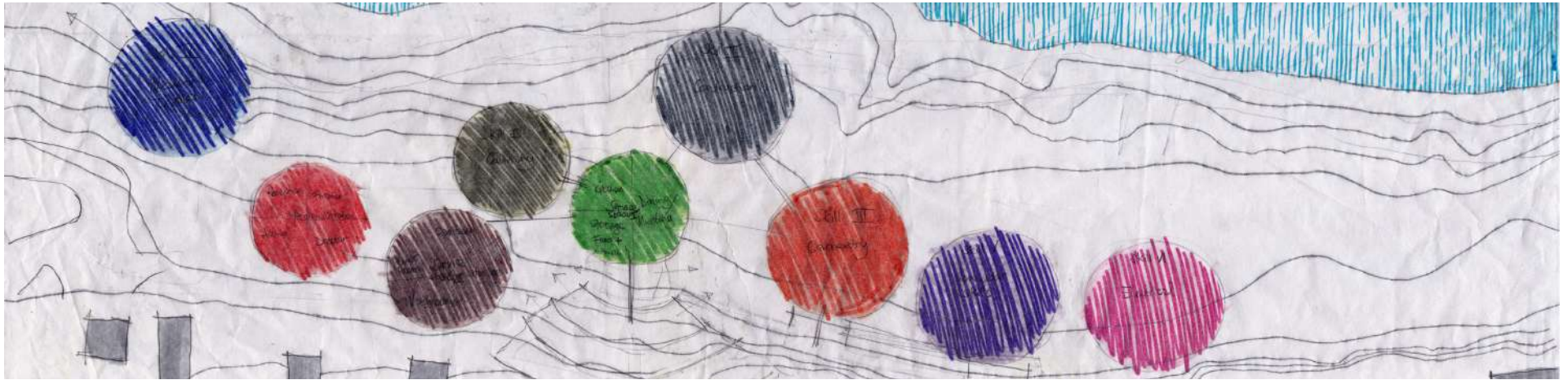


Fig. 57 The relationship between spaces of the project in for of bubble diagrams

Following the appreciation of spaces and their requirements, the design process proceeded to consider the relationship of the spaces collectively

5.1 Touchstone

To articulate the essence of the project, two materials were used: Bark cloth and cardboard. The essence of the project is a catalyst that links the site to the community, by facilitating activities that the residents of Melusi 3 can engage in to uplift their economic situation.

Envisioned as three elements, with the third as a mediator between the other two that are perceived to be of the same kind. The third element is in tension, linking the first (which symbolises the site) to the second (which symbolises the immediate context of the site). The mediator is the essence of the project, which serves to tap into the potential of the people, the site and its immediate context.

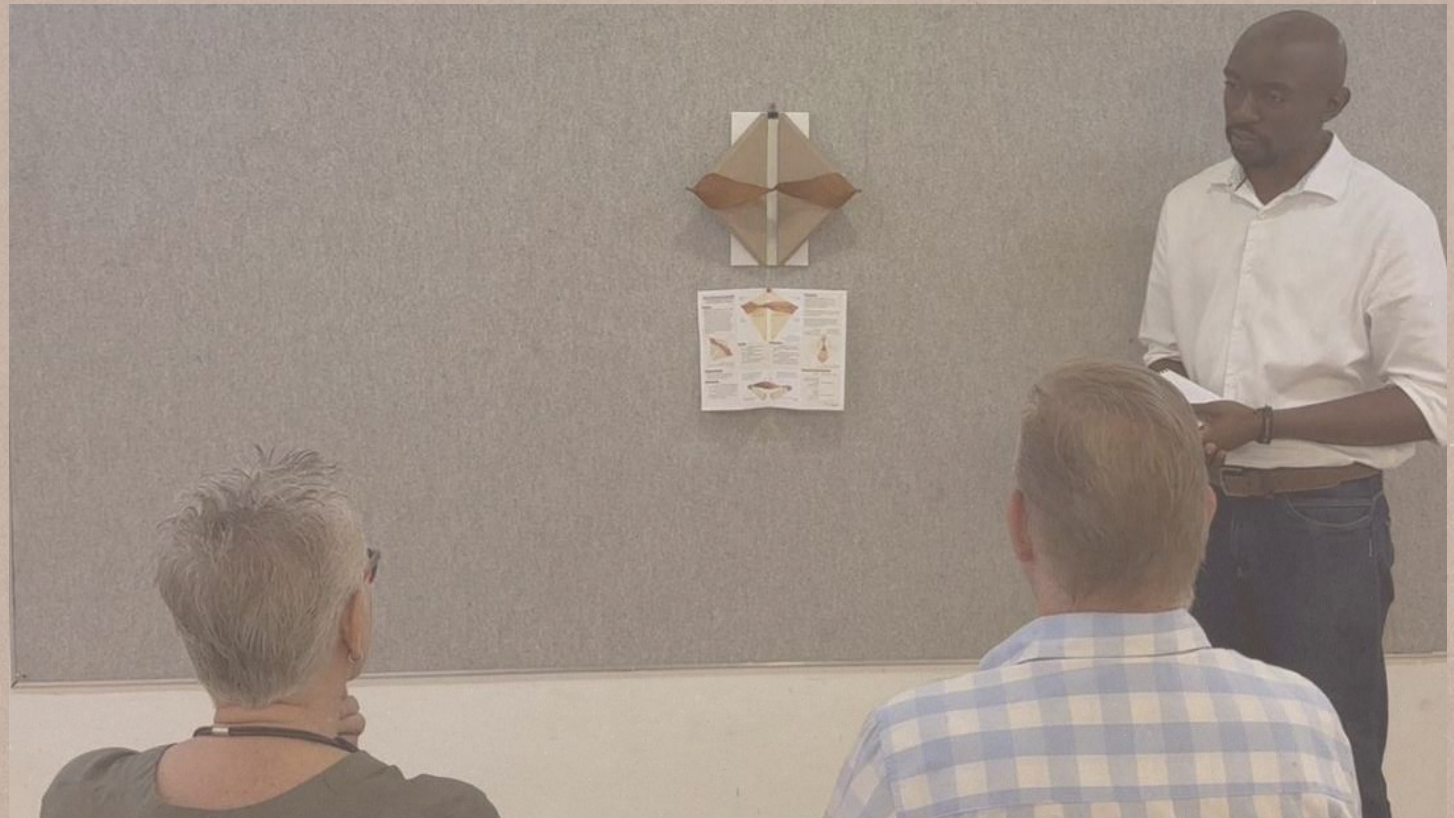


Fig. 58 Presentation of the touchstone project at the beginning of the project

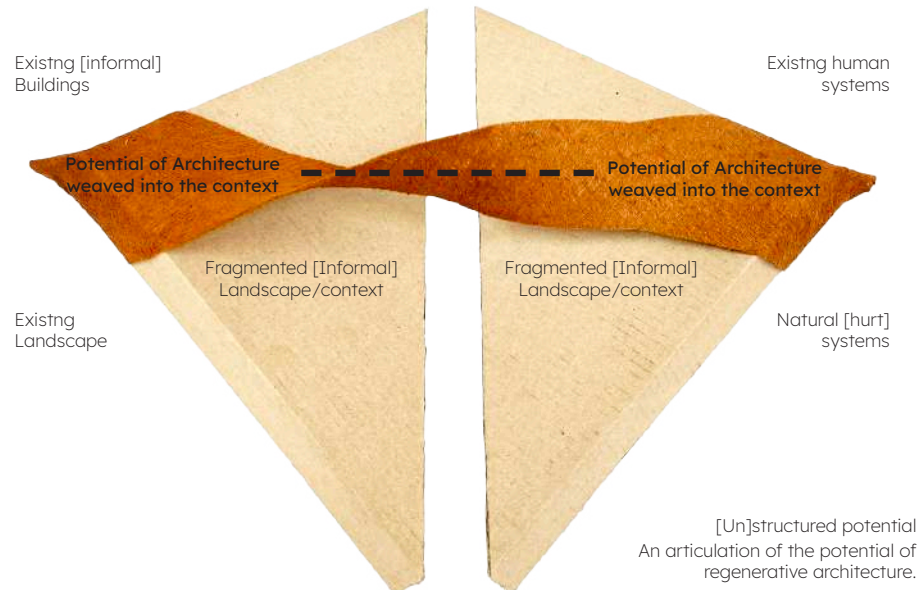
Problem:



[Un]structured potential
An articulation of adaptability, the essence of
the project.

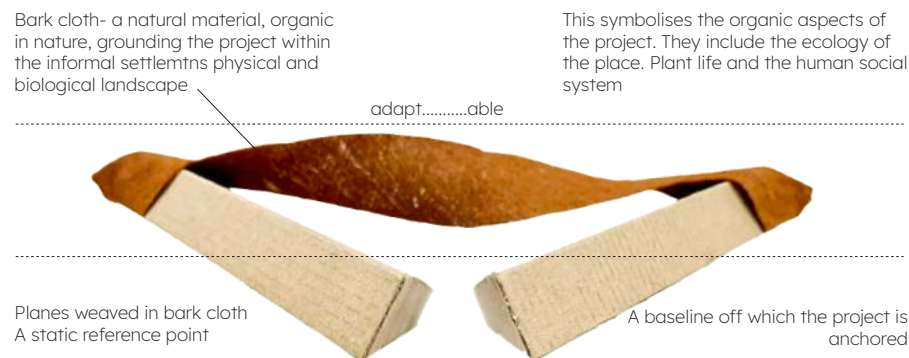
What is the potential of regenerative architecture in placemaking within the informal settlement of Melusi?

1. How can architecture respond to the challenges of an informal settlement?
2. How can architecture increase the resilience of an informal settlement?
3. What does vocational skills training entail and what does that mean in terms of architecture?



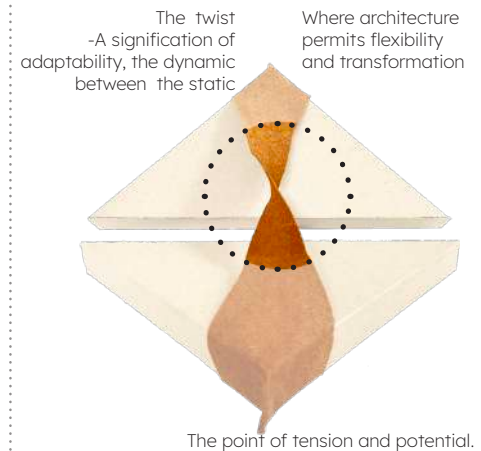
- I. Architectural adaptability in informal settlements
- II. Architectural resilience in informal settlements
- III. Placemaking in informal settlements
- IV. Vocational Skills training and what it means in architecture

- A. To establish how architecture can respond to an informal context like Melusi.
- B. To establish how architecture can increase the resilience of an informal settlement such as Melusi.
- C. To establish how architecture can contribute towards the uplifting of society through vocational skills training



A building that considers society by addressing one of its concerns on the vocational skills training of its youth, particularly the matriculants and other residents that are unskilled.

A building that spatially integrates people, place and stuff or equipment required to function, not just for human benefit but for the environment as well.



Offices	Administrative Space
Workshop spaces	Primary Spaces
Meeting/Gathering spaces	
Laboratories	
Lecture rooms	
Storage	Service Spaces
Kitchen	
Canteen	
Power room	
Washrooms	

| 64

5.2 Conceptual Approaches:

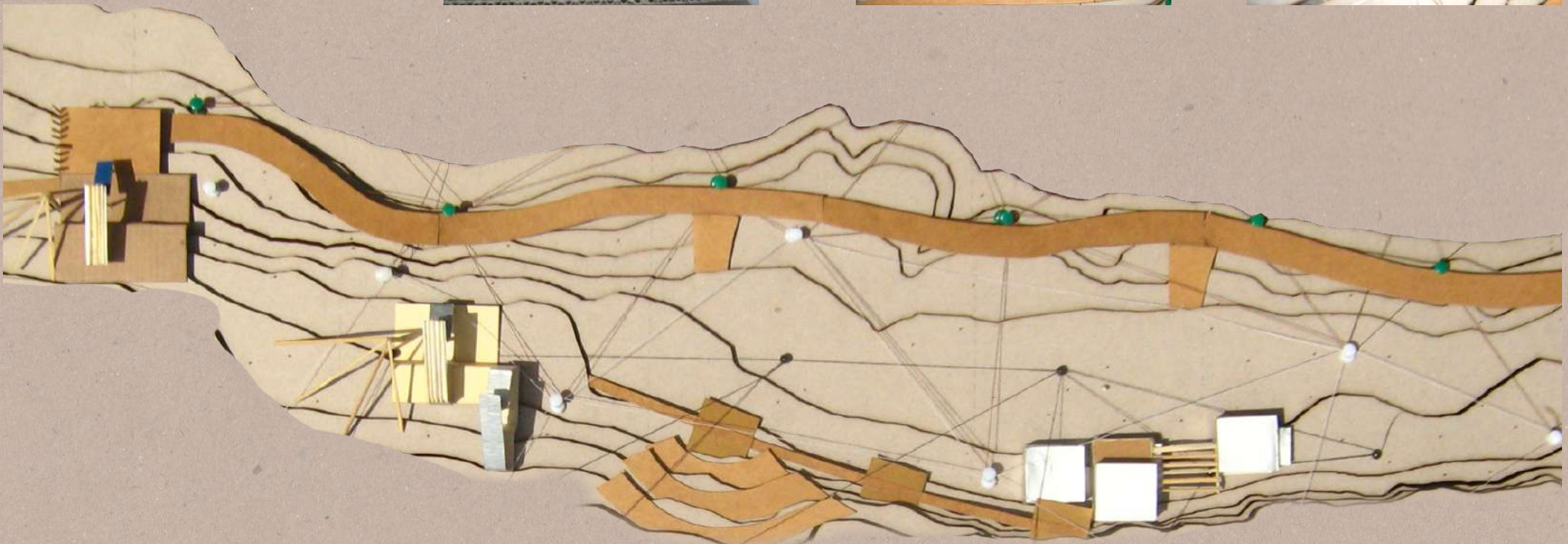
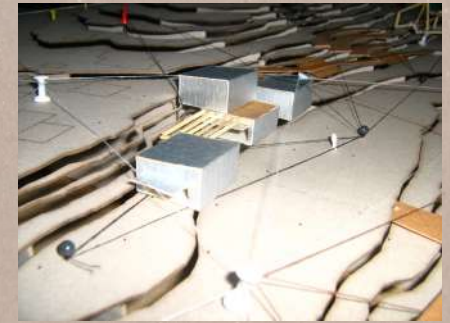
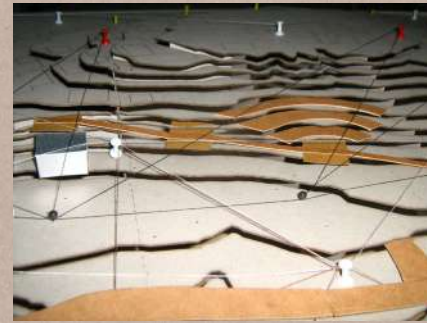
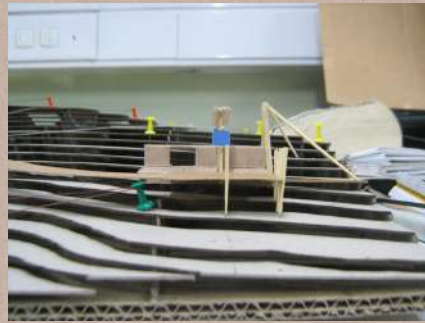
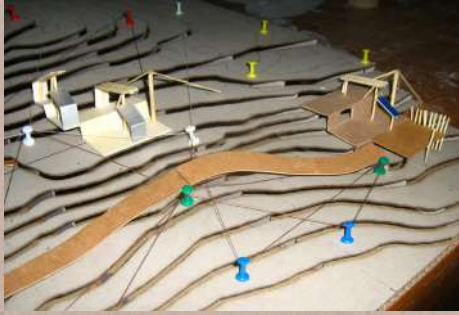


Fig.60 Design ideas for the project

Three cocepts were generated:

5.2.1 Vernacular Synergy

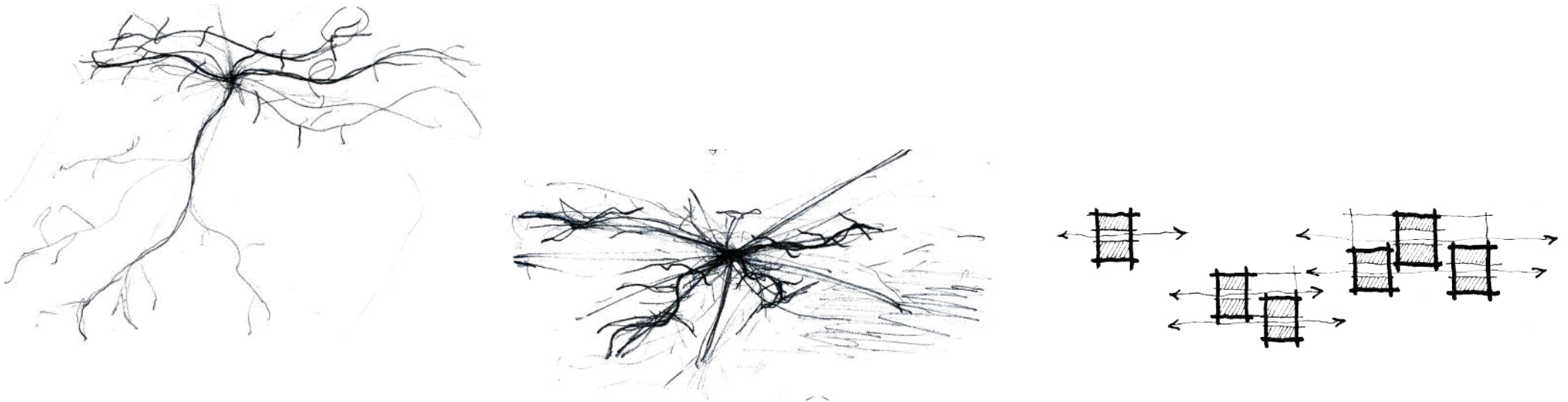


Fig. 61 Illustration of vernacular synergy. Lessons from the immediate and wider context are to be applied on site. These are drawn from building configurations, spatial materials and circulation patterns

This conceptual driver seeks to ground the project within the context and identity of Melusi. Borrowing from the macro and immediate context, this conceptual driver is to inform the material selection, building form, circulation and communal activities of the project.

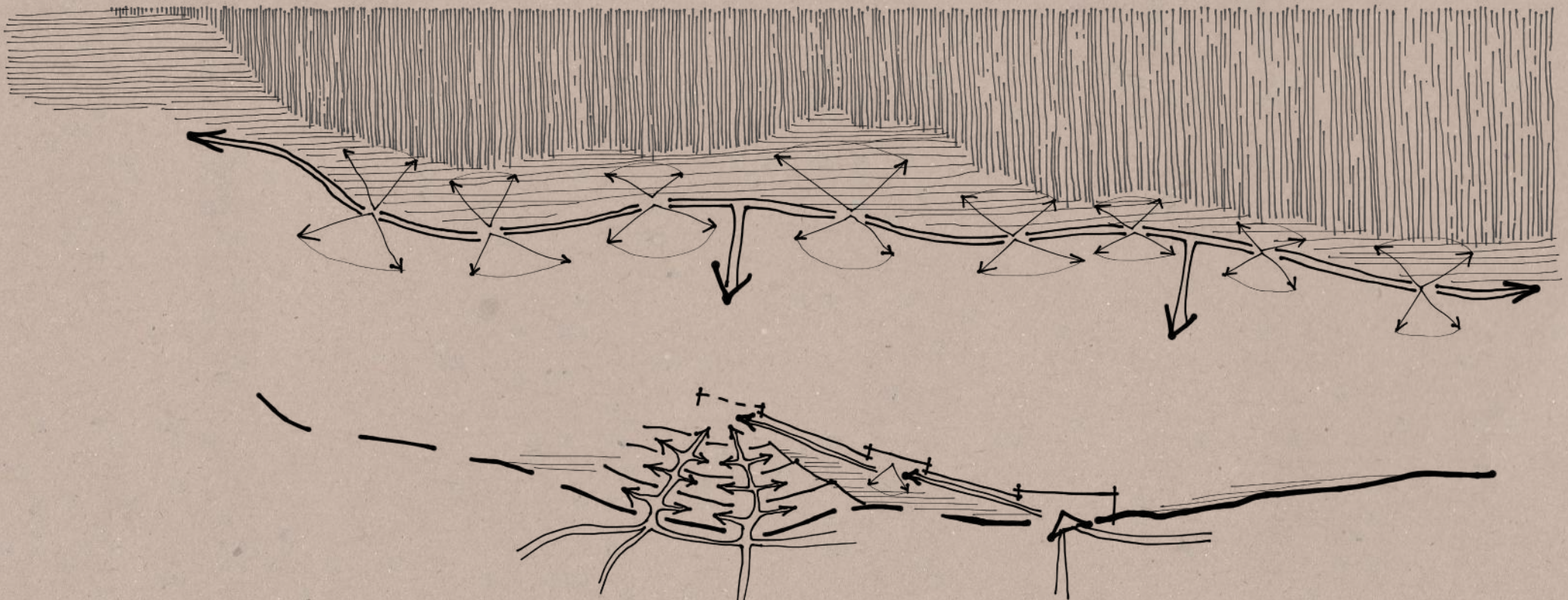


Fig. 62 Illustration of Ecological edges. The northern edge is a plantcentric edge as such calls for the integration of plants with in the site. This is to also optimise the availability of water from the old quarry dam. The southern edge is a peoplecentric edge. It is to aid (pedestrian) access to the project. considering the unfriendly drop in terrain. This is to be in the form of a series of landings as part of the project's ramp system

This conceptual driver seeks to activate the boundaries, edges and other thresholds as social and learning interfaces. within the project. Primarily the northern edge is plantcetric and the southern edge is peoplecentric. The nothern edge is to have a series of plants along the pedestrian access linking the various key spaces of the project. The southern edge is to have a series of ramps, leading users to a central place in the project, from the immeadiate neighbourhood context

5.2.3 Regenerative Modularity

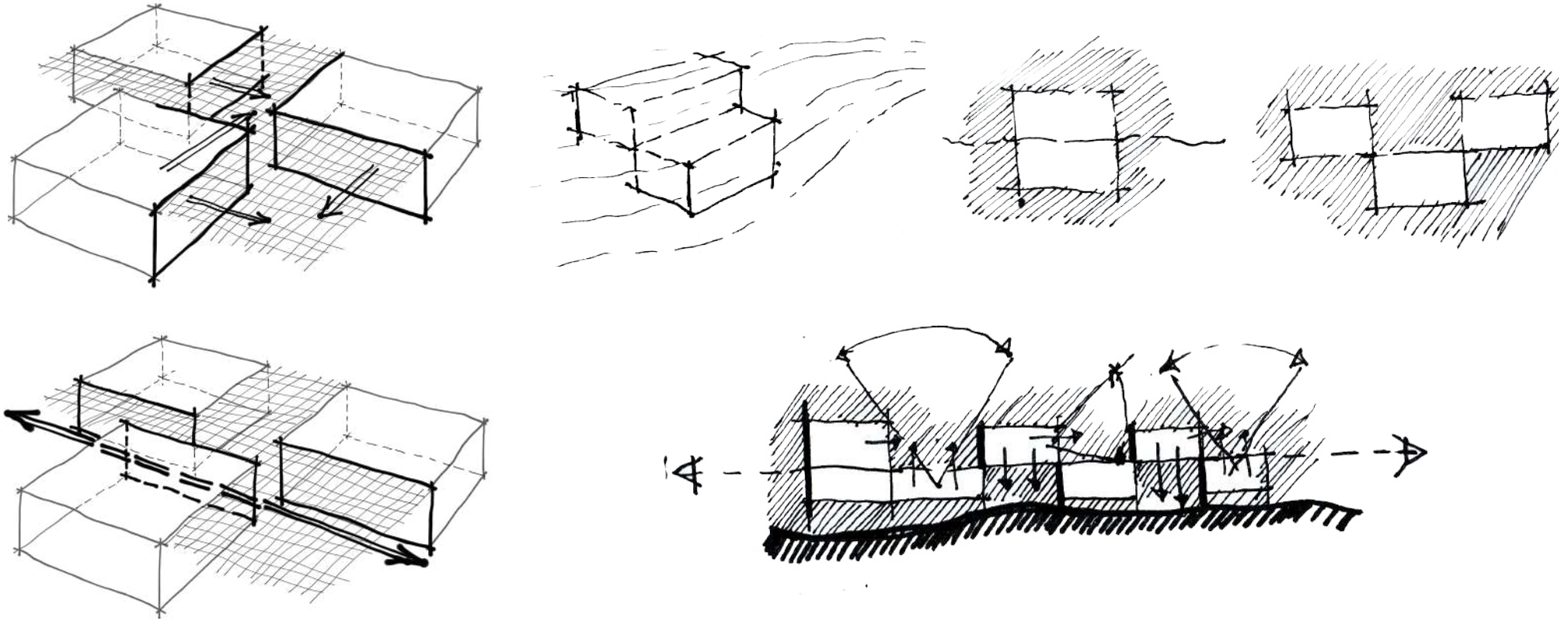


Fig. 63 Illustration of regenerative modularity. Considering the pedagogical task of the project, qualities of adaptability are essential to accommodate multiple modes of teaching and learning. This conceptual driver seeks to guide the use of modular elements to create opportunities for learning in various ways but in the same spaces of the project. This includes guiding to formation of shaded courtyards, indoor and outdoor spaces roof terraces and others

This conceptual approach seeks to anchor the architecture of the project as a pedagogical tool, towards the vision of the project as a regenerative adaptable system that educates through spatial and material design and assembly.

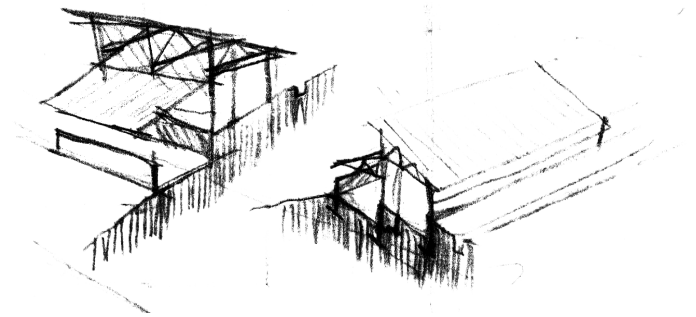
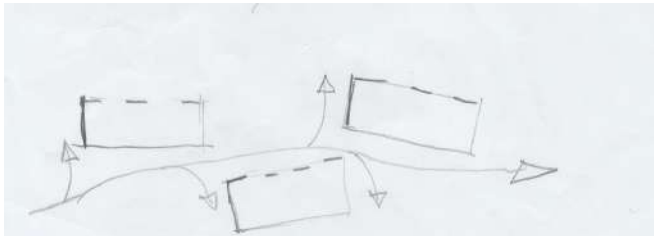
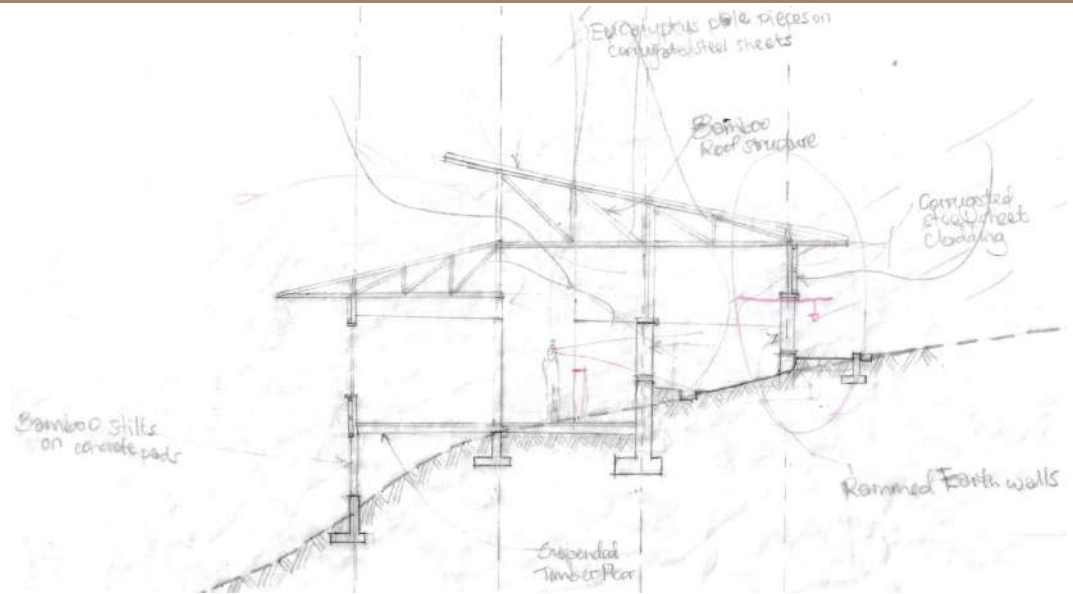
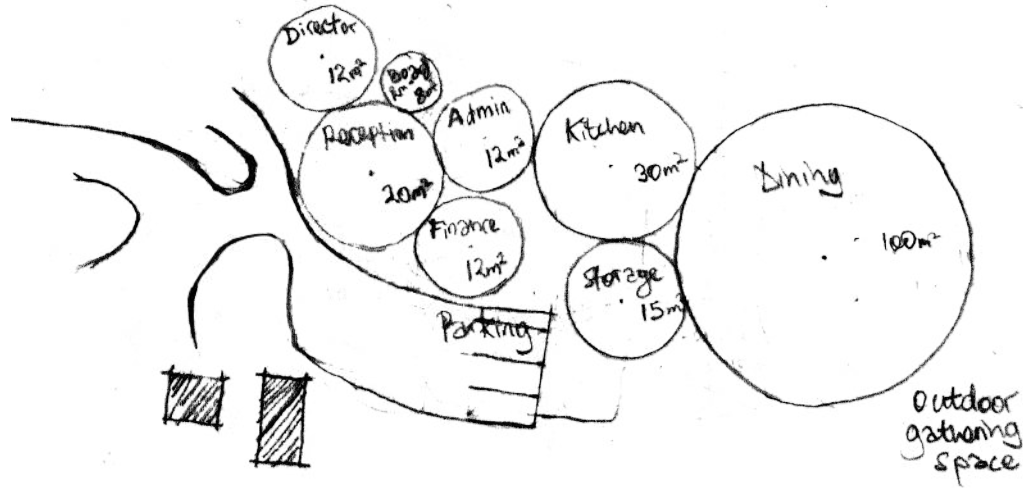


Fig. 64 Iteration 1

In this iteration, the design attempt follows an intuitive approach to the site based on an elongated layout of the project's program along the east-west axis. The spaces are laid out to support access along a spine which is situated in the centre of the site, running along the east-west axis. The built forms also follow the east-west orientation, which optimises the northern winter sun and allows for a minimised solar exposure to the west.

Since this iteration did not put into consideration the minimum sizes of the spaces, a better relationship diagram was called for in the second iteration.



Fig. 65 Iteration 1 site plan and sections

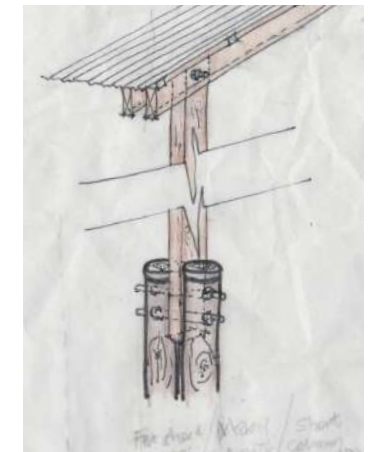
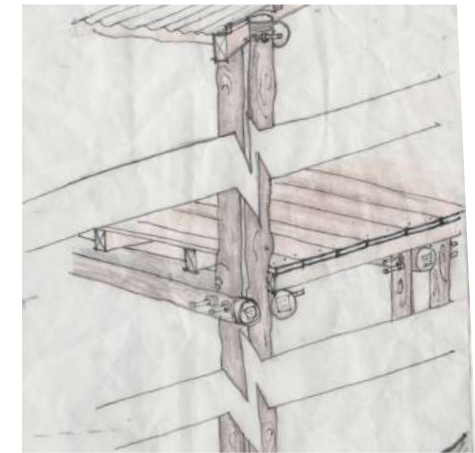
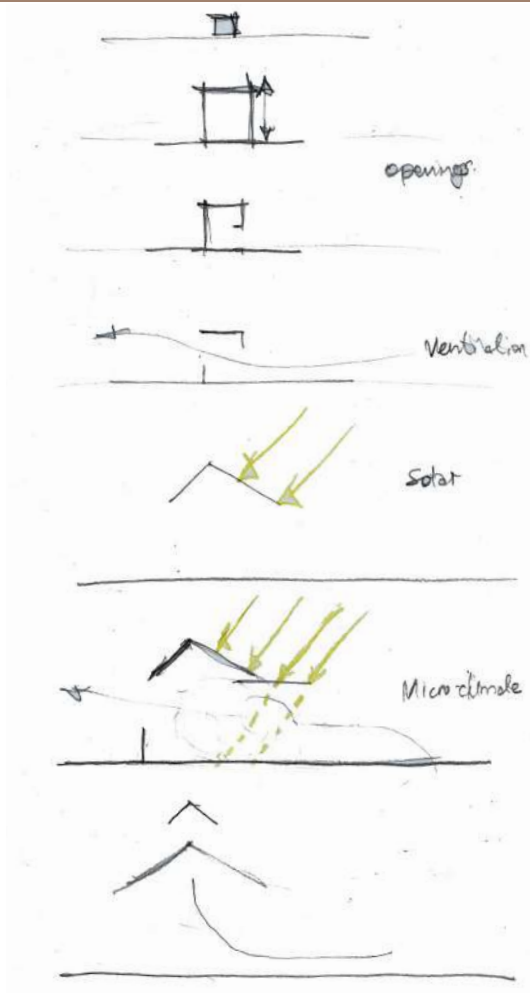


Fig. 66 Iteration II ideas.

In this iteration, the design considered a further exploration of the built form structure and the micro climate response. Openings were considered primarily to the north and south, to support cross ventilation. In the situation where there is a projected heat build up, the form was to respond in the form of a passive ventilation system that optimises a ventilation chimney. The northern facades adopted a consistent shading of the walkway, in form of a pergola. This pergola is to also support the growth of twinning plants, which contribute towards the shading of the summer sun.

Since this iteration developed into a monolithic form that consolidated the cooking spaces, the communal quality of the first iteration go lost. While the east-west circulation was carried forward, the north-south permeability was lost. This became a consideration in the third iteration.

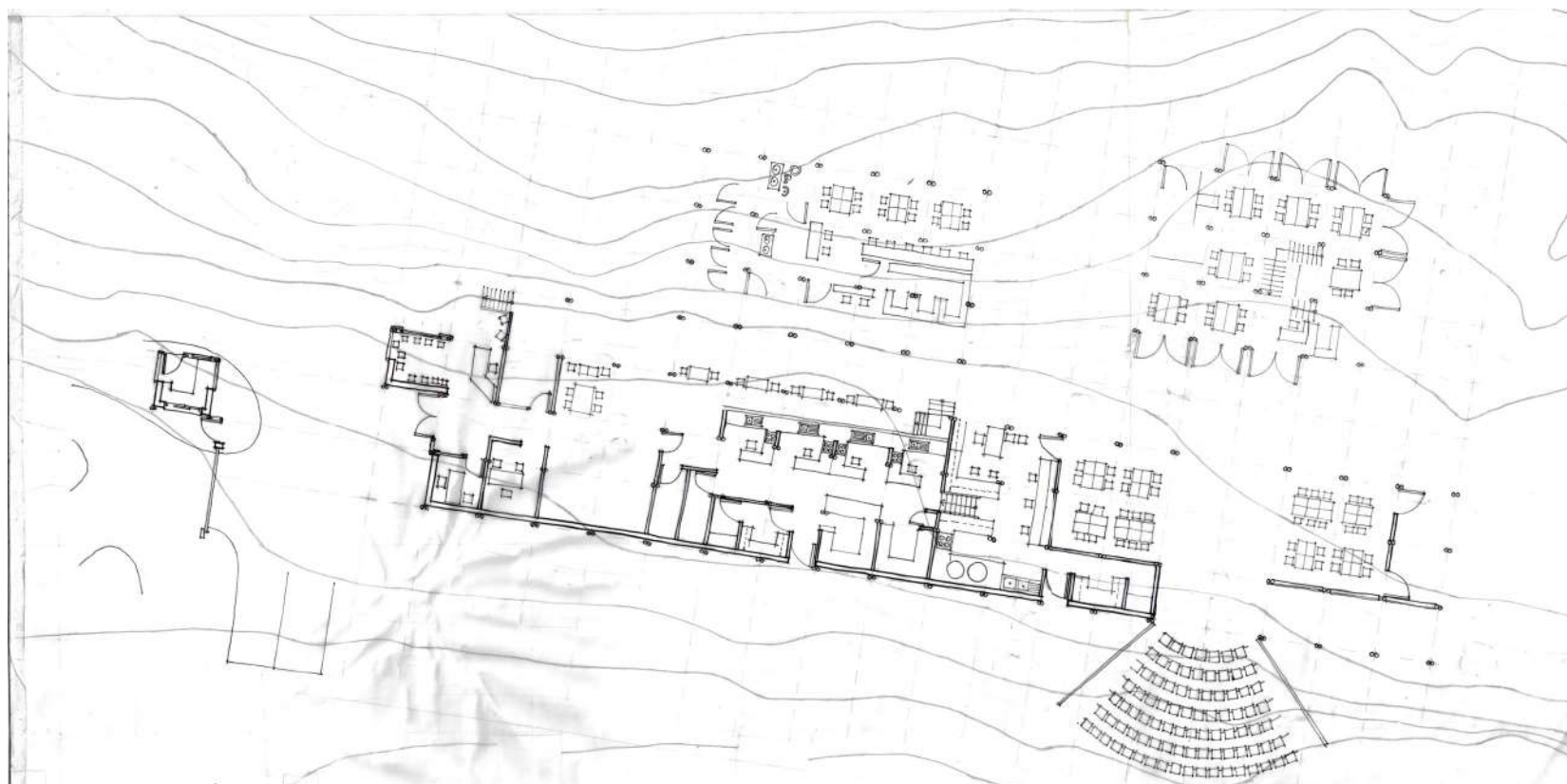
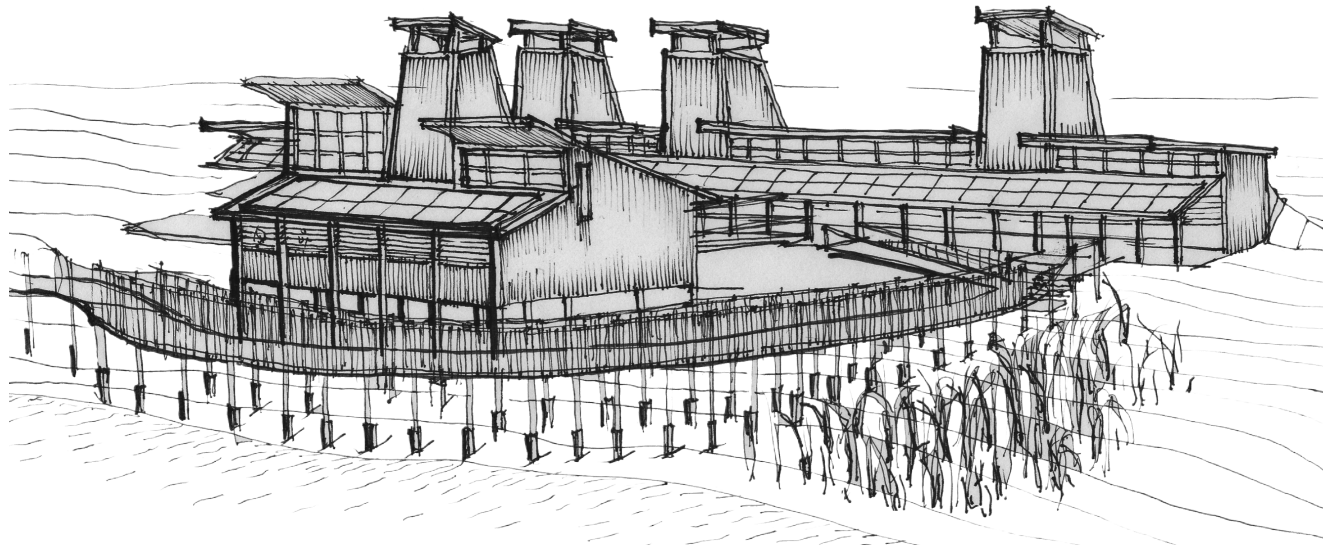


Fig. 67 A three dimensional sketch of the project and the floor plan

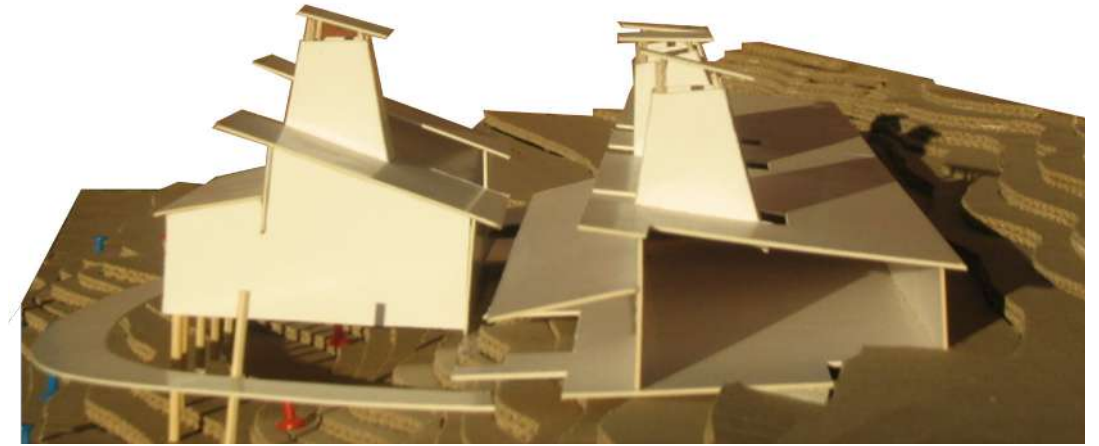
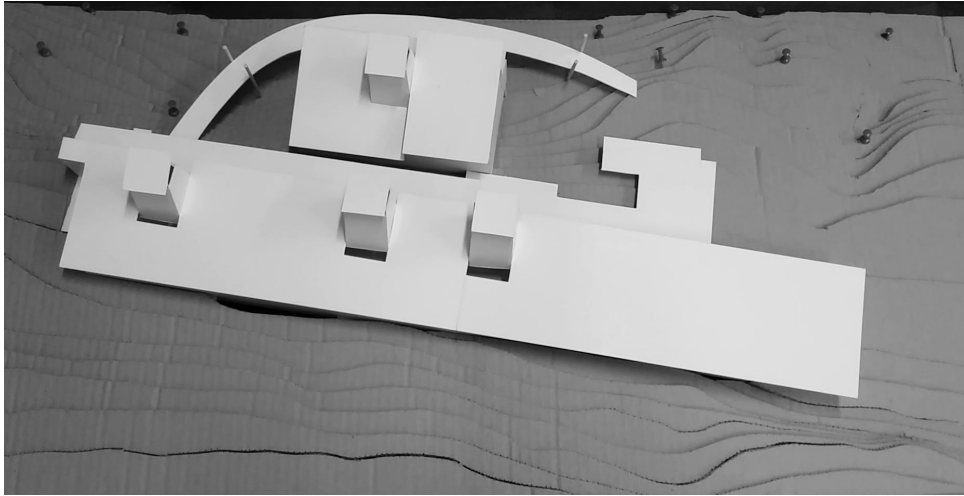


Fig. 68 Model explorations of iteration II

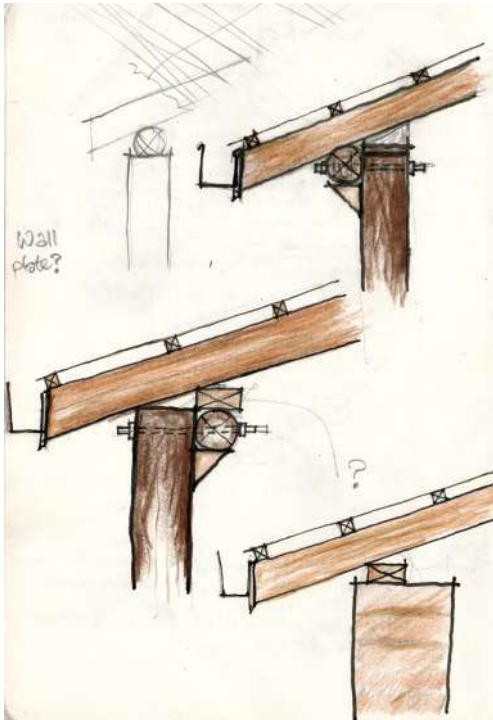


Fig.69 Explorations of the roof structure

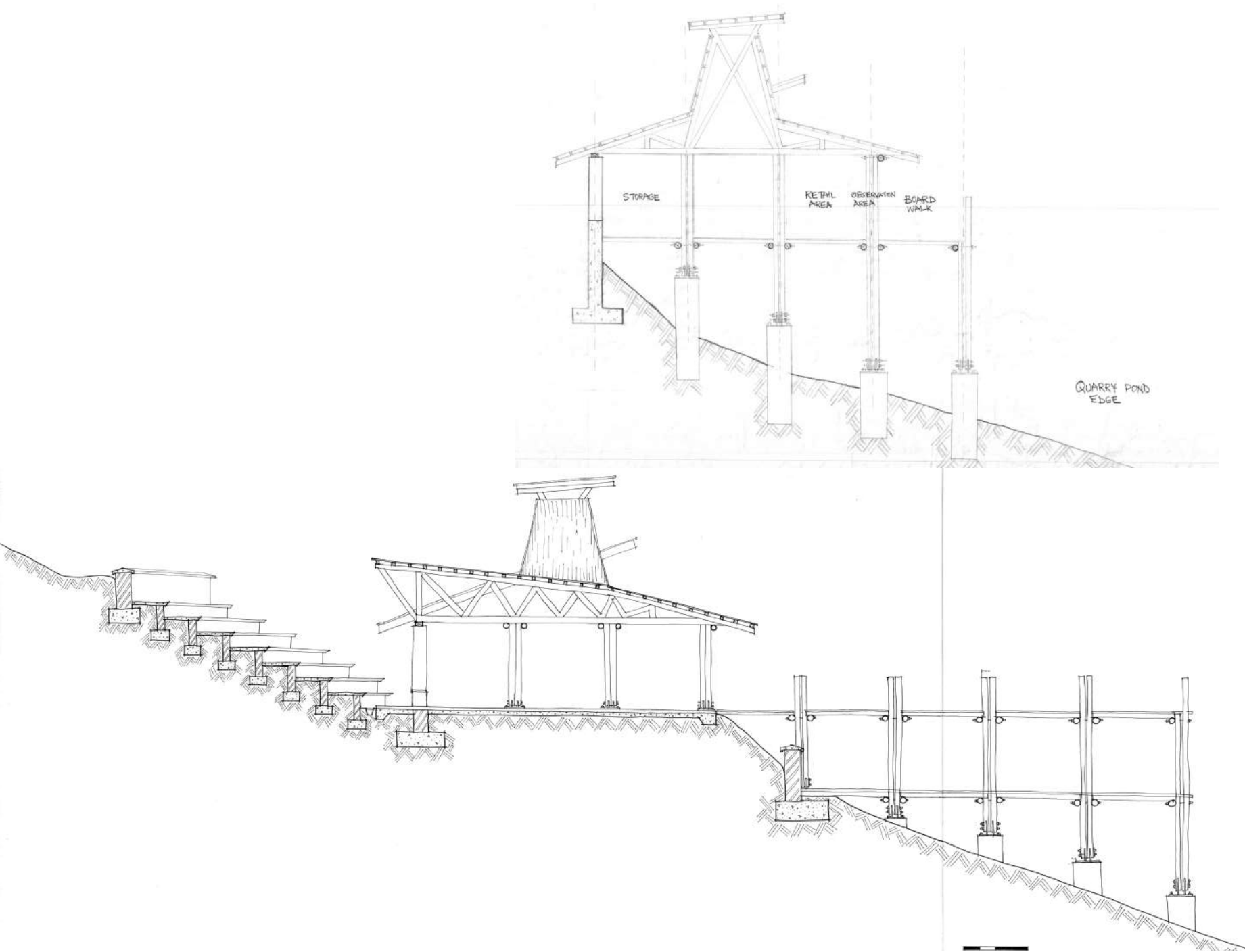
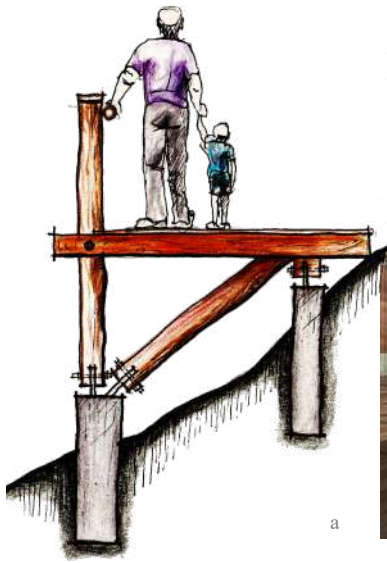
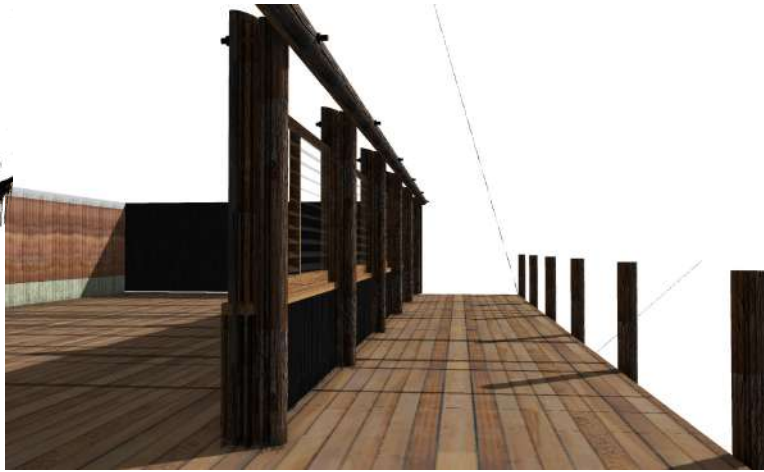


Fig. 70 Sectional exploration of the project



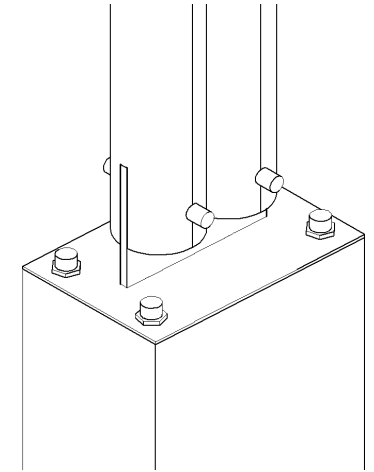
a



b



c



d

Fig. 71 Exploration of structure.



a



b

Fig. 72 a physical model exploration of the roof and the project in section

5.5 Iteration III Design Development

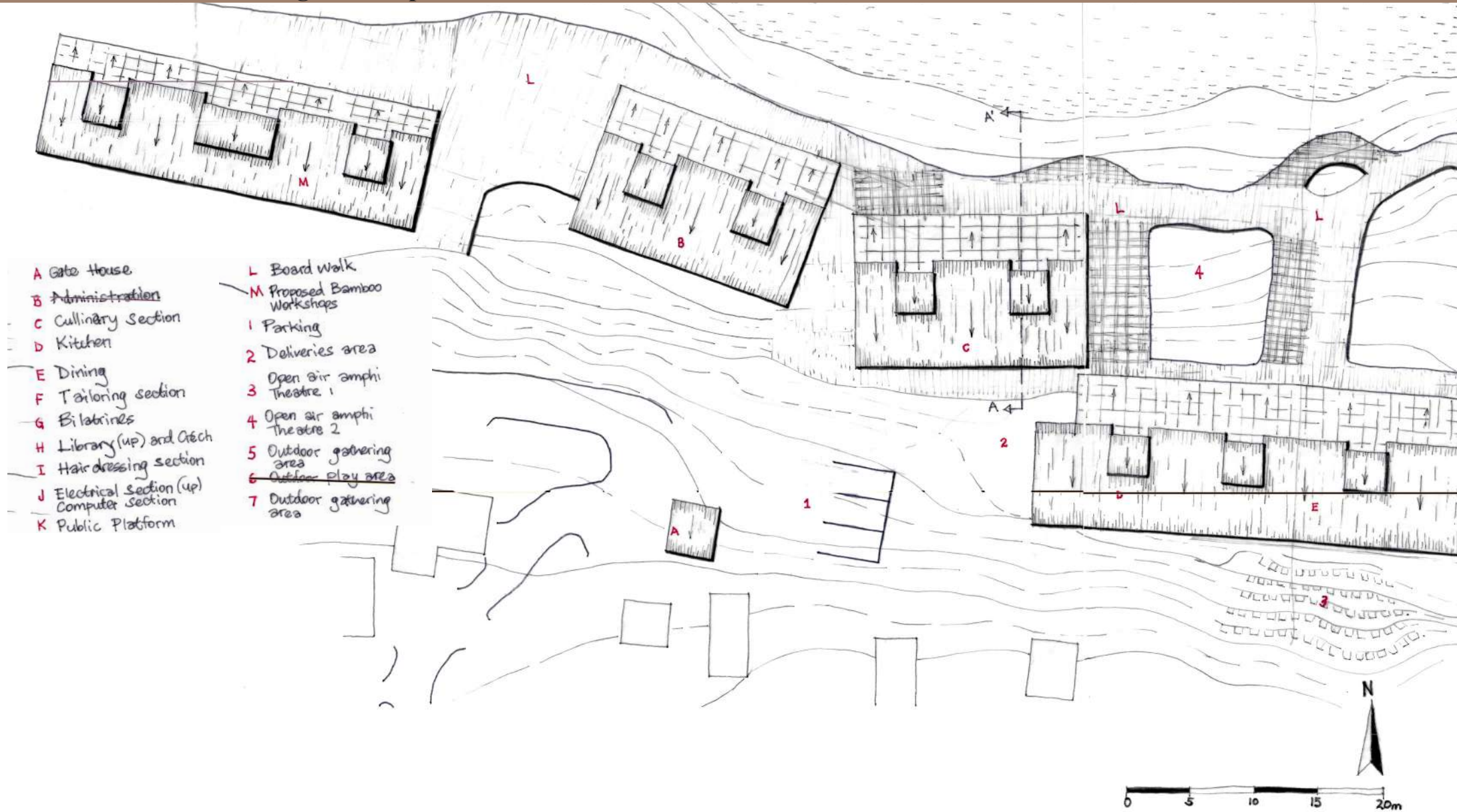


Fig. 73 Site plan

In this iteration, the design further improved the layout to accommodate more permeability in the north-south direction. The truss system and chimney were further revised, following the need to eliminate structural interferences in the spatial layouts.

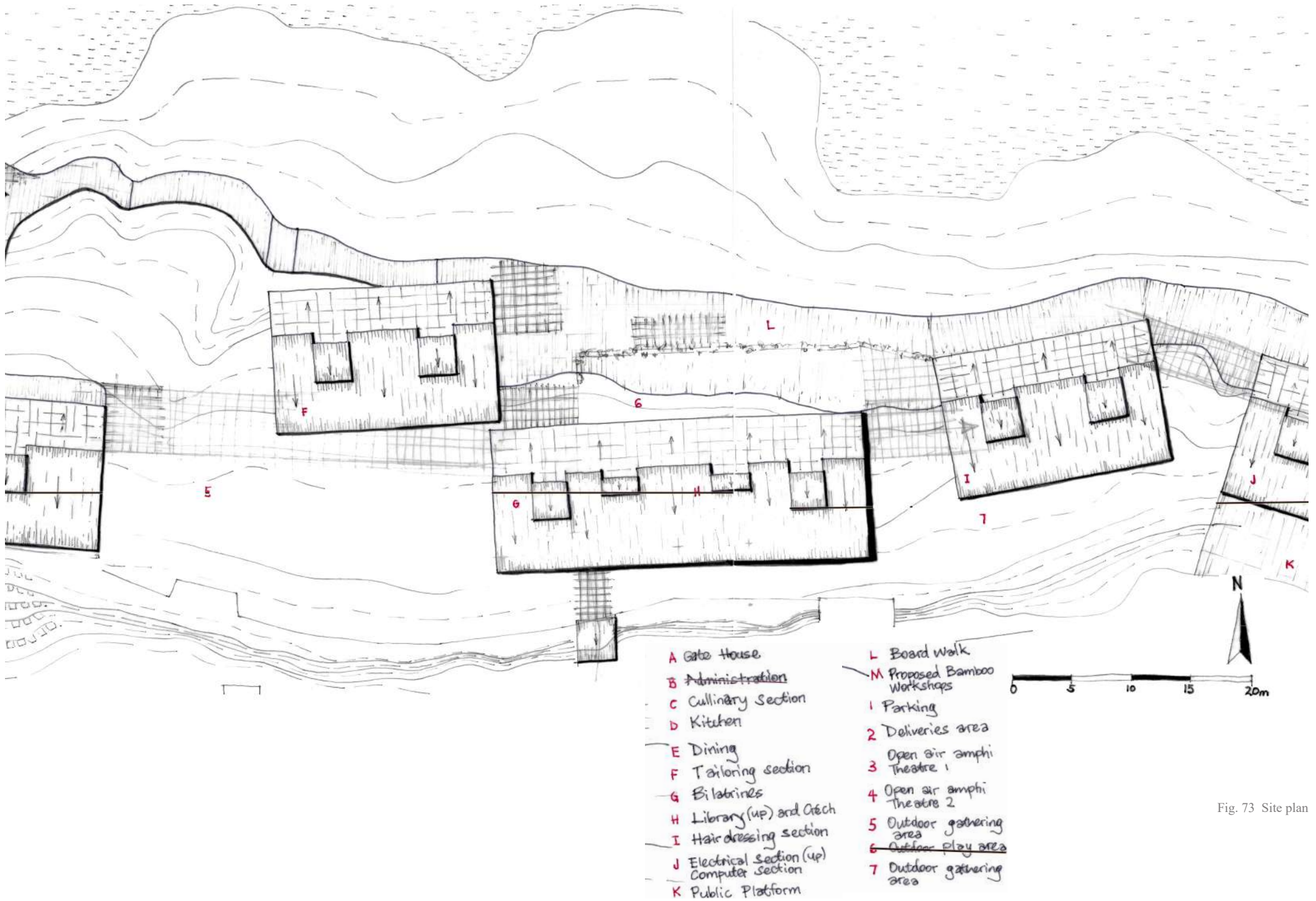
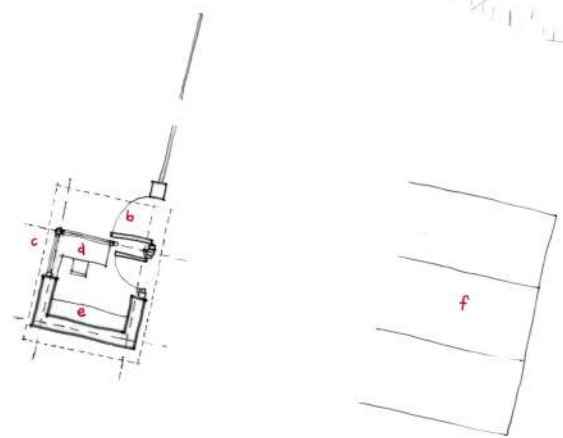


Fig. 73 Site plan



- a Vehicular access
- b Pedestrian access
- c Gate House inquiry
- d Gate House Work station
- e Storage
- f Parking

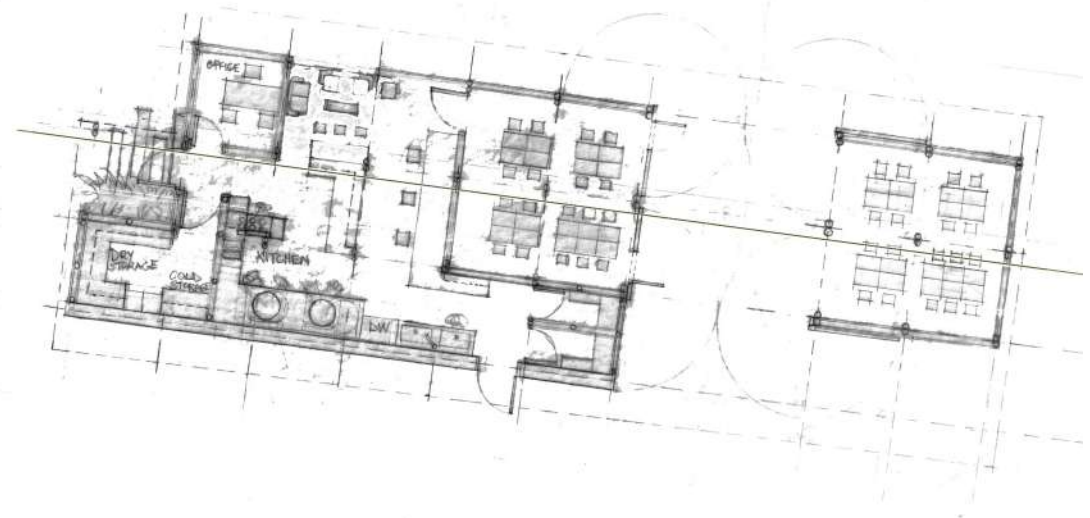
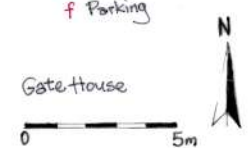


Fig. 74 Floor plan and Perspective

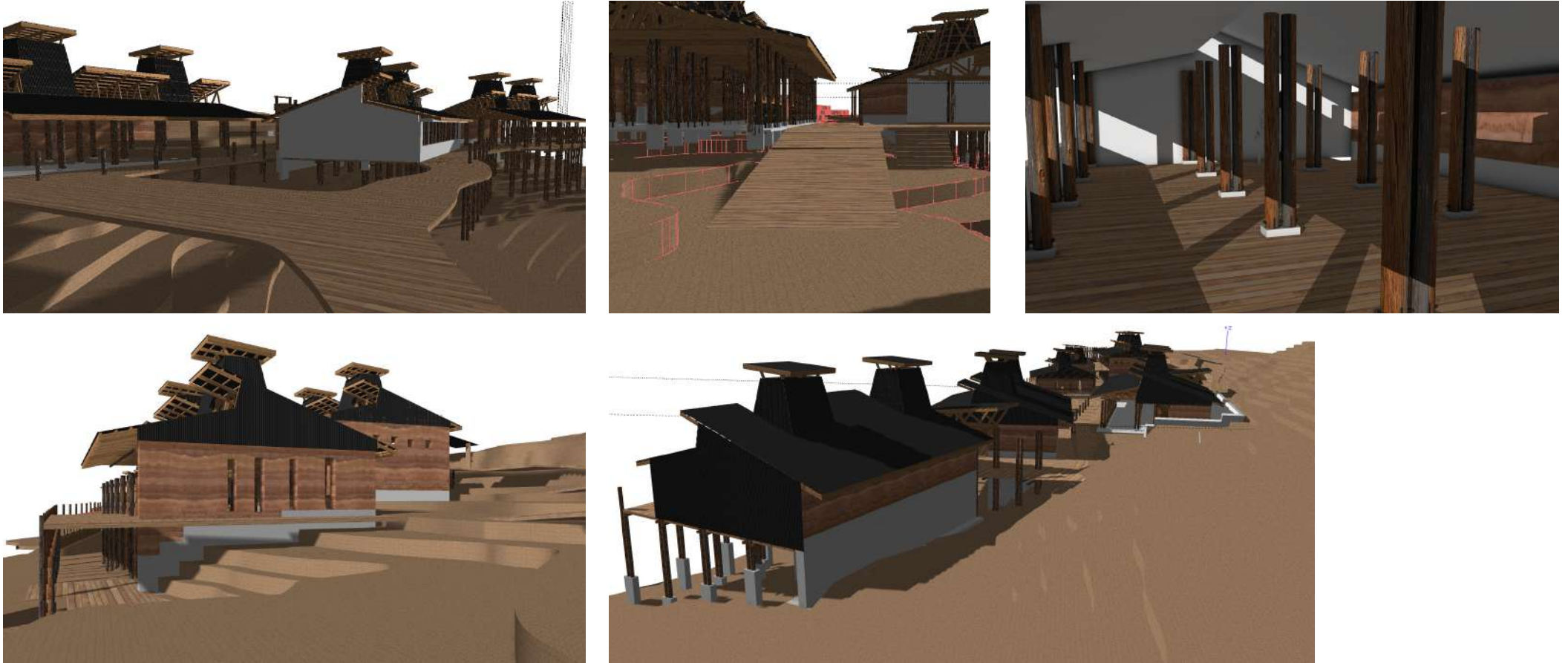
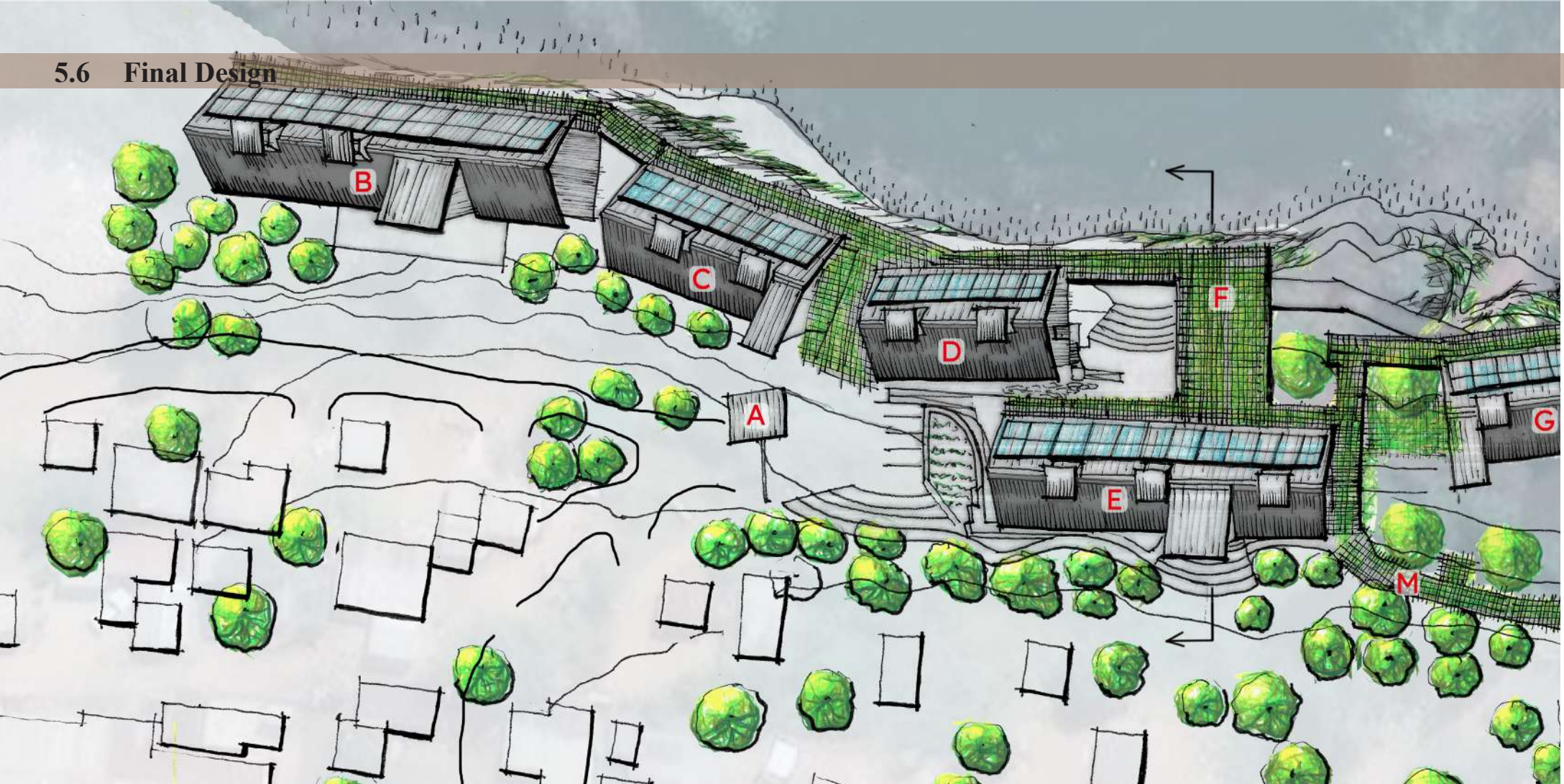


Fig. 75 Digital explorations of the project

In this iteration, the design further improved the layout to accommodate more permeability in the north-south direction. The truss system and chimney became a key concern, following the need to eliminate structural interferences in the spatial layouts and a simplification of the roof form.

5.6 Final Design



- A Gate House
- B Building and Construction Workshop
- C Administration Building
- D Culinary Skills Centre
- E Kitchen-Dining Building
- F Board Walk (Upper and Lower Deck)

Fig. 76 Final Design 3D Site Plan

In the final design, a cissor truss system was adopted. This freed the floor plates of intermediate supports, achieving the idea of adaptability of spaces, since furniture can be moved accordingly to accommodate a new function of a given space. The simplified structural system of the roof allowed for a simplified chimney, which improved the form a given built form in the project.



- G** Tailoring Skills Centre
- J** Board Walk upper and lower deck
(Link between Tailoring and Hair Dressing Skills Centres)
- I** Creche (Ground Floor) and Library (First Floor)
- K** Hair Dressing Skills Centre and Computer hub (Terrace over Hair dressing Skills centre)
- L** Electrical and Phone repair Centre and technical room(Ground Floor), Computer Skills Centre (First Floor) and Plaza (Roof terrace)
- M** Ramp
- H** Comunal Out-door Kitchen

Fig. 76 Final Design 3D Site Plan

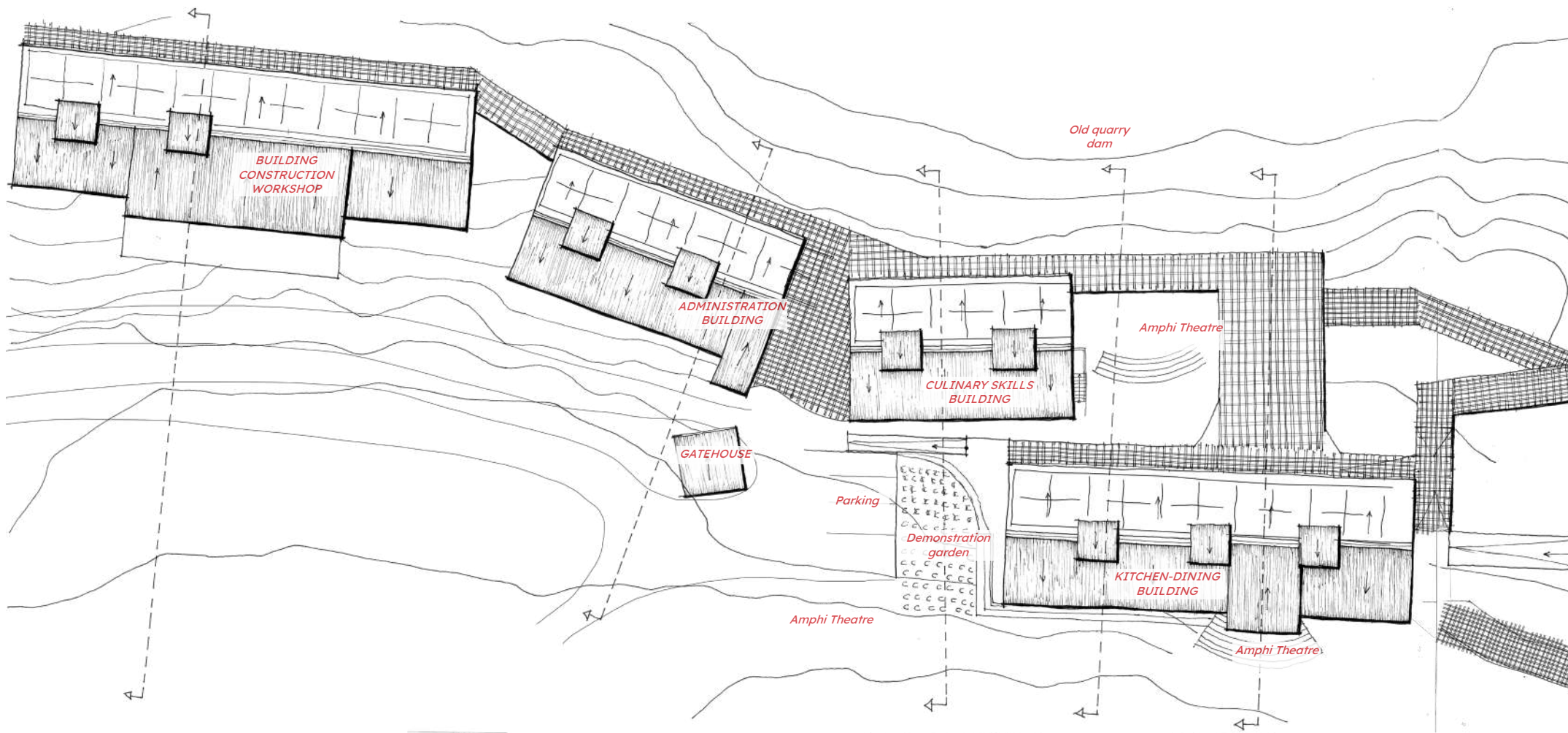


Fig. 77 Final Design Site Plan

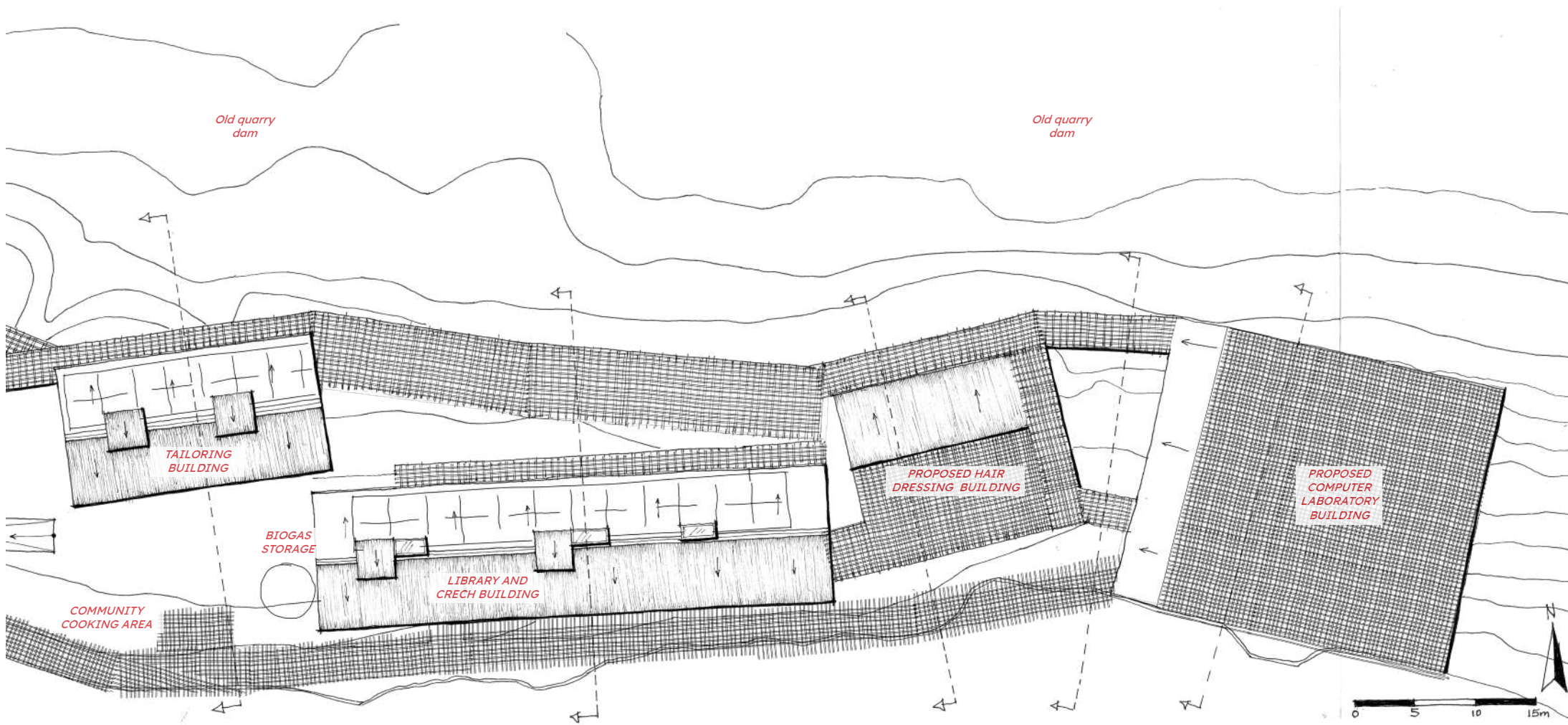


Fig. 77 Final Design Site Plan

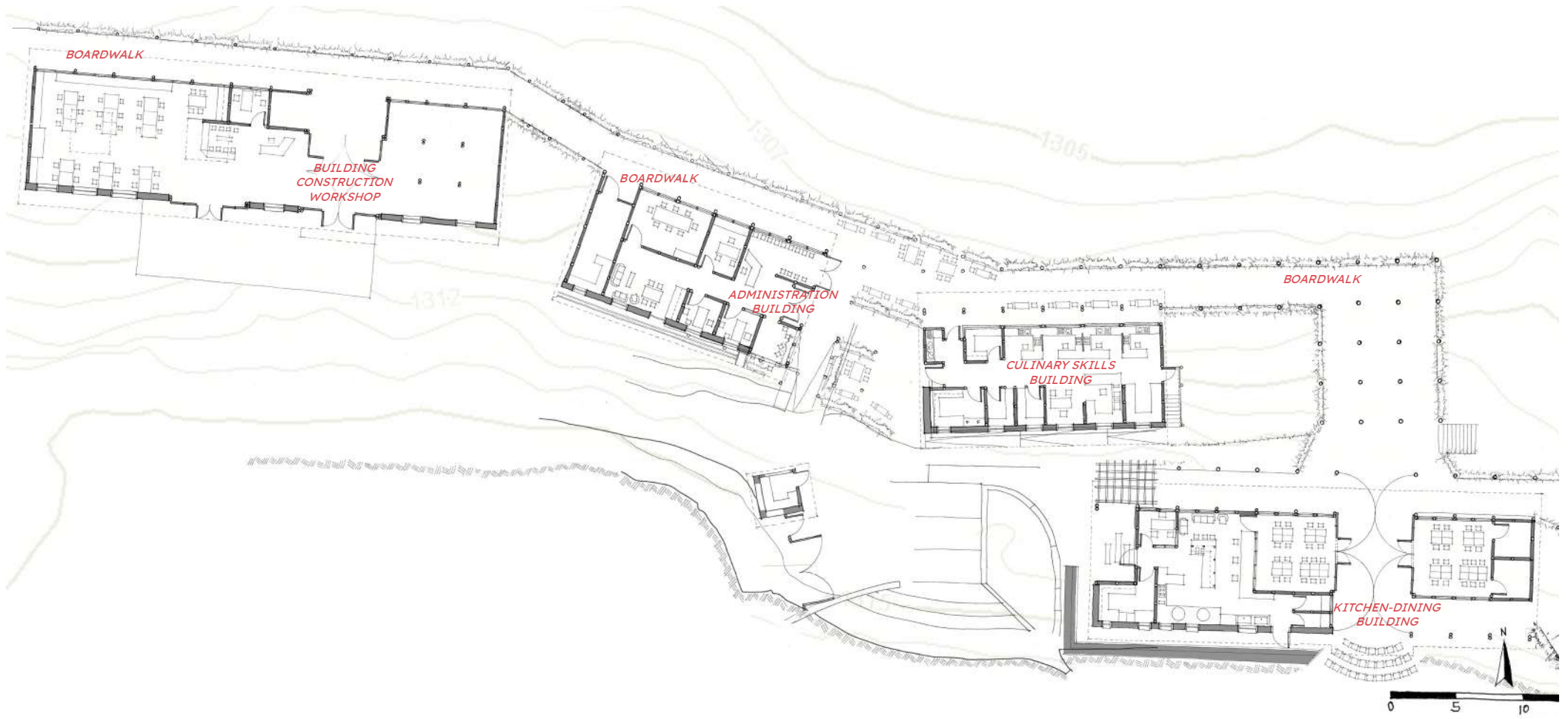


Fig. 78 Final Design Floor Plan

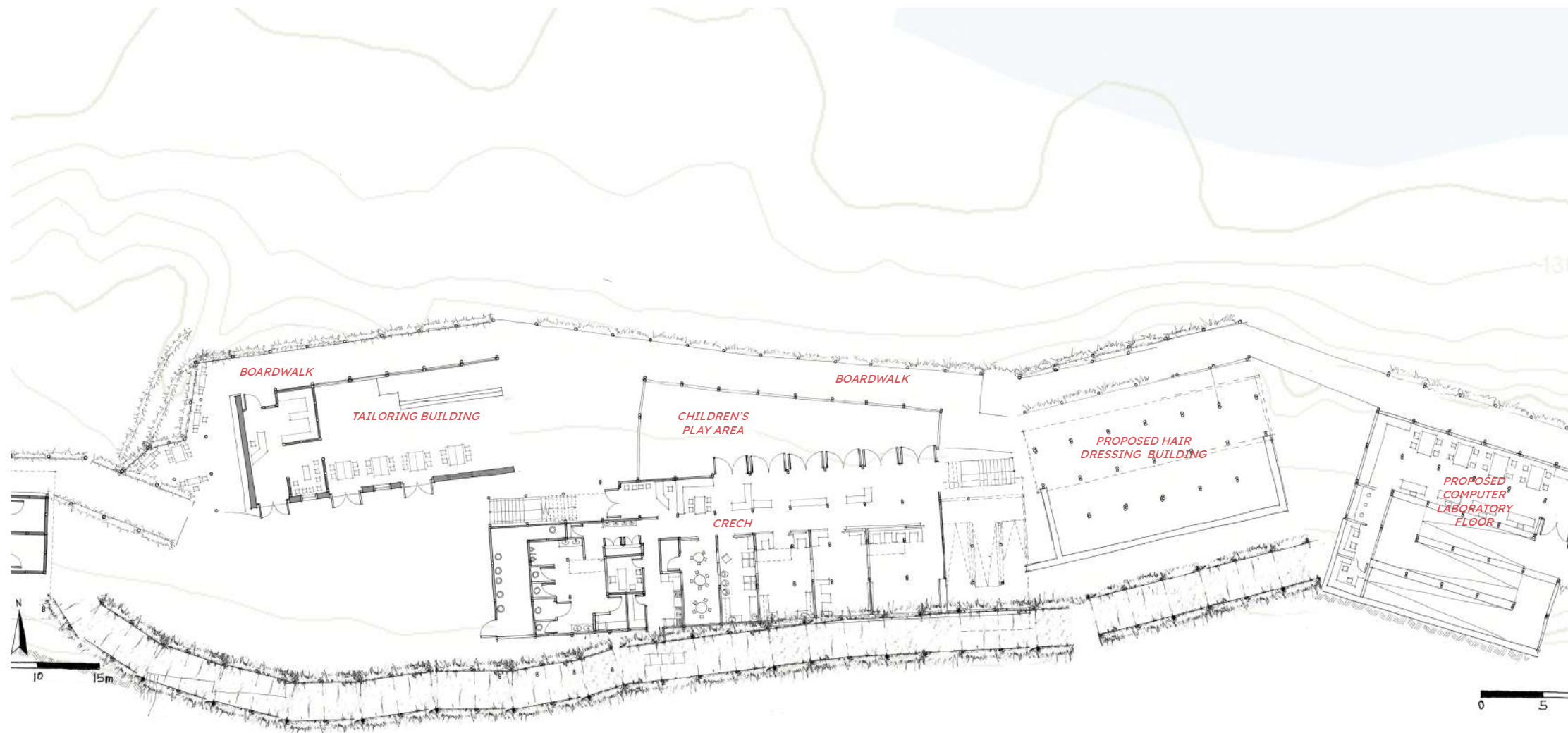


Fig. 77 Final Design Floor Plan

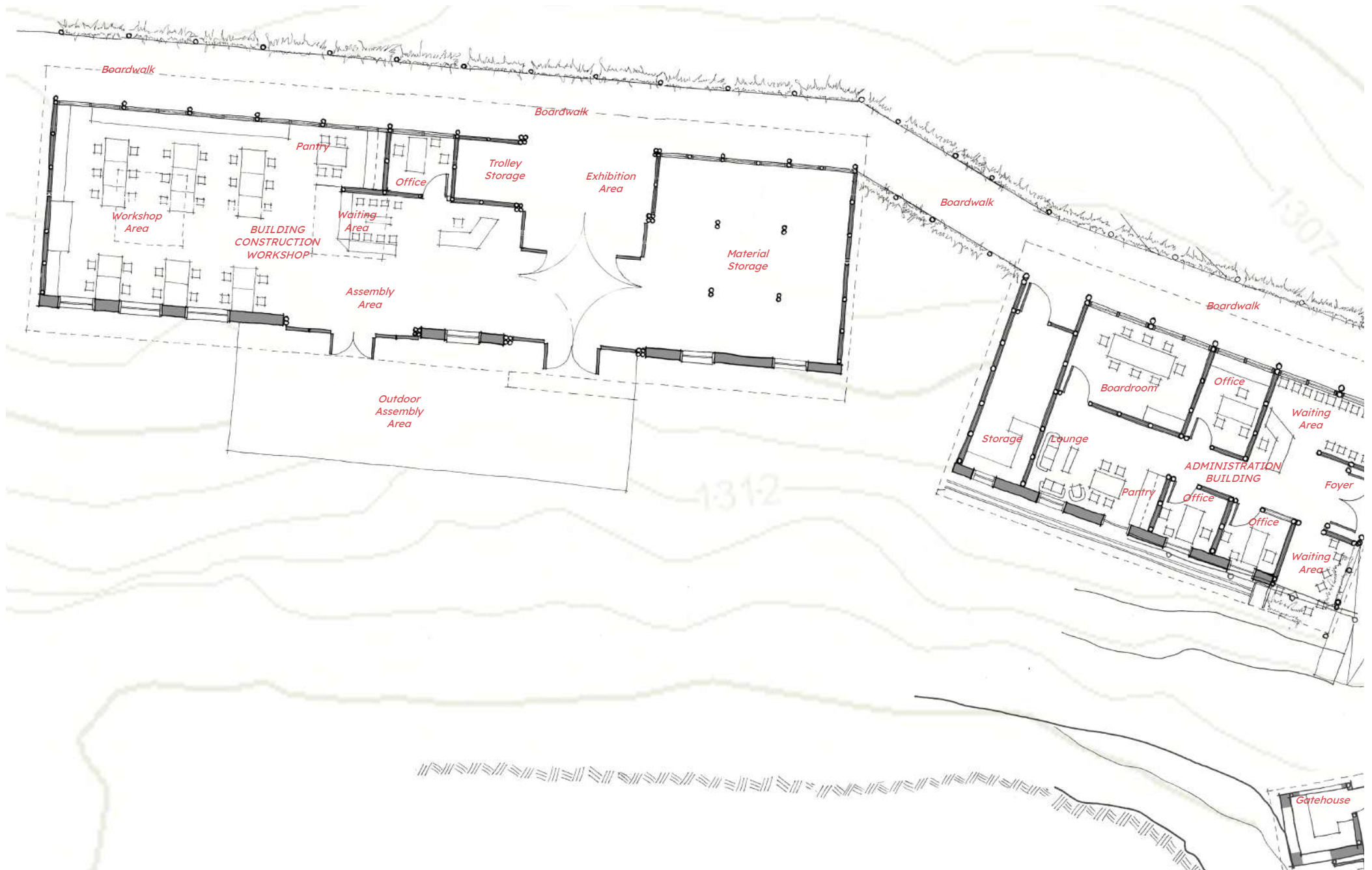


Fig. 79 Final Design Floor Plan-Building Construction Workshop



Fig. 80 Final Design Floor Plan Culinary Skills Centre

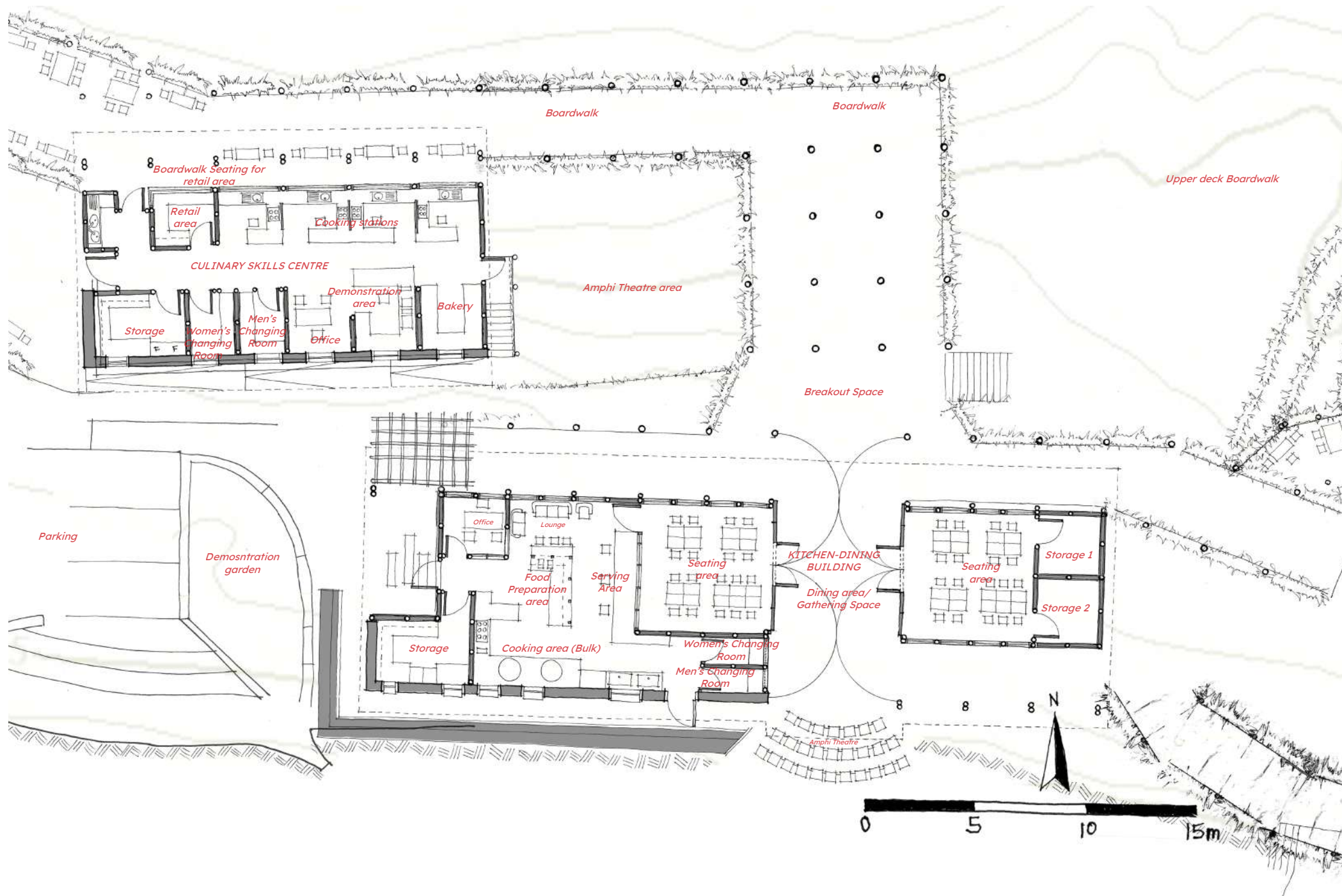
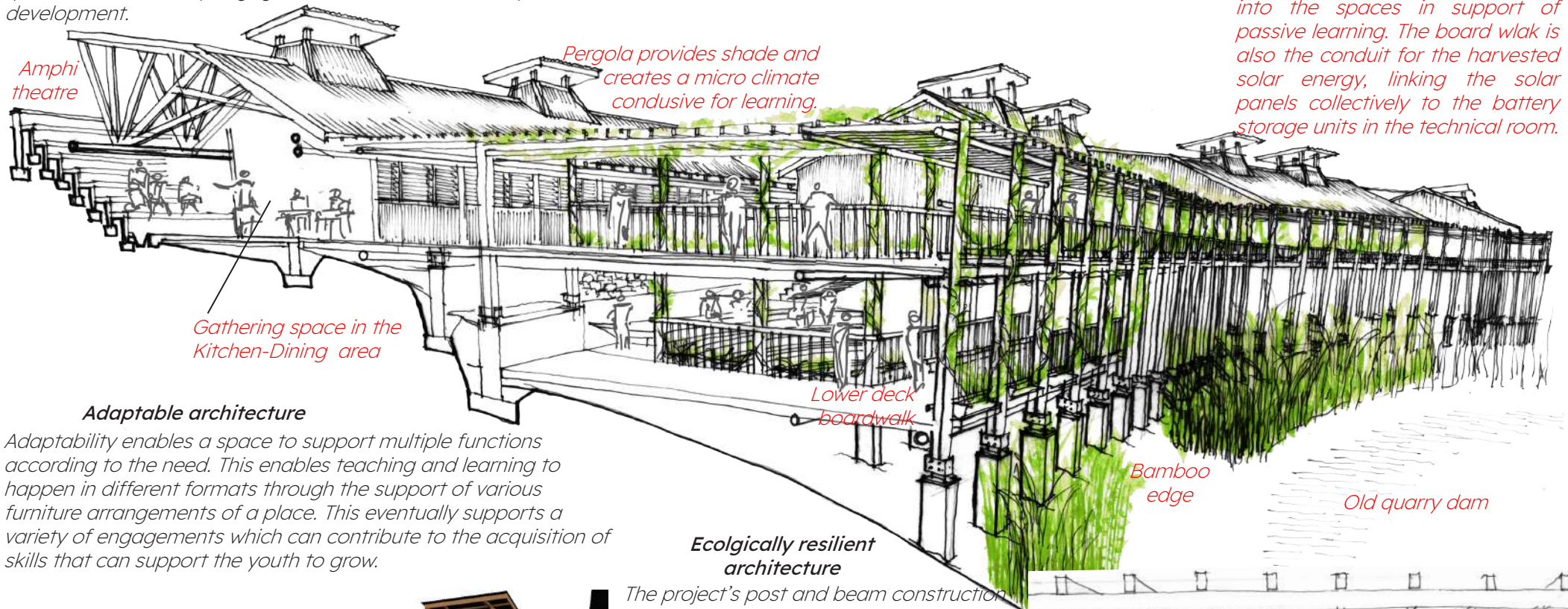


Fig. 81 Final Design Floor Plan-Kitchen-Dining building

Architecture as community space

Gathering spaces are supported through the integration of the building with the landscape. the Southern edge allowed for the creation of amphi theatres which are valuable gathering spaces for community engagement, which is critical for youth development.



Adaptable architecture

Adaptability enables a space to support multiple functions according to the need. This enables teaching and learning to happen in different formats through the support of various furniture arrangements of a place. This eventually supports a variety of engagements which can contribute to the acquisition of skills that can support the youth to grow.



Architecture as (third) teacher

Architecture has the capacity to teach. The exposure of the connection details of materials allows for a visual engagement with the users. This allows for passive learning which contributes to building of interest in construction skills.

Boardwalk linking buildings as a conduit, to allow visual connection into the spaces in support of passive learning. The board walk is also the conduit for the harvested solar energy, linking the solar panels collectively to the battery storage units in the technical room.

Ecologically resilient architecture

The project's post and beam construction system, where a modular system of gumpoles, corrugated steel sheets and rammed earth is used to create shelter on the southern banks of an old quarry dam, allows for an integration of plant thresholds along edges. This supports the ecosystem of the place as more plants are grown throught the project. A bamboo edge forms a threshold between the water and the building. This contributes towards biophilic advantages suchh as a cool micro climate and also the provision of a sustainable material for the building and construction workshop training space

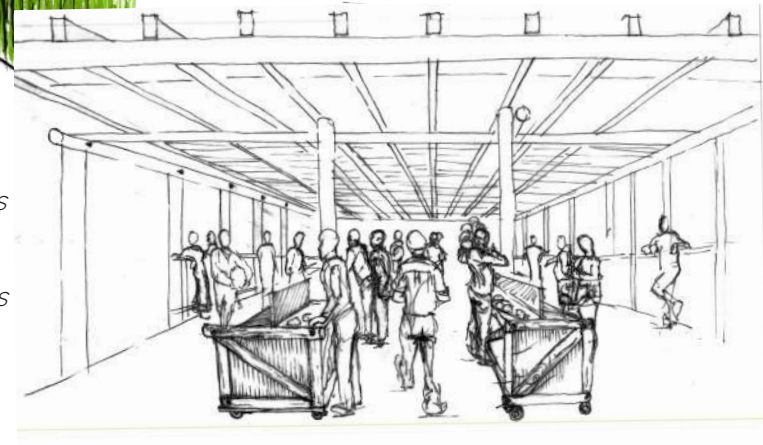


Fig. 82 Final Design Sectional perspective-Kitchen-Dining building

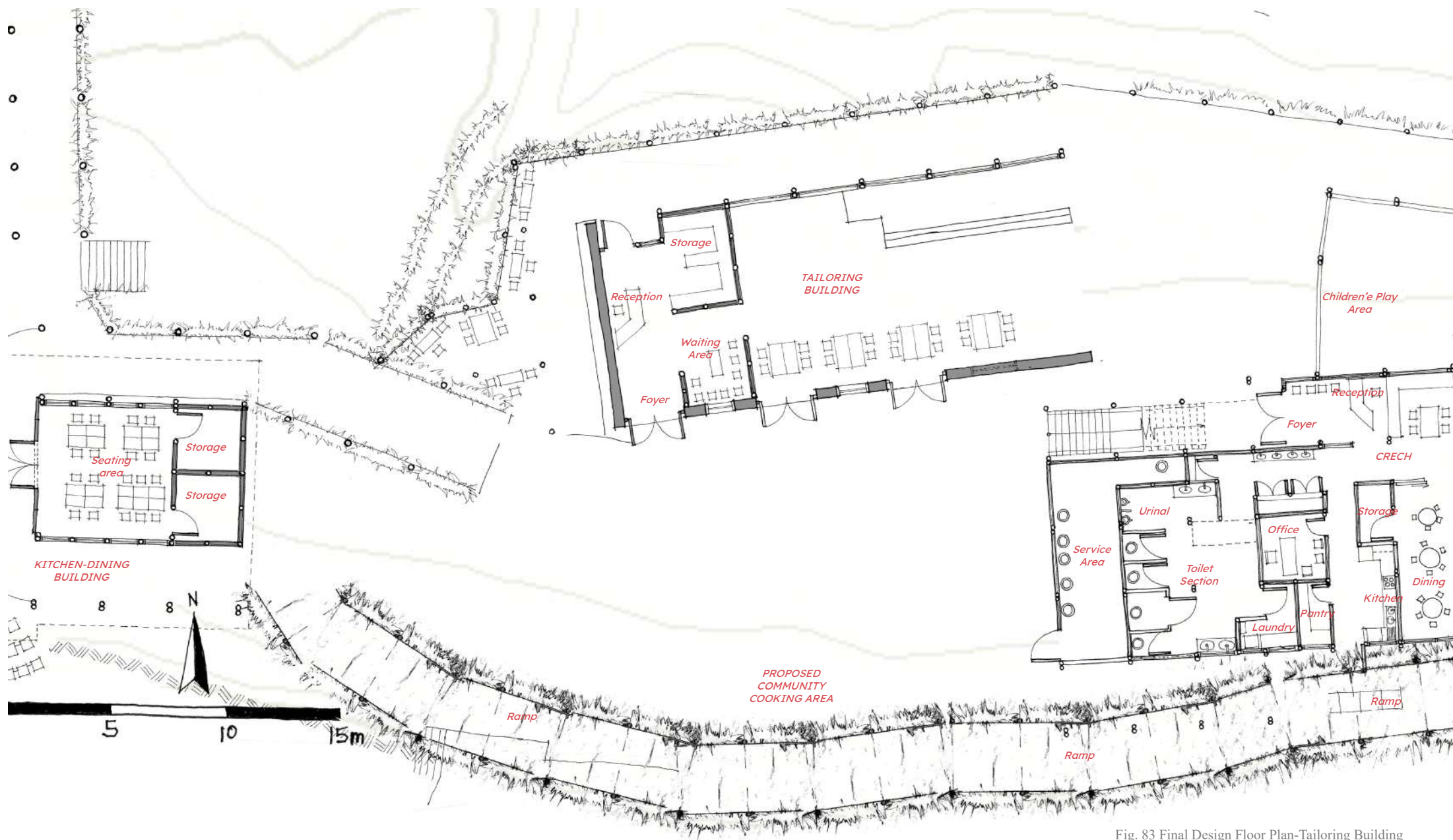


Fig. 83 Final Design Floor Plan-Tailoring Building

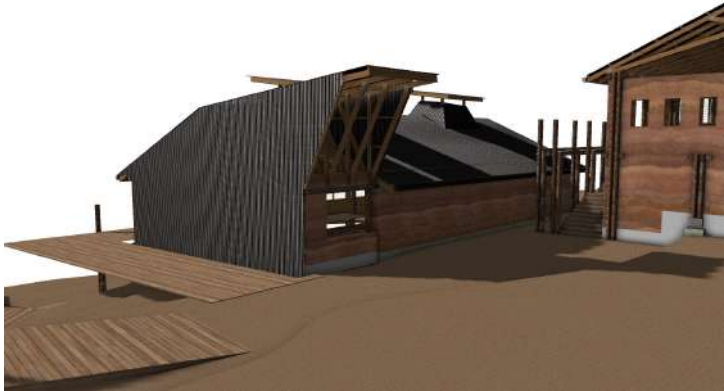


Fig. 84 Final Design-Tailoring Building

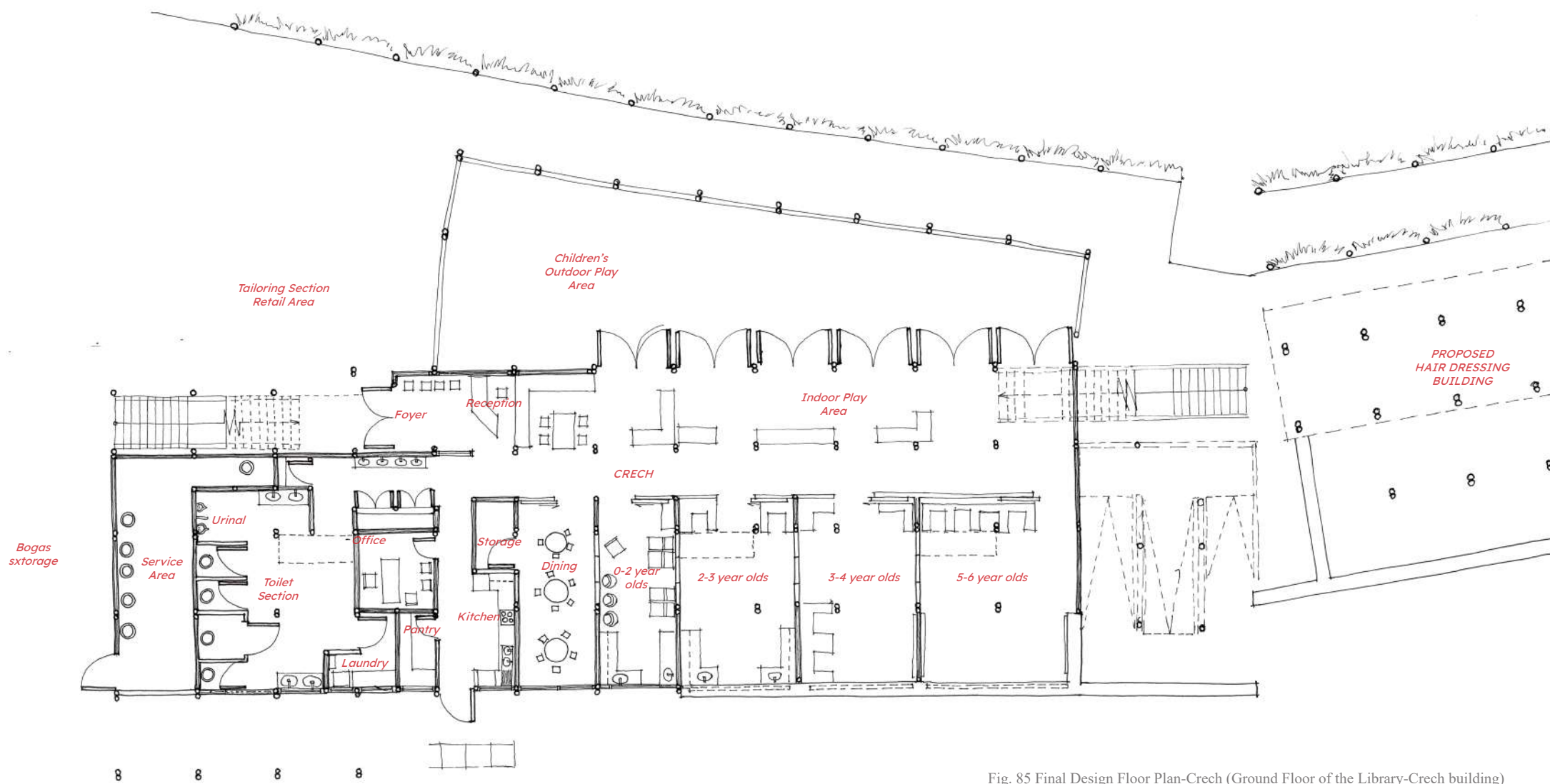


Fig. 85 Final Design Floor Plan-Crech (Ground Floor of the Library-Crech building)

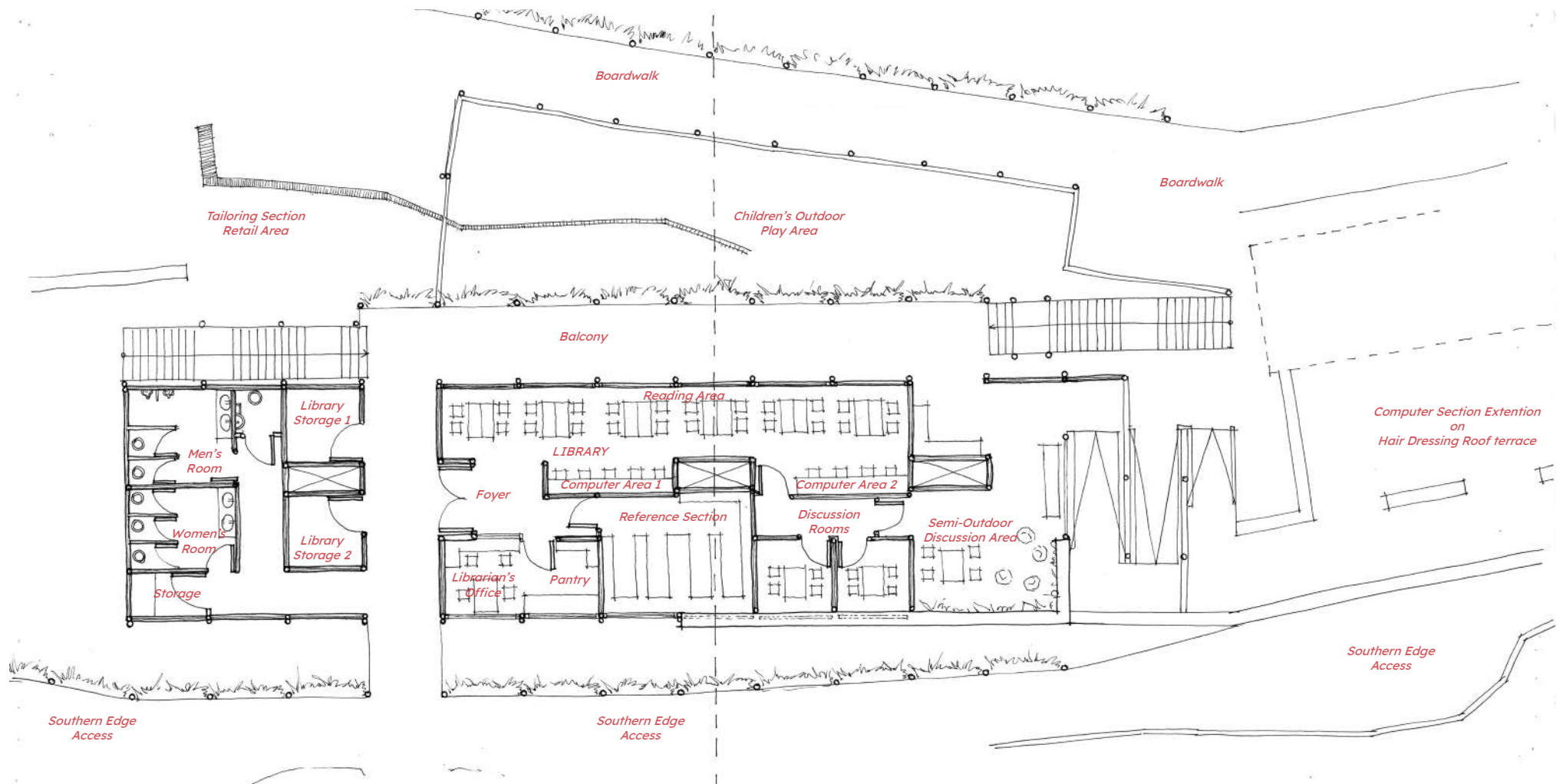


Fig. 86 Final Design-Library (First Floor of the Library-Crech building)

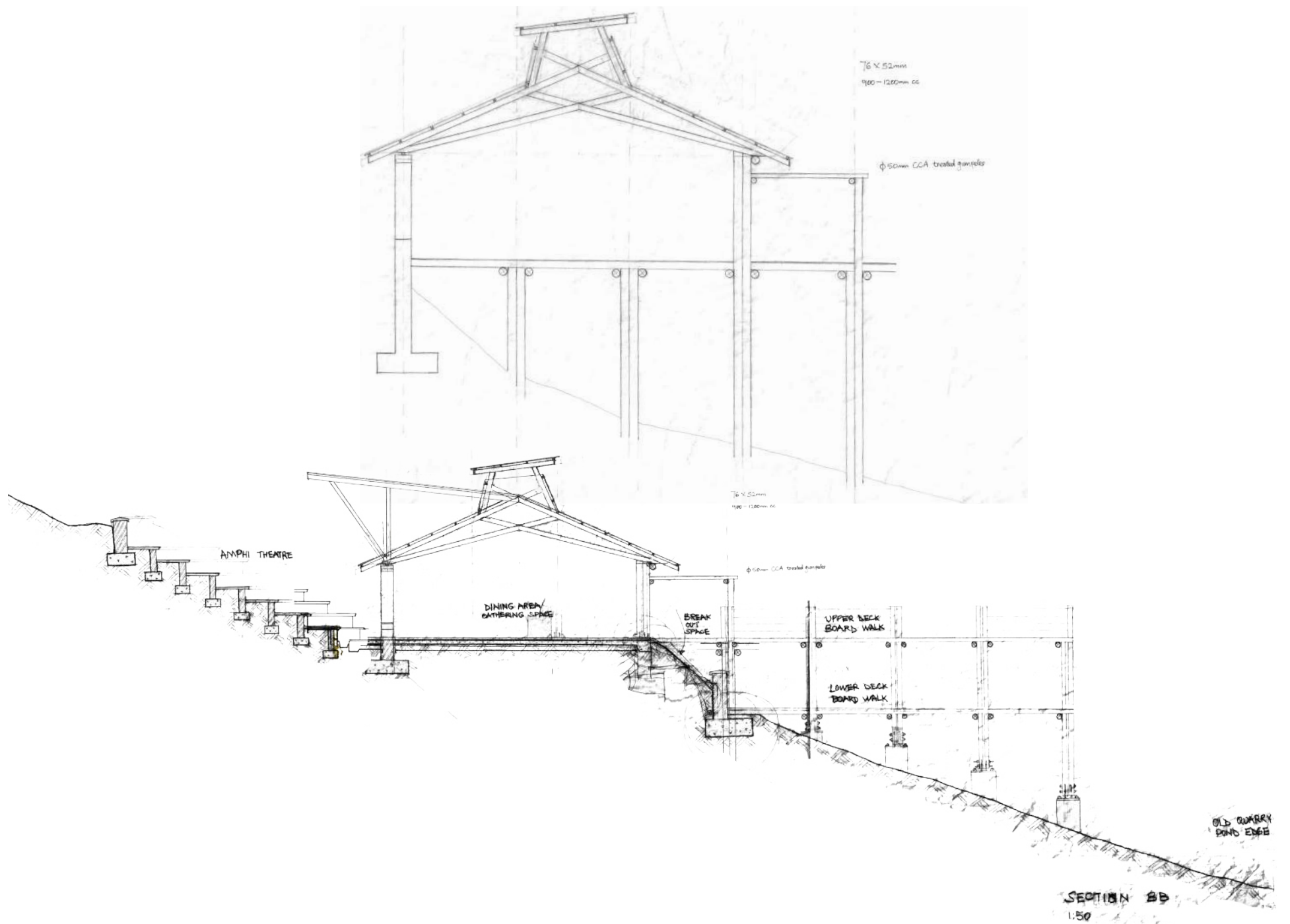


Fig. 87 Key sections of the project

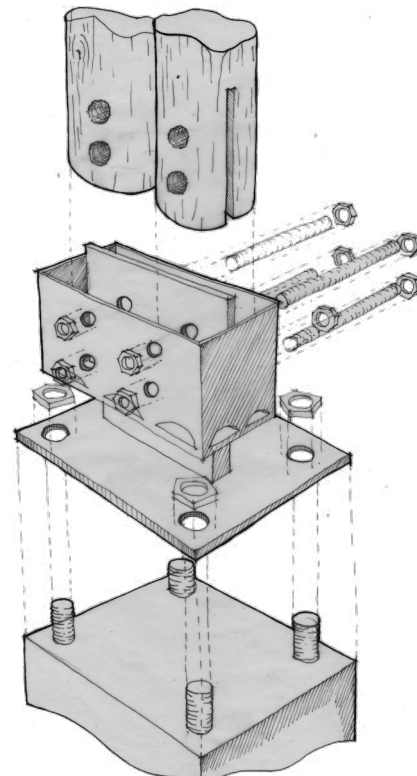
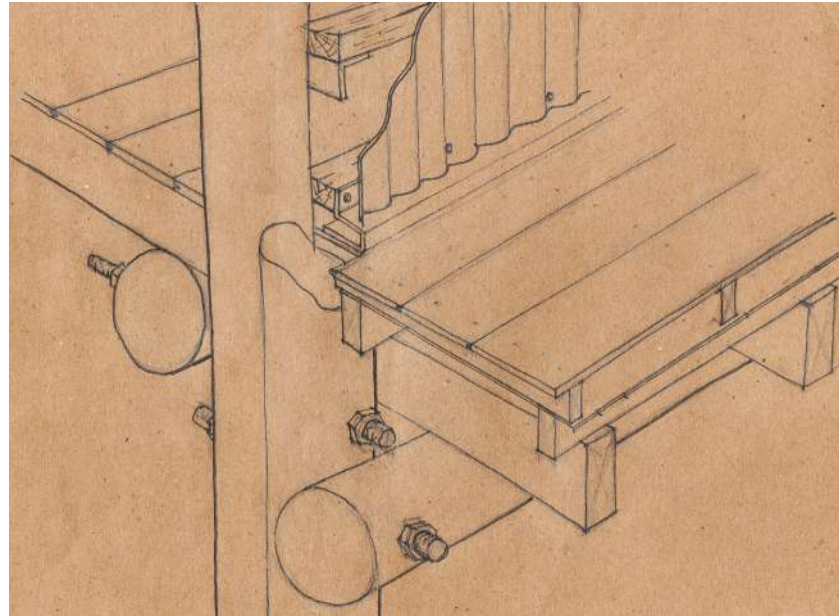
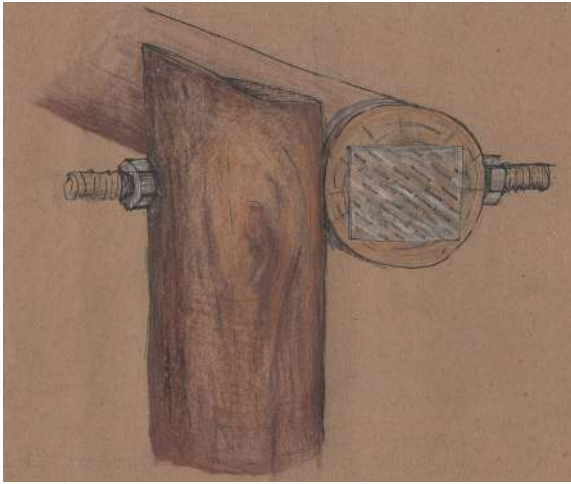


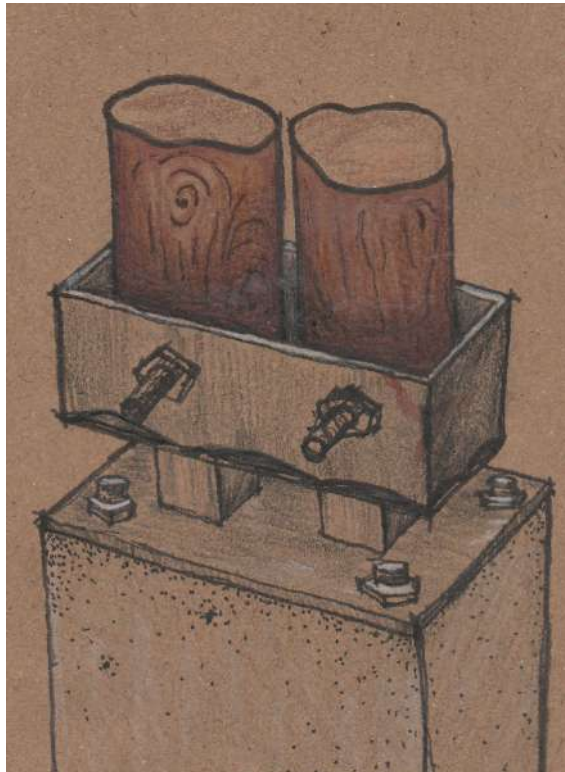
Fig. 88 Final Design-Axonometric drawings of a suspended timber floor and column detail



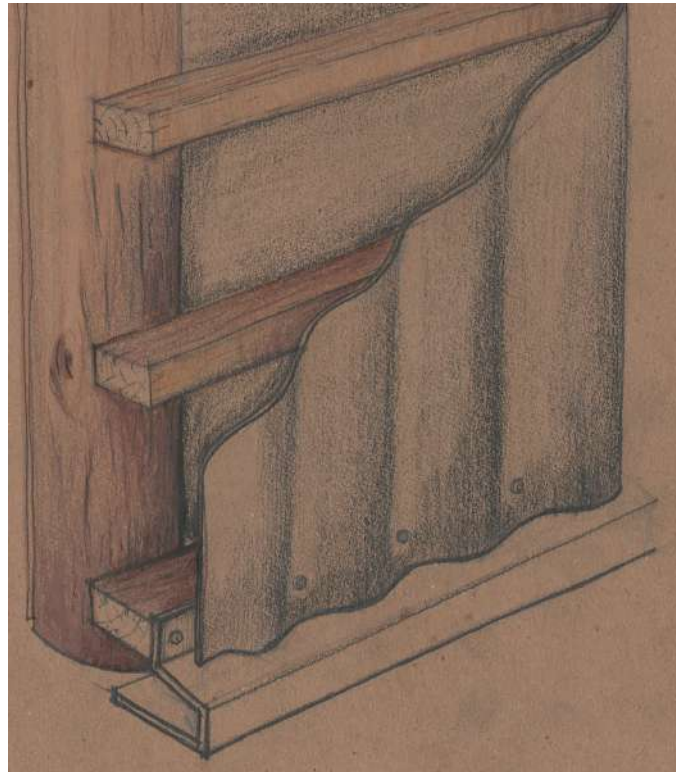
Fig. 89 Explorational Site Model



a



b



c



d

Fig. 90 Detail illustrations a-gum pole connection, b-double gumpole connection to foundation using a metal connector, c-wall panel detail and d- sections of the Roof

6 Technical Report

6.1 Approach to energy and water

- Energy Technical strategy

The project seeks to optimize the opportunity of renewable energy systems. These include a Solar Energy system and a biogas system. The project also considers a passive design strategy system to optimize energy in terms of heat gain and loss of the building.

- o Solar Energy System

The project optimises North-facing overhead planes such as roof planes and open space over-head elements like the pergolas, to support the solar panel system, which is to collect solar energy. The energy harvested is to be stored in a battery system that is to be situated in a technical room. The battery system is to discharge the electricity to the different buildings, with a boardwalk as the conduit.

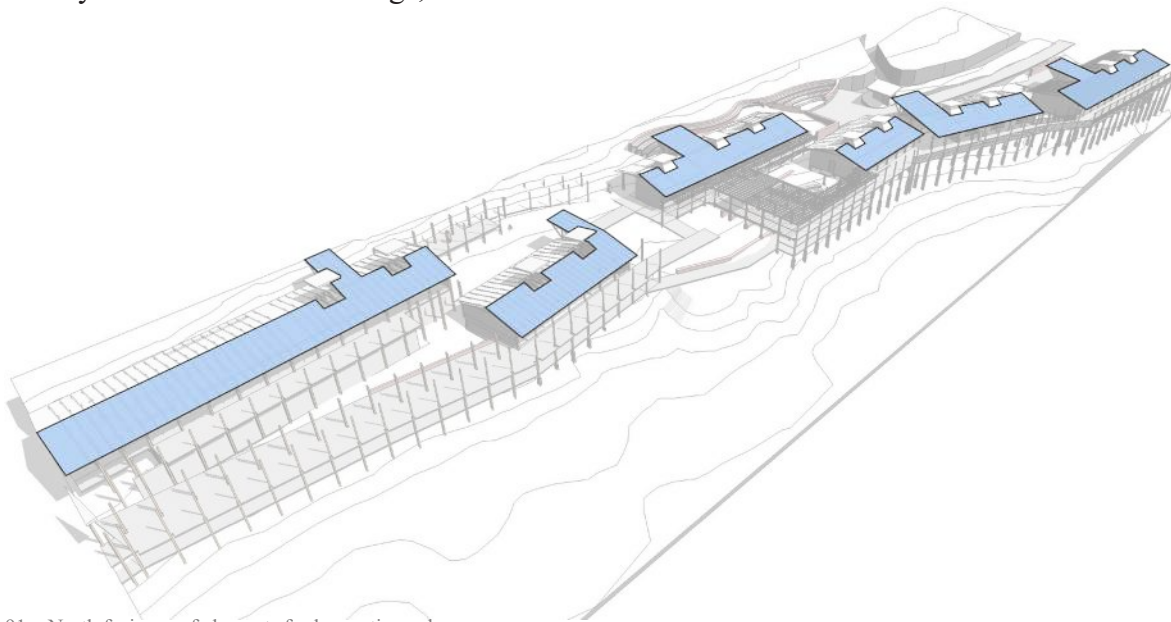


Fig. 91 North facing roof elements for harvesting solar energy

- o Biogas System

The project seeks to optimise human waste from a bi-latrline system, to supply biogas energy for cooking in the cooking spaces of the Kitchen and Culinary section.

The human waste is to be collected in a collection chamber that is linked to the toilet space interface. The collection chamber which is also the bio digester, is to support the breakdown of the waste into gases and solid matter that will be used in the garden of the culinary section. The bio digester is to be linked to the biogas storage chamber, through a series of filters that are to remove hydrogen sulphide and carbon dioxide from the methane, which is to be used in the cooking. It is from the storage chamber that the pipe to carry the biogas (methane) are to be connected to link the cooking spaces.

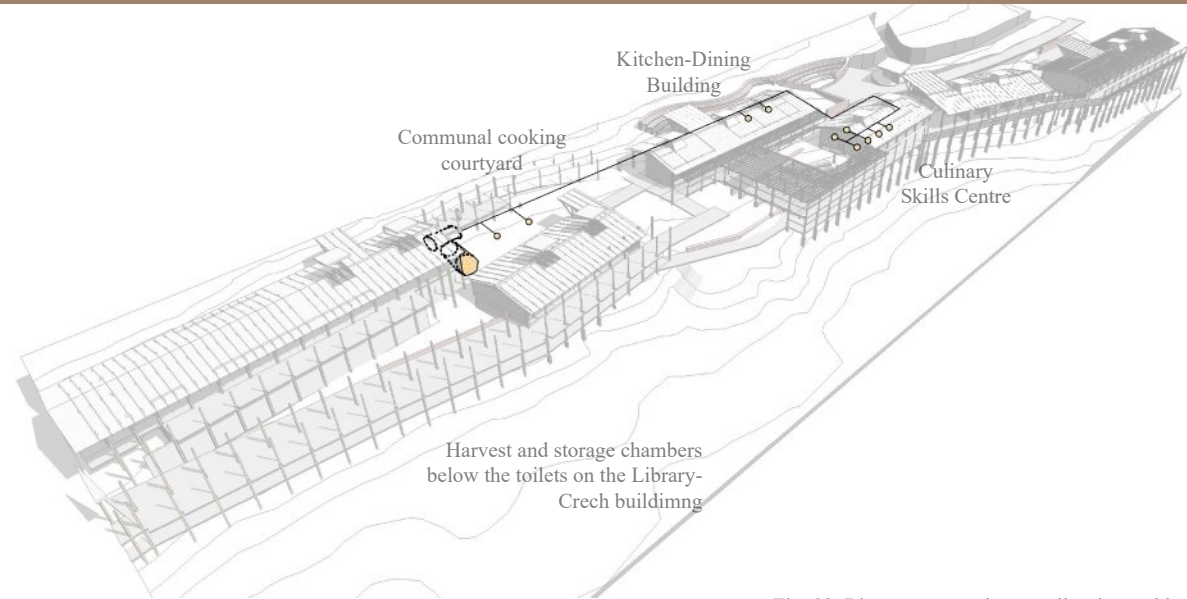


Fig. 92 Bio gas system that supplies the cooking areas of the project

o Passive Design Ventilation and cooling system

To address the potential heat build-up in the built forms, especially in the cooking spaces, the project optimises passive design strategies, which contribute to the comfort of the users. In this system, the building blocks are oriented along an East-West axis to minimise direct solar exposure to the longer façade of the building envelope. The fenestration is reserved for the North and South facades and is minimised on the East and West facades of the building envelope. This creates comfortable spaces that use less energy to maintain the comfort in the changing environmental conditions of a given day.

- Water Technical Strategy

The project seeks to optimize the opportunity of roof water harvesting, to support the cleaning activities in the centre. The planes of the roof are to be optimised for harvesting rain water, which is to be channelled into a series of water tanks. The water tanks are to be raised to support the gravity flow of water to the different spaces where it is needed to support the cleaning activities.

- Water supply systems

The project is to consider optimising the old quarry pond as a secondary water source, to support the roof water harvesting system. A pump-to-tank system is proposed to maintain the water supply from the pond to the tank.

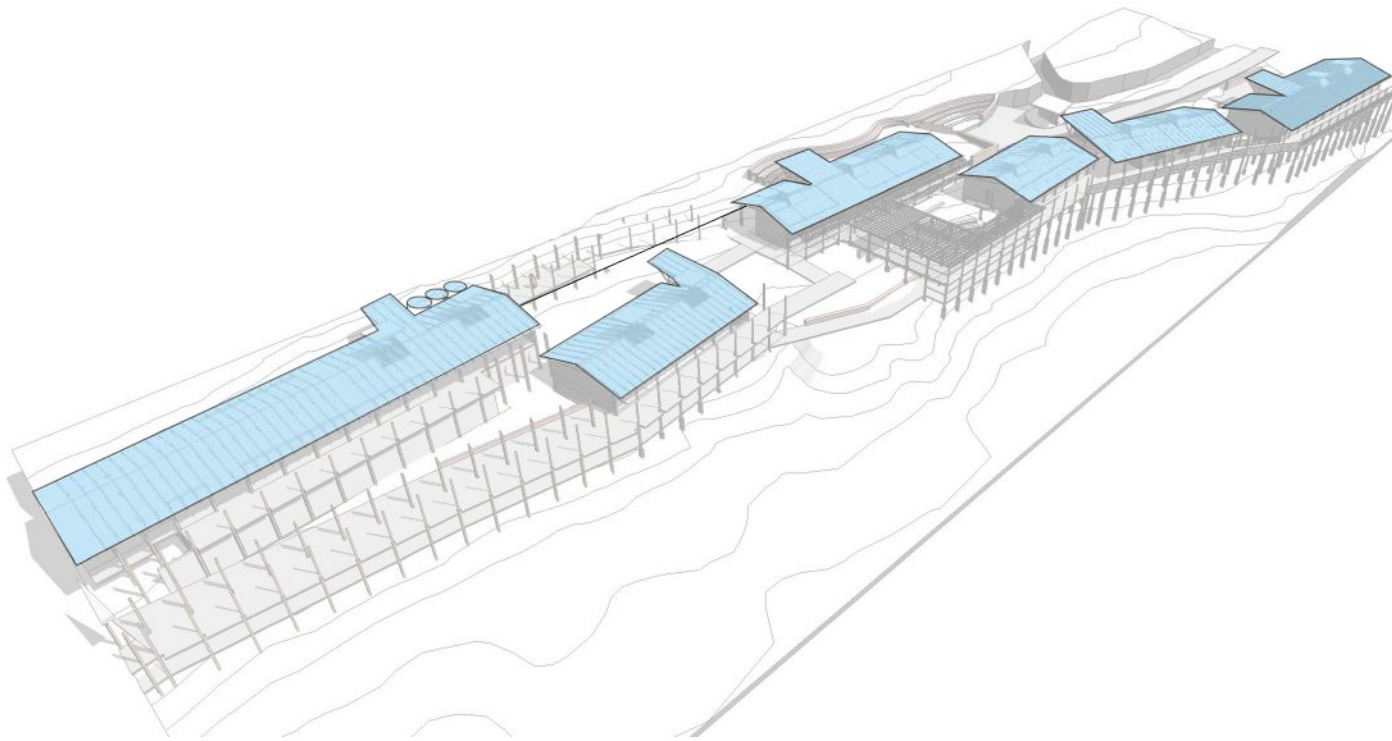


Fig. 93 Water harvesting system with the key storage tanks at the Library-Creche building

- Access to the site

The project has vehicular access to the West, as such the building materials are to be delivered to the parking area, from where they are to be carried to the workshop spaces for preparation of construction.

- Local building culture

The local building culture is to be influenced by the project to supporting communities with construction knowledge. A key space in the project is the construction workshop area, where members of the community are to be taught aspects of construction. Following their learning, the application of the new skill acquired will be done on site, promoting the ownership of the project.

- Materials

The key materials include gum poles, corrugated steel sheets and timber. Steel is also used sparingly in key details and joinery.

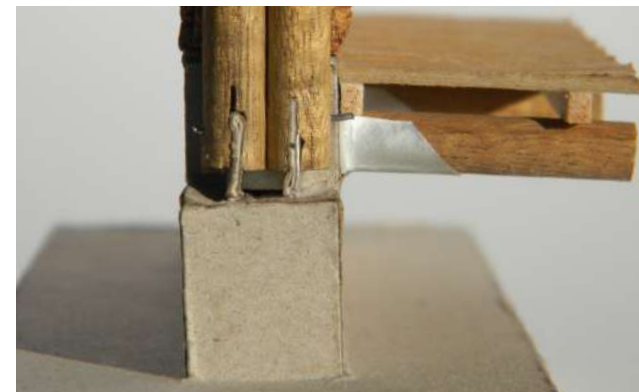
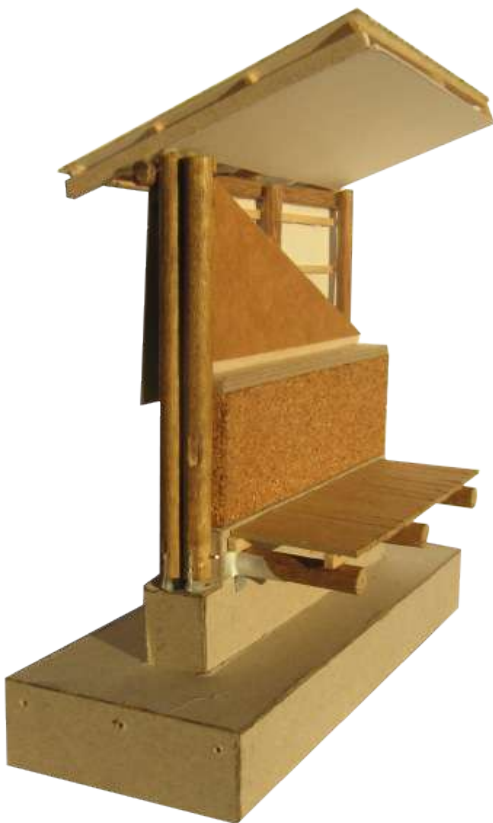


Fig. 94 Construction touch stone model

7 Conclusion

Through an architectural lens, this thesis has investigated the unemployment problem in South Africa, particularly among the youth in the informal settlement of Melusi in Pretoria. The project proposes a Vocational Skills Centre that not only acts as a skills development centre but also a community node in the informal settlement. The thesis argues that architecture can not only facilitate pedagogy but also social cohesion, ecological repair, which collectively contribute towards the transformation of a site into a device of agency and resilience.

Theoretically, the design is anchored in a critical synthesis of socio-ecological and pedagogical aspects. It draws upon:

Architecture as Community-Third Space Theory (Oldenburg, 1999):

Framing the Vocational Centre as an important community centre that is different from home and work, fostering social interactions that are unstructured.

Architectural Adaptability-Critical Regionalism (Frampton, 1983) and Placemaking (Hamdi 2004): Advocating for architecture that is grounded locally in culture, materials and community processes.

Ecologically resilient Architecture-regenerative design (Lyle, 1994):

Mandating a closed-loop, systems-based approach where the project actively restores its local ecology and urban metabolism.

Architecture as Teacher (Pezzetti, 2020): Proposing that the designed

environment is an important pedagogical tool that influences behaviour, curiosity, and learning.

Three conceptual drivers framed the architectural response:

Vernacular Synergy. The project borrowed from the informal settlement's material logic (corrugated steel, timber, incremental growth, to create a didactic architecture that celebrates construction techniques through exposing connections.

Ecological edges. The project reimagined the sited edges as productive social and ecological interfaces for human access, community and plant growth.

Regenerative modularity. The project was conceived as an adaptable learning organism with modular spaces, passive systems and visible infrastructural cycles (water, waste and energy) which create a continuous lesson on sustainability adaptability and resilience.

Some of the built works of architecture that informed the project's theoretical ambition include

Start up Lion Campus by Kere Architecture. This informed the sustainability of the project Komera Leadership Centre. This informed the adaptability aspects of the project

Design intent with theory application

The design proposes a vocational learning environment that is simultaneously educational, productive, ecological, and communal. Theory is translated into architecture through:

Adaptable spatial systems that allow multiple uses over time.
Material strategies employing local timber, plywood, and visible construction techniques that support learning and repair.

Ecological systems, including water harvesting, biolatrine waste treatment, and planted edges, which integrate environmental stewardship into daily practice.

Inclusive user accommodation, such as a crech, enabling young parents—particularly women—to participate in skills training.
Public-facing interfaces, where learning outcomes are exhibited, sold, or shared with the community.

In this way, the building does not merely house vocational training but becomes part of the training itself.

The Vocational Skills Centre ultimately argues for a redefinition of architectural value in informal contexts. It demonstrates that buildings can be more than a shelter for a programme; they can be the physical embodiment of the programme's ethos. By weaving together vocational training, ecological stewardship, and community placemaking into a coherent architectural system, the project offers a replicable model. It is an architecture that does not simply serve a community in need but actively builds that community's capacity—teaching skills, managing resources, and fostering resilience. In doing so, it aspires to be a quiet but powerful catalyst in the long-term project that works towards a skilled, and sustainable urban future, where the youth can use the skills acquired to fight unemployment.

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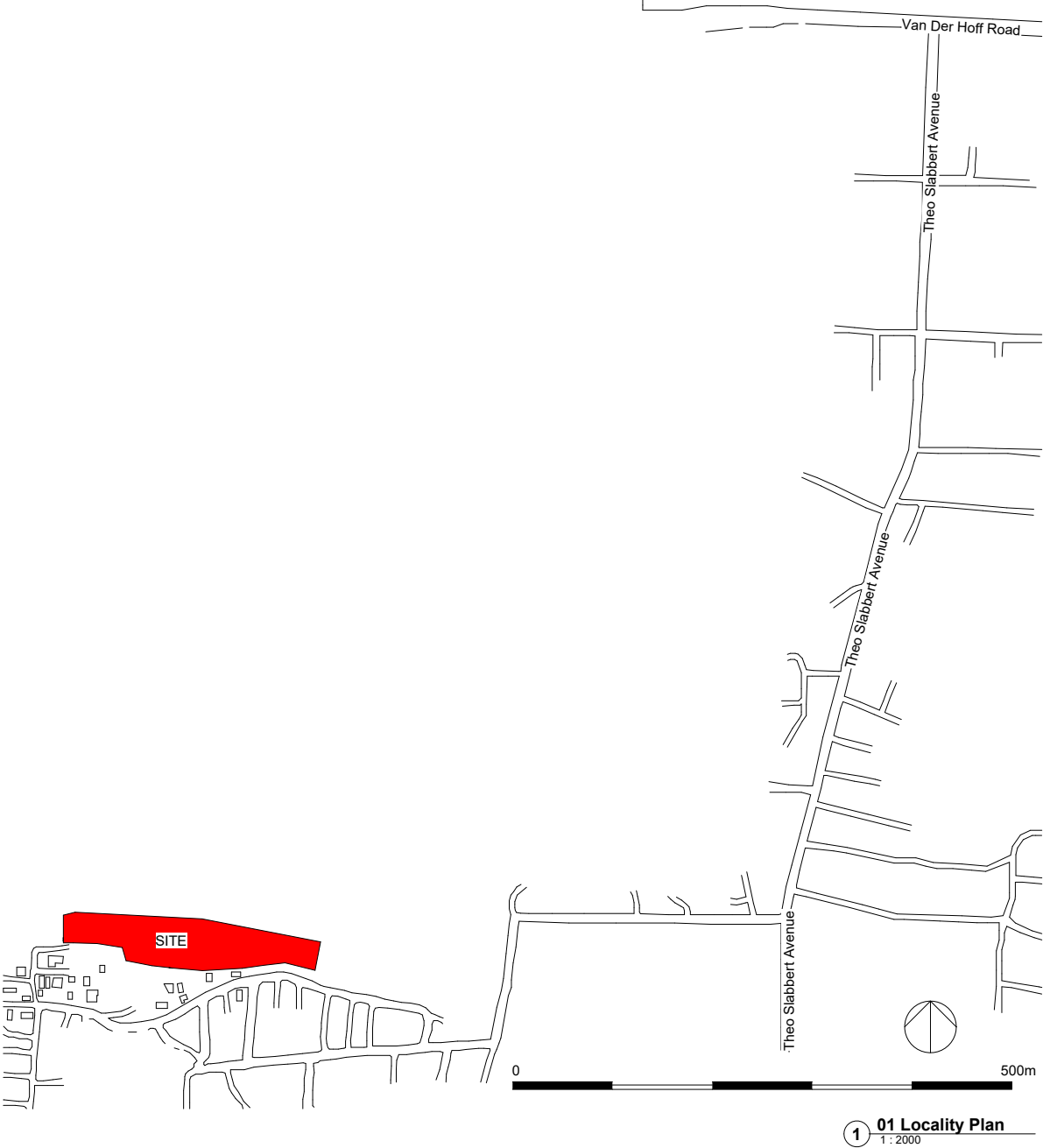
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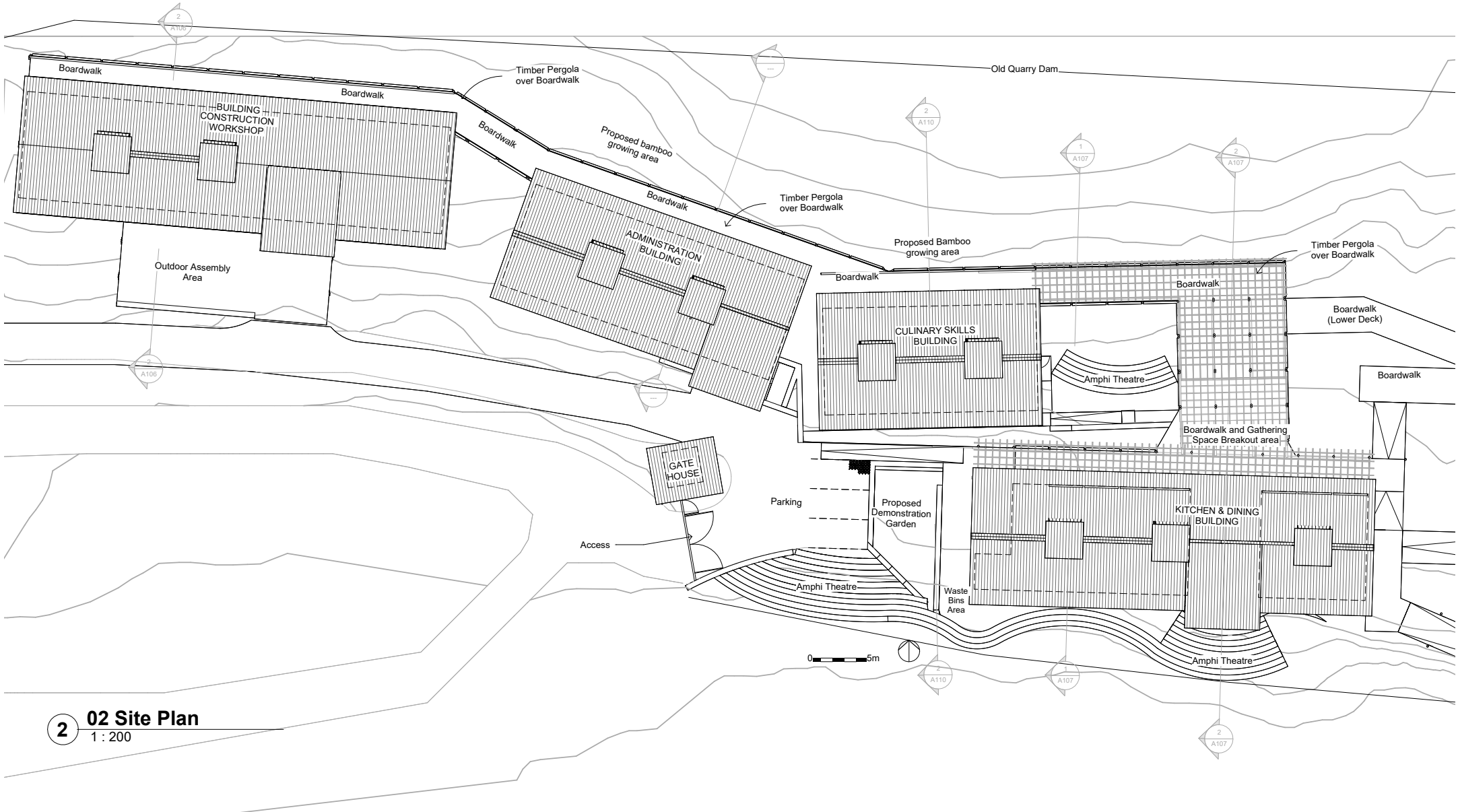
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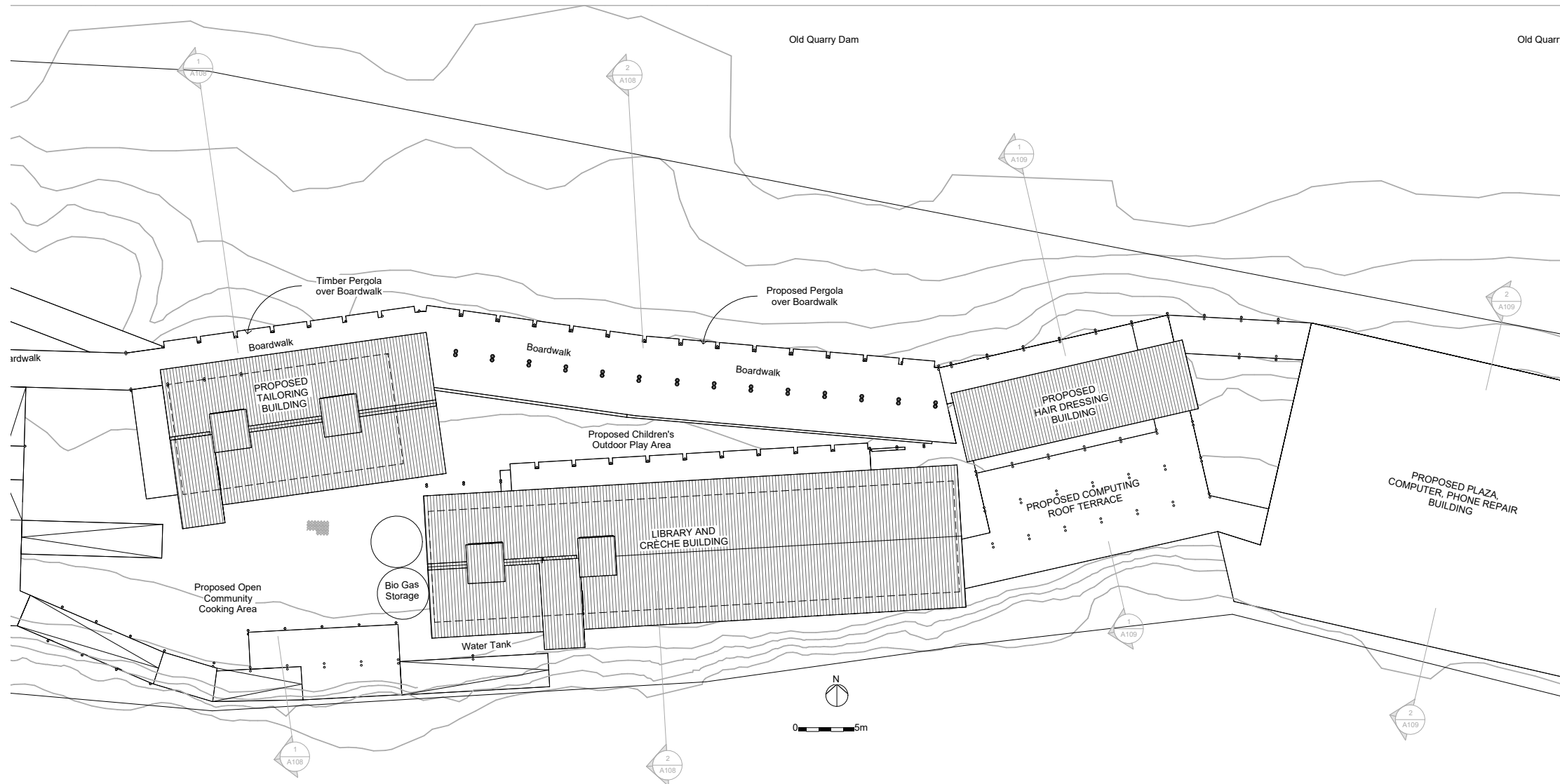
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Final Drawings and Photographs of the Model



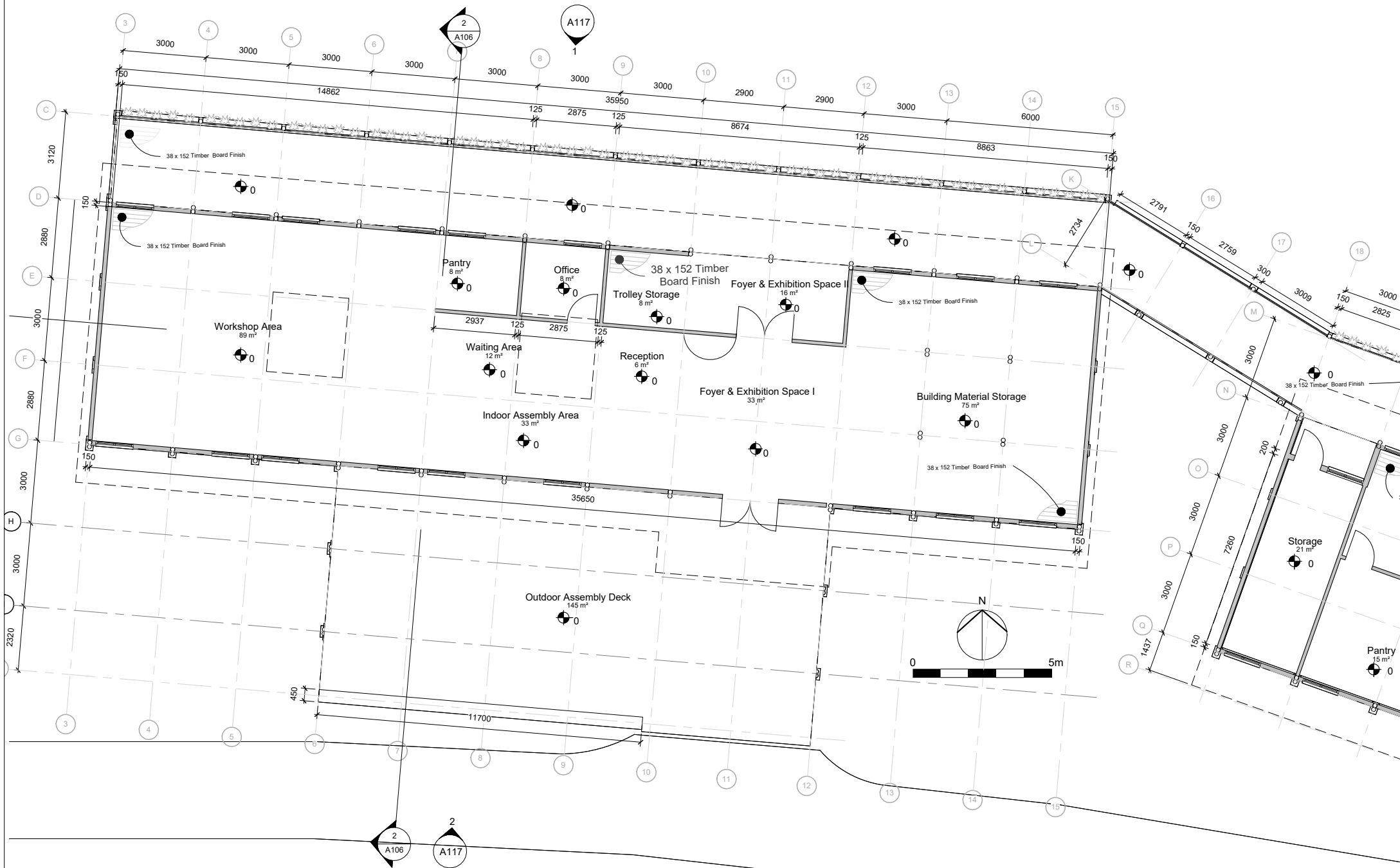


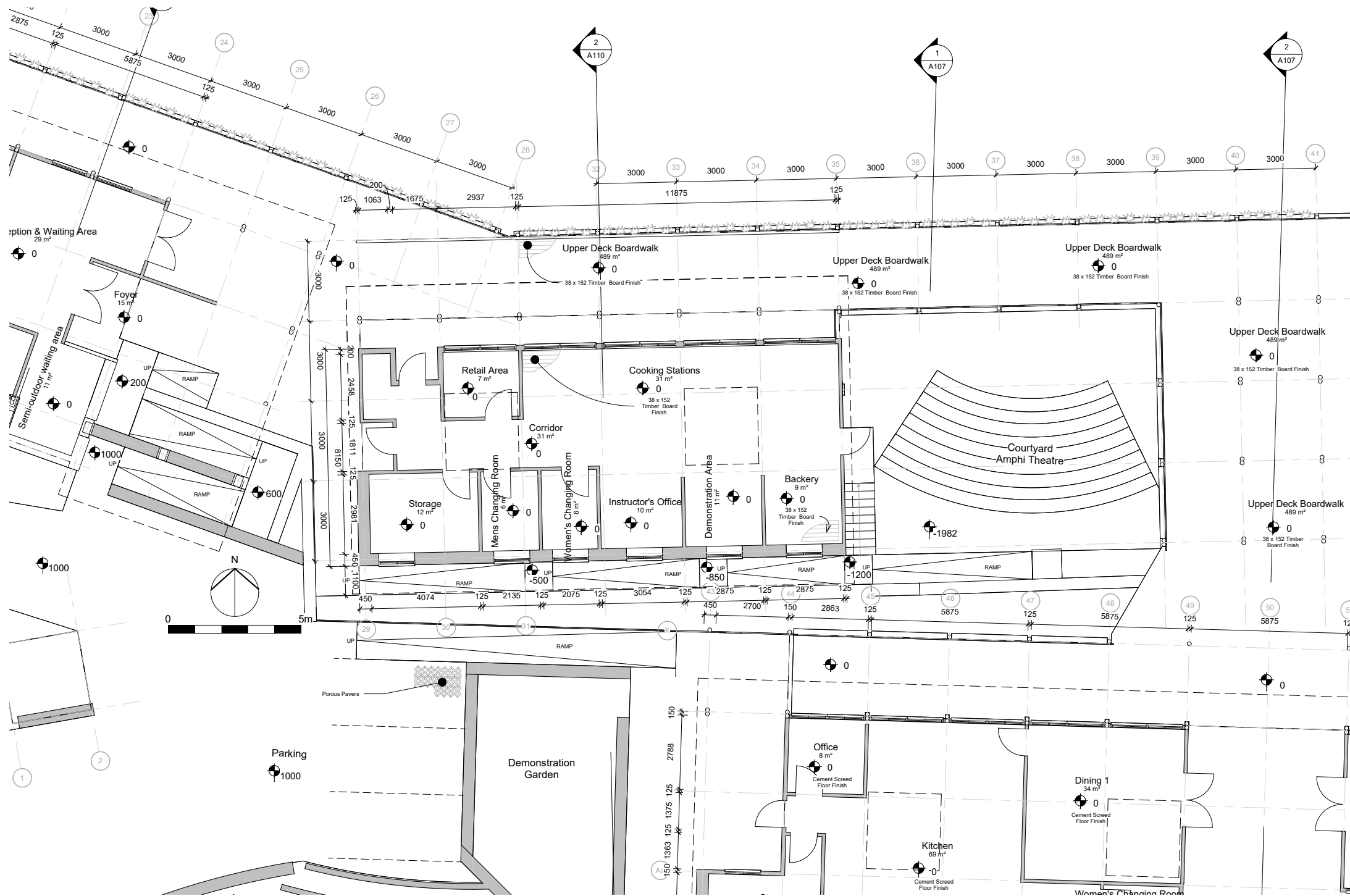
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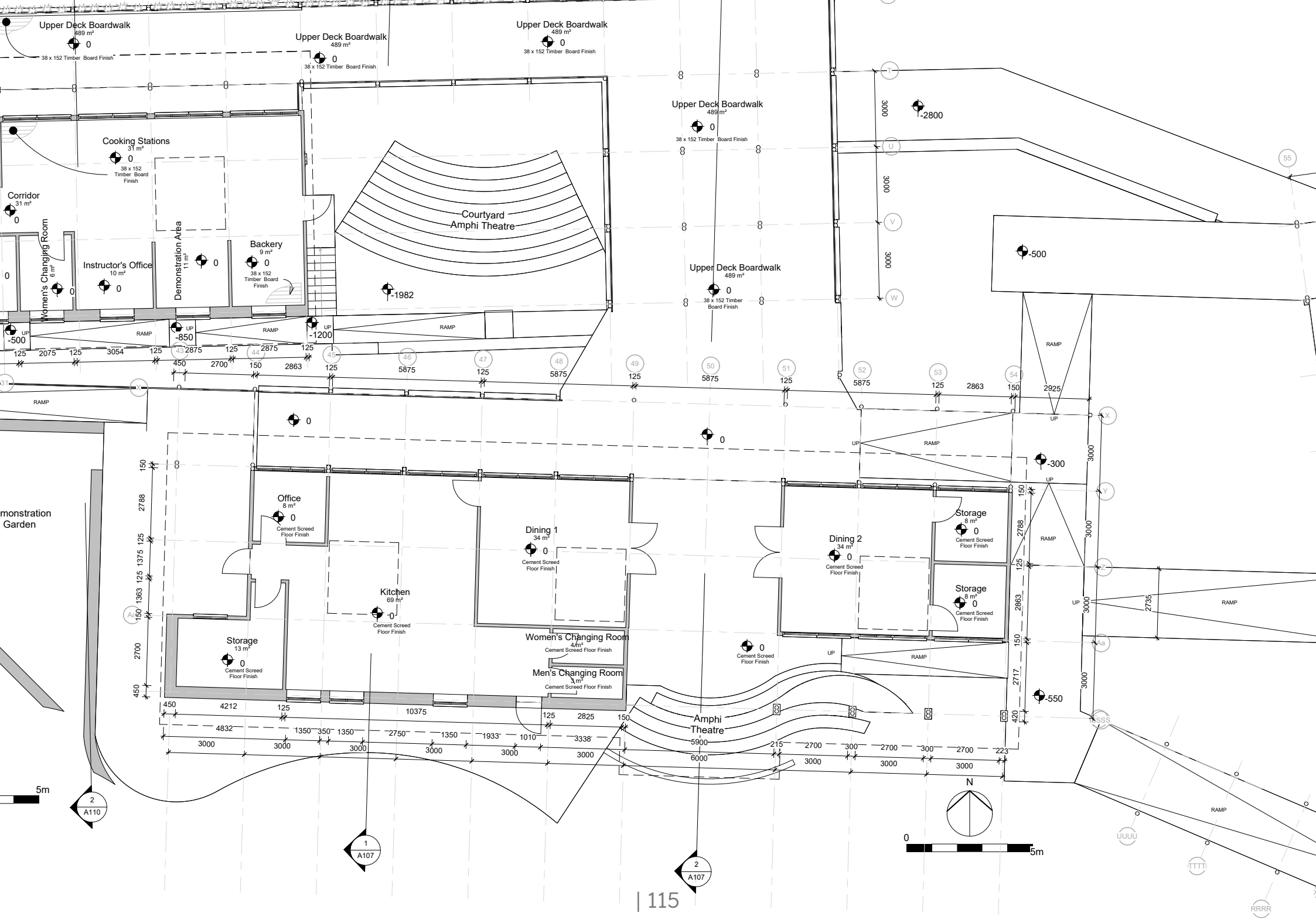


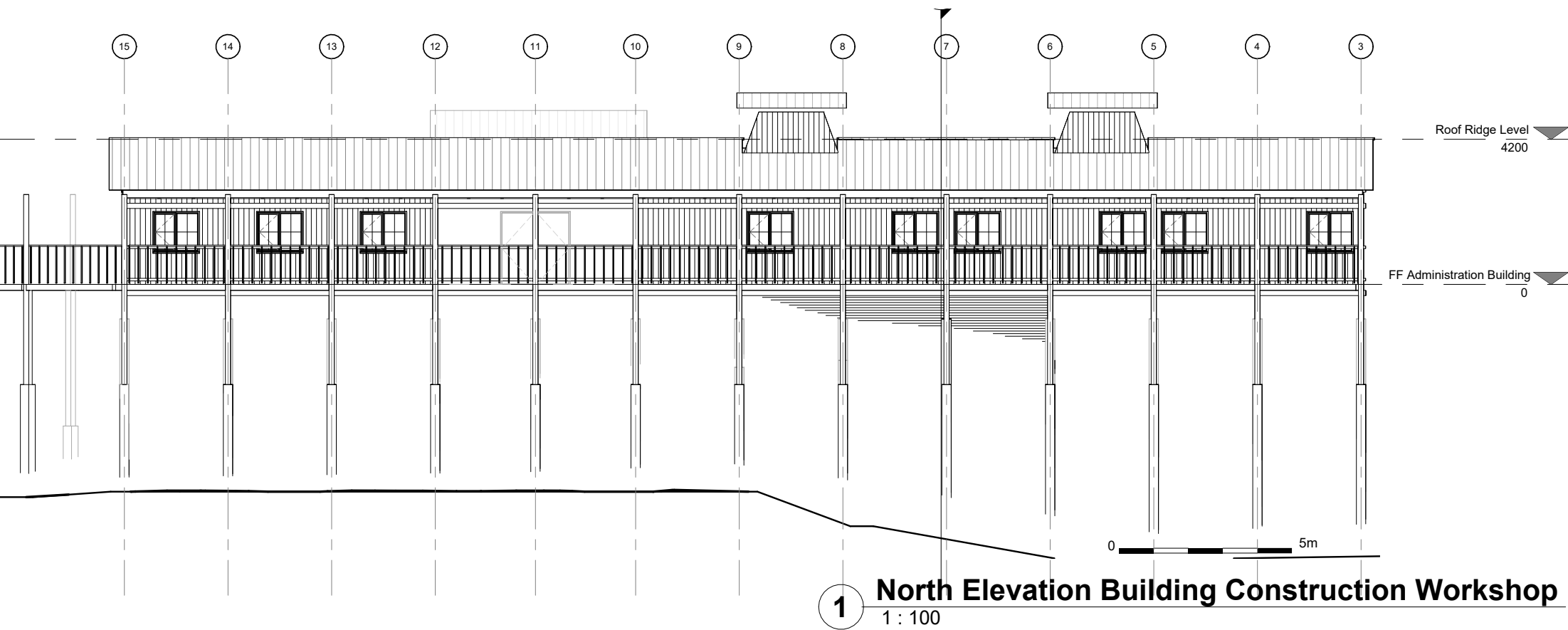


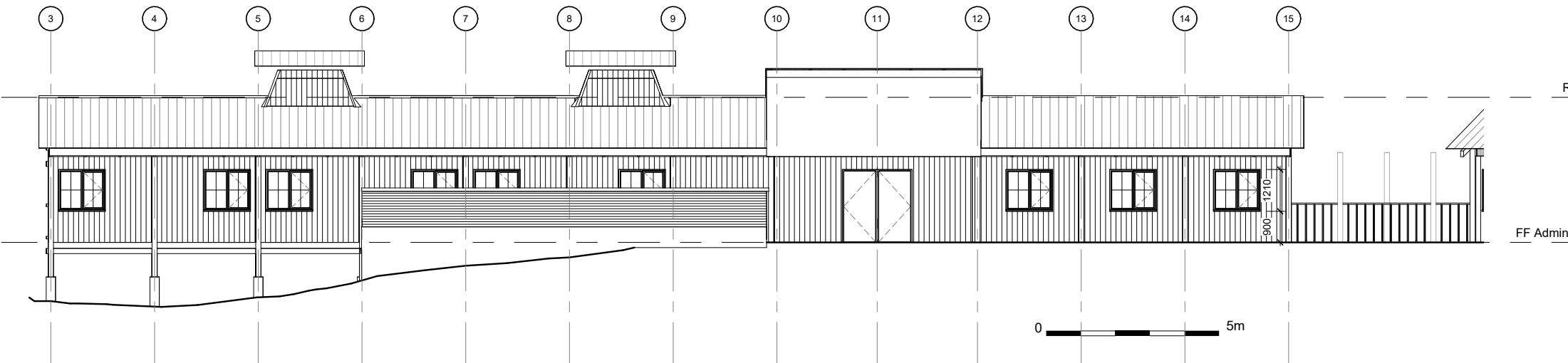
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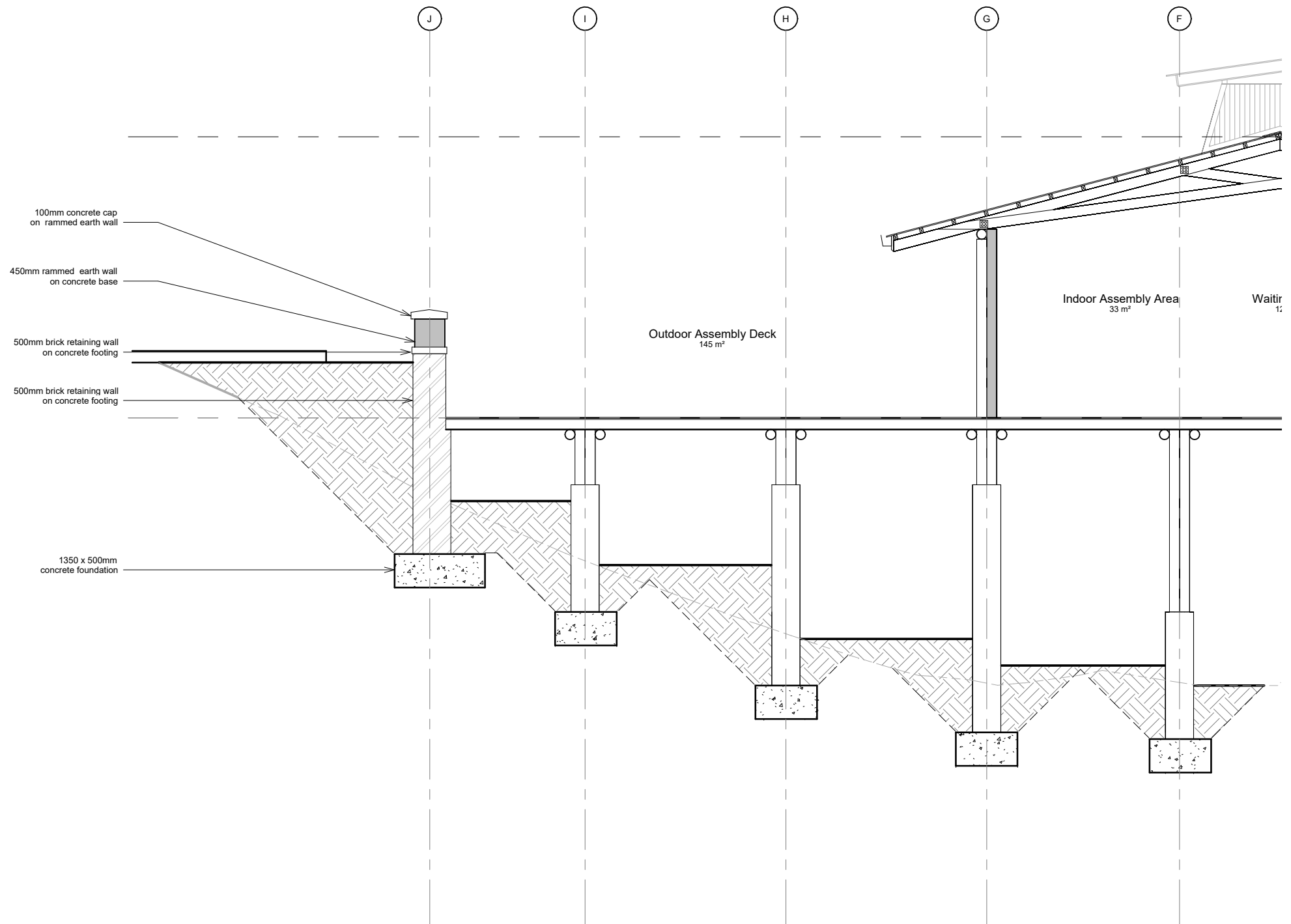


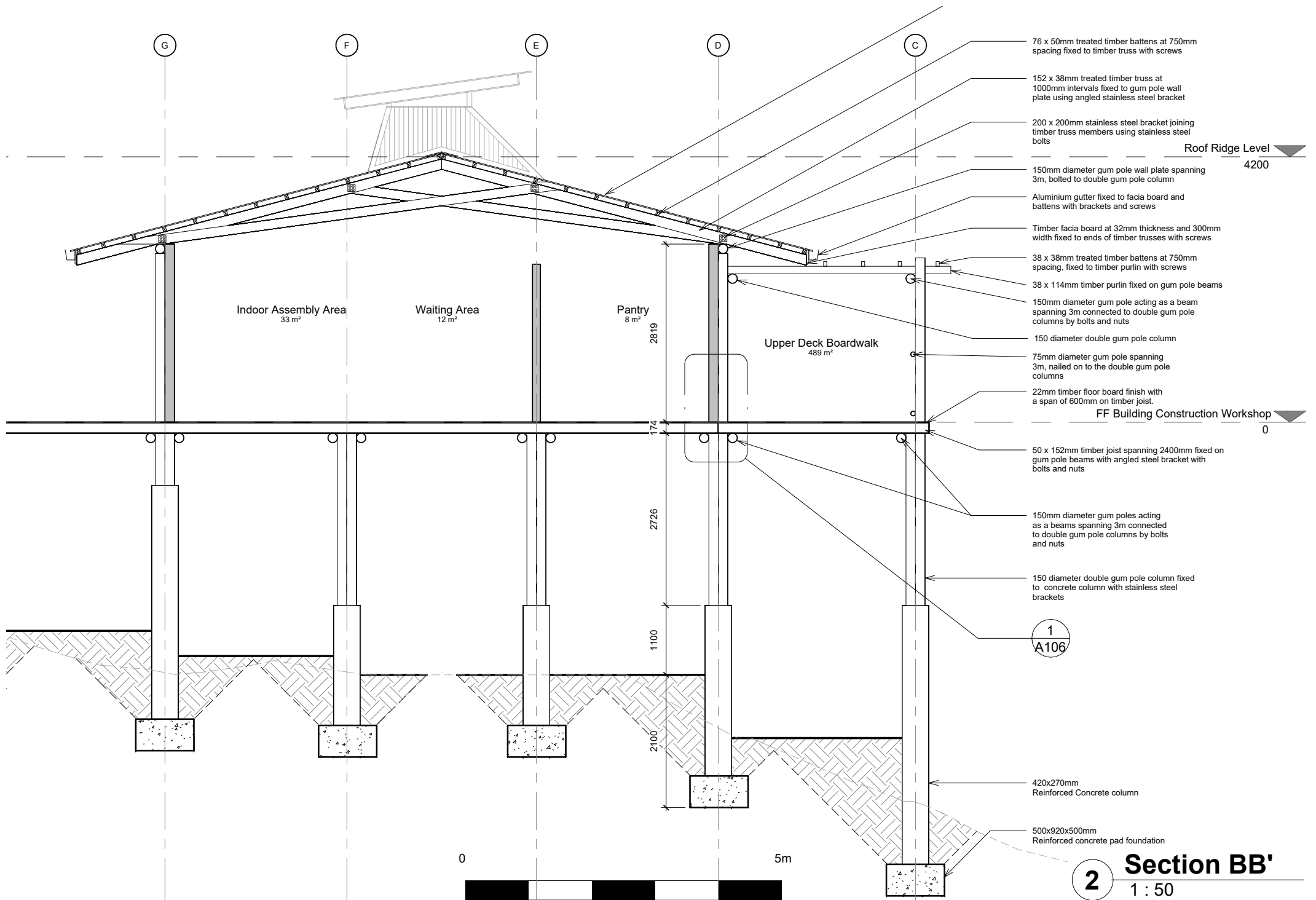


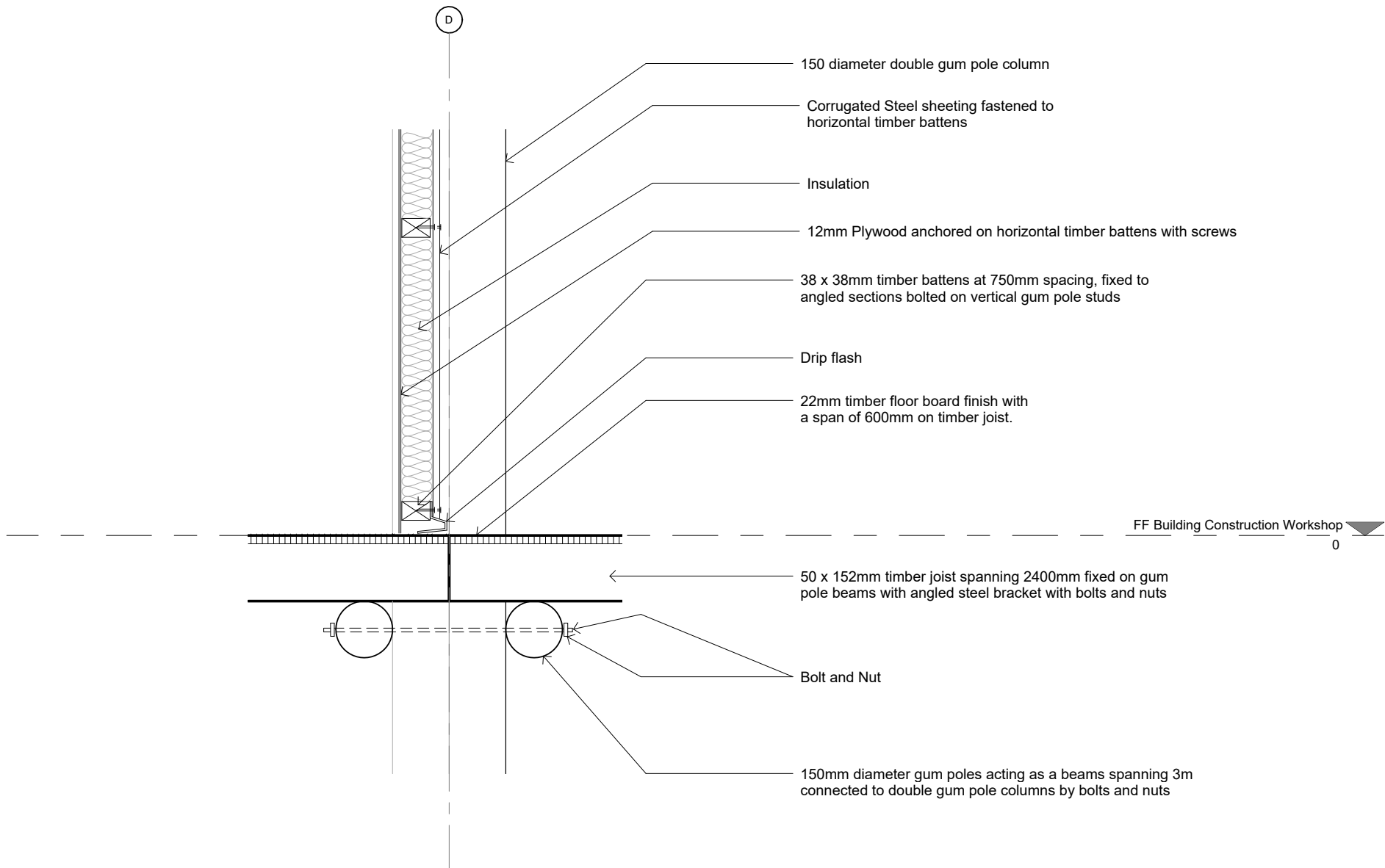




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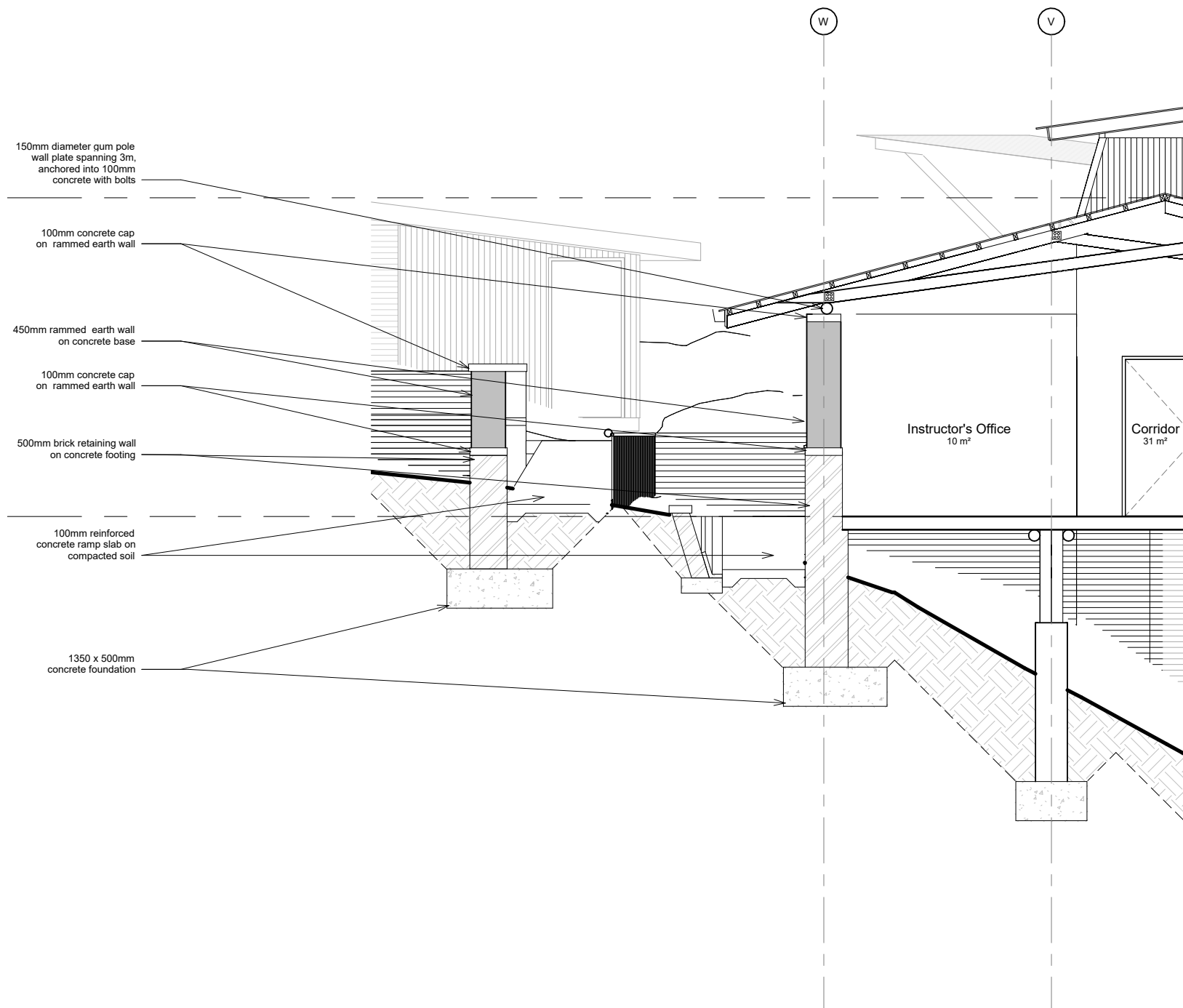


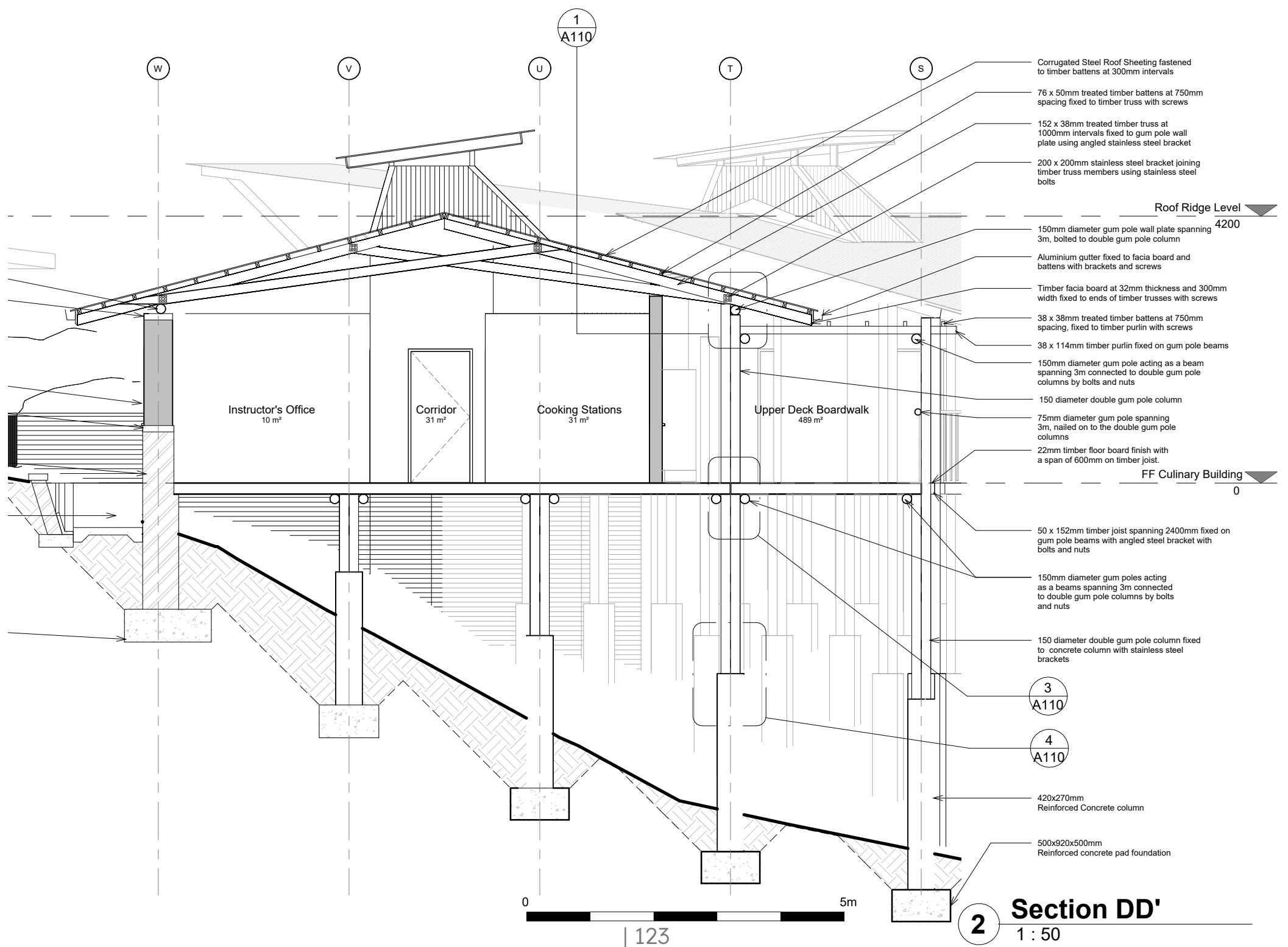


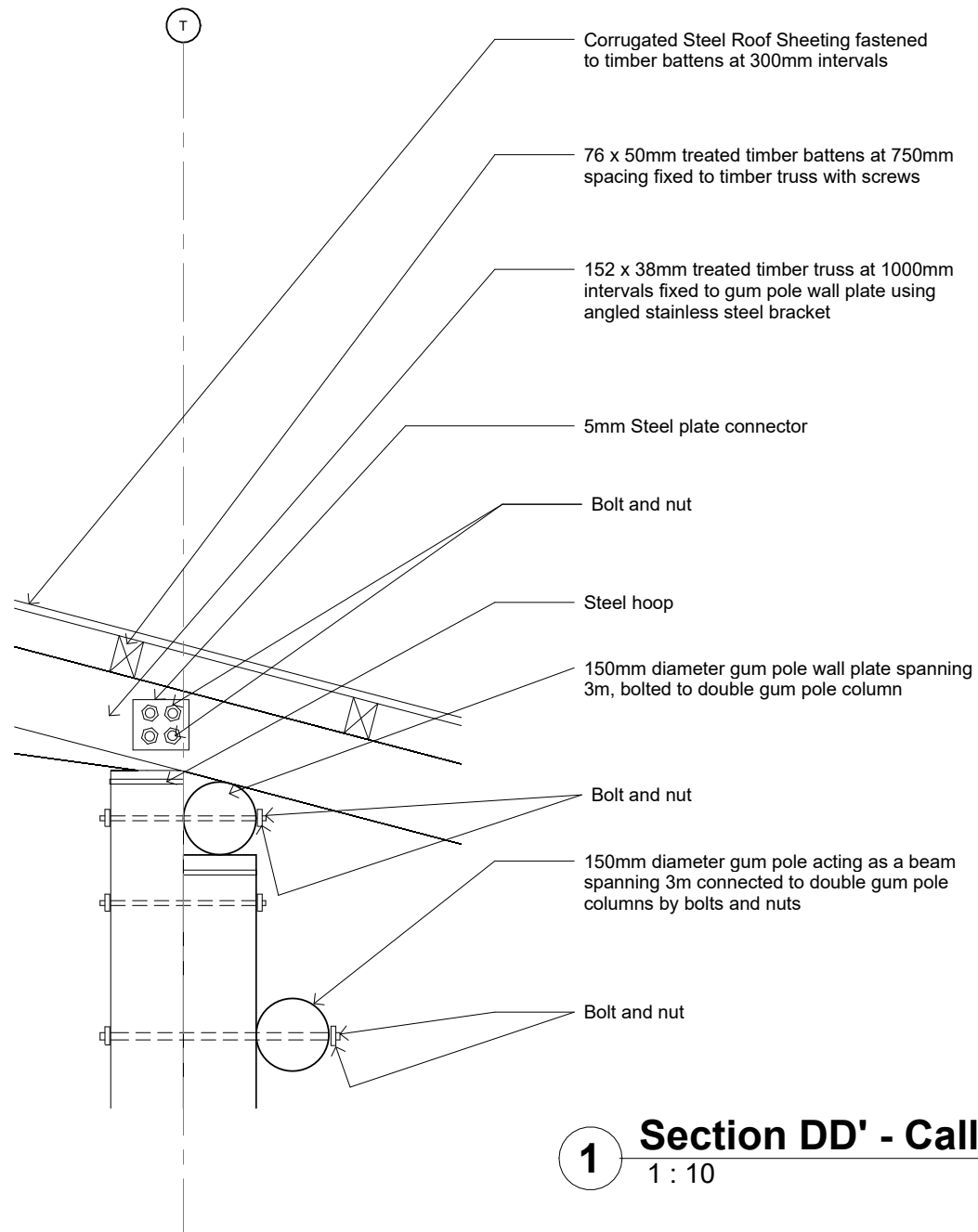


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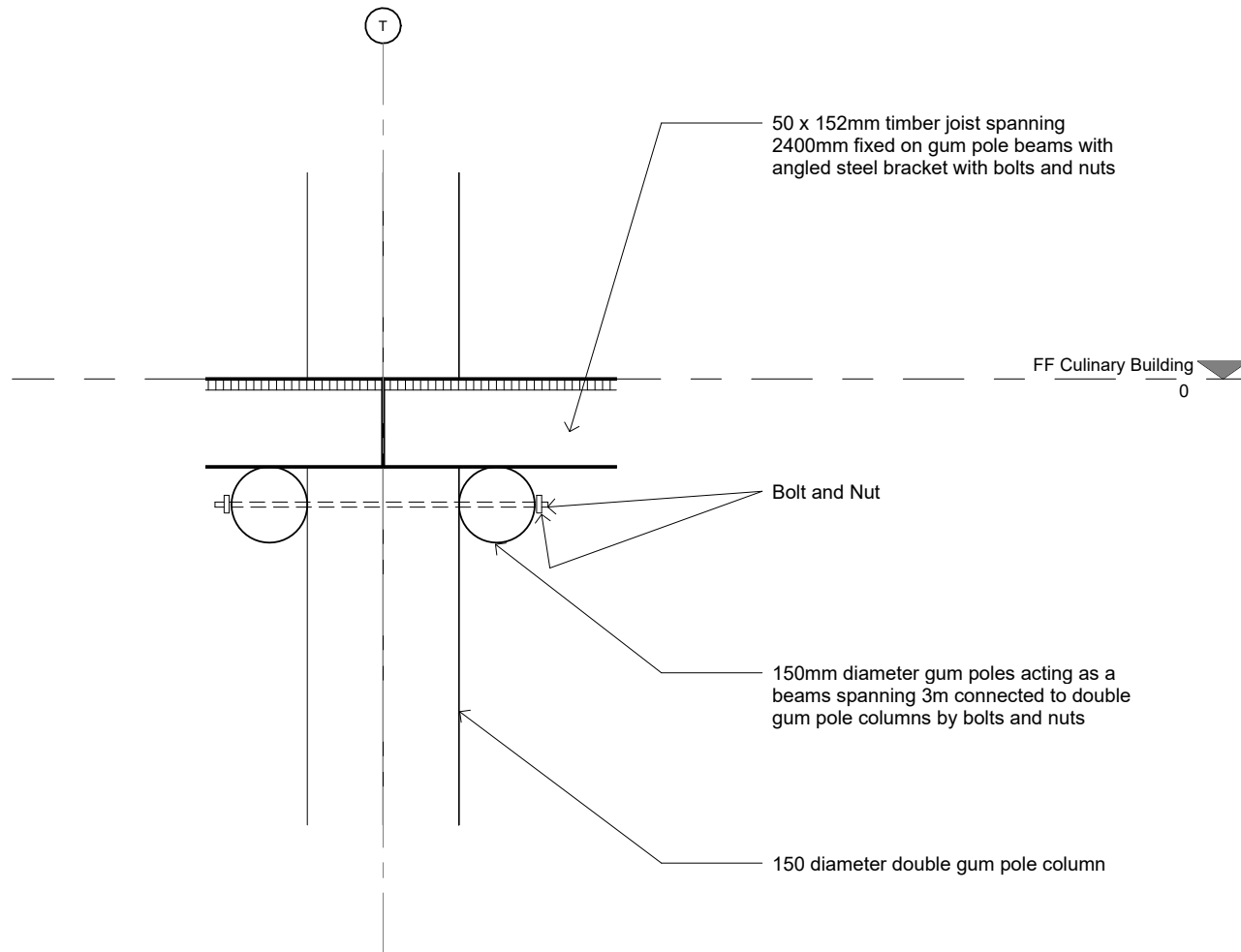






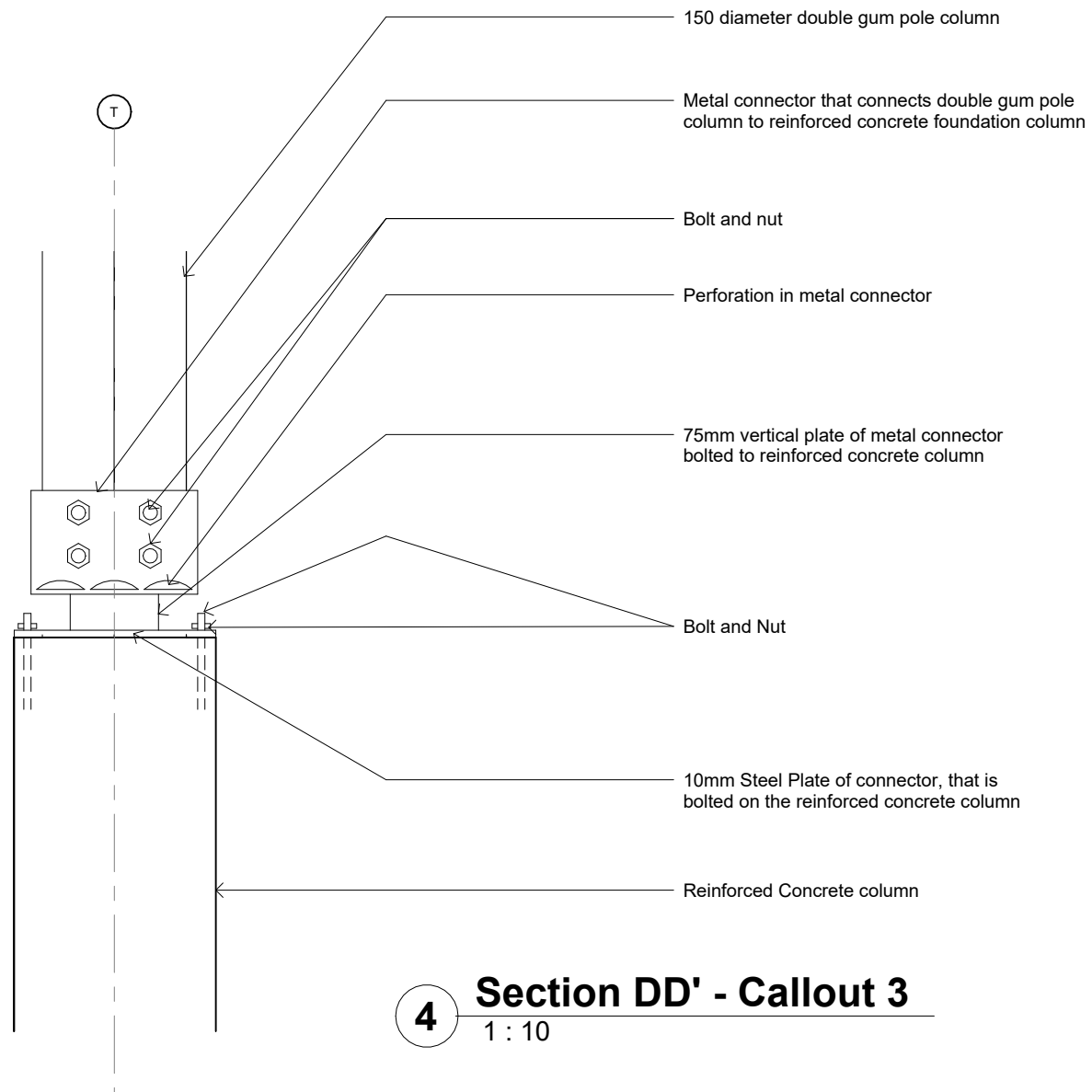
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