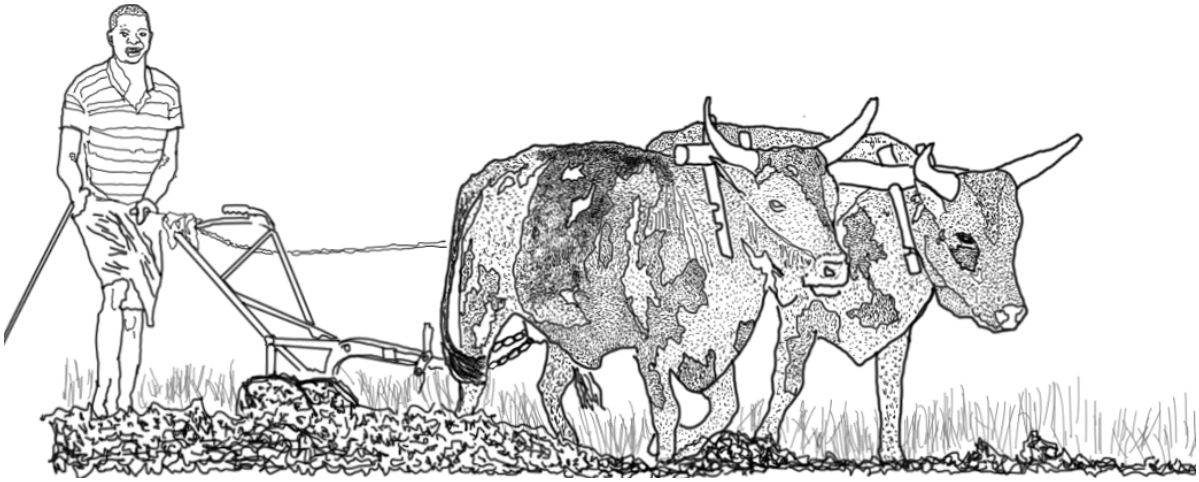

Drawn by Author (2021)

STITCHING THE DISCONNECT

How light infrastructure can become a connecting bridge to the fragmented village of Mpaka

by

Sifiso Mkhabela

Submitted in fulfillment of part of the requirements for the degree

Master of Architecture (Professional)
in the
Faculty of Engineering, Built Environment and Information Technology

University of Pretoria

November 2021

ACKNOWLEDGMENTS

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THANK YOU

My Creator:
Thank you for your faithfulness and protection.

Mom and Dad:
Thanks for all the love and discipline you instilled in us. You led the way and we followed.

Siblings:
To Sthe, Pepe, Fundo and Pukulu, thank you for all the love and support

Friends:
To Dr E, & Makhosi; you are more than just friends you are family.

Q and Prof Arthur:
Thank you for your mentorship and belief in my project!

ARC:
To Yolande: Thank you for your amazing heart, I wouldn't have done this without you. To Anton: Thank you for your amazing support, thank you for believing in me. Mo: thank you for mentoring me throughout my final year, you are such a great man. To Madi, I don't know where to start, You have laid such a good foundation in my career, thank you!

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TITLE OF DISSERTATION
Stitching the Disconnect
How light infrastructure can become a connecting bridge to the fragmented village of Mpaka

STUDY LEADER
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Longitude 31° 46’ 24.65”E

RESEARCH FIELD
Designed Ecologies

CLIENT
The Ministry of Tinkhundla and Administration

KEYWORDS
Agrarian urbanism, light infrastructure, development framework, local vernacular

PROGRAMME
Urban transect: Transportation facility hub, retain and commercial, agrarian urbanism, residential, sports and recreation and industrial node.

DEGREE
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DEPARTMENT
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UNIVERSITY
University of Pretoria, 2021

ARCHITECTURAL APPROACH
Interface between local vernacular and modern architecture

EDITOR
Debby Dewes

DECLARATION

In accordance with Regulation 4(c) of the General Regulations (G.57) for dissertations and theses, I declare that this Dissertation, which I hereby submit for the degree Master of Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of my thesis has already been, or is currently being, submitted for any such degree, diploma or other qualification.

I further declare that this thesis is substantially my own work. Where reference is made to the works of others, the extent to which that work has been used is indicated and fully acknowledged in the text and list of references.

.....
Signature

Contents

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List of Abbreviations

CAADP	Comprehensive Africa Agricultural Development Programme
DPZ	Duany Plater-Zyberk
EPA	United States Environmental Protection Agency
FOA	Food and Agriculture Organisation of the United Nations
ha	Hectares
KMIII	King Mswati III
kms	Kilometres
Kwh	Kilowatts per Hour
LED	Light-emitting Diodes
m	Metres
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental Organisation
SANBS	South African National Bureau of Standards
SMEs	Small-to-Medium-Scale Enterprises
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund
UP	University of Pretoria
USDA	United States Department of Agriculture
W	Watts

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Project Summary

Urban migration in populated cities remains a critical cause of urban sprawl. In turn, urban sprawl leads to large pieces of agricultural land being converted for non-agricultural purposes, at a fast rate, as more and more people move closer to necessary infrastructure and social services. Economic hardships play a key role in causing rural-to-urban migration, however, agrarian practices significantly impact the urbanisation of rural environments.

Due to the warm and semi-arid climatic condition, the Lubombo region is ideal for raising livestock for commercial use (i.e., the practice of ranching), as well as for the cultivation of vegetables, citrus, and sugarcane . Water catchment strategies are, therefore, an important practice in the collection and storage of water for domestic-animals and irrigation purposes within this region.

On an urban scale, the primary reason for people in Eswatini to move from rural areas to cities is the lack of built infrastructure in rural areas that could allow local economies to emerge and, thereby, enable residents to create start-up businesses and/or (otherwise) improve their quality of living. The lack of availability of such space and infrastructure, along with limited public services present within the rural setting siffles development and promotes social exclusion.

For the purposes of this study, the project manifesto was to work with available land and human resources in order to create a self-sustainable agrarian urban-transect. Such an approach involved working on a principle of zero-demolition, where no existing infrastructure is destroyed but rather enhanced architecturally. It also involved understanding the current nuances of the social and economic activities that take place on site so as to respond appropriately to the location's spatial and programmatic needs. This approach, therefore, aimed to reduce the area's carbon footprint caused by material imports by creating an opportunity to source local and indigenous knowledge and skills.

Furthermore, this project attempted to acquire local building material systems in order to create spaces that respond to the climatic and socio-economic needs of the site and, thereby, reduce rural-to-urban migration.

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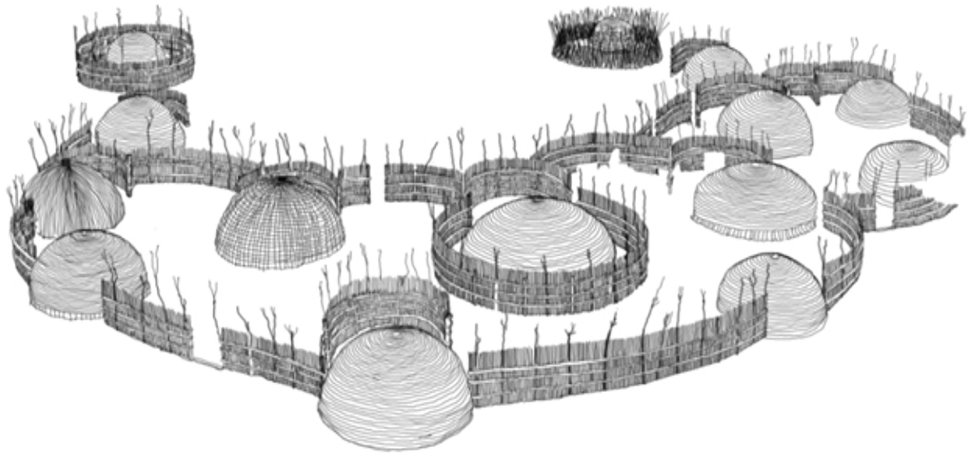
Abstract

It is projected that by the year 2050, over 60% of the world's population will be living in cities (United Nations [UN], 2018b, p. 1). General studies have shown that rural-urban migration leads to urban gentrification (Chong, 2017, p. 39). Such issues, in turn, cause urban sprawl, as low-income earners – due to increasing living expenses – drift towards urban fringes. The idea of densifying urban centres in a bid to create sustainable cities therefore remains a topic for debate. This presented study, thus, begins with a literature review on Frank Lloyd Wright's broad acre city, based on agrarian urbanism, in order to critique the current urban densification, as per Gray (2018, p. 150). The study then builds a case for a sustainable socio-economic development framework, situated in a rural setting, through light and regenerative infrastructure. A mixed-methods approach (i.e., the use of both qualitative and quantitative research methods) (Creswell, 2017, p. 294) is adopted to both measure and analyse data collected at Mpaka Village, located in the Kingdom of Eswatini, so as to identify key factors that cause urban migration. Since Mpaka is cultured in subsistence farming, the idea of agrarian urbanism is investigated in an attempt to create a circular economy that can, over time, grow into large-scale commercial farming. The research further investigates, through secondary sources, the motifs of traditional and cultural knowledge systems (i.e., spatial meanings, spatial hierarchies, thresholds, structural expressions, and envelopes) that could potentially drive form and place-making in the creation of sustainable socio-spatial conditions, in line with Nkambule (2015, p. 32). In all, this study aims to adapt the noted principles as a means to create interconnections that stitch together the fragmented Mpaka community .

Essay 1 Position and Situation



The following section serves to initiate the design project by developing a position in relation to the current condition of the kingdom of Eswatini. The outcome of this section is to formulate a research-by-design methodology.

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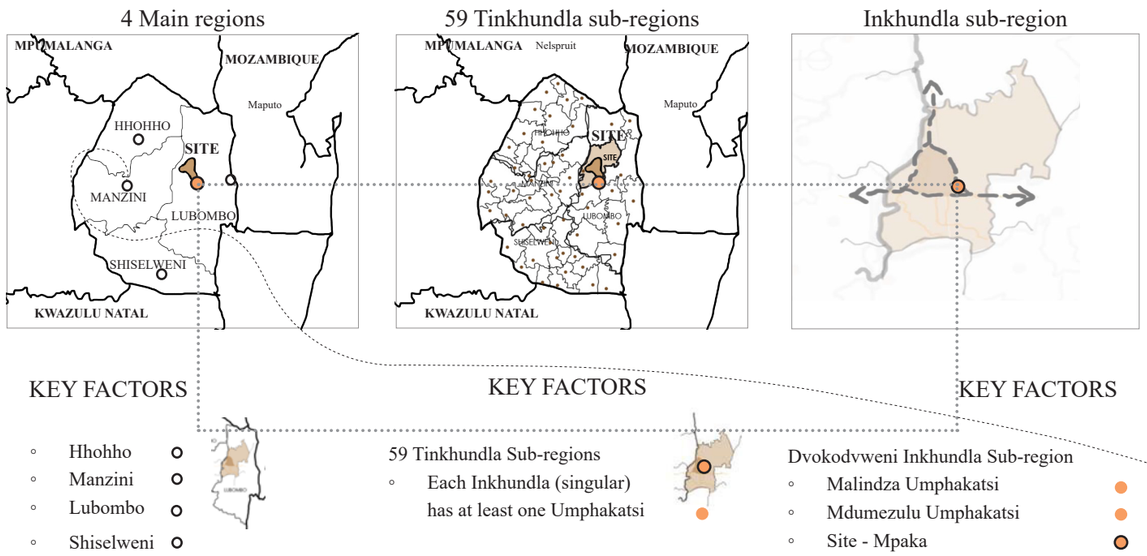
Mantenga cultural village; a window to the past (Author 2021)

1.1 Introduction

1.1.1 Background

The study site is located at Mpaka Village, which falls under the Malindza chiefdom, in the Kingdom of Eswatini. The Malindza region is governed by traditional chief leaders under the *tinkhundla*[1] regional administration (Simelane, 2011, p. 1). This particular regional administration consists of a governance system that works together with traditional leaders (i.e., chiefs) in bringing services closer to the rural community. Traditional leaders, in turn, facilitate the administration and allocation of residential land through a system called *kukhonta*[2] (Government of Eswatini, 2020, p. 16).

The noted rural setting is currently in the process of developing into an airport city, with His Majesty King Mswati III (KMIII) declaring it an urban area in March 2019 – approximately 10 years on from the confirmation of the new construction of the KMIII International Airport (Eswatini Civil Aviation Authority, 2010, p. 1). It should be noted, however, that this announcement was met with much social unrest, as local residents were to be forcefully evicted from their homeland and moved further away from public services in order to provide land for the development (Dlamini, 2017, p. 1).



[1] A third-level Government subdivision under the Ministry of Tinkhundla Administration & Development (Government, 2021).

[2] Residential land is allocated via umphakatsi (i.e., local traditional authority). The land cannot be individually owned or sold. This land is big enough for self-sustaining families who undertake agricultural activities, since each homestead is provided with at least 2 hectares (ha) of arable land (Simelane & Sihlongonyane, 2021, p. 1).

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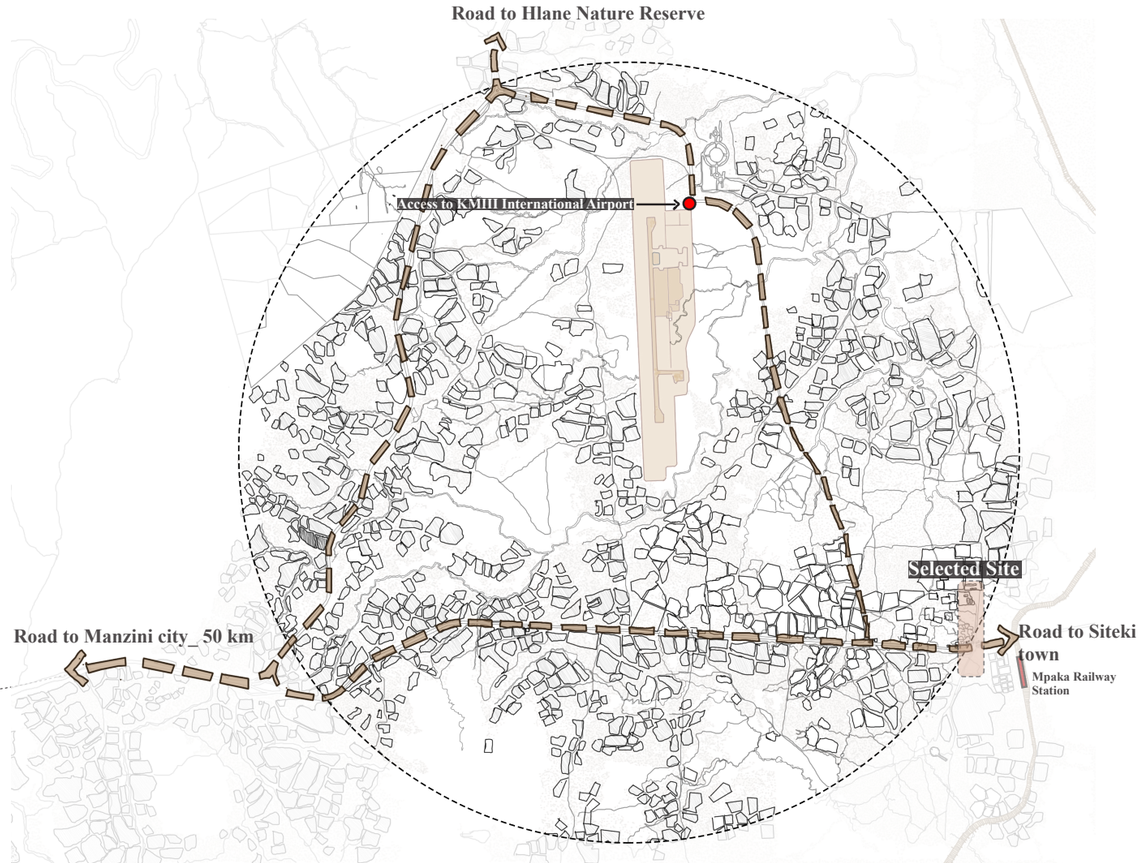
1.2 Context and Site Analysis

1.2.1 Site Location

The chosen study site is situated 50 kilometres (kms) away from the main city of Manzini, where many jobs, businesses, and industrial developments are located. As detailed later in Section 1.5.1: Site Context, there are several disconnected social services present at this site, including the Malindza Primary and High Schools, the Mpaka Vocational Training Centre, and the Malindza Refugee Camp (Blandau, 2017, p. 1).

Aside from such disconnection, this site has been selected primarily for its agrarian potential and its close proximity to two major transport landmarks, namely the KMIII International Airport and the Mpaka Railway Station.

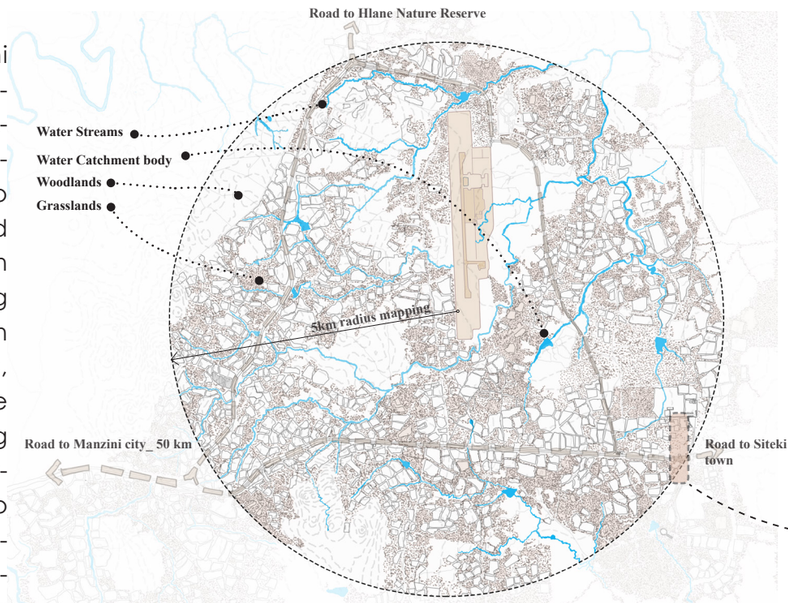


Site Location (Author 2021)

1.3 Macro Analysis

1.3.1 LAND USE

The main land use in Eswatini is extensive grazing. Communal grazing covers approximately 50% of the country, 19% of which relates to commercial ranching (Food and Agriculture Organisation [FAO], 2004, p. 3). Grazing also generally takes place on natural grasslands, savannas, and woodlands, with some of these areas further being used for community forestry (FAO, 2004, p. 3). Due to its warm and semi-arid climatic condition, the Lubombo region is ideal for raising livestock for commercial use (i.e., the practice of ranching), as well as for the cultivation of vegetables, citrus, and sugarcane . Water catchment strategies are, therefore, an important practice in the collection and storage of water for domestic-animals and irrigation purposes within this region.

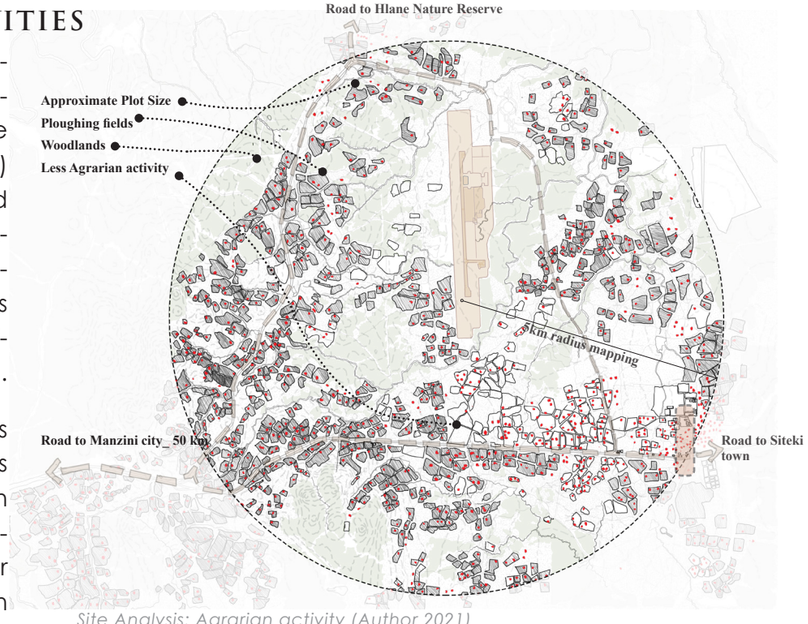


Site Analysis: Land use (Author 2021)

1.3.2 AGRARIAN ACTIVITIES

The total area under investigation is 113km2. Each homestead has an approximate plot size of 2-4 hectares (ha) of arable land, allocated through the system of kukhonta. In all, there are approximately 650 homesteads located across this area (African Financials, 2020, p. 1).

Although these homesteads have acquired large portions of land to conduct agrarian activities, and include grass-strips, homesteads, and other infrastructure, only 12% of such land is used for commercial farming, with the remaining 88% consisting of small-scale, subsistence, rain-fed agriculture . The majority of this region is, thus, used solely for subsistence purposes, primarily as a result of a lack of infrastructure and services that could better facilitate economic practices (Mavuso, 2015, p. 86).



Site Analysis: Agrarian activity (Author 2021)

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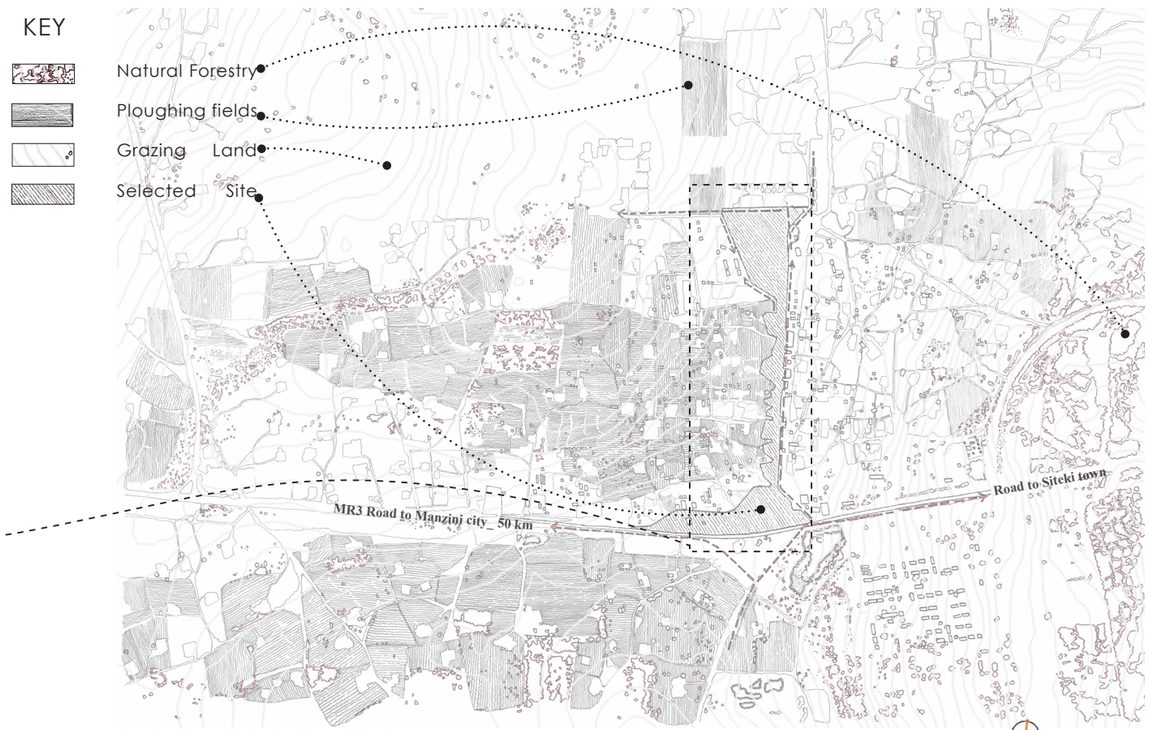
1.4 Meso Analysis



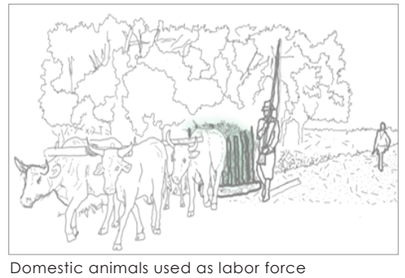
Context Analysis (Author 2021)

SCALE 1:7000

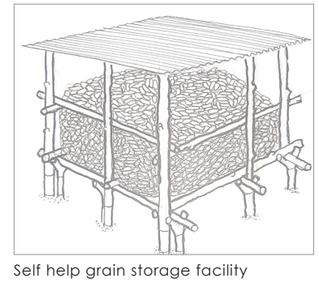
1.4.1 AGRARIAN HISTORY

New technologies and techniques have drastically changed agricultural practices from small-scale to large-scale farming (Systems Innovation, 2019). Most these traditional agricultural techniques were adapted towards locally available animals, human resources, and climatic conditions specific to a given area (Swilling & Annecke, 2006, p. 315). The industrial revolution, however, shifted the economic balance between small-scale farmers and large farm corporations (Anderson, 2010, pp. 3007-3021). Consequently, according to a Ministry of Agriculture and Cooperative report published in 2005, over 60% of all food consumed by Swazi residents is imported (Grima, 2014, p. 6). This includes items such as maize, wheat, vegetables, dry products, and other food commodities (Grima, 2014, p. 7). By 2016, the United States Department of Agriculture (USDA) reported that 90% of all agricultural products are imported to Eswatini (Torry, 2016, p. 2).

Prevalent Subsistence farming with enough land for commercial farming



Domestic animals used as labor force

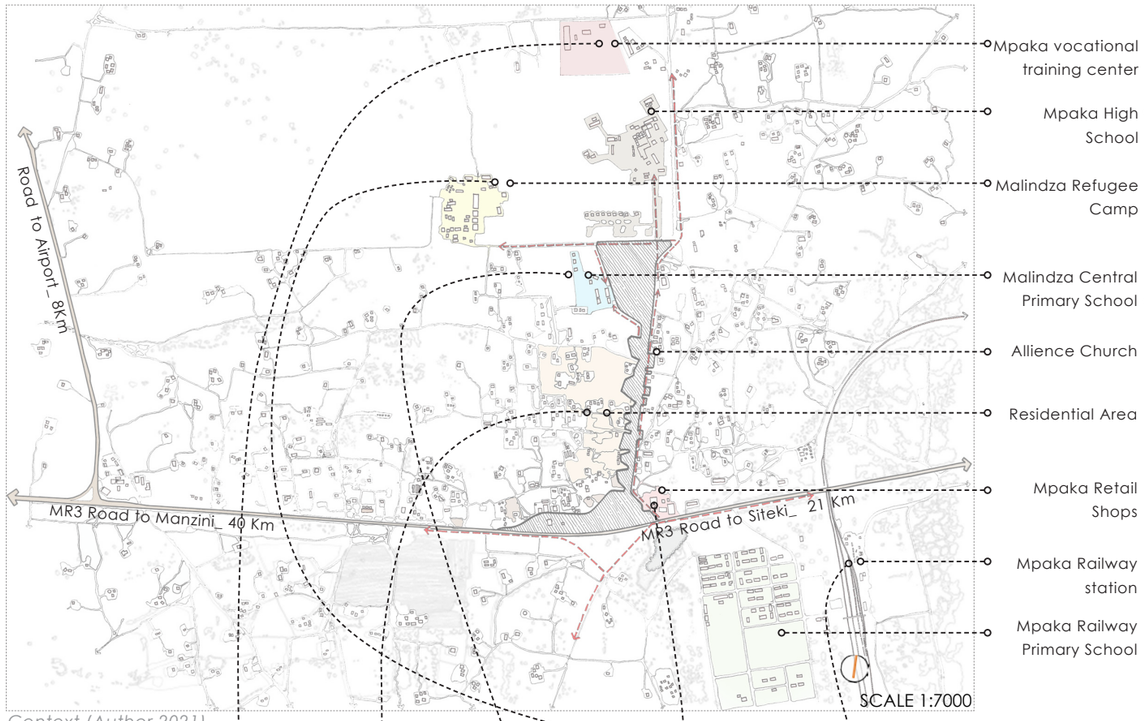


Self help grain storage facility

1.5 Micro Analysis

1.5.1 SITE CONTEXT

As noted previously, the selected site is situated in close proximity to important social and economic infrastructure and services, including the Mpaka Vocational Training Centre, the Malindza Refugee Camp, the Malindza Central Primary, the Mpaka High School, and the Mpaka Railway Station. However, the main challenge facing this community is the area's fragmentation, which is causing difficulty for community members to access available services. Such fragmentation is largely due to a lack of effective town and regional planning structures (Eswatini, 2007 , pp. 110-151). For example, the MR3 highway creates a disconnect between the northern and southern areas of the public transport hub (Dlamini, 2018, p. 5). This disconnection has resulted in an unsafe pedestrian space, particularly for school children and informal traders, who conduct business along the station and/or use it as a thoroughfare.



Context (Author 2021)

Lack of Job Opportunities after skills training

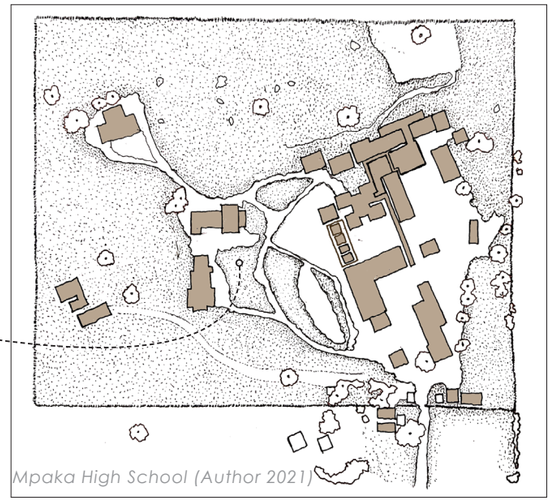
No extra curricular activities for school kids

Alienation of refugees_ restricted from integrating with community

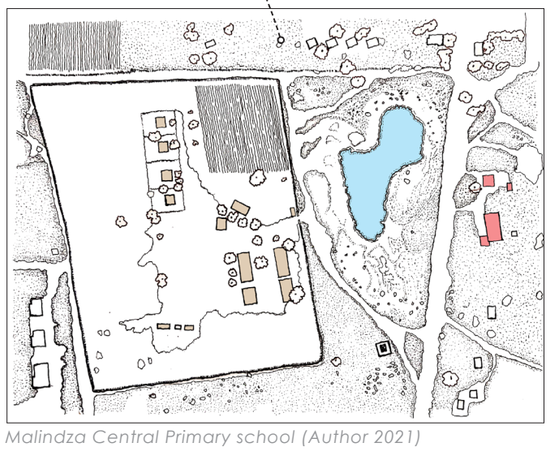
Lack of government support in residential property development

Self Help shelters for Vendors

Missed opportunity to transport goods in and out of the country



Mpaka High School (Author 2021)



Malindza Central Primary school (Author 2021)

MPAKA HIGH SCHOOL

Enclosed public school creates unsafe spaces for school children as they walk around dangerous alleys to arrive at the school

MALINDZA CENTRAL PRIMARY SCHOOL

There is no provision of student accommodation (boarding school). School children walk up to10 kilometers (km) to get to the school. I addition, the school does not have enough extracurricular activities to enhance learning

1.6 Definition of Terms

Light Infrastructure

Current urban conditions require the re-imagining of built spaces, where structures are interrogated in terms of programme, and reduced or broken down into their 'essence' (Light Infrastructure, 2020). Thus, instead of having a large and expensive building structure, the project presented in this current study aims to reduce the design to its essential function by using light and affordable structural materials.

Agrarian urbanism:

Contrary to 'urban agriculture'[3] and 'agricultural urbanism'[4] , Duany, Plater-Zyberk and Speck (2000) define 'agrarian urbanism' as a strategy that involves the whole (i.e., where every community member is involved in the cultivation of the extant land)..

Indigenous knowledge Systems:

In the construction of Freedom Park, Jethro (2013, p. 33-34) refers to 'traditional knowledge' as the analysis of material history in construction, and indicates how spatial arrangements can be derived from traditional (i.e., indigenous) knowledge systems.

[3] Process of producing and distributing food in and around urban environments.

[4] Urban design strategies that centralise development and complement such development with farmland (Duany et al., 2000).

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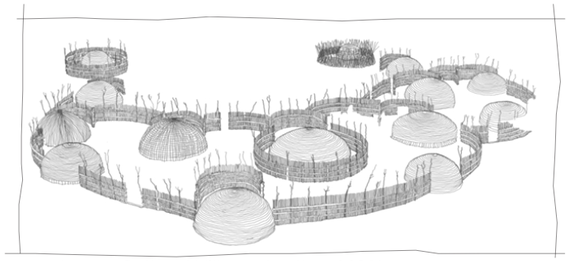
1.7 Normative Position

Urban migration in populated cities remains a critical cause of urban sprawl (Mckeown, 2004, p. 155). In turn, urban sprawl leads to large pieces of agricultural land being converted for non-agricultural purposes, at a fast rate, as more and more people move closer to necessary infrastructure and social services (Freilich, Sitowski, & Mennillo, 2010, p. 369). According to Smith (2014, p. 516-533), economic hardships play a key role in causing rural-to-urban migration. In particular, this author demonstrates how agrarian practices significantly impact the urbanisation of rural environments (Smith, 2014, p. 516-533).

In Eswatini, 70% of the population lives in pastoral areas, where an average of 3ha of land is provided for each homestead (Manyatsi, Masarirambi, & Hachigonta, 2020, p. 213). As such, each homestead has enough land to produce its own food (Magagula, 1982). For the purposes of this study, the normative position was to work with available land and human resources in order to create a self-sustainable agrarian urban-transect. Such an approach involved working on a principle of zero-demolition, where no existing infrastructure is destroyed but rather enhanced architecturally. It also involved understanding the current nuances of the social and economic activities that take place on site so as to respond appropriately to the location's spatial and programmatic needs. This approach, therefore, aimed to reduce the area's carbon footprint caused by material imports by creating an opportunity to source local and indigenous knowledge and skills. Furthermore, this project attempted to acquire local building material systems in order to create spaces that respond to the climatic and socio-economic needs of the site and, thereby, reduce rural-to-urban migration.

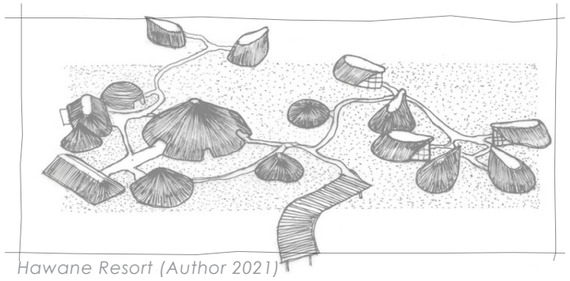
1.8 General Issues to be Investigated

The Kingdom of Eswatini is well-known for its rich cultural and traditional practices (Mavuso, 2015, p. 86). However, there exists a general issue of limited documentation related to the country's local architecture and built forms. There is, thus, a need for future research into the intricacies of the cultural practices that hold influence on this country's vernacular architecture. Such research could prove particularly valuable by highlighting how these cultural practices involve the use of local materials, such as thatched huts and reed screens, that define public and semi-public spatial thresholds (Frescura, 1980, p. 40).



Mantenga Cultural Village (Author 2021)

Buganu National Ceremony (Author 2021)



Hawane Resort (Author 2021)

Umhlanga National Ceremony (Author 2021)

House on fire Arts and craft festival (Calburn 2021)

Sibhaca Dance culture (Author 2021)

Hlane Game reserve (Author 2021)

Lusekwane/Incwala National ceremony (Author 2021)

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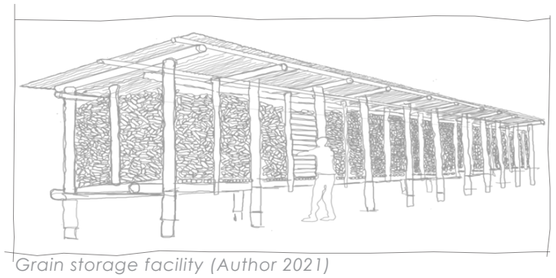
1.9 Urban Issues to be Investigated

On an urban scale, the primary reason for people in Eswatini to move from rural areas to cities is the lack of built infrastructure in rural areas that could allow local economies to emerge and, thereby, enable residents to create start-up businesses and/or (otherwise) improve their quality of living (United States Environmental Protection Agency [EPA], 2011, p. 1). The lack of availability of such space and infrastructure, along with limited public services present within the rural setting siffles development and promotes social exclusion (Ozkazanc, 2017, p. 74).

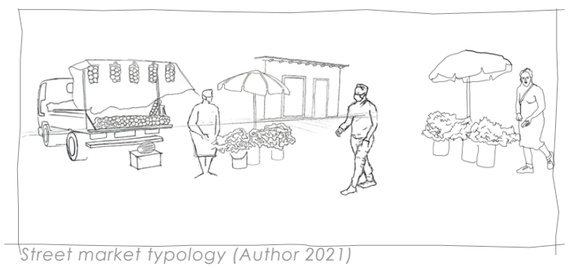
Mbabane Taxi Rank (Author 2021)

Traditional Ploughing methods (Author 2021)

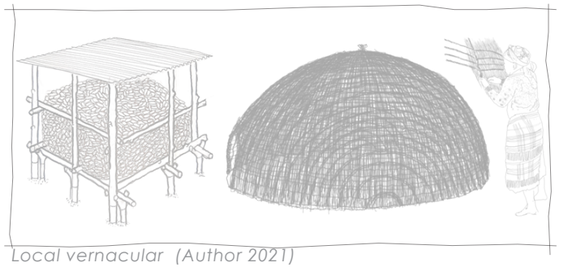
Vendor Markets (Author 2021)



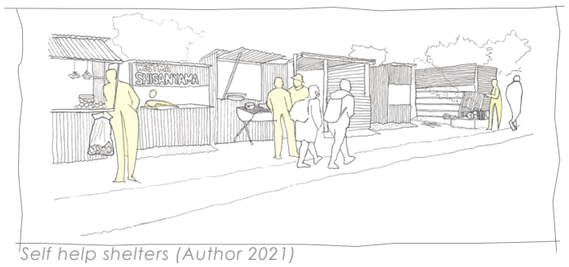
Grain storage facility (Author 2021)



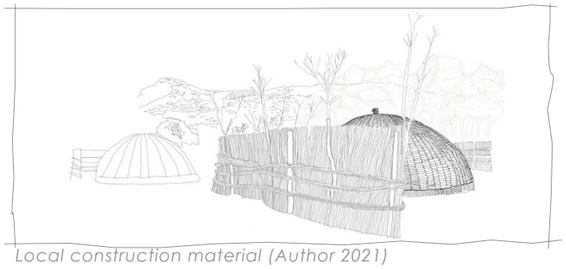
Street market typology (Author 2021)



Local vernacular (Author 2021)



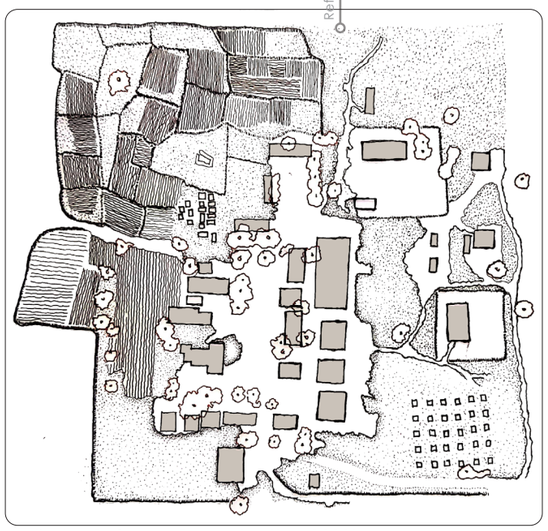
Self help shelters (Author 2021)



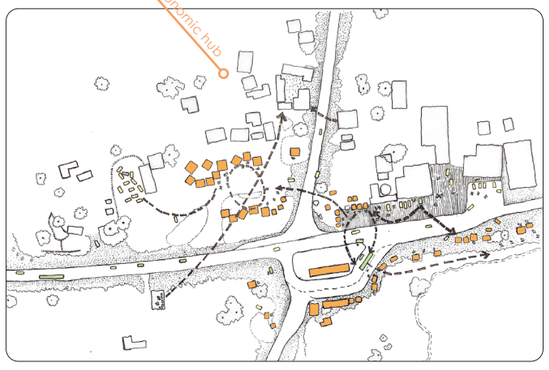
Local construction material (Author 2021)

1.10 Architectural Issues to be Investigated

Several architectural issues are, therefore, investigated in this project – the most prominent of which is the aforementioned issue of fragmentation and the disconnect between the local community and necessary social and economic services. An example of this issue is specifically seen in the alienation of refugees residing at the Malindza Refugee Camp, whereby asylum seekers are not allowed to integrate with the community, particularly in regard to engaging in economic activities and social exchange (e.g., the sharing of knowledge and skills such as farming techniques) (Rulashe, 2006, p. 1).



Malindza Refugee Camp (Author 2021)

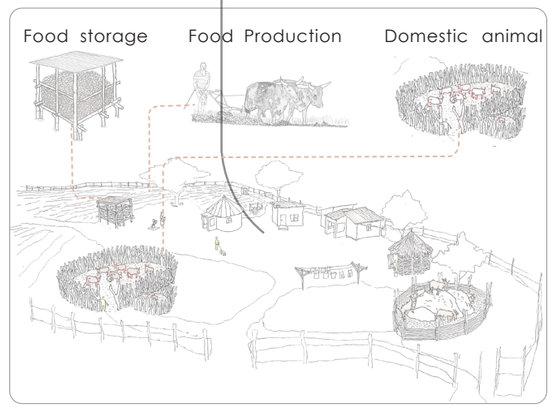


Mpaka Market and bus stop (Author 2021)

A further issue relates to the spatial arrangements of Swazi Nation Land, which is, as previously noted, 70% rural (New Partnership for Africa's Development [NEPAD], Comprehensive Africa Agricultural Development Programme [CAADP], & FOA, 2005, p. 1). As a result, locals tend to primarily live in scattered patterns, where almost every household in Malindza occupies an average of 2-4ha for agricultural activity (Baker & Dradri, 2006, p. 18). Such activity mostly constitutes growing maize, supplemented with cucurbits and sorghum (Baker & Dradri, 2006, p. 18). Many other mixed crops, such as sweet potatoes, legumes, and vegetables, are also grown for subsistence use (Manyatsi et al., 2020, p. 242). This high focus on subsistence farming is due to a lack of infrastructure, knowledge, and skills in respect to how best to utilise the available plot sizes in semi-arid climatic conditions and/or scaling up the production of already-available crops and vegetables for commercial purposes (Ndlangamandla, 2007, p. 32).

The current project seeks, therefore, to create decentralised economies through agrarianism by establishing equal opportunities for locals and refugees by 'stitching together' social and economic nodes in a bid to reduce fragmentation. This attempt is in line with recommendations presented by Berke (2008).

Typical homestead (Author 2021)



Essentials of a typical homestead (Author 2021)

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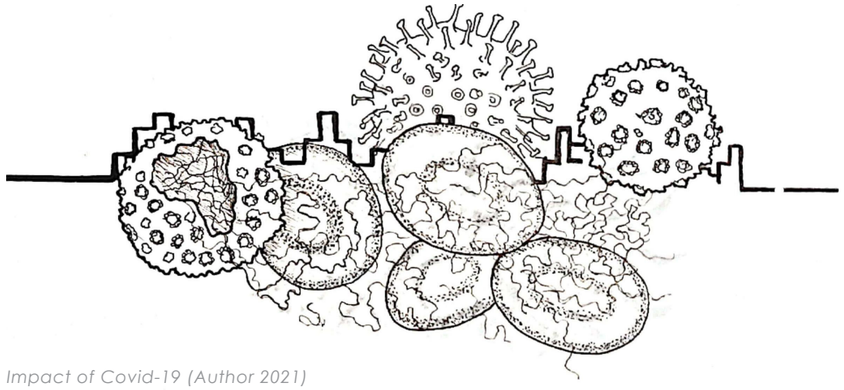
1.11 Initial Analysis of the Situation

Impact of climate change (Author 2021)

According to the Ministry of Economic and Development of the Kingdom of Eswatini, it is predicted that the number of rural-to-urban immigrants will increase by 26.5% in 2030 (Dlamini, 2013, p. 1). Furthermore, according to the World Bank (2019 , p. 1), people living in rural areas depend on agriculture, yet, due to climate change (e.g., changes in rainfall patterns and/or the destabilisation of ploughing seasons), many farmers are being forced to abandon their land and migrate to cities for better jobs opportunities. The general lack of basic services and infrastructure in rural areas has also increased global hunger (World Bank, 2019, p. 2). As such, over 75% of the world's impoverished people currently living in rural places are predicted to have migrated to cities by 2050 (UN, 2018 a, p. 1).



Impact of Covid-19 (Author 2021)

A converse consideration is, however, the persistent threat posed by the recent Covid-19 pandemic, which has accelerated an exodus away from cosmopolitan cities to more pastoral areas (Freear, Mirafftab, & Okolichany, 2021). In this case, many individuals are beginning to weigh out the restrictions placed on city-dwellers (e.g., quarantine, school closures, and working from home) in relation to the possible 'freedoms' associated with rural living. Recent studies by labour economies have also shown that city-based jobs are no longer guaranteed, which is transforming the real estate market in cities, especially in respect to office space (although the impact also extends to residential preferences). As such, it suffices to state that the pandemic has exposed how unprepared and vulnerable the world's cities can be in terms of job security and built infrastructure (Dizikes, 2020, p. 1).

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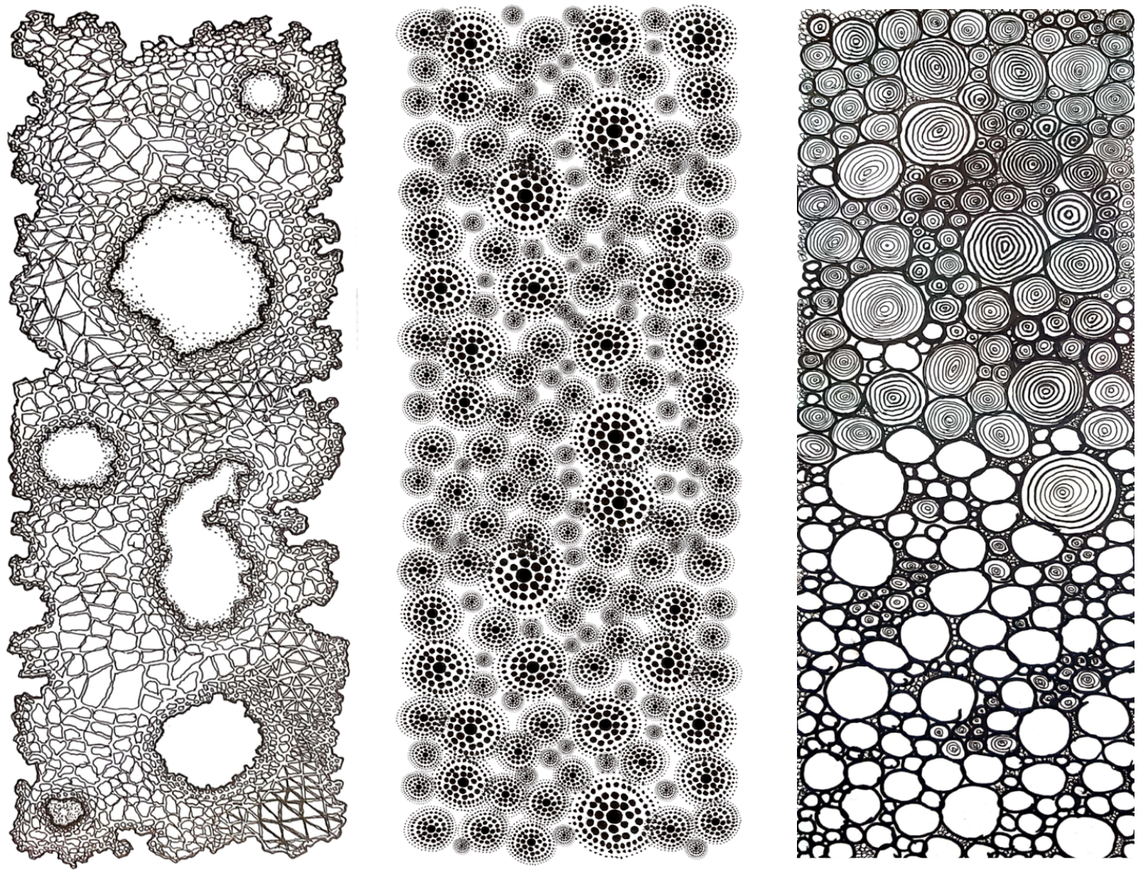
1.12 Outcome

The aim of this research is to validate the reasons and importance of agrarian culture, which promotes and preserves natural ecosystems and biodiversity. Such preservation is achieved through the growing and preserving of organic seeds and/or growing indigenous trees for both domestic and wild ecology purposes; thereby creating a complete 'human and eco-systemic' cycle (Shiva et al., 2017, p. 13). The bigger vision, then, is to create a rural-urban framework where locally produced fresh food can be supplied to both local markets and small-scale industries to process, package, and export food products through an established circular economy, as promoted by Hart (1995).



1.13 Literature Review

1.13.1 Agrarian Urbanism

Frank Lloyd Wright is one of America's most respected architects (Alofsin, 2017, p. 225). Wright confirmed the importance of decentralising communities in order to create a society that recognises both individual home property and, more importantly, small-scale farming (Robert, 2013, p. 25). This notion of decentralisation was clearly demonstrated on Wright's 12x12 inch broadacre city model, presented at the Rockefeller Center on April 14, 1935 (Gray, 2018, p. 1). Specifically, the model demonstrated 'agrarian urbanism' as a form of agriculture that allows every individual in the community to participate in the process of producing and/or selling food produce (Lapping, 1979, pp. 11-23). It should be noted that such a model is not limited to only growing food but involves other sectors as well, including education, health, and sales; or, at the very least, incorporates becoming urban consumers who buy and support locally produced food (de la Salle, 2014, pp. 237-250).

1.13.2 Garden Cities

Ebenezer Howard, who was inspired by Edward Bellamy's book Looking Backward (Talen, 2015, p. 1), writes about his 'utopian plan', where communities are defined by agrarian practices and where socio-economic infrastructure is surrounded by agriculture belts. Howard further argues that green spaces should not be relegated to urban fringes but should, rather, form an integral part of the urban lifestyle (Haney, 2005, pp. 14-15).

1.13.3 Miscellaneous

New urbanism, compact cities, and green infrastructure: Andres Duany, who is one of the founders of Duany Plater-Zyberk (DPZ), first introduced the 'smart code' that reflects agrarian urbanism as an approach to New Urbanism (Primoz, 2017, p. 110). As part of this code, Duany et al. (2000) encourage small plot sizes as a means to promote larger open public spaces.

1.13.4 Triple Bottom Line

Douglas Farr, presents a theory that focusses on the three dimensions of sustainable and resilient urban lifestyle, namely social, economic, and environmental considerations (Wise, 2016, p. 30). In Farr's (2018, p. 313) section entitled The Agrarian Lifestyle, the author puts forward the idea of mixed-use neighbourhoods and communities, where the practice of food production is not merely seen as a means of living but a lifestyle. Farr further emphasises the importance of organic farming, which, for centuries, has been the practice upon which small-scale farmers have survived. Agrarianism is also not limited solely to farming but involves economic aspects such as producing crafts that are sold to local retail shops, providing storage facilities, creating bookstores, and maintaining stables (Mitchell, 2016, p. 15). In terms of social and environmental concerns, Farr (2018, p. 314) argues that instead of planting non-fruit-bearing trees along streets, in between nodes, streets can be lined with berry, pecan, and walnut trees. Such trees can play a role in educating children as they walk to school (i.e., learn to understand different tree types and changes in seasons) (Patelski, 2008, p. 126).

1.13.5 Landscape Urbanism

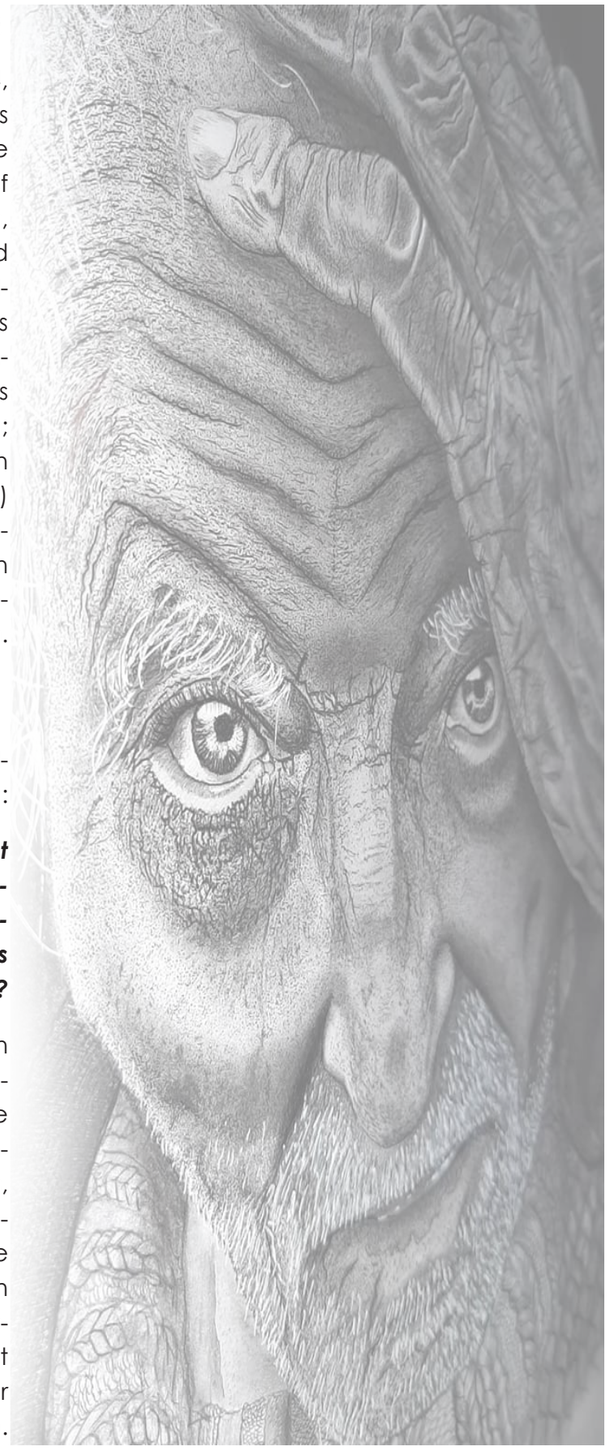
James Corner, according to Bennett (2014, p. 42), in reference to van Valkenburgh 's earlier claims, states that cities should be designed around the existing presence of their particular landscapes. In other words, the landscape itself should inform how and where urban forms should be placed (Viljoen, 2005, pp. 21-29). This approach calls for the understanding of spatial, programmatic, and logical strategic arrangements that grow and adapt to changing times; thereby creating a more resilient urban framework (Green, 2021). Corner (2014) also emphasises the same notion of the importance of agrarian- and horticulture in respect to understanding the use and application of material systems in urbanism.

1.14 Research Question

This study aims to answer the following primary research question:

How can agrarian urbanism, through light and regenerative infrastructure, create a development framework that sustains local and socio-economic activities through indigenous knowledge systems?

In a dissertation on architecture's role in culture, Nakanishi, Sheppard, and Hutton (2020, pp. 88-90) present evidence regarding the importance of creating infrastructure that speaks to historical roots, heritage, and culture – particularly in relation to the context of African people groups. Not only can such an approach prevent failed projects, but it can encourage inhabitants to identify with the project at hand, since it speaks directly to their identity (Folkers & van Buiten, 2010, p. 19).



1.15 Research Methodology

In this study a mixed-methods approach was utilised (i.e., where both qualitative and quantitative approaches are employed).

1.15.1 Qualitative Method

The qualitative research method takes a philosophical stance by undertaking an ontological and epistemological approach to analyse a given study area (Lincoln, Lynham, & Guba, 2011). With regard to indigenous knowledge systems, as pertaining to the current study, an inductive approach is undertaken in order to search for design patterns, motifs, forms, tectonic and spatial traditional arrangements, and contemporary architecture inspired by vernacular building typologies. This approach also broadens the African context through the use of secondary sources by conducting the same type of exercise (i.e., expanding previous work by incorporating the refugees who come from different African countries in the study location). This qualitative exercise also aims to derive design principles such as hierarchy, progression, approach, and material use with the objective of establishing a design language that speaks to local African identity.

1.15.2 Quantitative Method

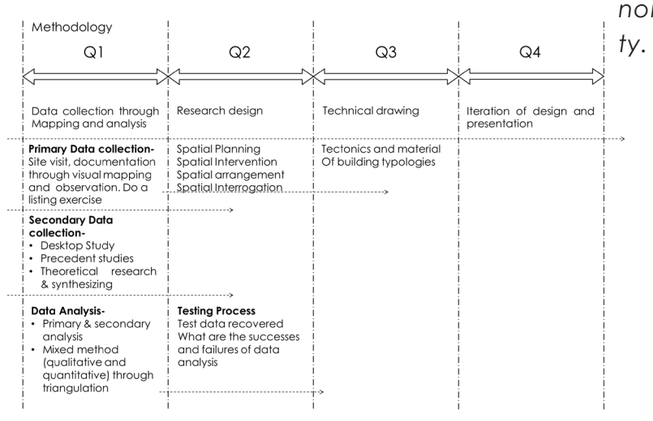
Based on both primary and secondary data, a deductive approach is used in this study to develop an hypothesis that promises to develop design strategies that form a framework that can effectively respond to the social and economic needs of the site in question. This exercise is conducted through a process of primary data collection, where most architectural firms in Eswatini were visited in order to collect a selected number of design projects. The objective was, then, to identify each project's design approach, purpose, brief, lead architect, and client in an attempt to deduce an hypothesis that might derive a theoretical position in validating the project's credibility and adding value to the chosen site.

1.15.3 Hypothesis

This study offers two hypotheses:

H1: *It is possible to, through identification, prove that certain factors cause urban migration.*

H2: *It is possible to, through the use of secondary sources, gather evidence that proves that the development framework can work in improving the social and economic aspects of the given rural community.*



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1.16 Research Plan

1.16.1 Methods

In order to achieve the study's purpose, an exercise of mapping and surveying the site was first conducted as a means to better understand the culture and existing social and economic activities, as well as to identify indigenous knowledge systems that have made the communities within the chosen location thrive in the past. Such an approach included the study of large plots, the benefits and limitations of small-scale farming, and how agrarian urbanism can be implemented so as to create a balance between a community and its ecosystems. This initial rural spatial analysis was conducted over a 50km radius around the site. The site-analysis exercise was also undertaken in order to identify existing infrastructure, such as rivers, dams, schools, roads, and clinics. An exercise in listing was then also included so as to map out and identify economic nodes (e.g., amenities) that can grow over time.

1.16.2 Instruments

As noted previously, the current study is concerned with spatial analysis, as based on community needs and observational methods. The study has, thus, been conducted by documenting the chosen area through visual mapping and the general collection of information. Tools such as a digital camera, ArcGIS, Google Earth, cellphone recordings, and interviews with architects have all been used for data collection. The University of Pretoria (UP) library was also consulted in a bid to collect relevant secondary information. Such information has been employed as a tool to supplement the study as a whole, and the primary collected data in particular.

1.16.3 Sampling

The research focusses on local farmers, vendors, refugees, the youth, and entrepreneurs in an attempt to create a comprehensive development framework.

1.16.4 Data Analysis and Interpretation

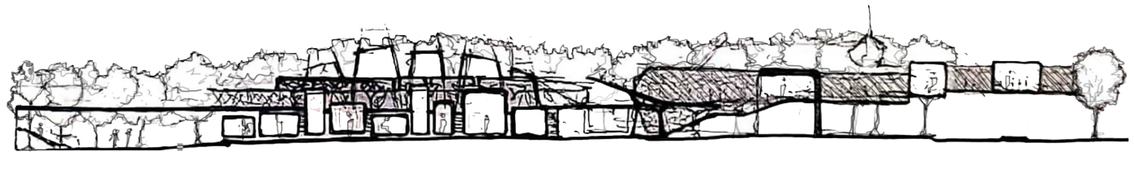
The project was conducted during the third quarter of the second semester of the current year (2021), where both testing and evaluating was undertaken through the adoption of a triangulation method aimed at validating the research.

1.16.5 Ethics and Limitations

The site was visited three times. The first visit was to request permission from the Commissioner for Refugees to conduct the research. No interviews were conducted with refugees themselves, only with the refugee administrators. The second visit was undertaken in order to consult with local architects and acquire their selected works for academic purposes (Appendix A). The third site visit was conducted for the purpose of observing and understanding the urban context of the Mbabane, Manzini, and Matsapha areas and, thereby deriving an insightful hypothesis regarding how a development framework might successfully be implemented at the study site.

Several photographs were taken on-site to support the noted spatial analysis and observations. Such photographic information has been recreated in the form of relevant sketches or sketch diagrams in this study so as to uphold relevant ethical considerations regarding the use of sensitive photographic data. Furthermore, a budget of R5 000 was saved for site visits, and no incentives were provided to participating architects.

Essay 2 Design Research



The following section takes a critical and speculative design approach through explorations and discussions, for the purposes of developing a theoretical based design position.

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Derelict Street condition of the site (Author 2021)

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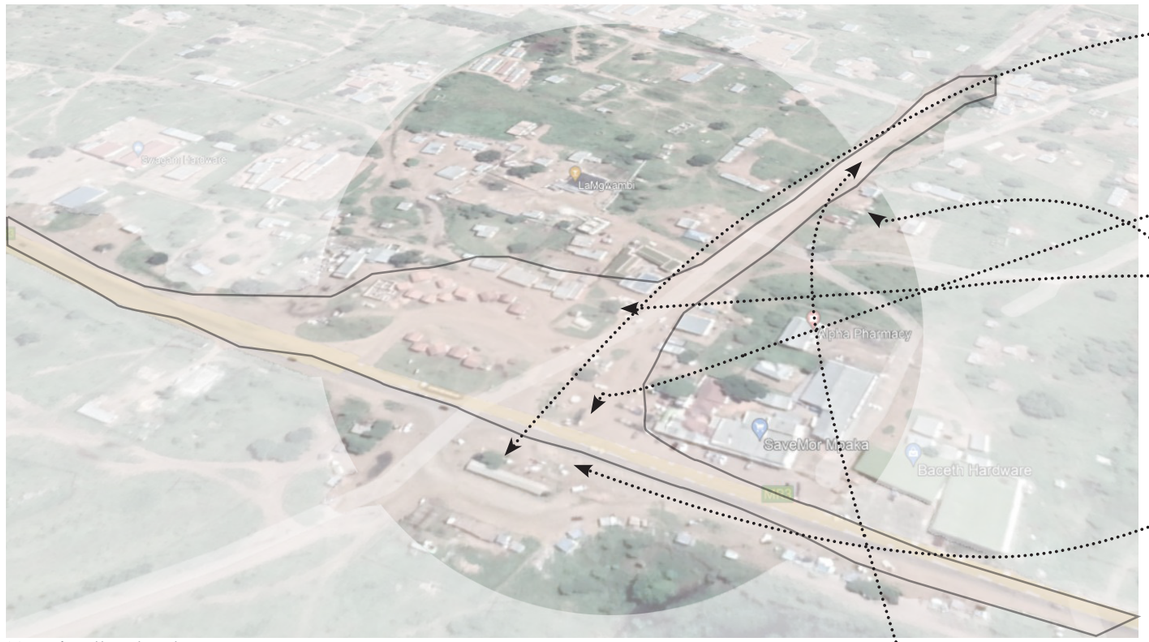
2.1 Design Argument

The economy of Eswatini has reached a state of emergency, where over 70% of its population lives under the poverty line (World Bank, 2021 , p. 1). The Malindza constituency has little to no infrastructure, and access to goods and services is limited (UN International Children's Emergency Fund [UNICEF], 2005 , p. 1). Over the past 10 years, the poor state of the country, which is highly dependent on Government, has faced economic challenges that have affected its economic development as well as the growth of both the public and private sectors (Ministry of Economic Planning and Development, 2019, p. 5).



Mapping the street

Based on such issues, the design project presented in this dissertation has, as its main focus, agribusiness and agro-processing facilities that are aimed at supporting local entrepreneurial growth. The study's main target involves the youth, refugees, and informal vendors who trade along the MR3 intersection. The project further engages in the construction of agrarian infrastructural facilities such as workshops, trading stalls, storage facilities, temporary accommodation, and public ablutions. The aim of this development is to curb the presently high levels of unemployment, particularly present within the youth demographic, by providing opportunities for the development of small-to-medium-scale enterprises (SMEs).

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2.1.1 Social and Human Capital Investment






The Kingdom of Eswatini is currently experiencing political upheaval, particularly with regard to the destruction of centralised political and economic hubs (Dlamini, 2021 a, p. 1). Despite such upheaval, decentralisation has been found to be a key factor in creating safer and more resilient economies (Williams & Thampi, 2013, pp. 1337-1357). By focussing on developing human potential through a programme of education, agribusiness, and health, a community can begin to better negotiate business enhancement, both locally and internationally (Ministry of Economic Planning and Development, 2019, p. 5). Such development is further possible if equal opportunities are distributed amongst all communities and community members (Belachew, 2020, p. 15). In order to achieve such enhancement, better infrastructure, such as health and social services, should be provided as a means of uplifting the community in general, and the youth, women, and refugees in particular.

2.2 Case Studies + Precedent Studies

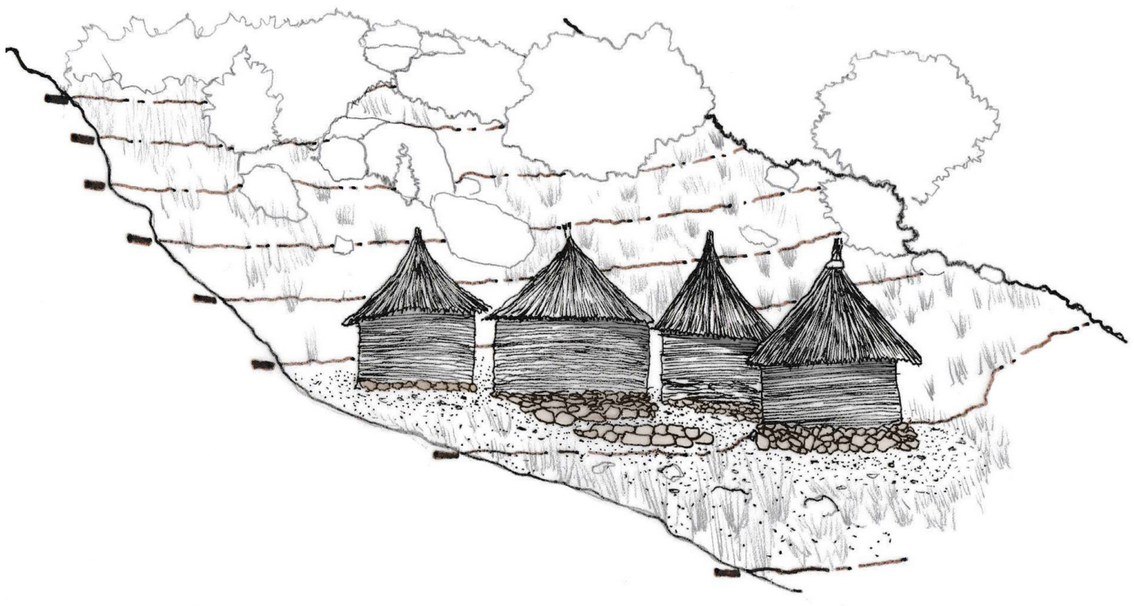

Image (Author 2021)

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2.2.1 Case Study :1 Curitiba City

Curitiba, Brazil, founded in 1693 and later developed by Governor Jaime Lerner in the 1970s onwards, initially existed almost solely on agriculture and cattle farming (Campbell, 2007, p. 68). Lerner then put into practice that people matter more than economics when designing a city, and supported the notion that small-scale, cheap, and participatory action involves changing a busy street into a mall. In this way Curitiba was transformed from a centre for processing agricultural products into an industrial powerhouse.

Three centuries after its inception, Curitiba was found to be well ahead of its time by becoming one of the first cities in the world to start a recycling service in the late 1980s (Lerner, 2012, p. 73). This initiative has made the city a pleasant environment in which to live. For example, refuse-removal trucks collect waste products and separate them into organic and inorganic waste. The process includes separating cans, glass, metals, plastics, and papers and has, as a result, created many jobs for, especially, immigrants and people with disabilities.

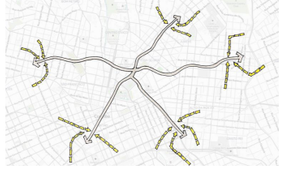
A bartering exchange system, where local people bring their sorted refuse to the refuse removal trucks in exchange for food parcels or bus tickets to travel to the city has further been implemented (Kroll, 1999, p. 92). As a result, the city does not have to pay for expansive road widening as residents are encouraged to use the bus system, and surplus food does not go to waste. Furthermore, there is a library available for school children that is stocked entirely from other people's discarded books (Rosario, 2016, p. 112).

Governor Lerner also solved the city's persistent flooding by turning riverbanks into parks. Many trees have been planted, and many disused factories have been recycled into sports facilities. In addition, the city has an integrated bus system that reduces traffic congestion caused by commuters who drive individual cars (Smith, 2014 , p. 1).

RECYCLING

INTEGRATED CONNECTIVITY

Grey buses drive on Express routs with few stops



Orange buses bring people from the outline to the Express routs

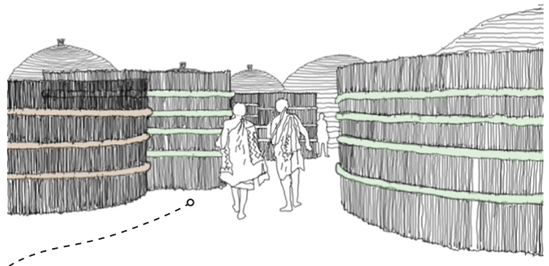
Blue buses link suburbs outside the city center with the Express routs

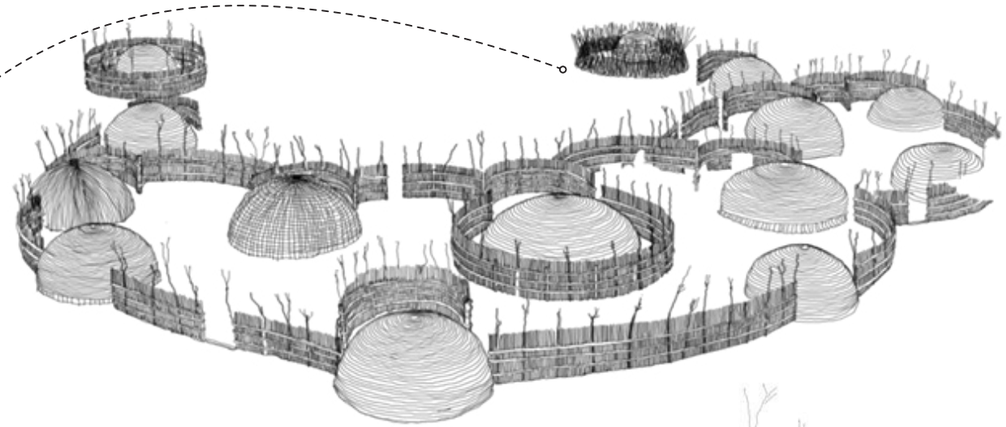
Green buses link some suburbs directly in to the city center and has many more stops than the Express routs with few stops

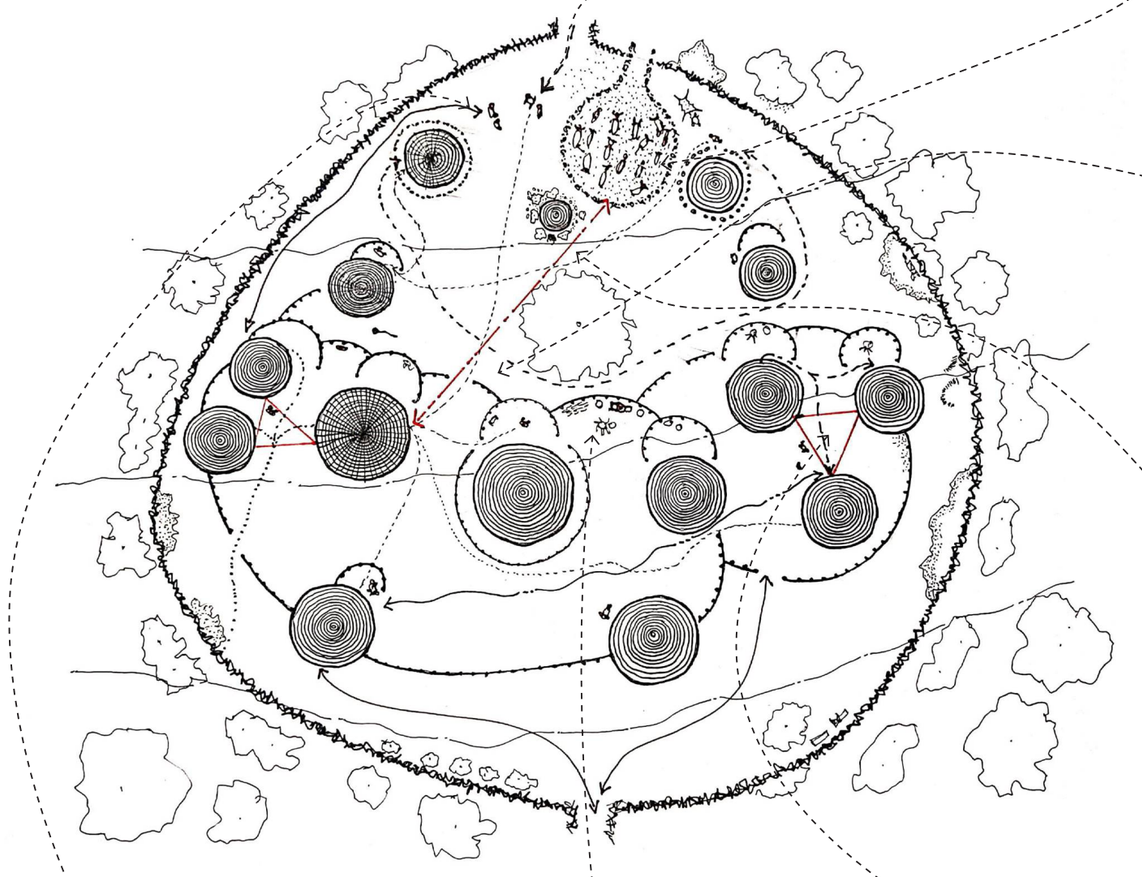
Case Study 2.2.2

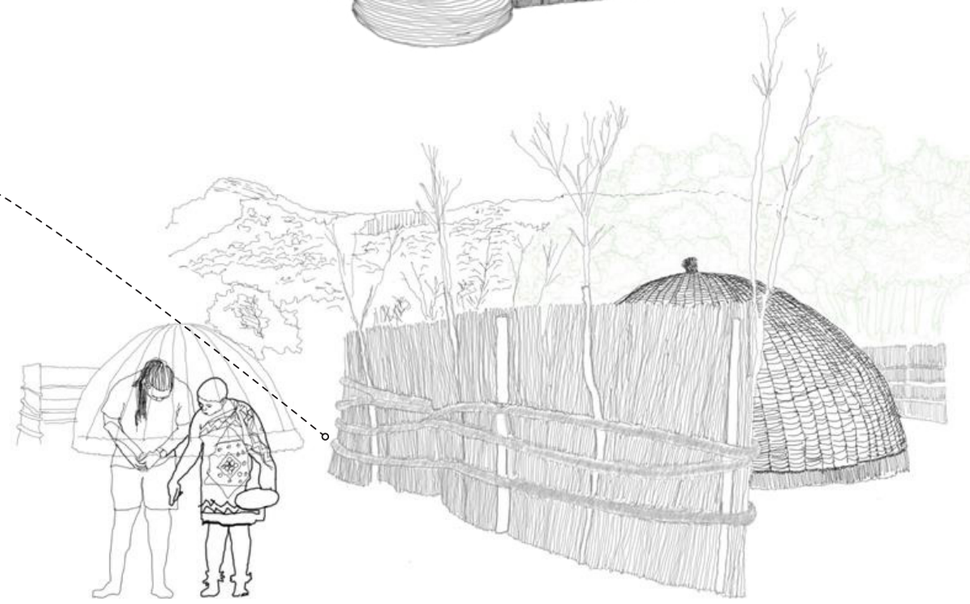
Mantenga Cultural Village

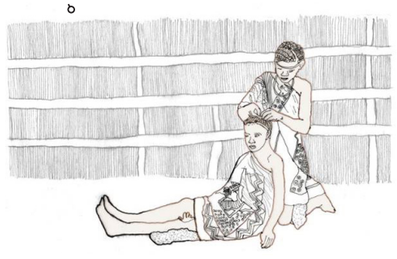
Project Location: Zulwini, Eswatini
Project Architect: Local Swazi
Project Informants: Local Vernacular

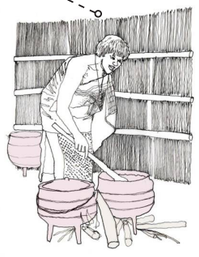












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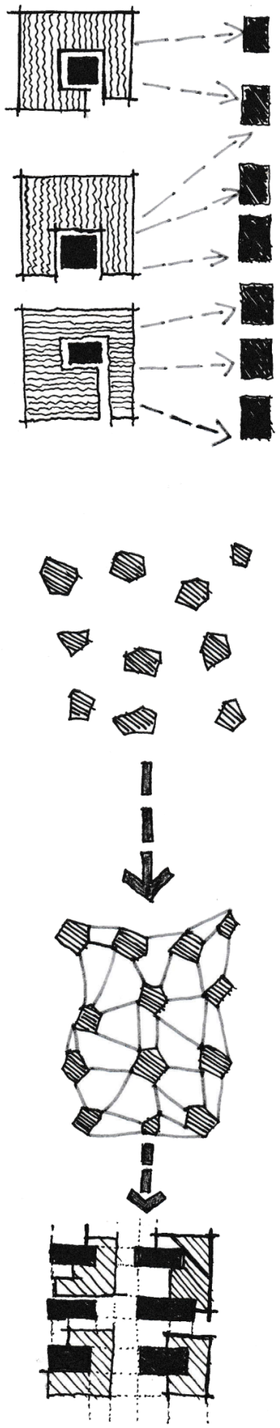
2.2.3 Precedent Studies



Agrarian Urbanism

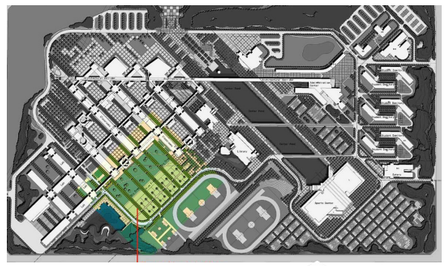
WALTER SISULU SQUARE

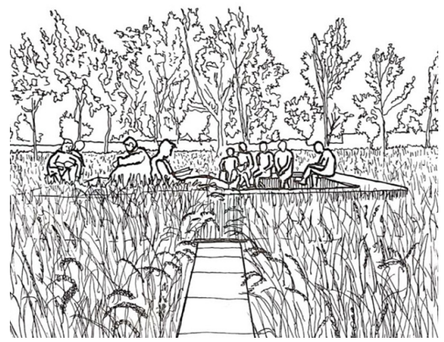
Project Location: Kliptown, Soweto
Project Architect: Studio Mas
Project Informants: Historic

The scheme deals with individual economic empowerment through participation and ownership. It seeks to shift the idea of exclusive economic participation that came with the legacy of Apartheid (Noble, 2006, p. 13) .

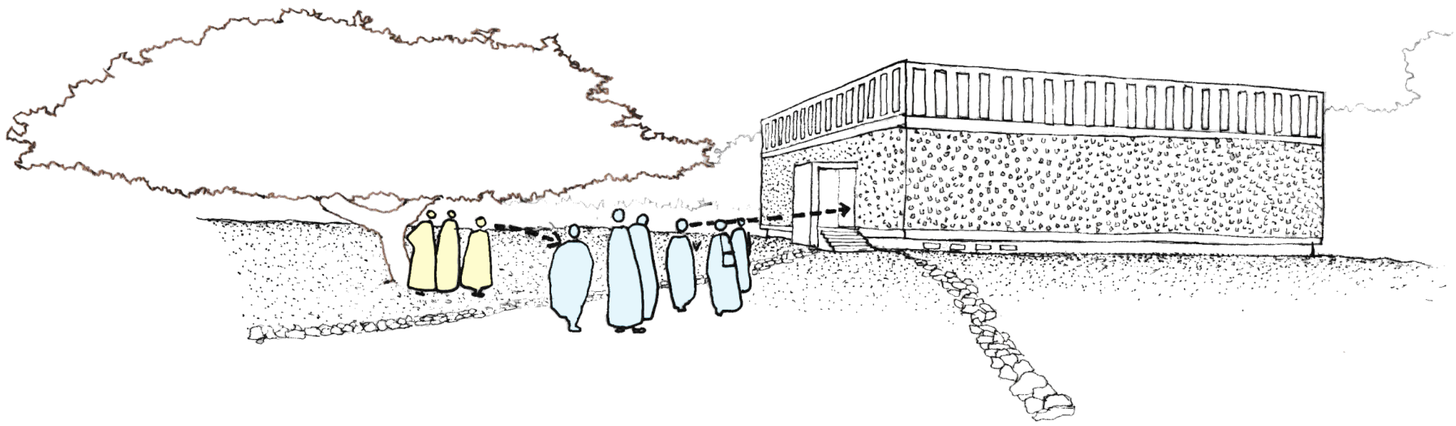
SHENYANG ARCHITECTURAL UNIVERSITY CAMPUS

Project Location: Shenyang city, China
Project Architect: Kongjian Yu
Project Informants: Agriculture Landscape





The design presents a part of a campus landscape proposal for a site that has a rich agricultural history as it lies on what used to be a rice field that brought the community together and was the pride of the people. The project had to be developed within stringent budgetary and time constraints challenging and limiting design.



Culture and Heritage

UNESCO - PROTECTED MERO ROYAL BATHS IN SUDAN

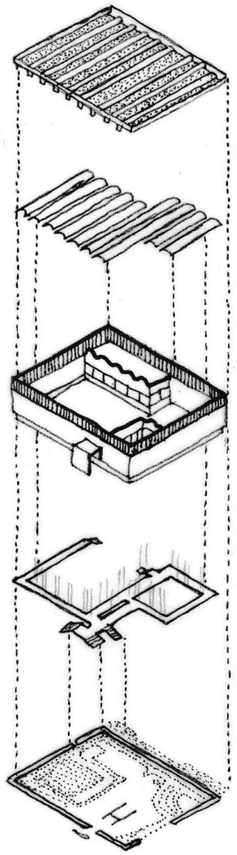
Project Location: Sudan
Project Architect: Kere Architecs
Project Informants: Historic

Long span double- envelope roof

Exterior and interior walls

Suspended walkway

Archaeological site

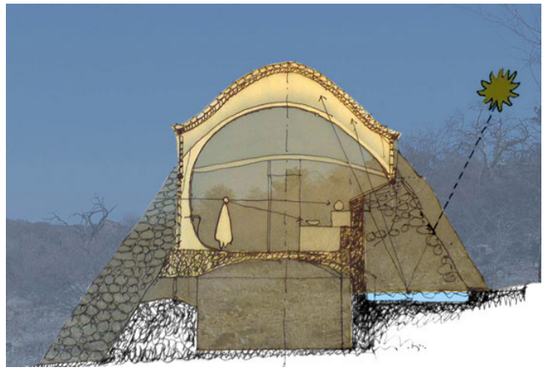


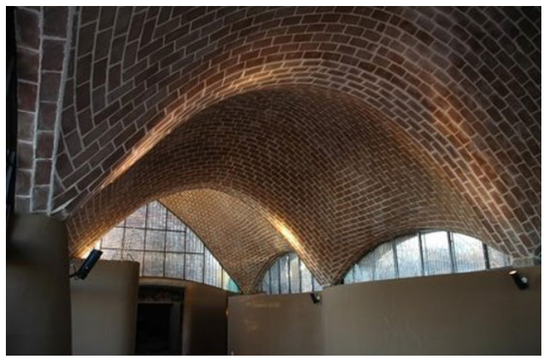
Kéré Architecture's proposal for a protective shelter preserves and celebrates the heritage of the site.

Climate Adaptation

MAPUNGUBWE INTERPRETATION CENTRE

Project Location: Limpompo
Project Architect: Peter Rich
Project Informants: Climate control

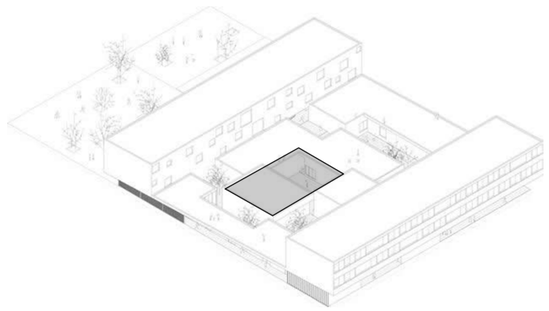


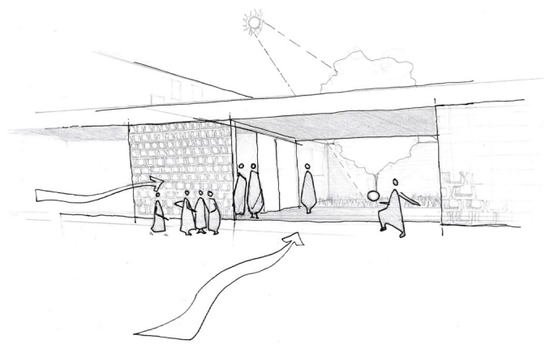


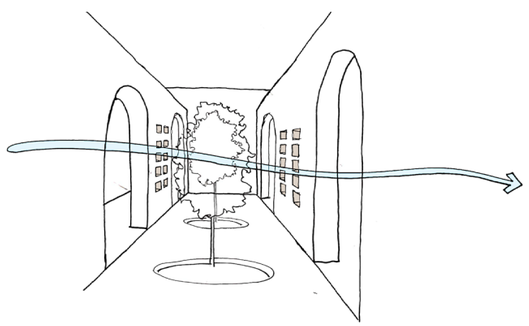
These slight shells have been covered over with local rock, which not only has an aesthetic function, but also provides thermal mass to militate against important diurnal temperature swings experienced in these arid conditions(Meuser 2021:456)

SHEIKH BOARDING SCHOOL: RA PROJECTS

Project Location: Somalia
Project Architect: R.J Projects
Project Informants: Climate control







The material is predominantly stained concrete to mimic the color of the region's soil

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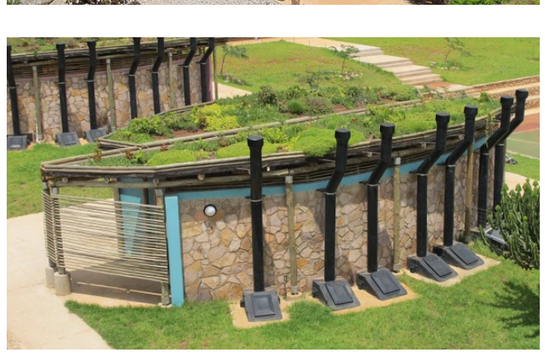
Local + Modern Material

VELE SECONDARY SCHOOL IN VHEMBE DISTRICT, LIMPOMPO

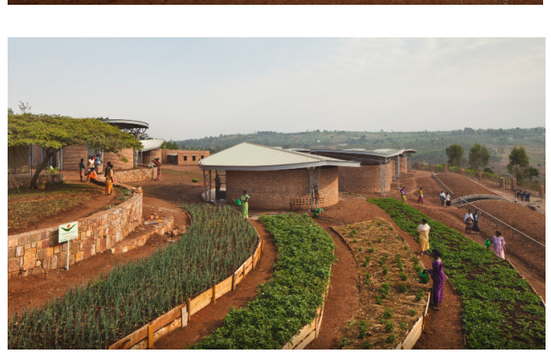
Project Location: Limpompo
Project Architect: East Coast Architects
Project Informants: Materiality



Since 2007 Vele has experienced transformation from a dilapidated rural learning facility into a pioneering South African community resource that firmly embeds learning and teaching in both its environmental and cultural heritage (East coast architects)

WOMEN'S OPPORTUNITY CENTER / SHARON DAVIS DESIGN

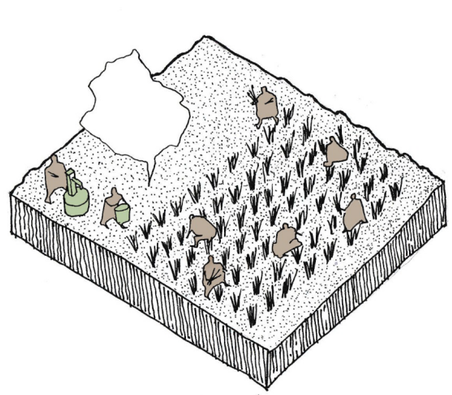
Project Location: Limpompo
Project Architect: Sharon Davis Design
Project Informants: Materiality

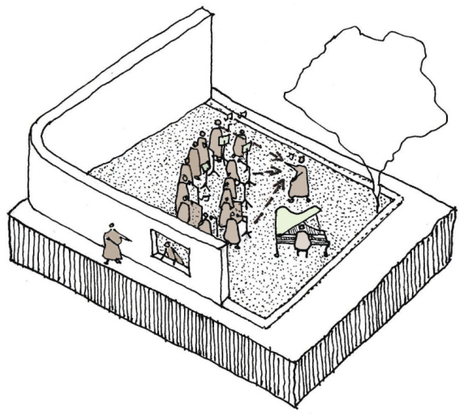


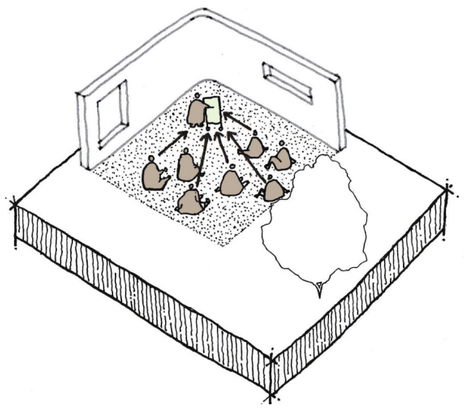
Two-hectare site in Rwanda, the most densely populated country in Africa, the Women's Opportunity Center is empowering one small community

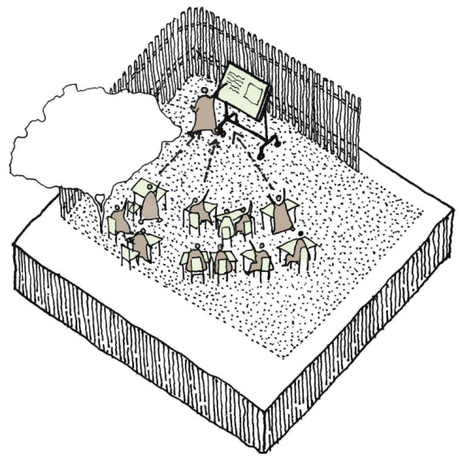
In this semi-rural setting, women dedicate their days to small subsistence farms, fetching fresh water, and scavenging wood for fuel.

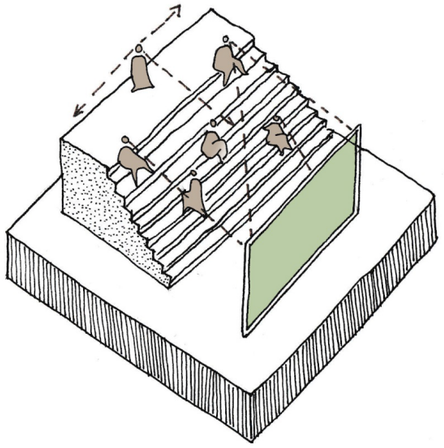
2.3 Urban Strategies

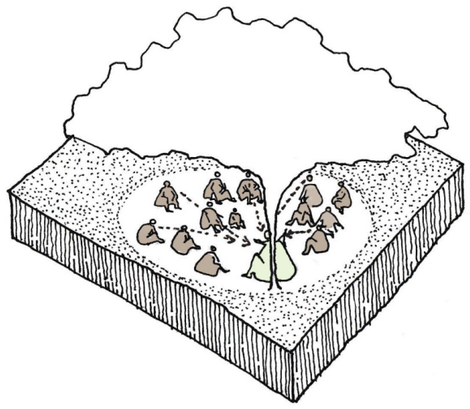












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2.4 Design Objectives

TO ENSURE A PRACTICAL DEVELOPMENT INFRASTRUCTURE THAT CONTRIBUTES TO ECONOMIC UPLIFTMENT AND GOOD QUALITY OF LIFE:

In order to achieve this first objective, the underlying urban structure should contribute positively towards the upliftment of the community by addressing both spatial and socio-economic needs.

TO ENSURE SAFE AND SECURE COMMUNITY SPACES THROUGH THE CREATION OF DECENTRALISED AND DIVERSE ECONOMIES:

When the majority of a community owns individual businesses rather that one individual owning an entire (enterprise) block, the possibility of negative activities such as vandalism or criminal undertakings can be reduced (Grace, 2019, p. 235). Optimising visual connections through a micro-grid structure can also improve passive surveillance by positioning windows, doors, and/or balconies along the street to serve as a public interface. Creating a cross programme could, furthermore, encourage a mix of complementary activities that might keep the street active both day and night. This approach, therefore, aims to improve the overall quality of the community and reduce perceptions of insecurity

TO CREATE EQUAL AND DIVERSE ENTREPRENEURIAL OPPORTUNITIES FOR LOCALS AS WELL AS REFUGEES RESIDING IN AND AROUND MPAKA:

The creation of adaptable spaces where start-up businesses can be developed can be achieved by providing convenient platforms to trade and integrate with refugees through the exchange of knowledge and skills. In this way, it may become possible to ensure that public facilities and amenities are adequately provided and accessible for current and future needs.

TO EASE ACCESS TO AMENITIES AND SOCIAL INFRASTRUCTURE FOR EVERYONE, INCLUDING THOSE WITH DISABILITIES:

In order to create a vibrant development framework, the urban conditions for the access of goods and services need to be well-facilitated through efficiency and convenience. Many layers of connectivity through a hierarchy of spatial connections between economic nodes can, thus, improve the levels of integration and permeability for pedestrian movement. As a means to understand the generators of movement, spaces that connect through existing pedestrian desired lines strategically programme the improvement of such linkages through enhanced landscaped sidewalks. Such improved links also promote healthy outdoor activities, such as cycling and jogging, that can take place along these corridors.

TO CREATE SYMBIOSIS BETWEEN PRIVATE AND PUBLIC SPACES AS WELL AS TO ENSURE POSITIVE INTERFACES BETWEEN AND ACROSS PUBLIC SPACES

The quality of public space is determined by how well-designed, articulate, and well-maintained these spaces are (Orrell,

2020, p. 23). In order to achieve such in the current project, it is necessary to allow local residents to take ownership of the interface between their backyards (i.e., their private spaces) and frontline businesses (i.e., public spaces). This interface has, thus, been configured to suit the functional relationship between private homes and the public street.

TO RESPECT HERITAGE PRACTICES THAT ARE OF CULTURAL SIGNIFICANCE:

A 'sense of place', as presented within the chosen location, is characterised by Swazi cultural identity and the traditional practices associated with the country's natural features. These qualities are important in introducing a design language for the built forms that respond to the local environment as well as for the cultural informants of the existing and future building styles and techniques adopted.

TO PROTECT AND ENHANCE NATURAL RESOURCES AND THE AREA'S BIODIVERSITY:

In order to create sustainable communities and a constant relationship between the natural environment and its built forms, it is necessary to ensure that a development responds according to the present natural ecosystems (e.g., through enhancing the quality of water and reducing waste and energy production) (Singh, Sinha, & Singh, 2014, p. 107). In respect to this current project, the buildings along the spine have, thus, been positioned in such a way as to respond to the area's current and naturally occurring environmental conditions, including wind patterns, sun paths, and drainage patterns. By taking such factors into account, it is possible to maximise comfort levels.

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2.5 Outcome: design concept

The type of density presented in this study will take years to build in the current location. However, this project still promotes the introduction of a catalyst that could demonstrate how a spine might integrate diverse spatial conditions based on agrarian urbanism and micro-economics, as derived from existing local activities. Through the continued layering of connectivity between nodes, start-up businesses may eventually become the main driver of the local economy, to a point where the area could even begin to attract international markets.

2.6 Theory and form generation

2.6.1 The Production of Space Henri Lefebvre

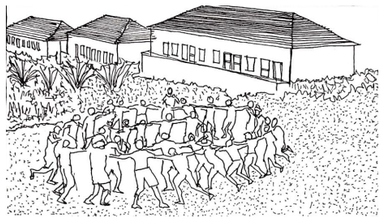
It is common practice in modern society to witness social and political upheaval, where looting and destruction of, for example, large warehouses and retail shops occur due to a vast majority of citizens not participating in the economy (Kumalo & Zwane, 2021, p. 1). Therefore, in order to establish 'right thinking' about the development of cities, Lefebvre (1991, p. 30) highlights the two 'circuits of capital'. The first circuit is the 'primary circuit of capital', which relates to the investment of money by capitalists into manmade materials and/or machines in order to produce goods that are sold to the market for profit. The second circuit, which is also economic, is the 'secondary circuit of capital', which focusses on investment in real estate and land for profit. Both these circuits are essential for the stability and rejuvenation of a city (Aghaei, 2020, pp. 33-48).

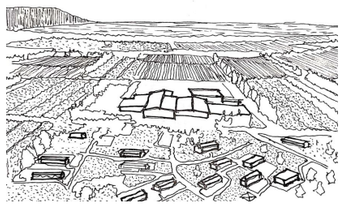
2.6.2 Jan Gehl Cities for People

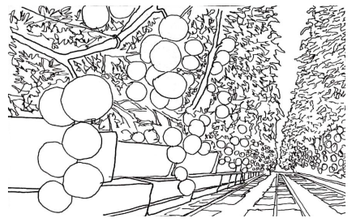
Gehl (2010, p. 33) states that the quality of outdoor spaces determines the quality of outdoor social activities. In general, people like to take shorter pathways to reach certain destinations (Matan, 2018, p. 386). Therefore, in respect to the current study, the Mpaka primary and secondary circulation routes have been created based on pedestrian 'desire lines' (Section 2.7.1: Zoning the Site). In order to create successful street edges, Gehl (2010, p. 129) further asserts that favourable walking conditions for lingering and which connect to social and economic destinations are important.

2.6.3 Kibbutz Community

The Kibbutz is a collection of 275 communities located throughout Israel that functions on what has appeared to be a rather successful self-reliance-based socialist ideology for the past 70 years (Harris, 2000). Kibbutzim establish their own business ventures, introduce technologies into their manufacturing processes, and invest in a variety of start-ups (Rebecca, 2020, p. 108). As a result, these communities are able to cover their members' municipal accounts, rent, and rates and taxes, all with free healthcare systems also being in place (Yinnon, Matalon, Goldman, & Antonovsky, 2007, p. 337). The Kibbutz economy, as a whole, has been found to account for 40% of Israel's agricultural output and 9% of the country's overall turnout (Cheng & Sun, 2015, pp. 160-175).







2.6.4 Kevin Lynch: The Image of the City

In his book, The Image of the City, Lynch (1960, pp. 46-48) alludes to five elements of a city, namely paths, edges, districts, nodes, and landmarks – all of which are discussed as follows:

PATHS:

These may be streets corridors, walkways, transit lines, or railroads that people use as channels to move from one destination to another while observing other elements of the city in relation to each other. Paths, thus, play an important role in any urban setting in respect to improving connectivity along economic nodes.

EDGES:

These serve as interfaces between two or more realms, such as public and private spaces. Edges also play an important role in terms of defining spatial hierarchies and the relationship between different elements of the city.

DISTRICTS:

Zoning in urban settings becomes an important factor in defining medium-to-large sections of a city. Districts, in particular, help in defining the character of a section within a city.

NODES:

These are strategic points located within a city that are allocated across reachable distances from each other, as understood by the observer. In concept, nodes have a specific relationship with paths, since junctions where nodes are located are typically formed by the convergence of paths.

LANDMARKS:

These include any defining elements found within a city, including objects, buildings, signs, stores, telephone towers, or even mountains. Landmarks are typically seen from many angles and are often defined as part of the historical identity of a place.

2.7 Spatial development framework

Figure 2.1 presents the Matsapha spatial development framework, which indicates land use and zoning, as a reference to assist in deriving the project's development framework. This framework has been structured in such a way as to enhance existing nodes by introducing a new programme. The suggested programme, in turn, aims to create a catalyst that, over time, might develop into a vibrant urban precinct. Therefore, Figure 2.3 highlights seven nodes proposed by the overall urban development project. However, it should be noted that for the purposes of this current study, the design development has been narrowed down to two nodes only, namely Node 1 (transportation) and Node 3 (educational).

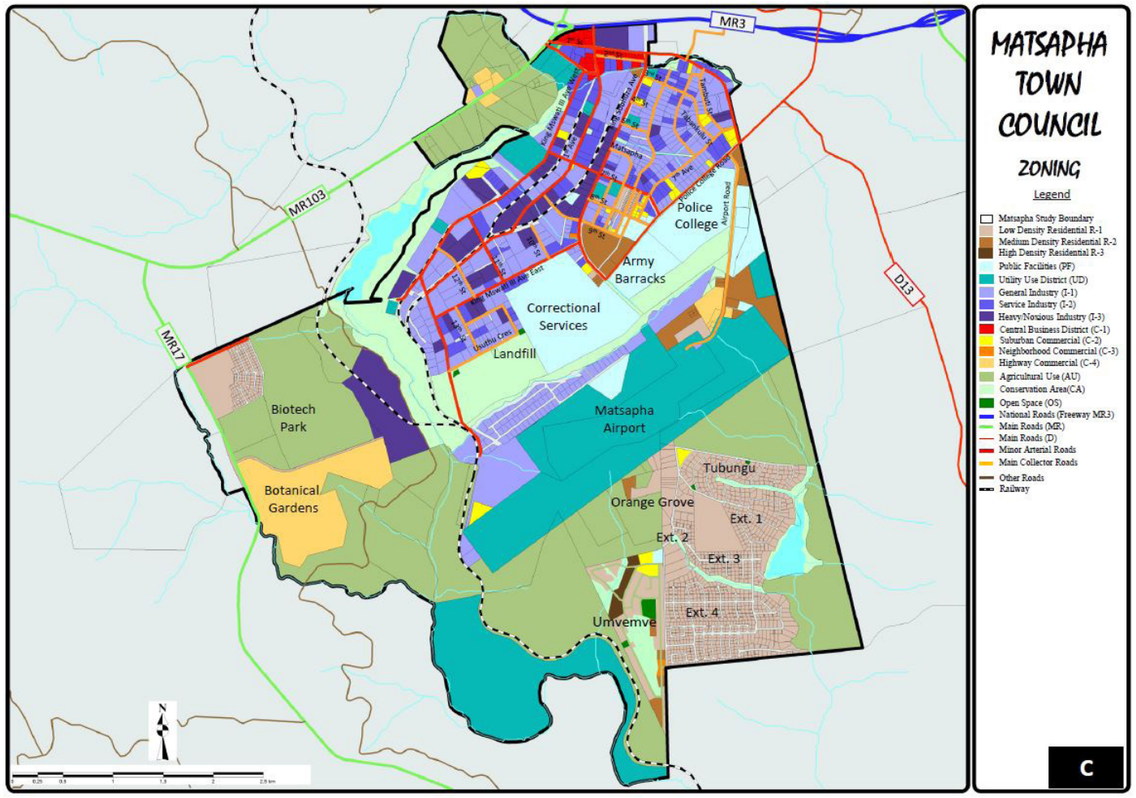


Figure 2.1: Nodes along Site (Matsapha Municipality, 2019, p. 130)

2.7.1 Zoning the site

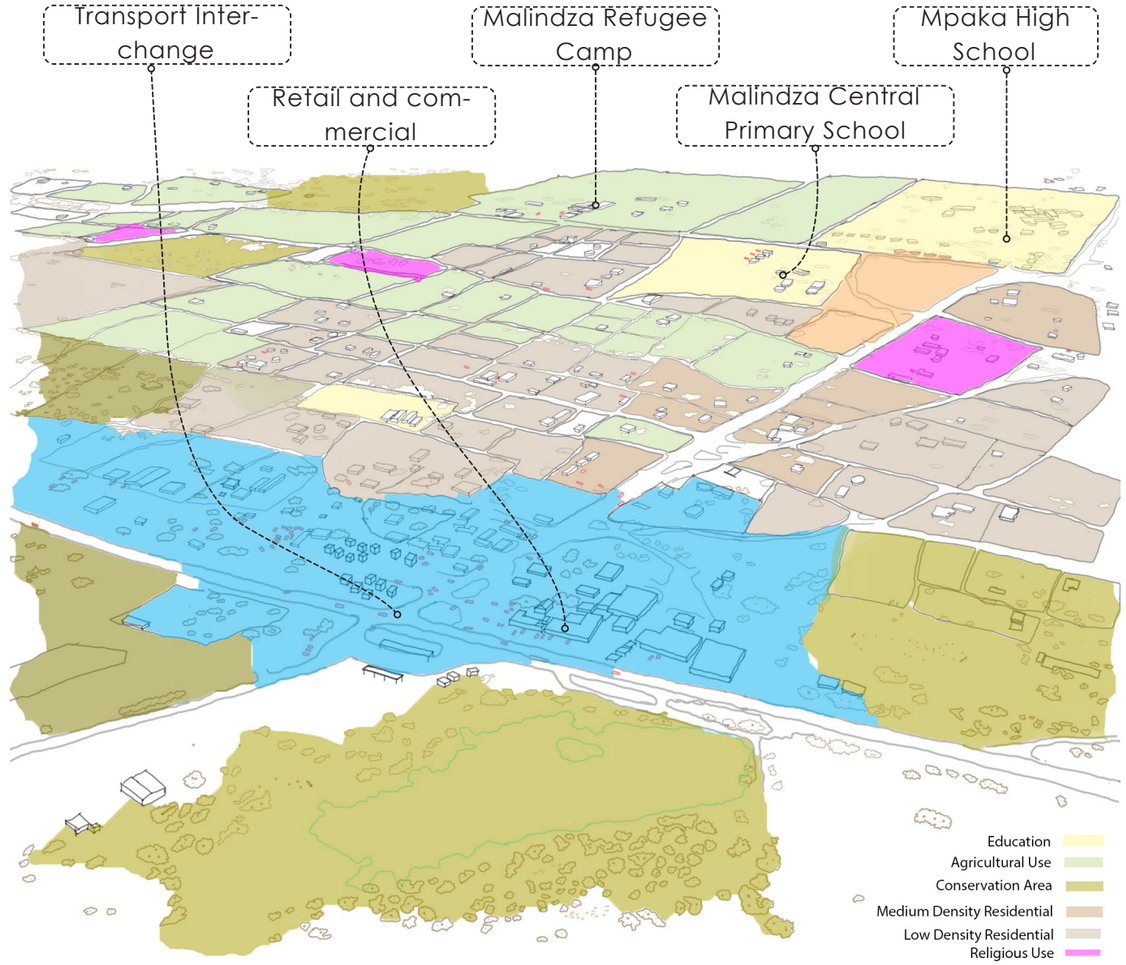


Figure 2.2: Anticipated Zoning

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2.7.2 Nodes proposed framework for Mpaka

2.7.2.1 NODE 1: TRANSPORTATION FACILITY HUB (EXISTING)

The first node serves as the main access to the site from the main MR3 highway intersection. This road connects the Manzini and Siteki cities. The interchange allows daily commuters from the city to change transport modes at this point and travel to peripheral destinations, such as the KM111 International Airport and the Emalahleni coal mines.

2.7.2.2 NODE 2: SOLAR FARMING FACILITY (PROPOSED)

In order to provide reliable electrical energy for both existing social services and new development transects, the current project proposes solar farming as a new programme. This approach could provide sustainable energy for the proposed irrigation facility of the agrarian precinct.

2.7.2.3 NODE 3: EDUCATION NODE (EXISTING)

This third node represents the central point that links the existing primary school, high school, refugee camp, and vocational school. At the centre of this node is a rainwater catchment that has been excavated to provide water for domestic animals. There is an opportunity present in this node to propose a (future) water-recycling plant for the precinct.

2.7.2.4 NODE 4: SMALL-SCALE INDUSTRIAL SITE (EXISTING)

The fourth node consists of an existing hardware shop, fuel station, and various retail shops. The node also links the presented route to the airport from the MR3 highway, which is situated 5km away from the site.

2.7.2.5 NODE 5: AGRARIAN SORTING AND DISTRIBUTION CENTRE (PROPOSED)

The fifth proposed node could be used for the sorting and distribution of agricultural produce from nearby farmland. Existing corridors could also be used to deliver produce along the spine, in a type of 'hatched region', where the linear markets are located. Furthermore, in between Nodes 1 and 3, there is a commercial and retail mixed-used section that includes housing and trading stalls, storage facilities, and a collection centre for agricultural products.

2.7.2.6 NODE 6: AMARULA PROCESSING PLANT (EXISTING)

The sixth note presents a future development proposal of a large-scale industrial site. The existing and functional cargo railway carrier could export goods from this site to the Matsapha industrial site located near Manzini as well as shuttle further exports into South Africa.

2.7.2.7 NODE 7: SOCIAL HOUSING AND BOARDING SCHOOL (PROPOSED)

Housing plays an important role in developing any economy, as people coming into an area to do businesses are always in need of accommodation. This presented project, thus, seeks to minimise expenses associated with individuals having to travel long distances in order to reach their places of accommodation.

2.7.2.8 FOCUS: NODES 1 AND 3

As noted previously, the aim of this framework is to develop an urban transect that enhances existing corridors that intersect along the spine. The design proposal, thus, attempts to demonstrate how the selected two nodes might be 'stitched' together. While the following demonstration highlights the overall development proposal, it should be noted that the design project focusses primarily on the agrarian precinct, which addresses three main aspects, namely agro-economy, health, and education. The study promises, therefore, to provide a solution for the community towards a sustainable economic development framework.

Figure 2.3: Seven Propose Nodes of the Development Framework

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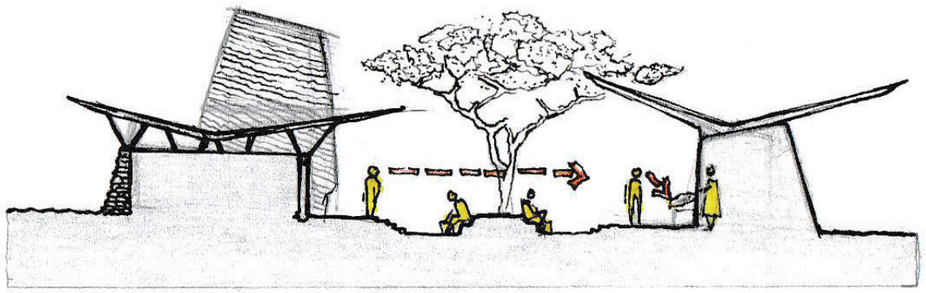
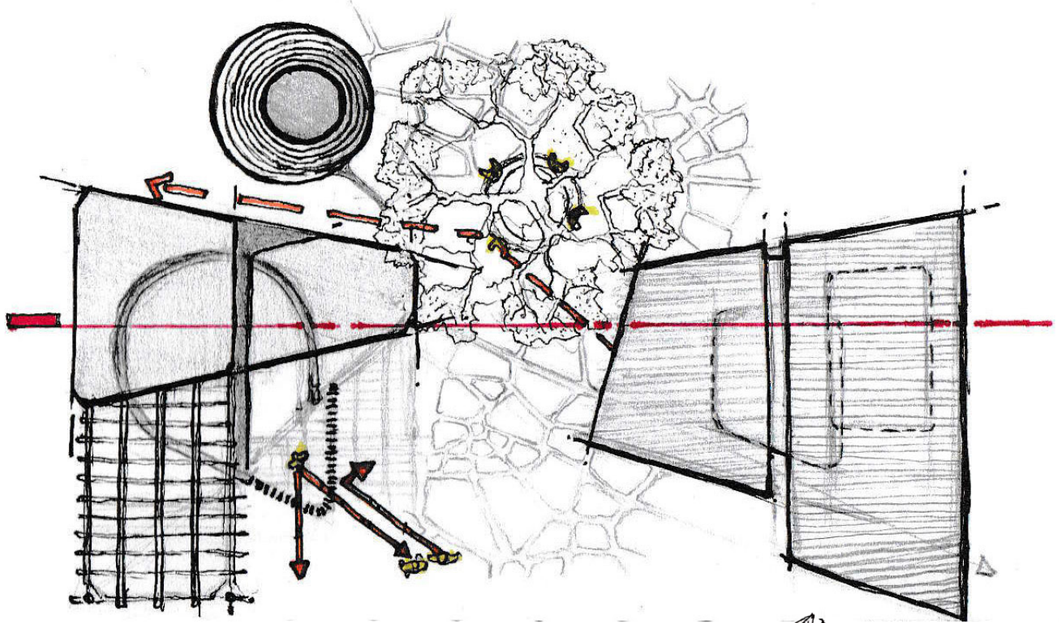
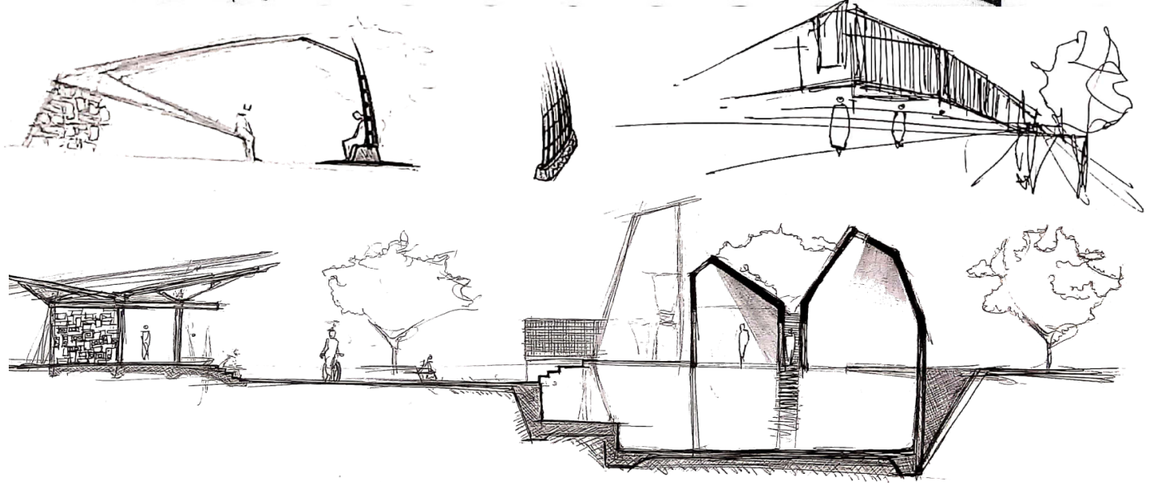
2.8 Concept Exploration







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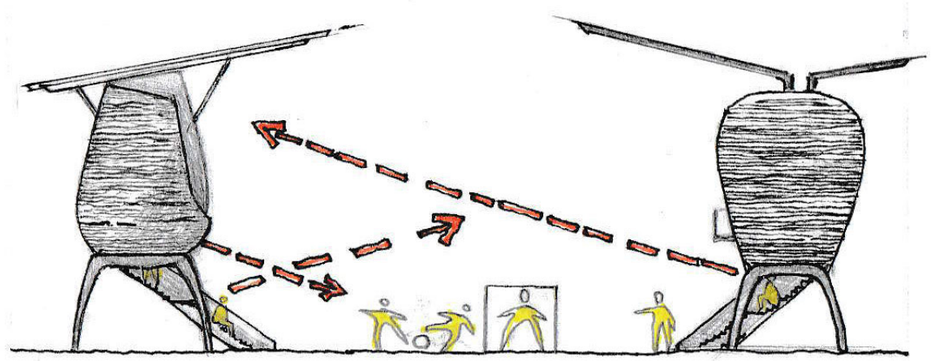
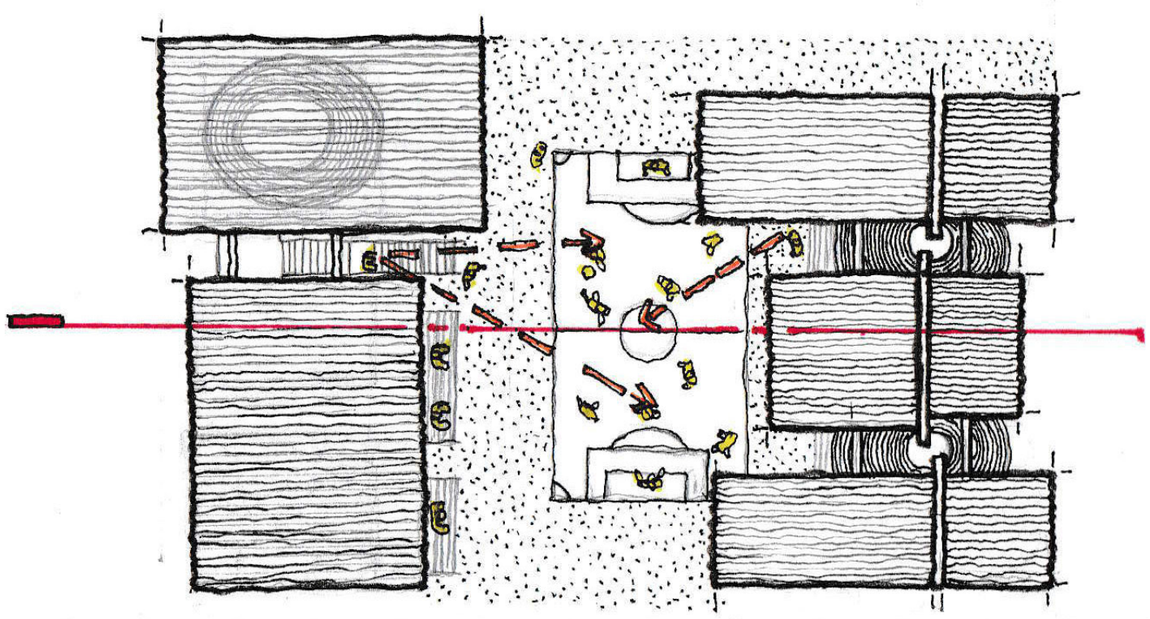
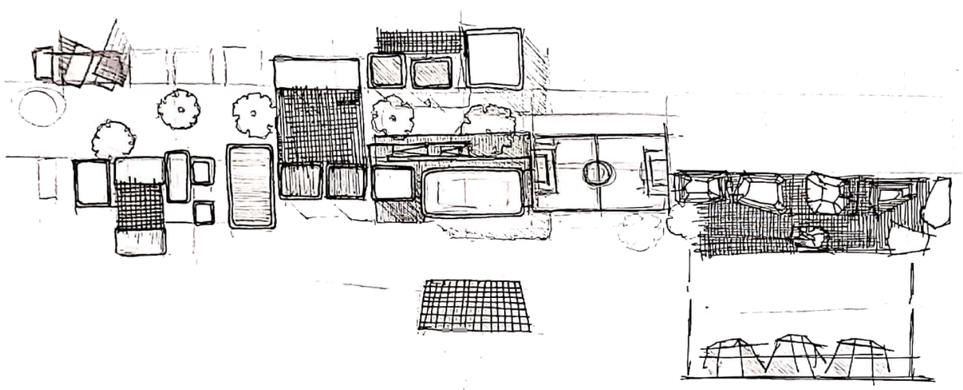
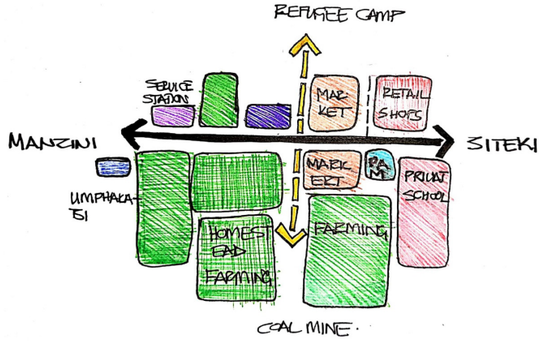
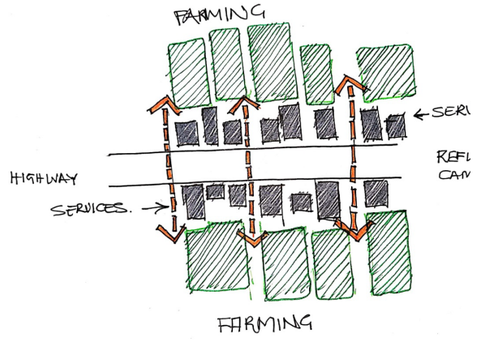






2.9 Model exploration





2.10 The Transect Strip Master plan

2.10.1 Urban development strategies (along node 1 and 3)

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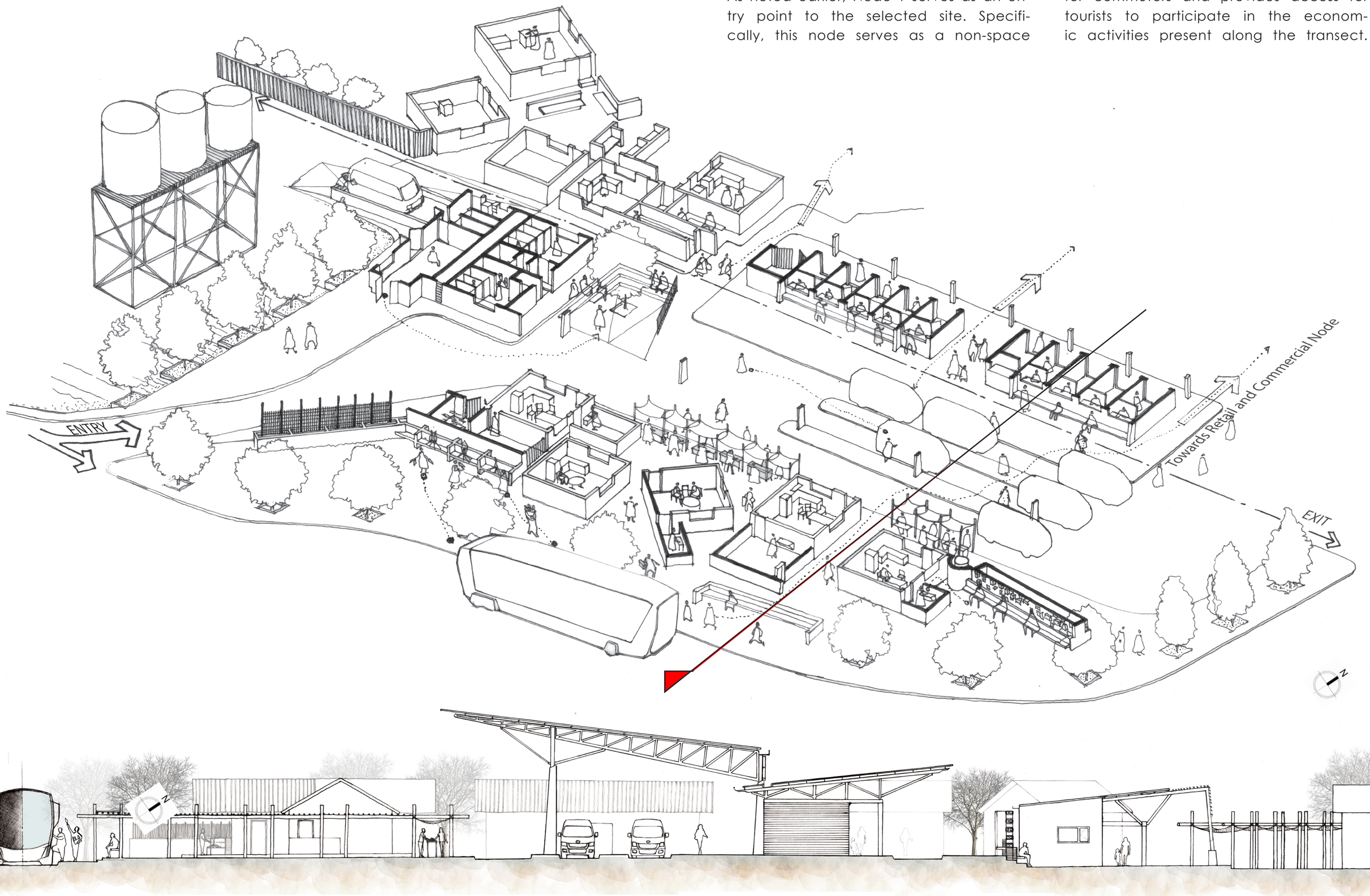
TRANSPORTATION FACILITY HUB:

As noted earlier, Node 1 serves as an entry point to the selected site. Specifically, this node serves as a non-space for commuters and provides access for tourists to participate in the economic activities present along the transect.



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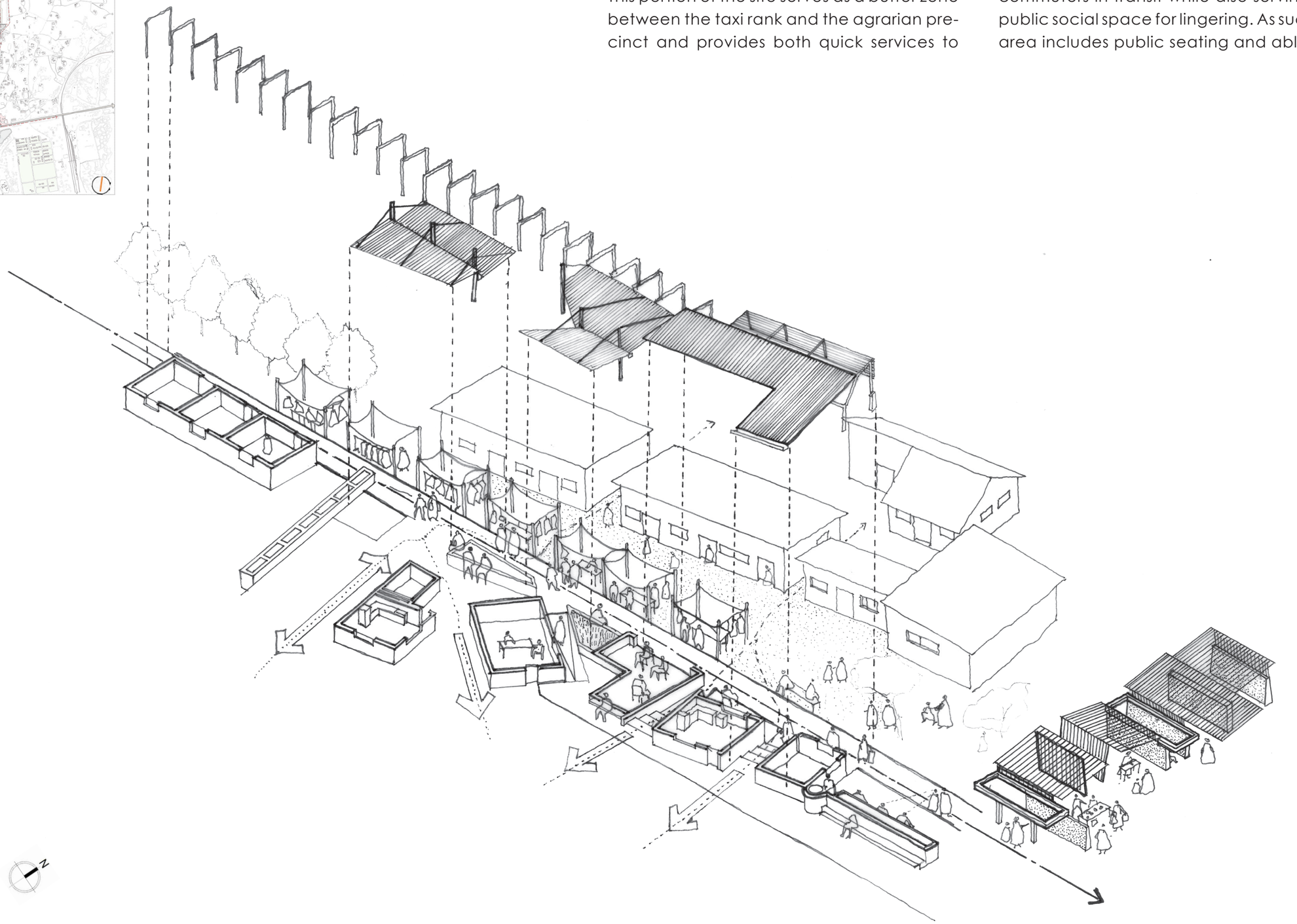
KEY

LOCATION

COMMERCIAL AND RETAIL ZONE:

This portion of the site serves as a buffer zone between the taxi rank and the agrarian precinct and provides both quick services to commuters in transit while also serving as a public social space for lingering. As such, this area includes public seating and ablutions.



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AGRARIAN PRECINCT

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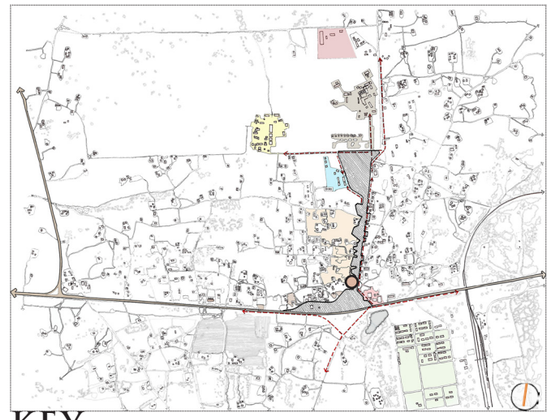
AGRARIAN PRECINCT:

This area forms the focus of the presented design project. Specifically, the agrarian precinct serves to present a 'mini-representation' of the entire transect by offering a mixed-use programme (detailed later in Section 2.11: Agrarian Precinct).



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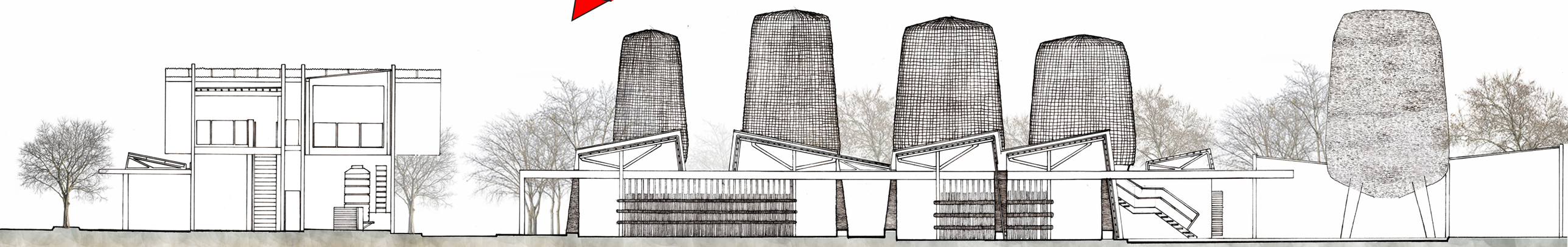
LOCATION



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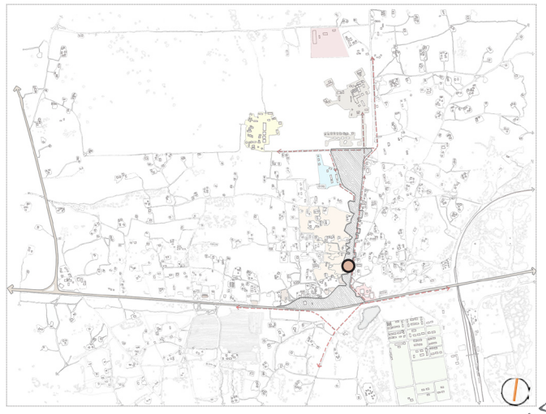
LOW-INCOME RESIDENTIAL AREA

This component provides medium-to-long-term accommodation for the purpose of catering to small-scale entrepreneurs who are looking to create start-up businesses in the area. The area is, thus, arranged in such a way that it activates the spine by encouraging pedestrianisation and, related thereto, passive surveillance.



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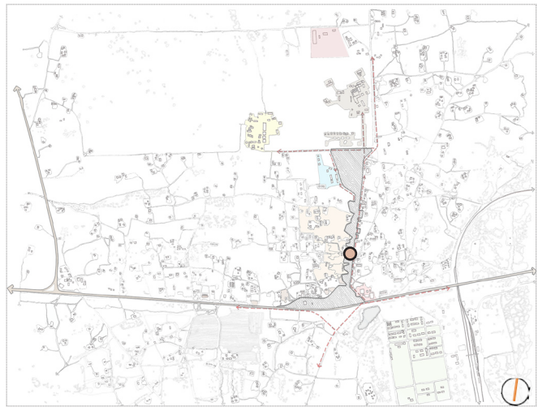
LOCATION

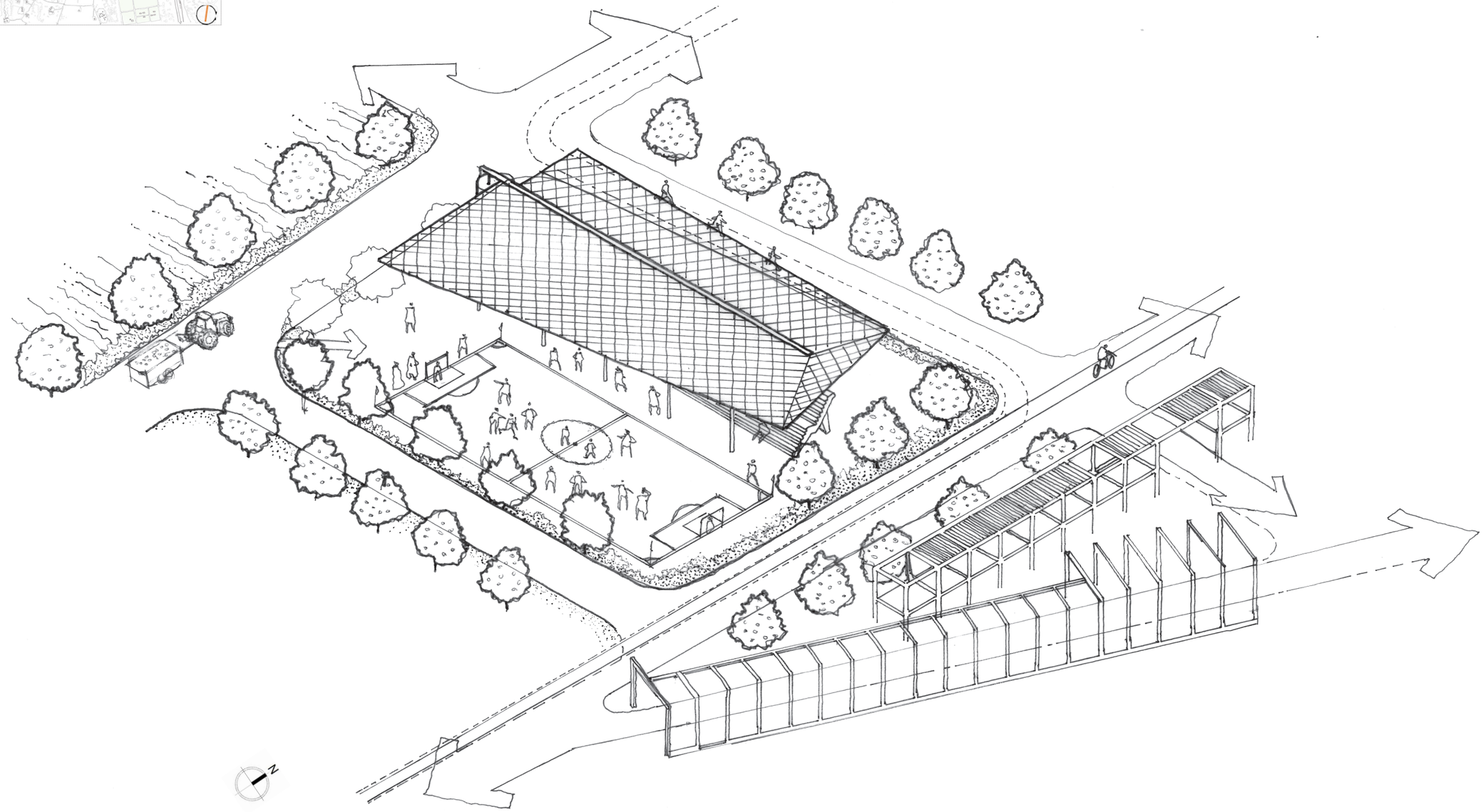


KEY

LOCATION

SPORTS AND RECREATION FACILITIES:

In response to the education node, this area serves as an extension of the available school facilities so as to enhance student learning. Its location also serves to create the passive surveillance of school children during the evening hours. Furthermore, various indigenous and fruit trees would be planted as anchor nodes along the corridors that link the refugee camp and the Malindza vocational school. These corridors would serve as spaces for physical transportation (e.g., jogging and cycling).



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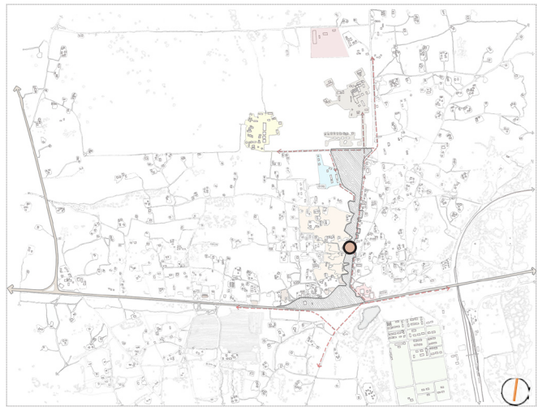

KEY

LOCATION

MID-TO-HIGH INCOME RESIDENCES:

As the development grows, both in terms of business and the creation of more jobs, the project perceives the need to provide a higher-level category of accommodation, which could assist in the stablisation of the economy

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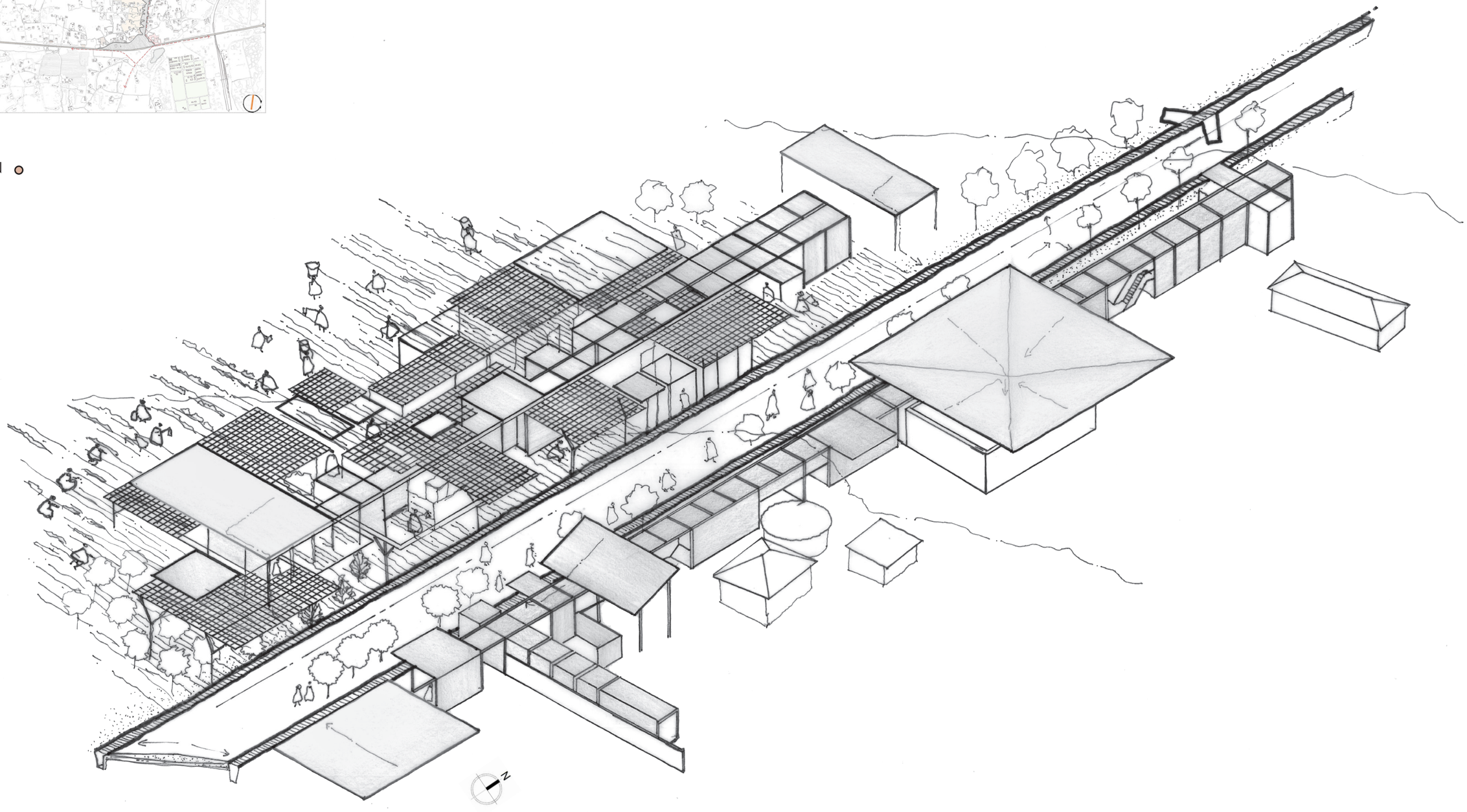
KEY

LOCATION

LARGE-SCALE FARMING:

The commercial farming area forms the 'backbone' of the transect by creating opportunities for the whole community to participate in the process of food production. The agrarian precinct, thus, demonstrates how the smaller farming endeavours could eventually be scaled up to a larger, more commercial scale.

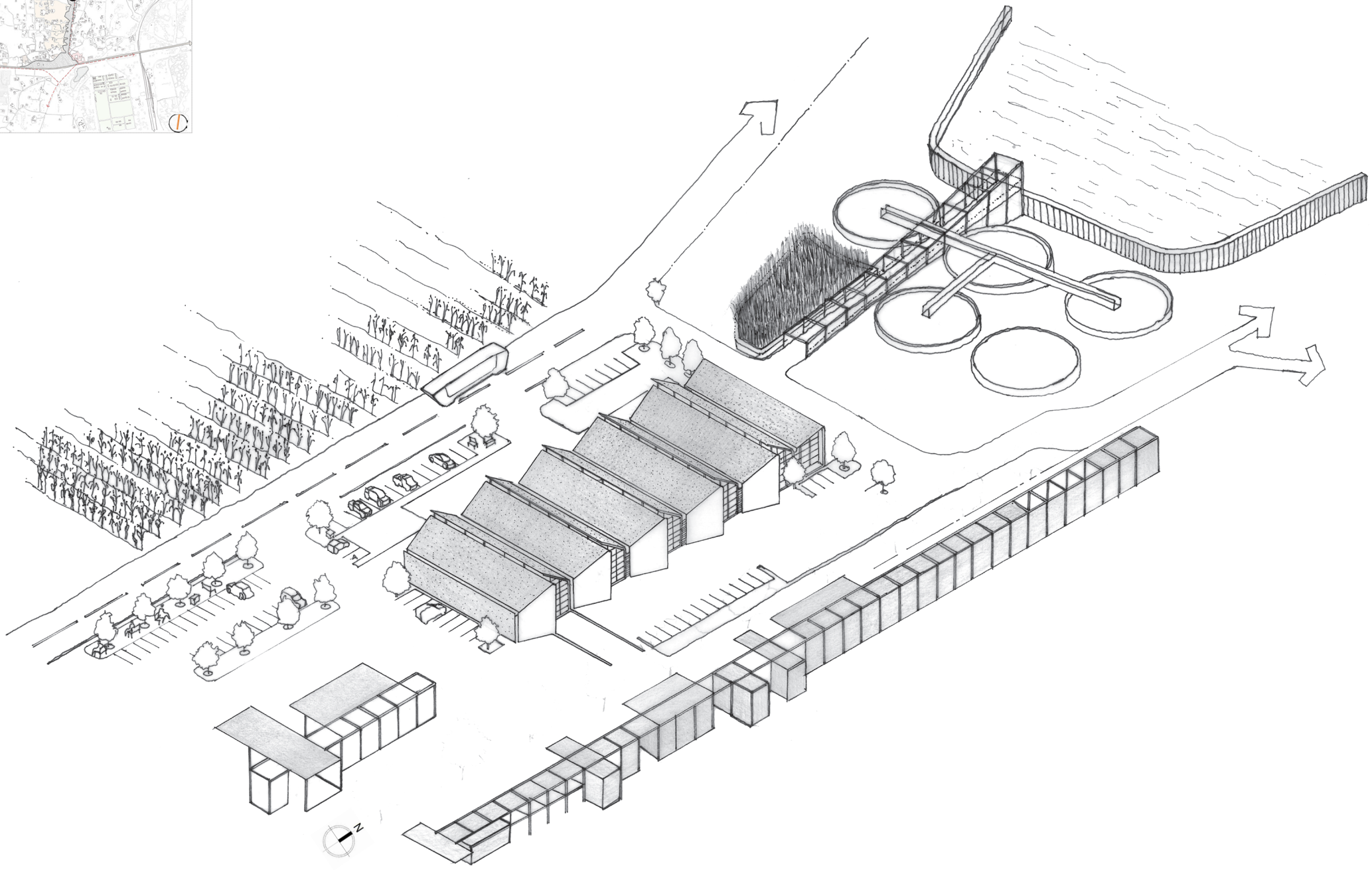


KEY

LOCATION

SMALL-SCALE INDUSTRIAL ZONE:

Water plays an important role in the successful running of this particular project. Therefore, a water recycling plant is necessary, not only to sustain the community but to provide enough water for irrigation.



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2.11 Agrarian Precinct

With specific focus on aspects directly related to the study at hand, the programme presented in the following subsections represents the core design principles.

2.11.1 EDUCATIONAL:

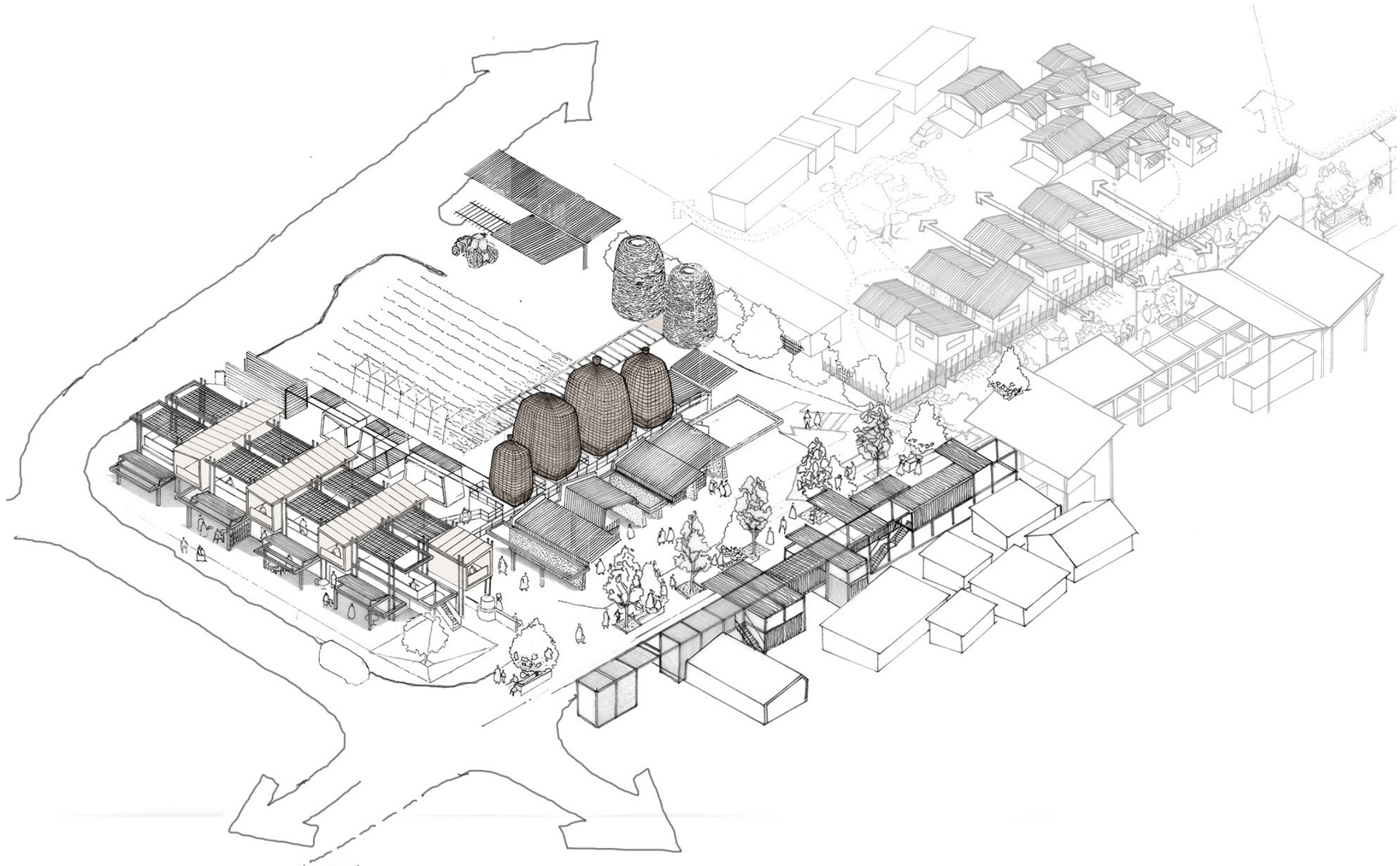
The educational aspect will not only focus on formal education but will attempt to address other forms of education, such as informal skills-education (e.g., the knitting of mats). The aim of this exercise is to expand skills knowledge through delegation, training, and the sharing of new skills. Functioning as a platform for qualified teachers and professionals from the nearby refugee camp, the sharing and exchange of knowledge skills with the local community through this hub becomes eminent.

2.11.2 AGRO-ECONOMY:

Through the development of the site's economy, local farmers could be educated about banking and financial strategies aimed at expanding their businesses. Such education could include details around loaning and investment strategies aimed at improving these farmers' economic potential. In order for development to occur, however, there must be some level of social capital as well as a relationship between individuals so that parties can build together (Coughenour & Swanson, 1988, p. 442) In other words, people must be able to connect with one another through the exchange of knowledge.

2.11.3 HEALTH:

The aspect of health in this instance focusses primarily on how traditional doctors can exercise their knowledge of indigenous plants that are available locally. Such knowledge extension could include educating the broader community by pro-



SITE PLAN ISOMETRIC

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In all, the aim of this programme is to ensure a sustainable agrarian practice that promotes and uplifts the economic status of the community in which this study has been conducted while still preserving and nurturing the natural environment and its existing ecosystems. Such an attempt includes producing high quality fruits and vegetables for both local and international consumption as well as developing a sustainable economy through agrarian urbanism. This project further provides environmental protection and the enhancement of the area's biodiversity. In addition, the project establishes a platform for local residents to create start-ups and other ventures into and across various business opportunities aimed at supporting agriculture. The understanding is, though, that the main driver of the economy would be agricultural in nature.

2.12 Accommodation schedule

AGRO-ECONOMY:

Water collection facility, water storage facility, plant nursery, bio-gas tank, artificial wetland, trading stalls, storage facility

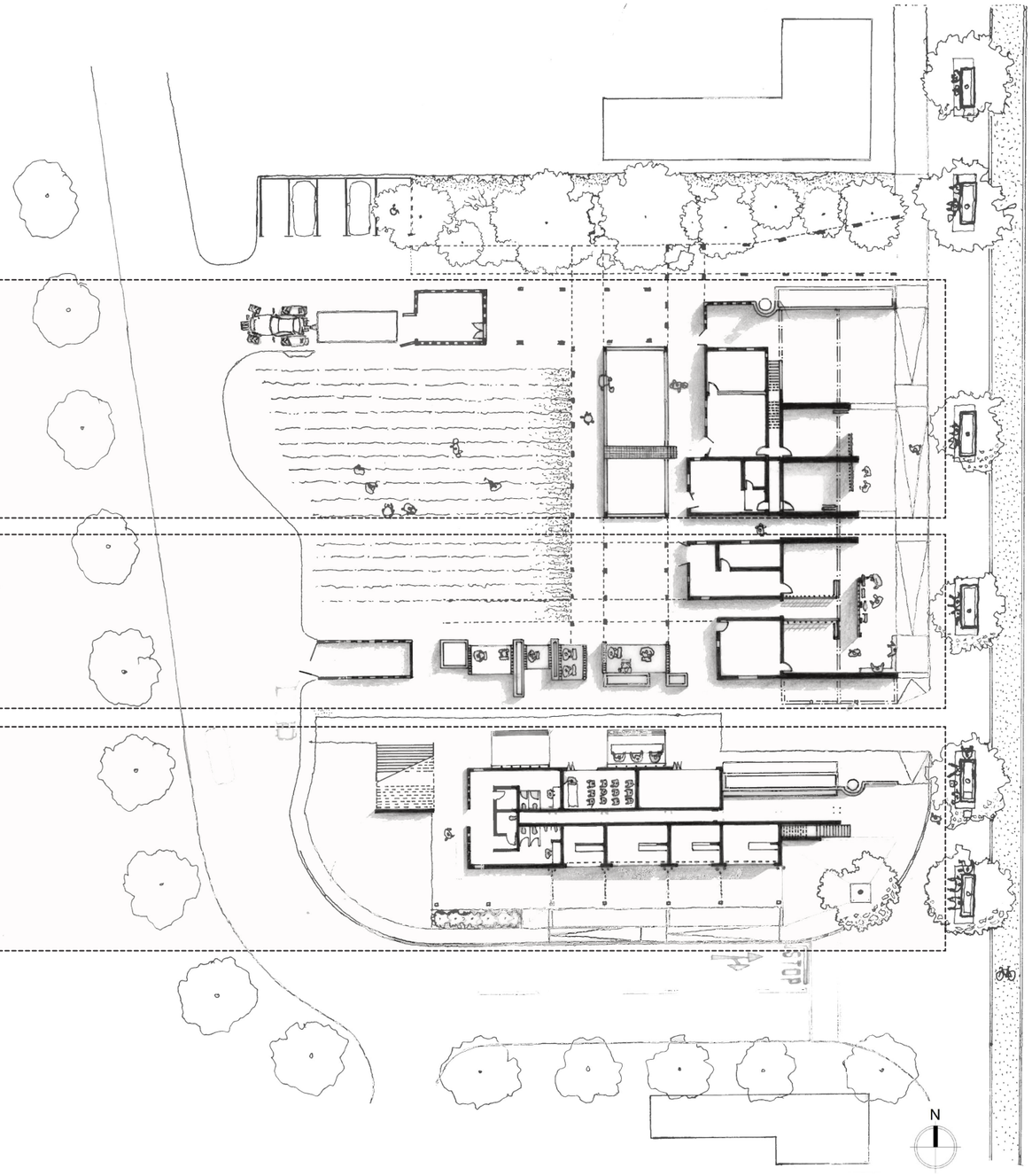
HEALTH FOOD PRODUCTION:

Traditional pharmacy, charity centre, cleaning and sorting unit, market stalls, planting indigenous trees along existing corridors

EDUCATION:

Animal skin and wood recycling, storage, hand skills training room, library, working cabins, temporal accommodation, public ablutions, cinema or alternative assembly hall, radio station, postal services

Ground Floor Plan



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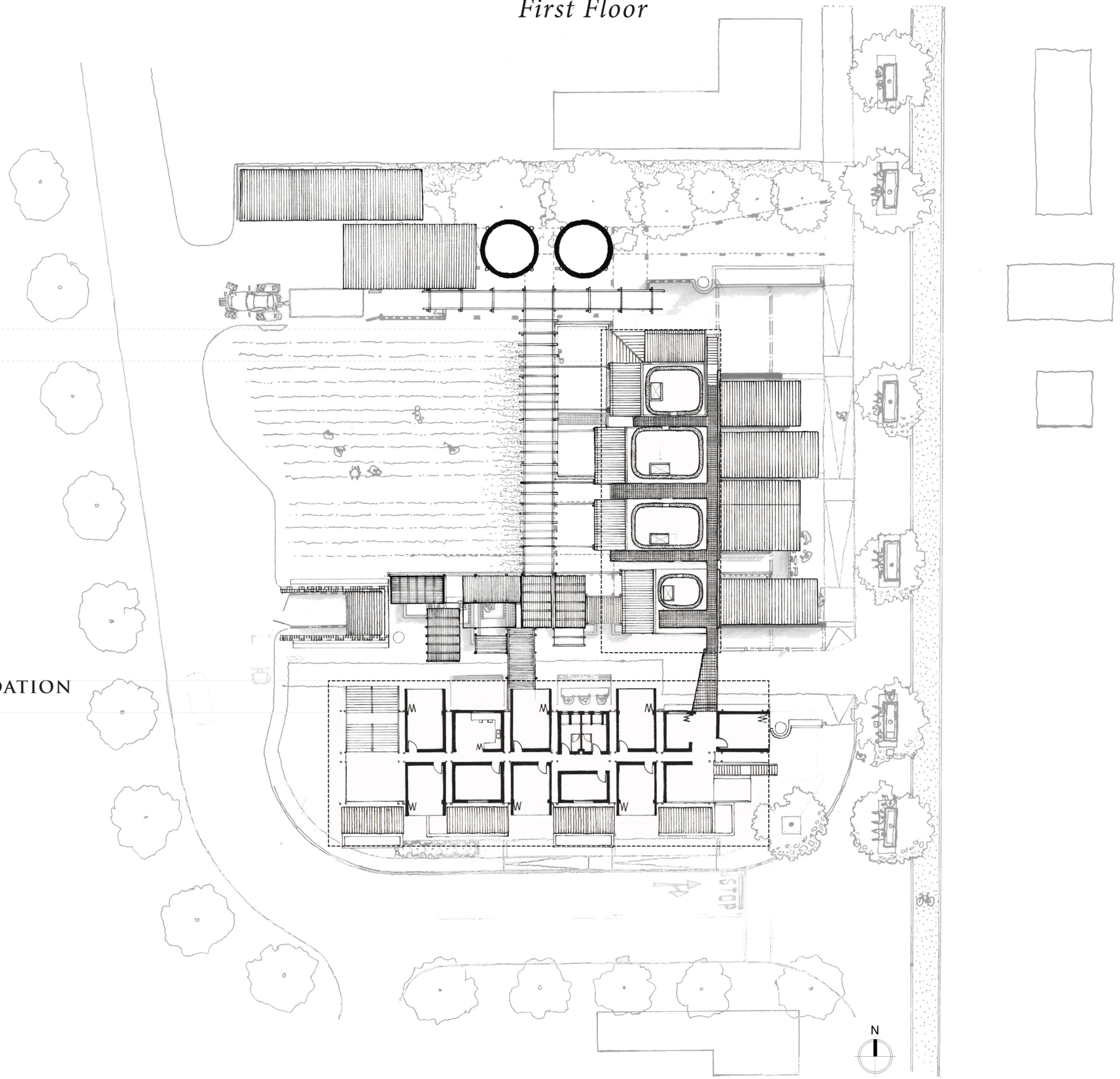
First Floor

GRAIN SILO

TEMPORARY ACCOMMODATION



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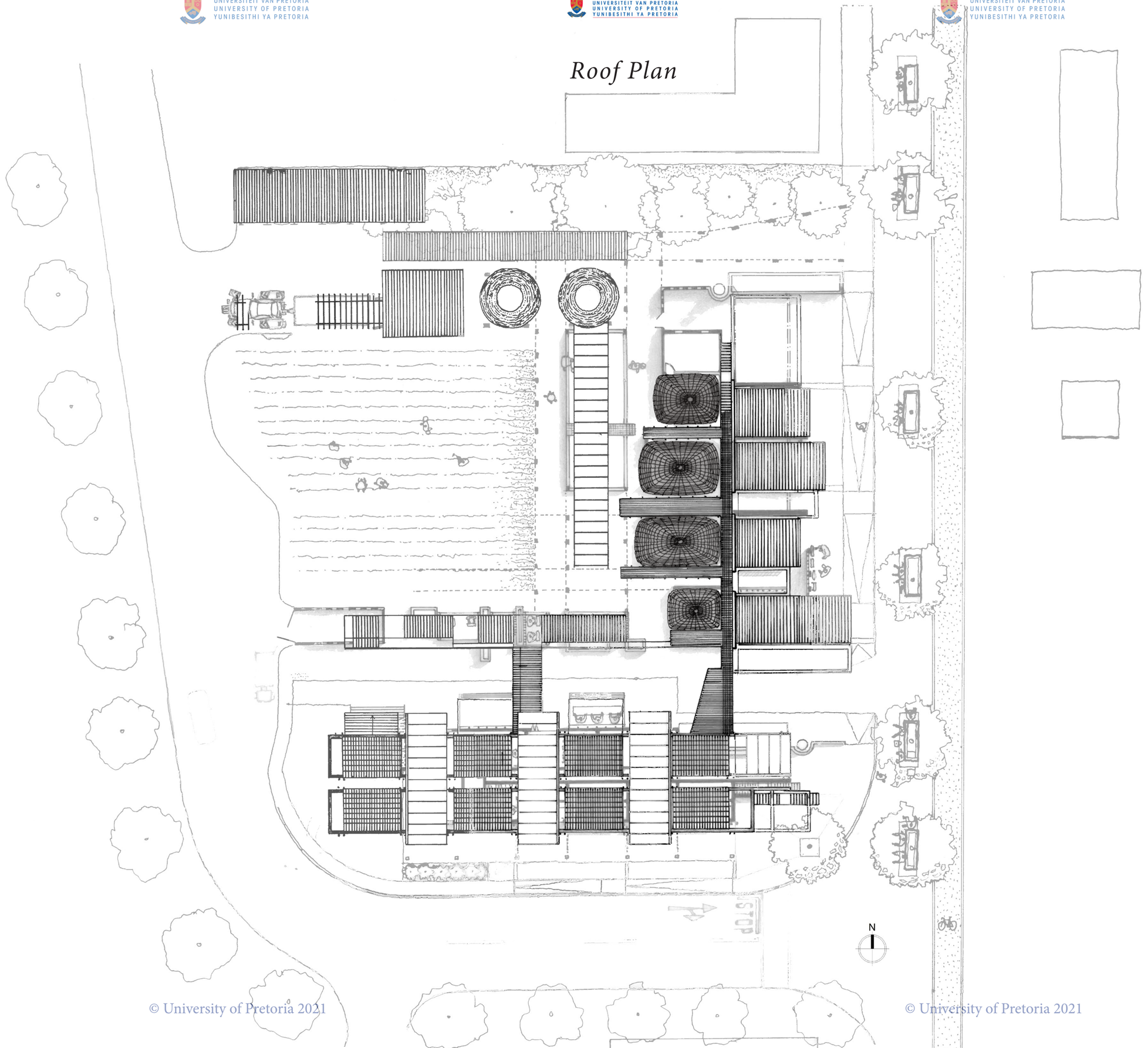
Roof Plan



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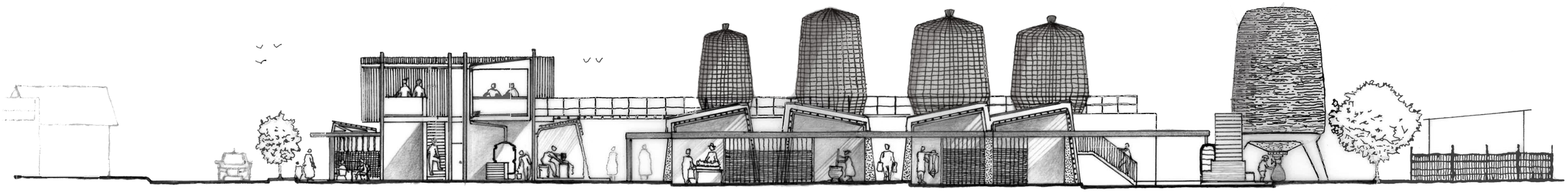
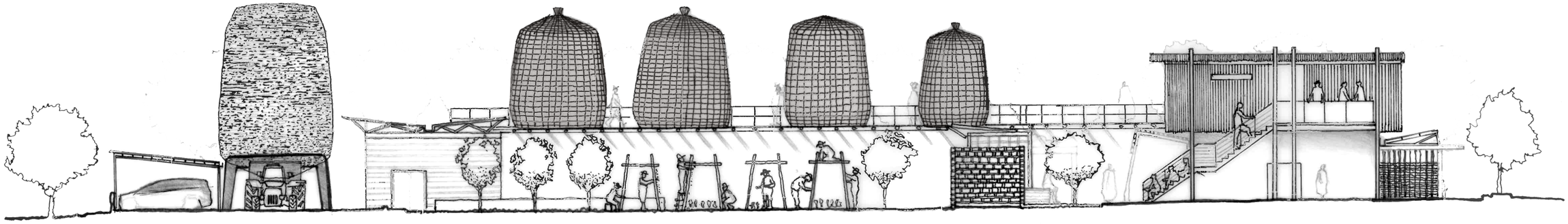
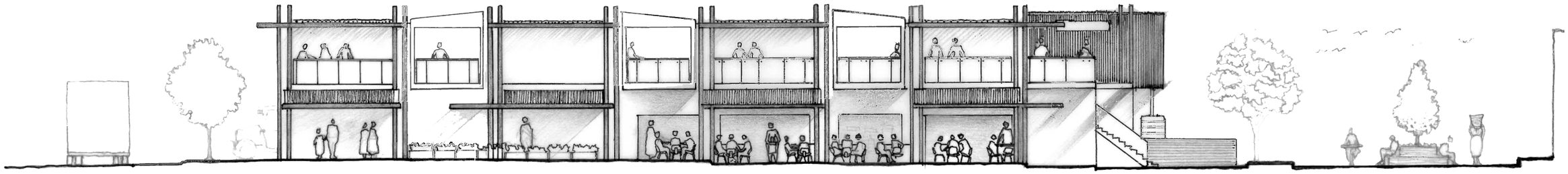
Elevations



EAST ELEVATION 1:100



WEST ELEVATION 1:100



SOUTH ELEVATION 1:100

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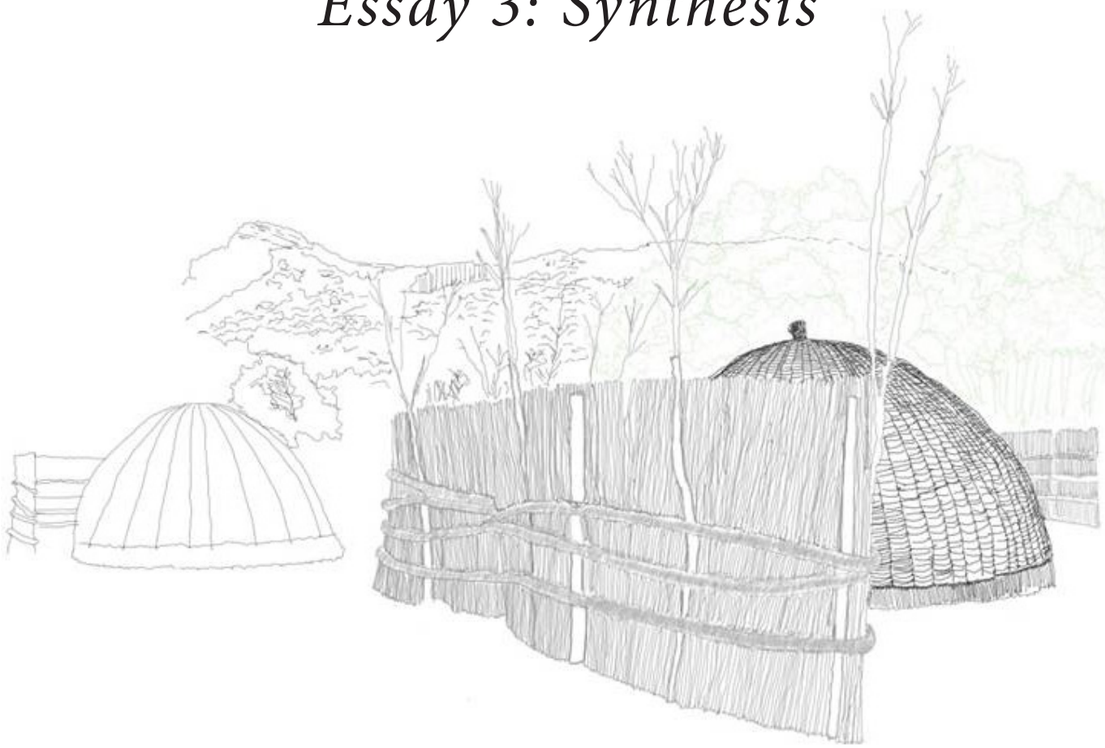
Essay 3: Synthesis



The following section explores the poetics of design and technology through an iterative process. In support of the previous two essays, critical design decisions are taken based on empirical and scientific evidence.

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Local vernacular as a main design language informant (Author 2021)

3.1 Contextual Analysis

3.1.1 Design Informants

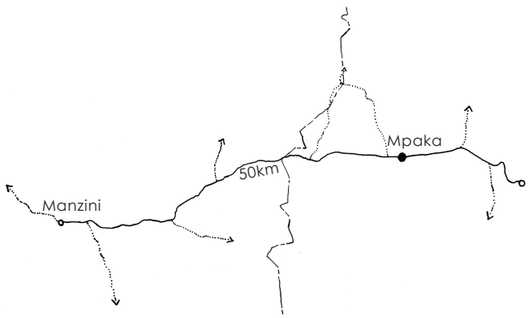

Figure 3.1: Distance between the site and major city

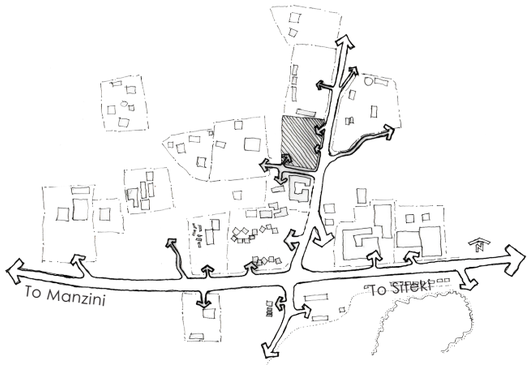

Figure 3.2: Agrarian Precinct location

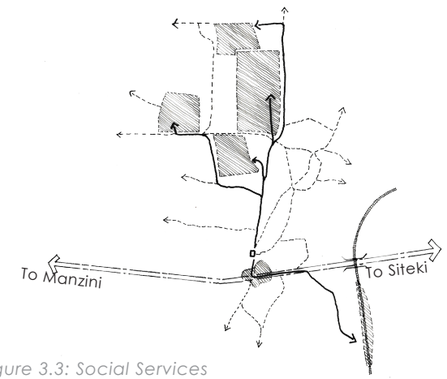

Figure 3.3: Social Services

SITE LOCATION:

The site is located next to the retail and commercial node, 155 metres (m) away from high traffic noise along the MR3 highway. Specifically, the chosen location is situated at an intersection between a new service road, located on the left-hand side, and the pedestrian boulevard on the right. As per the Matsapha Town Planning Scheme, the site's building line is set back 5m away from the road (Matsapha Municipality, 2019 , p. 82).

NEIGHBOURHOOD CONTEXT:

The location's immediate surroundings include a low-density residential zone with detached single-family dwellings on the northern side. These units provide accommodation for young entrepreneurs who intend to create start-ups on-site.

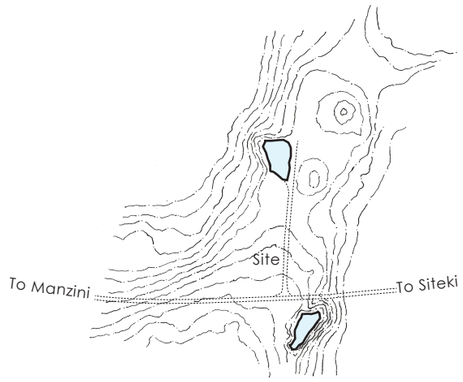

Figure 3.4: topography and two water bodies

SIZE AND ZONING:

The site covers a total area of 3 250m2 and is zoned for agricultural use; accessory buildings, offices, and structure ancillaries for commercial use are also permissible (Matsapha Municipality, 2019, p. 108). The building restriction is limited to 8m per storey (Matsapha Municipality, 2019, p. 115), with the currently presented building project having a maximum of two stories. The project's building is further provided with a maximum of five parking bays and a 50m2 on-street loading zone for delivery vehicles. This loading zone is required for the delivery of grain bags coming in from the maize fields. The presented taxi rank, in turn, caters for the additional parking of eight taxis per bay (City of Johannesburg, 2018 , p. 72).

LEGAL:

While the area is currently in the process of urbanisation, it still falls under the governance and leadership of Chief Ndlondlo and other inner-councilmembers, including the indvuna (governor), Sipho Cijwa Dlamini. The project will, therefore, have to abide by all traditional legalities before commencement (Dlamini, 2021 , p. 1).

NATURAL PHYSICAL FEATURE:

As indicated on the map in Figure 3.4, two existing water bodies provide drinking water for domestic animals. However, this water is currently unsuitable for human consumption. The map also shows 1m interval contour lines indicating the direction of the topographical slope that channels stormwater towards the retention dam for treatment.

MANMADE FEATURES:

The current street does not have any surface paving. Hence, the project intends to pave the street in order to maximise efficient rainwater collection.

CIRCULATION:

The current street is used as the main boulevard while a new service road will be constructed as part of the project in order to better access different areas of the transect. Furthermore, the main boulevard is pedestrian-oriented and has intersecting corridors that link to the main service road. These two streets intersect and lead to the main MR3 highway.

UTILITIES:

There are a limited number of public utilities in the area, including electricity supply and a telecom tower for cellphone connectivity. The project, thus, further introduces a water treatment plant at Node 3 that can supply fresh water for the development framework and which recycles wastewater for irrigation use. Its capacity is discussed further in Section 3.11: Services. For the purposes of the current discussion, however, it is sufficient to state that the installation takes place 2m underground with reinforced concrete stormwater service channels that run towards a water cistern.

SENSORY:

When initially mapping the site, it was discovered that during the weekend, the current market street becomes less busy and less noisy. There is also less traffic activity and fewer informal activities that take place. This lowering in 'busyness' over the weekend was found to be due to a lack of storage facilities, as vendors often have to transport their goods daily to sell on the market street.

SHUMAN AND CULTURAL:

Each homestead has at least one rondavel often roofed with thatch. This is because of the historic and cultural nature of the Swazi lifestyle, of building separate units according to their function. The sacred hut (Kagogo) for example, remains an important unit in each homestead (Malindzisa, 2021). In general, local materials and their technologies have the element of temporality. This is also revealed by national cultural practices such as the Umhlanga ceremony, which occurs annually. Maidens engage in a tradition of cutting reeds to revive 'emaguma' (huts) for the royal residents. This practice is not only limited to national cultural events but also practiced in rural communities, where thatched rondavel and adobe walled houses are constantly revived and maintained.

CLIMATE:

The climatic conditions of Mpaka indicate a maximum temperature of 30˚ C and a minimum of 20 ˚ between May and August. The graphs below indicate the average precipitation and north-south prevailing wind directions during the May and August month. These months have been selected to maximize the most effective design strategies of the project.

SITE WEAKNESS:

The site has a lack of public infrastructure such as the market area. It is not conducive for the community to conduct social and economic activities. As a result, people migrate to the cities leaving the area sparsely populated thus adding to the difficulty of providing efficient and integrated infrastructural systems such as water and electricity supply connections.

SITE STRENGTH:

the site has fertile land available for agrarian activities and open spaces for development. The site is adjacent to the MR3 highway which provides easy access to the KM111 International airport, an important entry point for tourists to visit the site. The site forms part of the circulation route to tourist destinations such as the Hlane nature reserve 7 km away from the site. The Mpaka railway also forms an important gate way that connects the site to Matsapha industrial site located in the Manzini region.

OPPORTUNITIES:

There is the opportunity to utilize the available land, animal, and human resources, through agrarian urbanism strategies, to boost the economic status of the community. Through NGO sponsorships, the build infrastructures can provide platforms for trading, educating, training, and empowering locals as well as asylum seekers at the refugee camp. Due to its geographic location, this framework has the potential to attract local and international markets.

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3. 2 Critical Questions to Derive the Development Framework

How can this proposal become a catalyst for developing a sustainable framework?

How will the infrastructure be maintained?

What policies are put in place to guide the development and protection of the infrastructure?

How will the locals and refugees in the area benefit from the development?

What is the hierarchy of services needed for the framework to attract tourist and international markets? (i.e., trading: market hub, education: indigenous knowledge skills training, arts & culture connectivity: taxi rank, radio station, Housing: residential development, recreational spaces, and parks, etc.)

3.3 Aim

To stitch the social and economic fragments together to enhance the lives of the local community.

To strengthen existing corridors that connect these strategic economic development nodes

To upgrade the transport facility hub that links the site to nearest cities and tourists destinations

To Integrate refugees and asylum seekers through the exchange of skills and knowledge and be part of the community

3.5 Technological Intentions

The following sections detail the investigation into the technical solutions present in this study, based on local and sustainable technologies, so as to create a sustainable agrarian development framework that responds to the socio-economic needs of Mpaka. The poetic intention of these solutions is to create a mediation where the permanent stereotomic and temporary tectonic architecture can meet.

Figure 3.1: Local vernacular (Author, 2021)

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3.6 Technological Responses

In respect to an aerial overview, the form and spatial arrangements of Mpaka seem to have appeared randomly; however, upon closer analysis of the socio-economic activities in this area, it is possible to see the meaning behind the seemingly organic spatial forms. Specially, this rural spatial context creates opportunities for establishing a dialogue between organic and orthogonal interfaces, where the relationship between local and modern technologies become more appreciated.

3.7 Structural System

Figure 3.2 shows the explored view of the transportation hub roofing system. The emphasis is on the three structural elements of the roof, the namely primary, secondary, and tertiary structures.

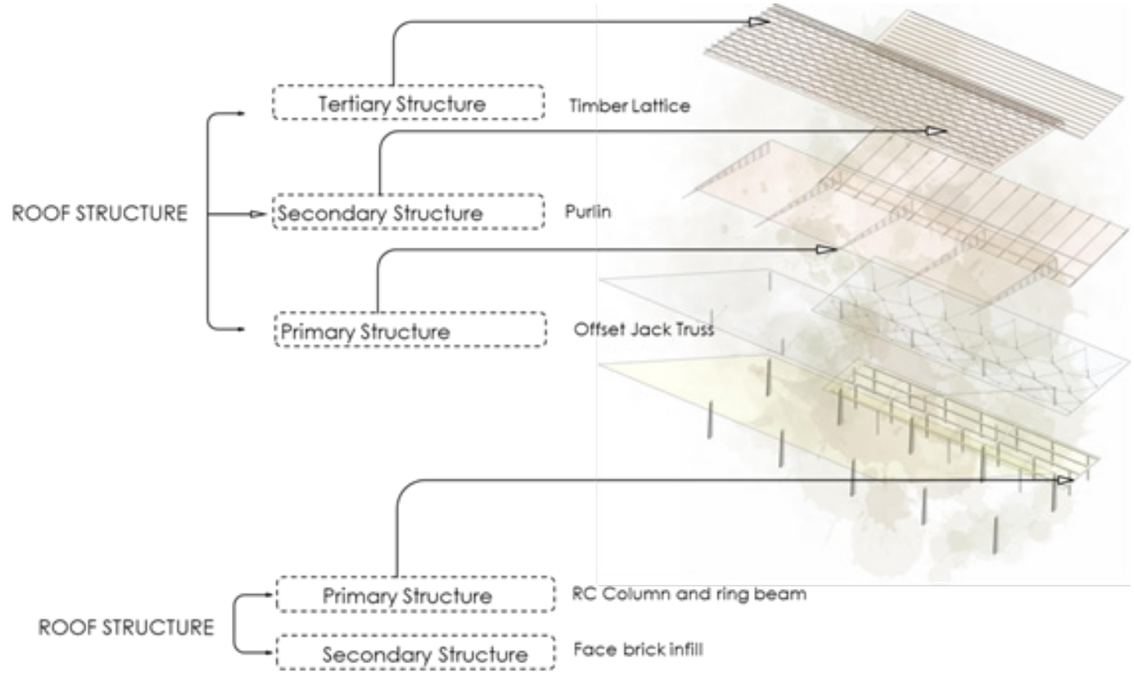

Figure 3.2: Primary, Secondary, and Tertiary Structure (Author, 2021)

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3.8 Structural Intentions

The taxi rank diagram presented in Figure 3.3 highlights the first concept of the project's structural intentions, namely to determine whether or not this principle could be applied in different iterations of the transect. These iterations focus on the wall (skin) and roof in terms of its primary, secondary, and tertiary structures.

3.8.1 SKIN:

The primary structure of the skin consists of a reinforced concrete column, along with a reinforced concrete ring beam, designed to act as tectonics in framing the trading market stalls. This technique allows the primary structure to be independent of the stereotomic face-brick, which acts as an infill.

3.8.2 ROOF:

The main structure of the taxi interchange is made of an offset jack truss, which allows for longer roof spans. The same principle applies to the butterfly steel struts covering the market stalls, which work to allow the roof sheeting to span longer distances. The secondary structure of the roof consists of purlins made of lightweight steel material. The tertiary structure, in turn, is made of local timber lattices that resemble local African patterns, as in line with Brown and Maudlin (2012, pp. 347-350).

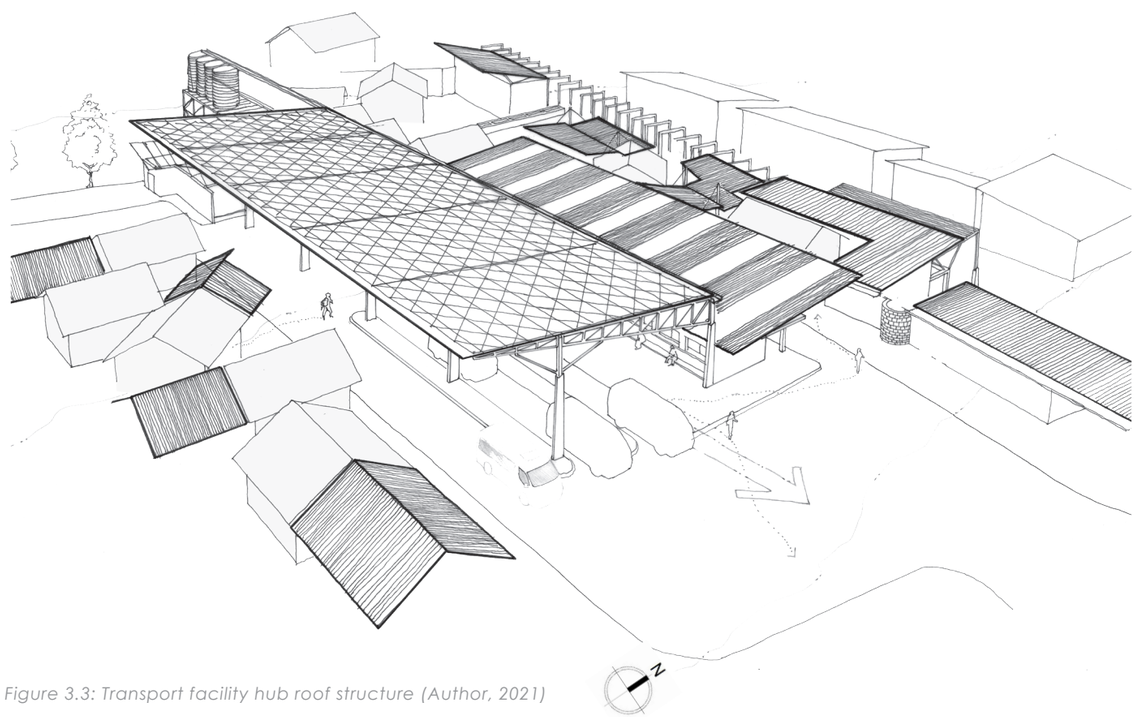


Figure 3.3: Transport facility hub roof structure (Author, 2021)

3.9 Materiality

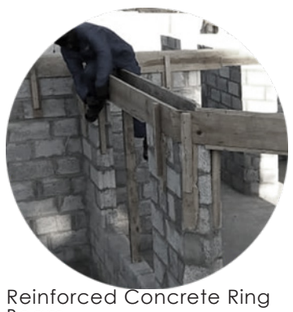
The use of local materials in a rural setting has always been a crucial factor in construction (Clifford, 2021, p. 58-63). This approach to building also involves a tactile method, where vernacular skills are transferred through gender socialisation in the preservation of cultural practices . The presented project, thus, aims to create a symbiosis between the temporary and permanent use of material in respect to specific parts of the urban transect.

The tectonics of the roof, for example, apply large roof overhangs that provide a permanent structure that allows for the temporary vernacular adobe wall to act as an infill in order to present a culturally expressive solution (CS Studio Architects, 1998, p. 1). Similarly, the large steel sheet overhangs protect the wearing out of the adobe wall against flood rains.

The agrarian precinct, furthermore, allows for the involvement of the project's contractors to collaborate with the local community in skill-sharing during project construction. This engagement can create a sense of authorship for the local user and may, thereby, foster a spirit to protect, maintain, and preserve these structures in the long run.

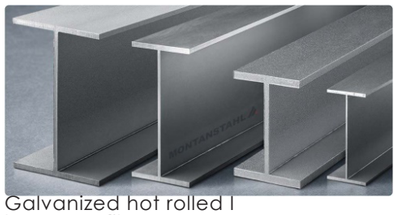

Clay Brick


Local produced hollow core concrete Blocks


Reinforced Concrete Ring Beam


Reeds and grass


Klip-lok 406 roof Sheeting


Galvanized hot rolled I beam profile


Adobe wall


Gum poles

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3.10 Sustainability – The Environmental System

There are a number of aspects to consider in respect to sustainability:

PASSIVE DESIGN:

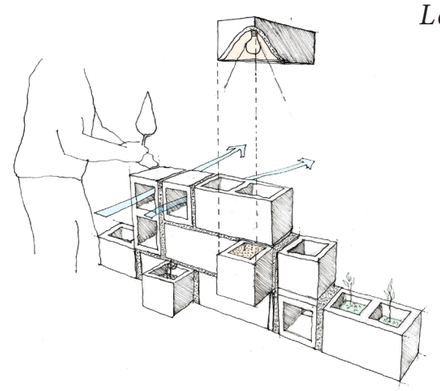
The design intentions are to limit the use of mechanical ventilation and, by association, limit maintenance costs. This is done through the playful use of local air bricks that allow the building skin to breathe during the hot summer season.

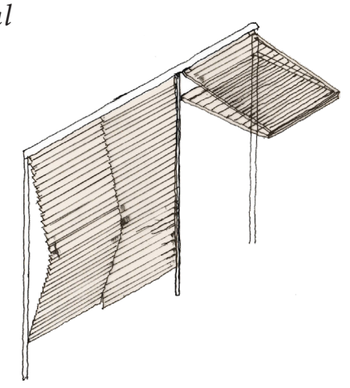
MATERIAL USE:

The project uses thatched roofing to insulate the grain and water storage facilities. This strategy is used to more creatively reduce energy consumption.

SERVICES:

The water storage facility is positioned in such a way as to allow water to flow through potential energy so as to reduce electrical and mechanical costs.


Local Material



Precedent Study


Seed bank: Local used concrete block by Paragon architects


Local vernacular

3.11 Systems

3.11.1 WATER

Due to the aforementioned lack of infrastructure, such as municipal water supply systems, the people of Mpaka tend to practice water conservation through means of rainwater harvesting, with the use of water tanks (Eslamian, 2021, p. 21). However, this water is never enough to support sustainable agrarian activities, as rainwater and streams remain the only source of water supply. The project, therefore, embarks on a process of creating sustainable water supply systems. The existing and complimentary light infrastructure are also further supplemented with rain storage tanks in order to collect water from smaller rooftops.

3.11.2 WATER SUPPLY

Agrarian urbanism requires an intensive water supply. As such, the 1km long spine connecting Nodes 1 and 3, according to the development framework, is paved with asphalt and recycled plastic material to allow efficient flow of stormwater. This flow follows the topographic slope towards the water catchment, as indicated in Figure 3.4. It should be noted that the benefits of rainwater harvesting involve commercial as well as domestic use, such as cleaning, cooking, and irrigation (Lancaster, 2010, p. 122).

3.11.3 WATER SUPPLY AND THE ECOSYSTEM

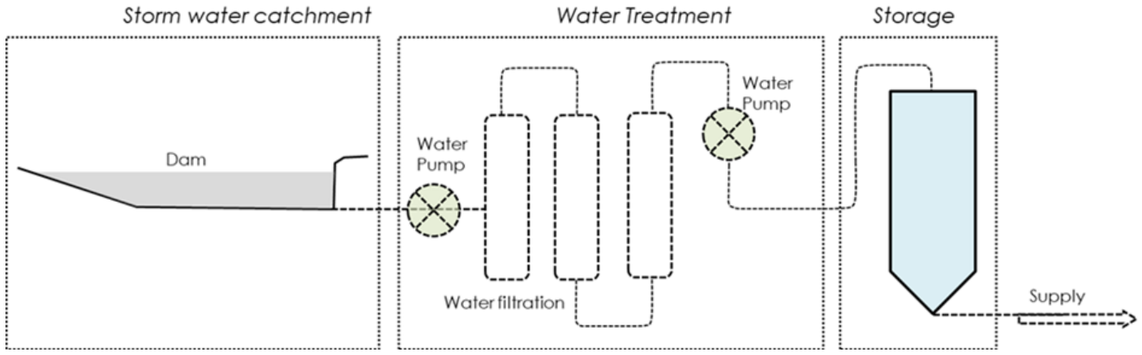
In times of changing weather patterns and unpredictable rainfall, water becomes a precious resource (Aleksandra, 2021, p. 713). Therefore, it is necessary for this design concept to indicate how water can be collected, purified, and stored. To that end, the existing topography, together with its habitat, is handled more conservatively so as to allow for the effective collection of wastewater for purification and irrigation purposes. A water management system also forms part of the programme in order to build strategic water catchment channels that collect the stormwater that supplies the farming endeavours.

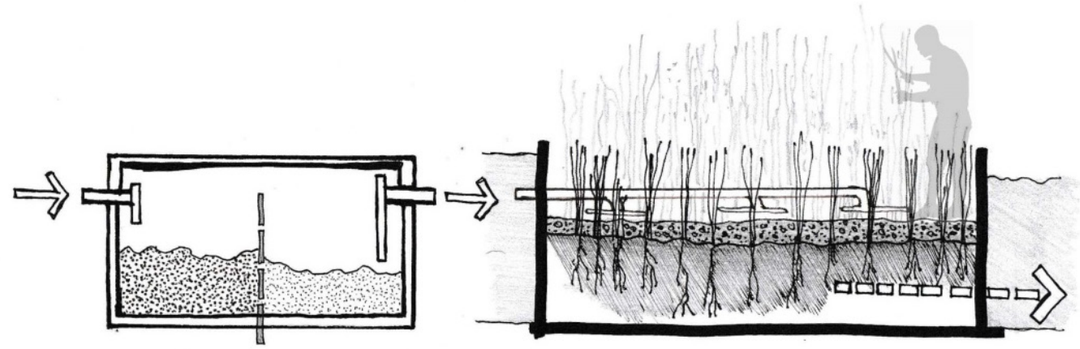
3.11.4 WASTE MANAGEMENT POLICY

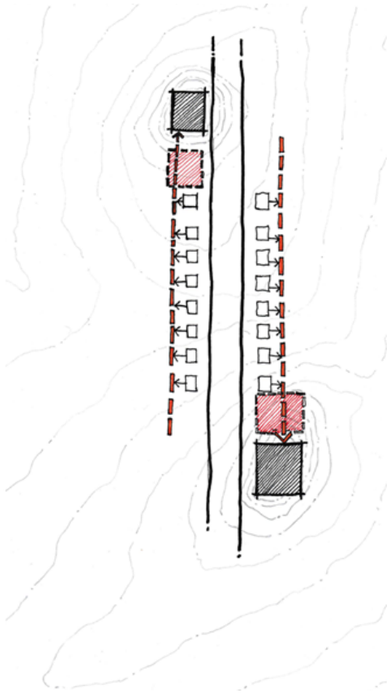
Policies are put in place to ensure that the aspects of water and waste management are effectively implemented and to protect the natural environment and its biodiversity.

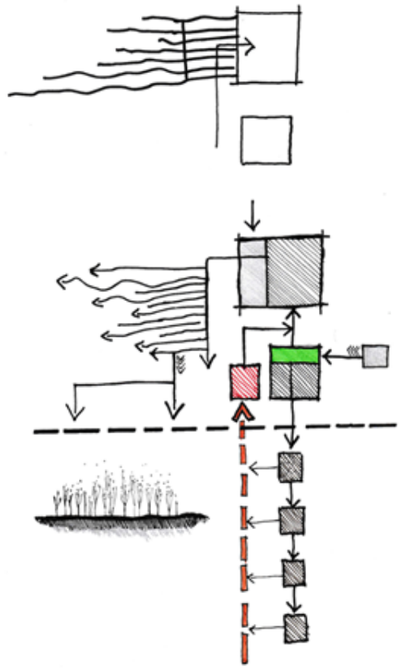
3.11.5 BIOGAS FACILITY AND SOLAR FARM

Organic waste is taken through several processes, including the creation of fertilisers that are supplied back into the fields. Animal and plant manure is also used as biogas for domestic use.









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3.12 Services

3.12.1 STORMWATER CHANNELS

The industrial section of the development framework involves the process of water harvesting, in conjunction with the establishment of the water treatment plant. After the stormwater has been collected and treated for domestic supply, wastewater can be collected and treated so as to form part of the general irrigation process.

3.12.2 WATER YIELD

Rainwater is collected through the large roof overhangs of the transport facility hub, as well as via the paved surfaces of the transect. According to the yield calculations in the table below , an annual average yield consists of approximately 6 085 251m3 of water, with an average of 4.2844m of precipitation per year.

Yield (m^3) = P x A x C

P = Precipitation (m)

A = Area of catchment (m^2)

C = Runoff coefficient, 0.8 to 0.9

The urban strategy further intends to harvest rainwater from hard surfaces (e.g., large roof overhangs and impervious paving) on an average of 80-90% efficiency. The precipitation diagram for Mpaka, thus, indicates how many days per month certain precipitation amounts might be reached.

The locally produced concrete block can also be used as an air brick for cross ventilation and cooling strategies. In addition, locally produced grass mats are used as sunscreens and shutters for passive ventilation. These elements create and maintain the relationship between locally available skills and materials while also introducing modern materials.

3.12.3 SYSTEMS LIGHT

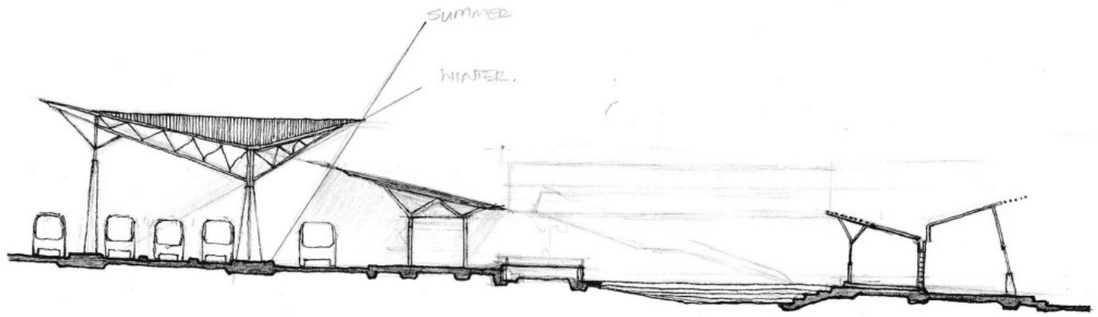
In addressing the issue of natural lighting that flows into the trading hub, Klip-Lok translucent roof sheets are used to allow diffused light into the space.

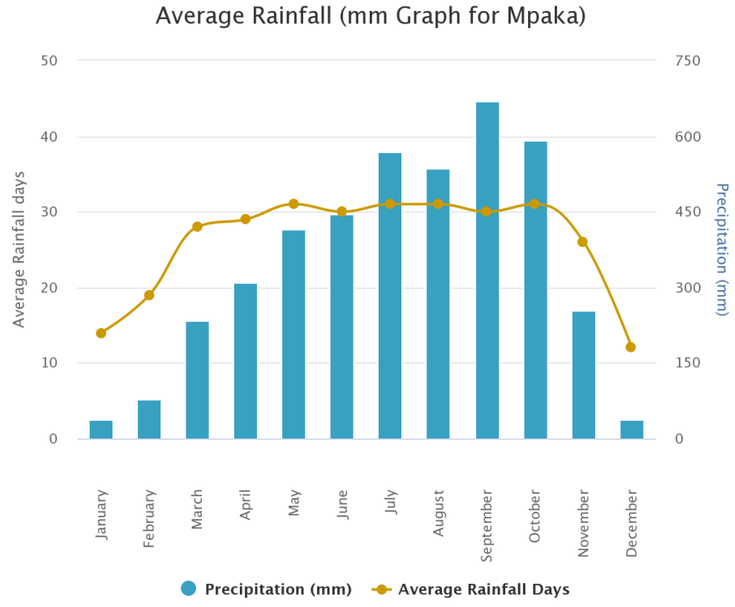
Month	Ave. Monthly Precipitation, P (m)	Yield (m^3) = P x A x C
January	0,0369	23645
February	0,0778	49853
March	0,2340	149944
April	0,3089	197939
May	0,4164	266824
June	0,4450	285151
July	0,5683	363968
August	0,5365	343783
September	0,6694	428944
October	0,5910	378706
November	0,25540	163657
December	0,0372	23837

Table 3.1: Monthly Precipitation and Yield (Author, 2021)

Catchment	Area (m^2)	Runoff Coefficient, C (Weighted)
Roof	33220	0,41
Paving	729625	0,43
TOTAL	762845	0,84

Table 3.2: Catchment Surface Area (Author, 2021)





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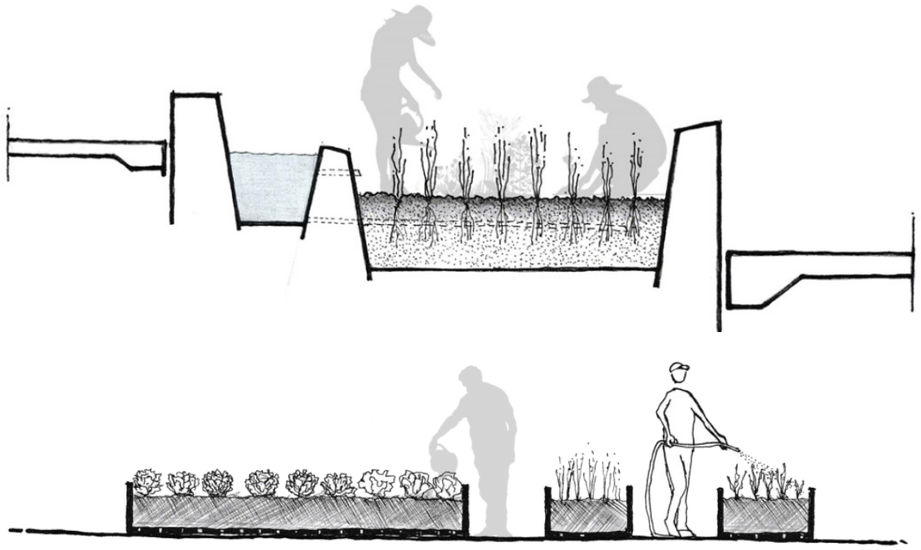
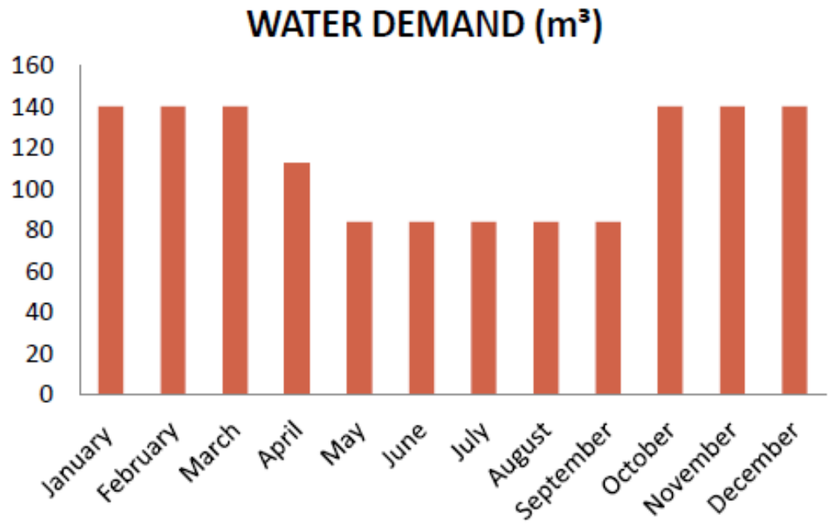
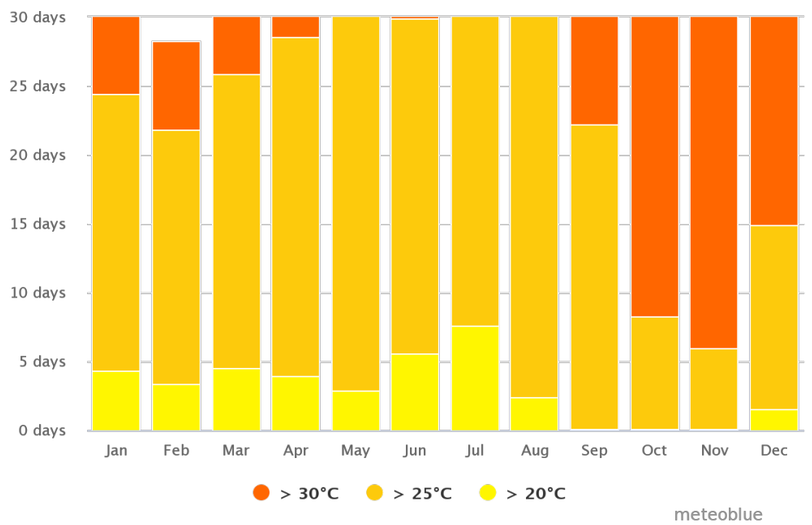
3.12.4 WATER DEMAND

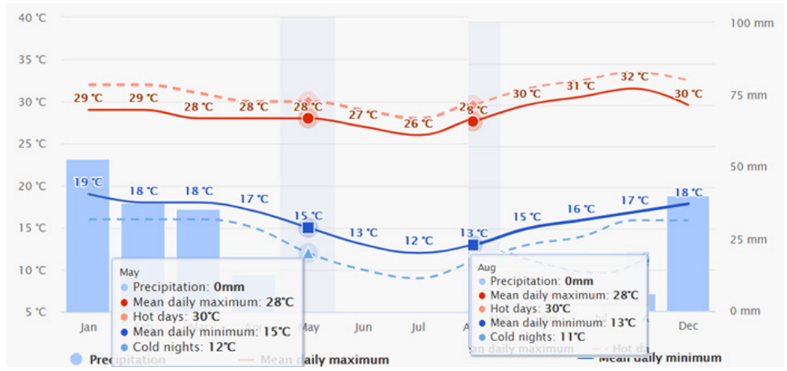


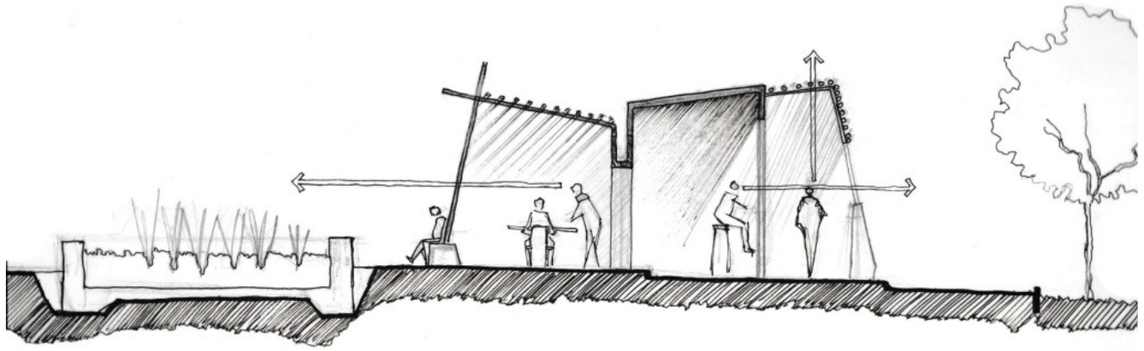
Irrigation Demand				
Month	Planting Area (m^2)	Irrigation depth /week (m)	Irrigation depth/ month	Irrigation demand (m^2/month)
January	10000	0,05	0,2	140
February	10000	0,05	0,2	140
March	10000	0,05	0,2	112
April	10000	0,04	0,16	84
May	10000	0,03	0,12	84
June	10000	0,03	0,12	84
July	10000	0,03	0,12	84
August	10000	0,03	0,12	84
September	10000	0,03	0,12	84
October	10000	0,05	0,2	140
November	10000	0,05	0,2	140
December	10000	0,05	0,2	140
				1372

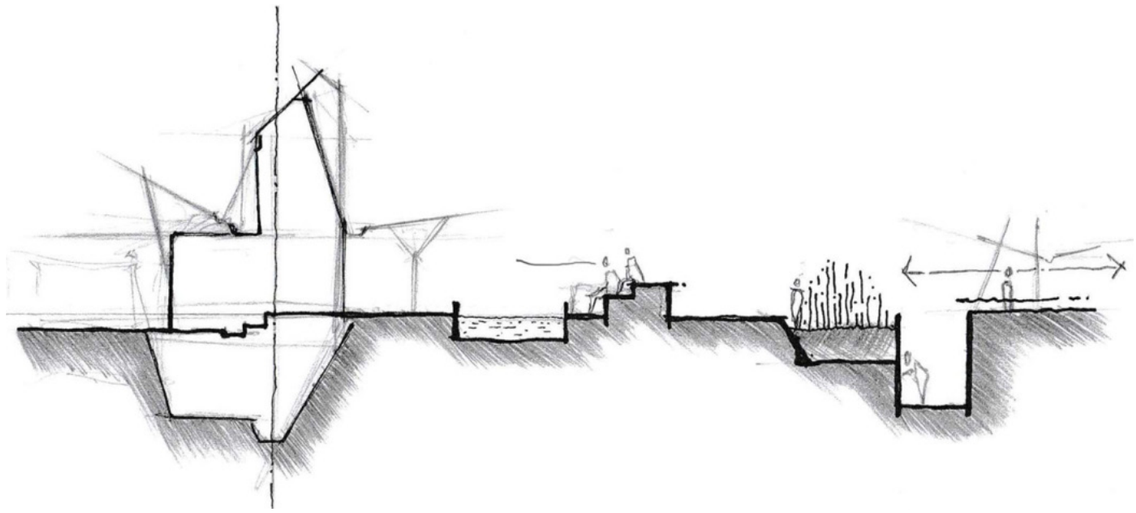
Table 3.3: Irrigation Demand (Author, 2021)

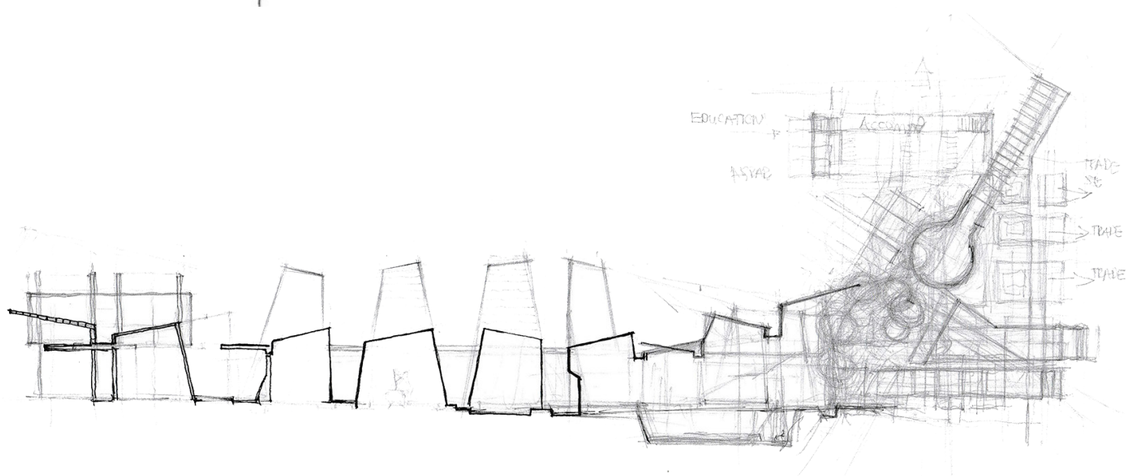












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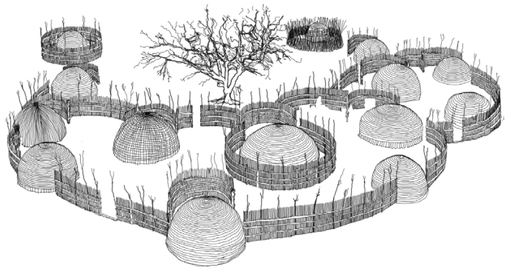
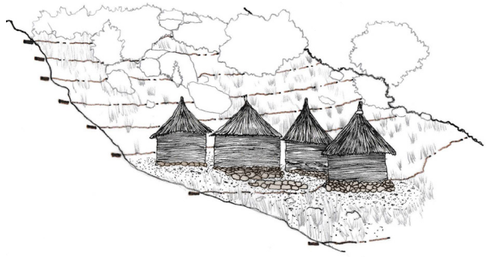
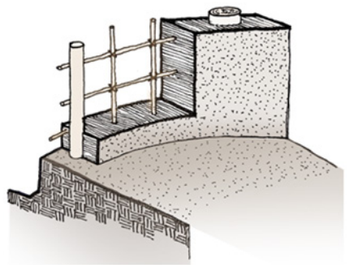
3.13 Technology

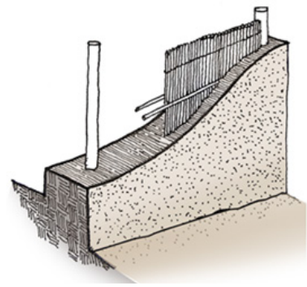
Learning from the local vernacular, the tectonic structure is essentially made of timber framing, while the mud cladding serves as skin in the protection and enclosure of the internal spaces.

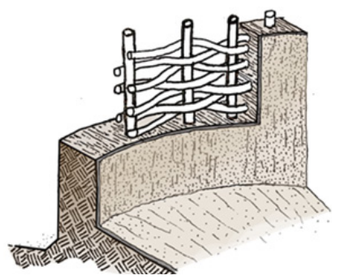
A similar technique is implemented in respect to the light infrastructure, where the tectonic concrete column/ring beam frames the structure and supports the roof with large overhangs. This strategy allows the stereotomic adobe wall to then act as an infill while still being protected against rainwater by the steel roof sheeting.







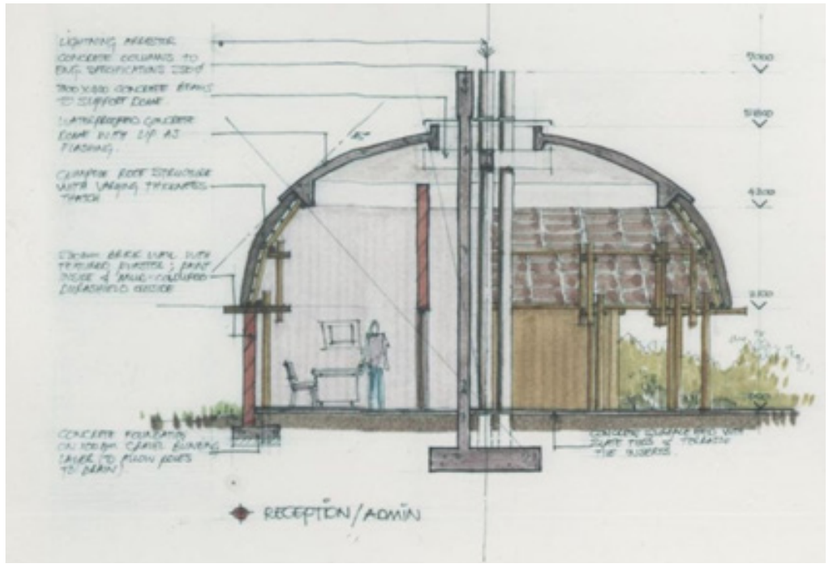


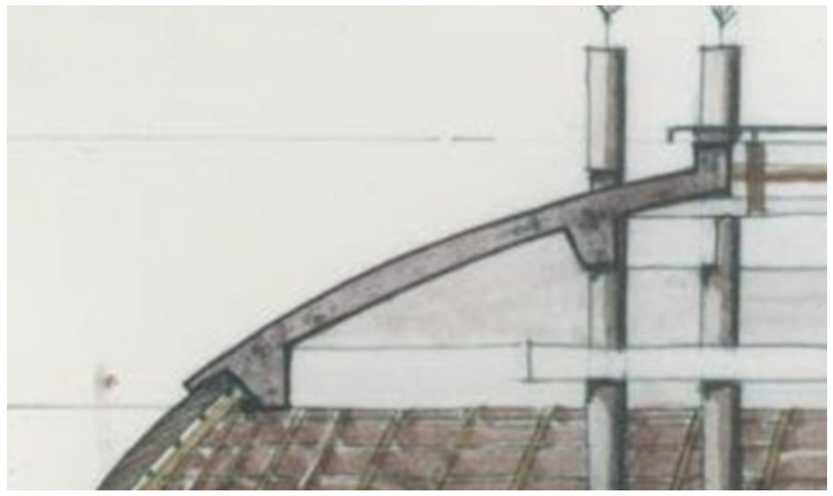


3.14 Precedent Study - Technology

3.14.1 ZULU SUN LODGE (DURBAN, SOUTH AFRICA)

AArchitect Niel Crafford demonstrates how vernacular material, such as thatched roofing, can be improved upon in terms of its durability by using more permanent material (Crafford, 2021). Crafford (2021) expressly details why the angle plays a key role in determining the lifespan of this roofing material. In particular, anything less than a 45˚ slope drastically deteriorates the grass and rots quicker than the rest of the thatch (Thatchers Association of South Africa, 2016, p. 30). In order to improve the longevity of the roofing in his design, Crafford thus opted to replace the grass that lies below the 45˚ degrees slope with a concrete roof cap.





3.14.2 NIKE FOOTBALL TRAINING CENTRE (SOWETO, SOUTH AFRICA)

Luyanda Mpahlwa and Mokena Makeke spoke about the playful use of public spaces using African architectural identity at the 2021 Design Indaba. As part of their address, they noted how the Nike Football Training Centre, located in Soweto, reveals how local timber louvers are used as cladding strips and solar shading (Gerin, 2008, p. 113). Such louver use is reminiscent of a regional reed beehive screen that defines private and public spaces and emphasises visual connection (ArchiDatum, 2021, p. 1).

3.14.3 CENTRE FOR EARTH ARCHITECTURE (MOPTI, MALI)

Kere Architecture demonstrates how a ring beam supported on a reinforced concrete column, functioning as a primary structure, can create independence between a roof structure and the local brick infill (Goodwin, 2021, p. 1). This principle is experimented on in respect to this current study's own transport hub, and is also replicated throughout the site in different iterations. The strategy has been found to be particularly useful in creating an opportunity to adopt stereotomic wall infill using local vernacular material such as adobe walls. This approach also allows the independent roof to have large roof overhangs that can protect the walls from rainwater.

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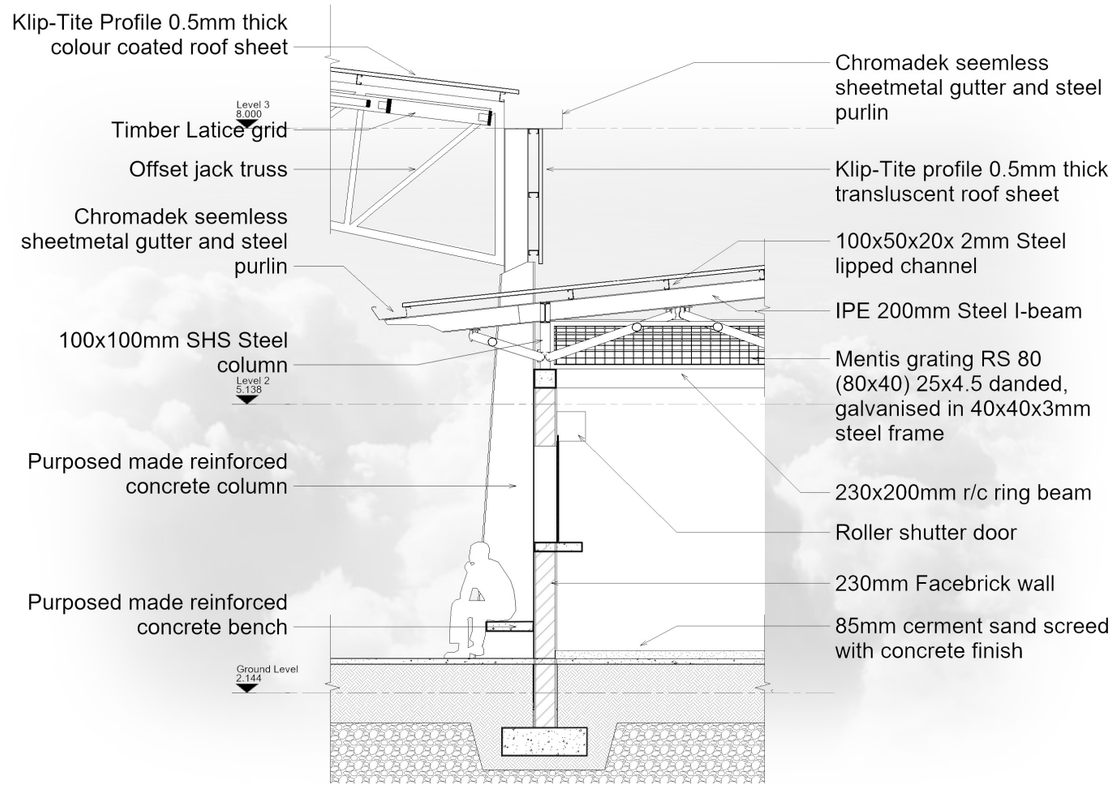
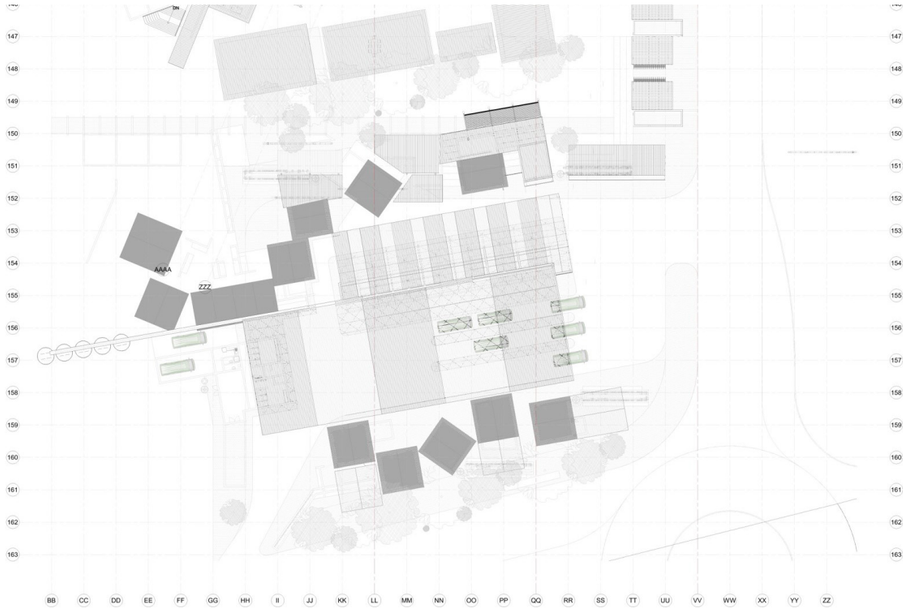
3.15.1 Transport Hub Plan

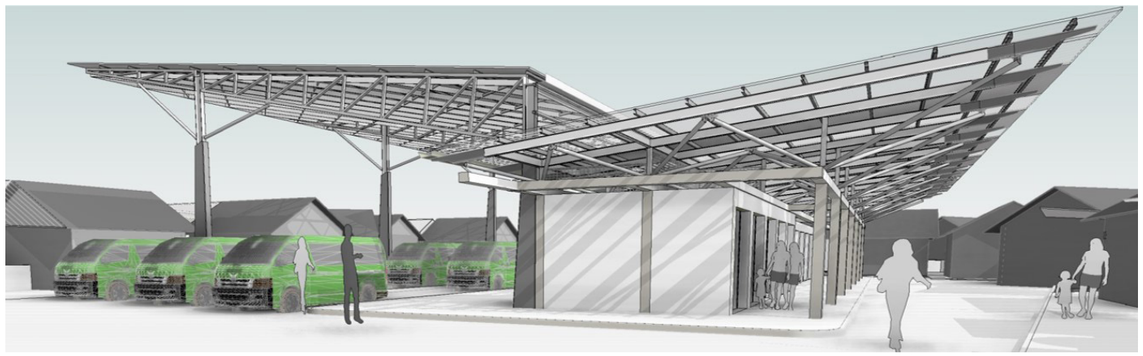
3.15.2 Transport Hub Section



3.15.3 Transport Hub Roof Plan



3.15.4 Transport Hub Pespective



CONCEPT INTENTIONS

Structural Intentions

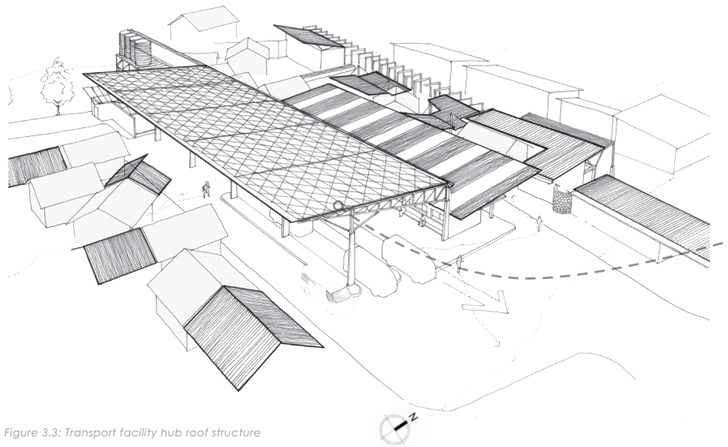
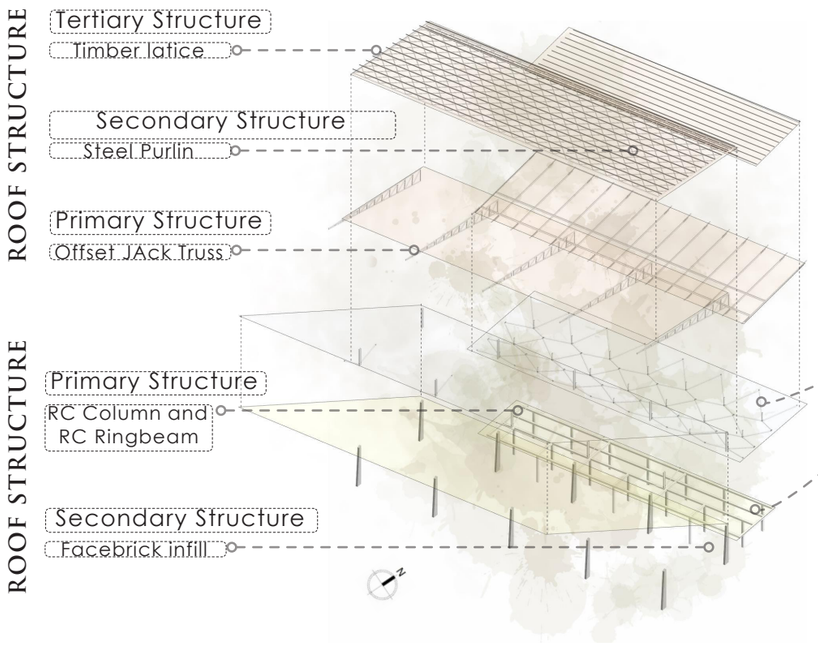
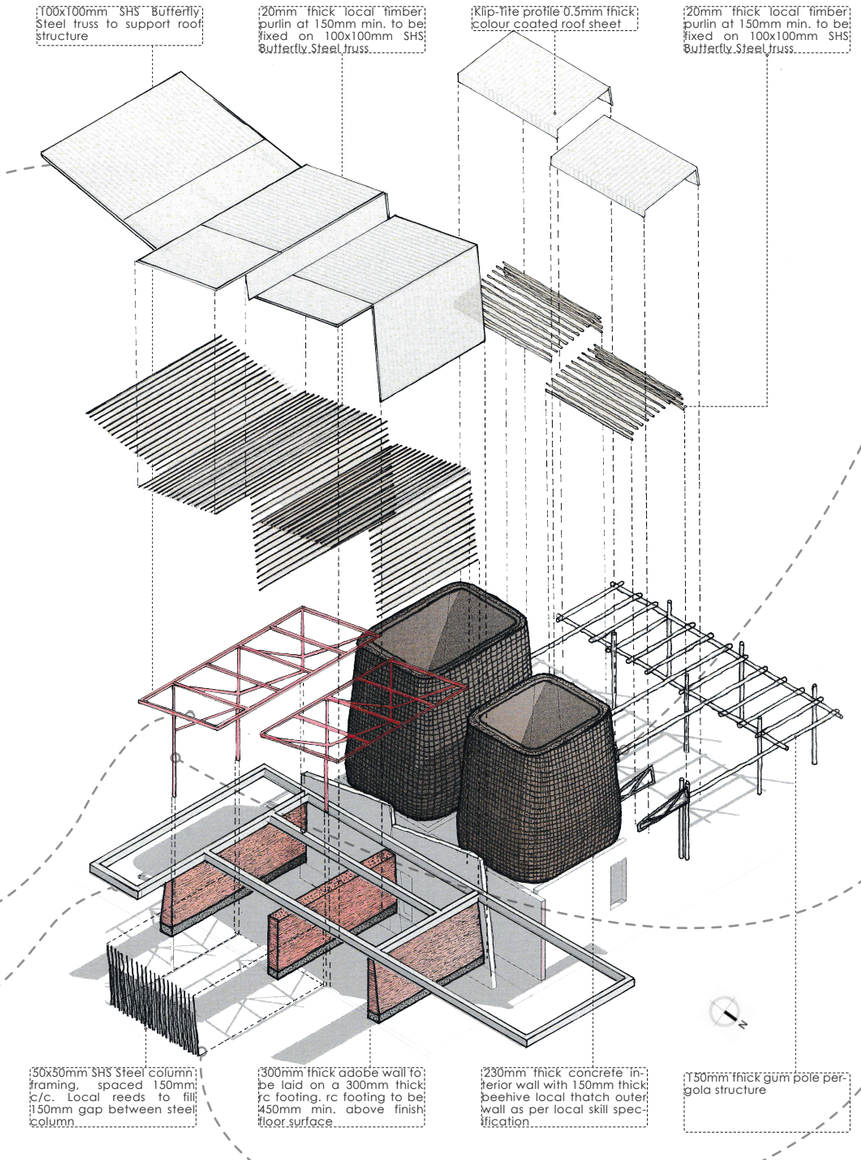


Figure 3.3: Transport facility hub roof structure

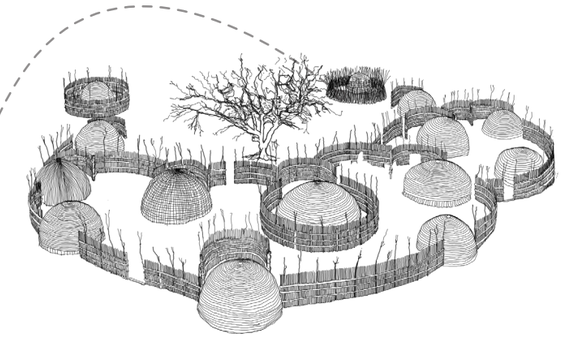
3.7 Structural System

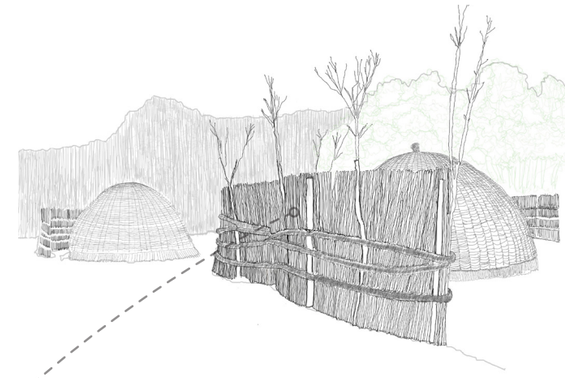


Technological Responses



Mantenga Cultural Village





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Elevations

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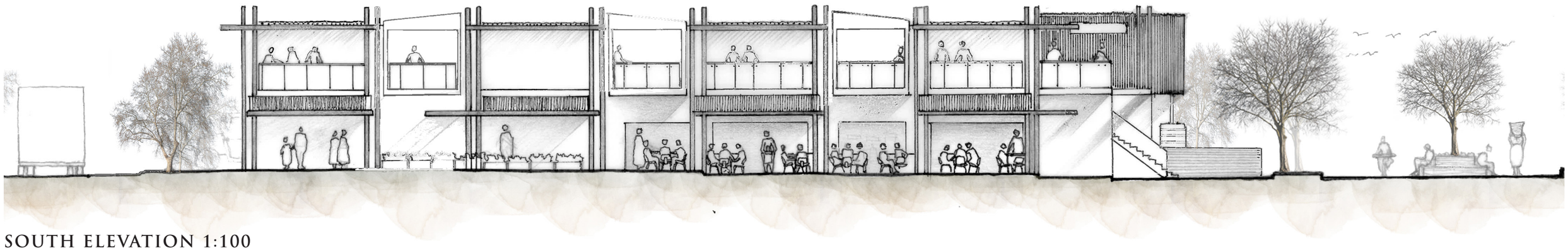
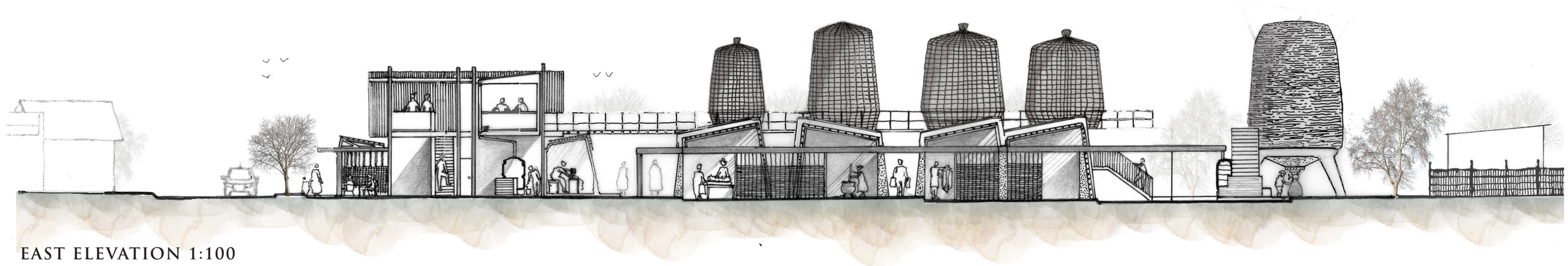
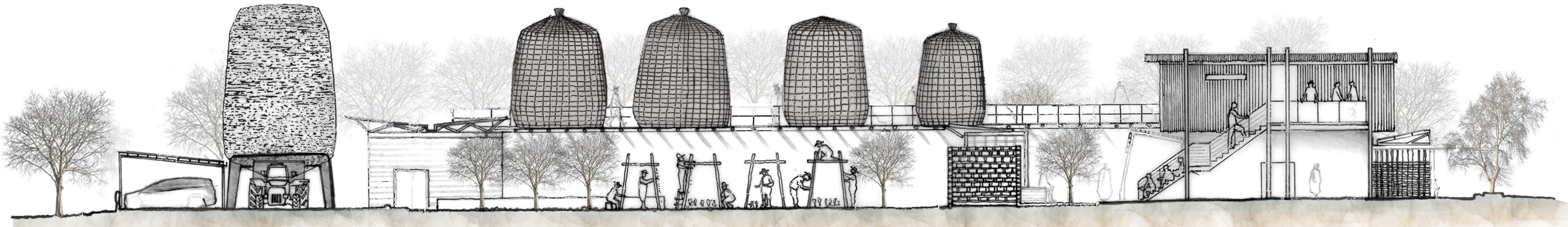


SOUTH ELEVATION 1:100



EAST ELEVATION 1:100



WEST ELEVATION 1:100

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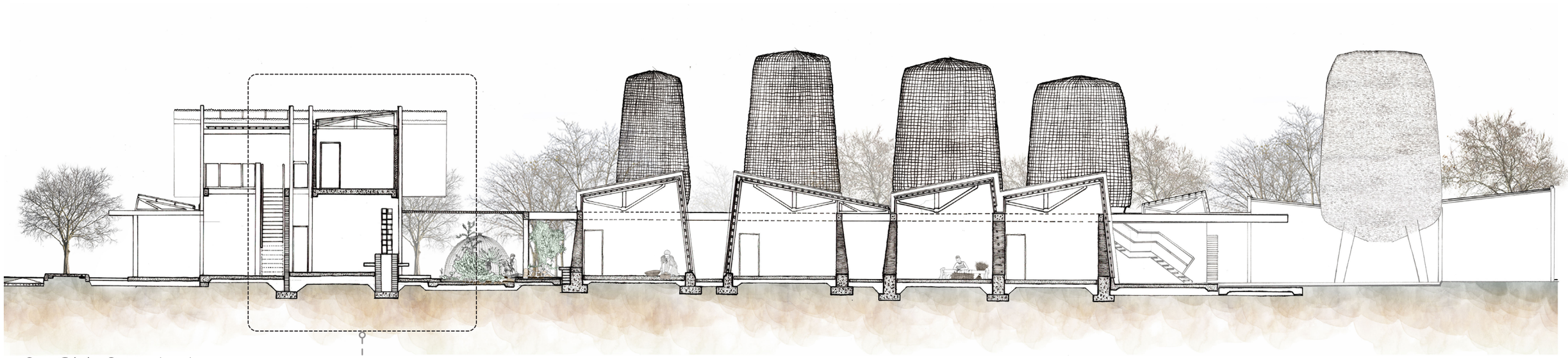
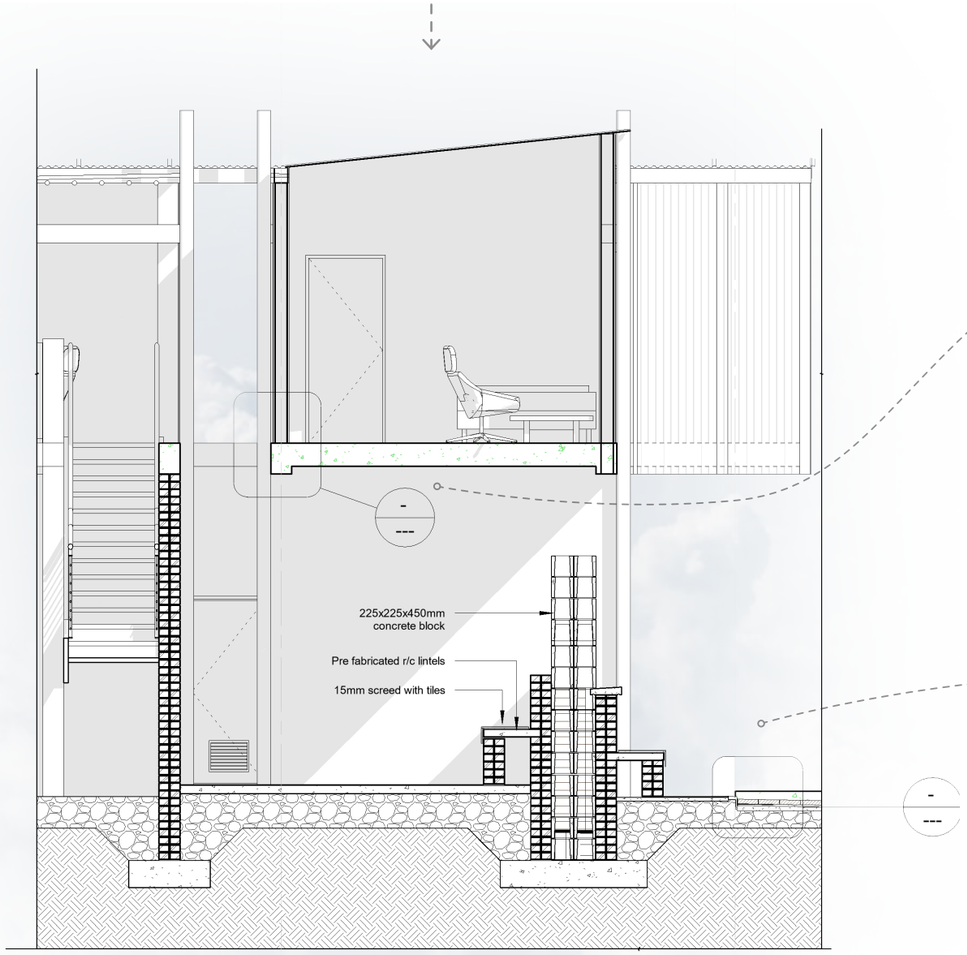
SECTION and DETAILS

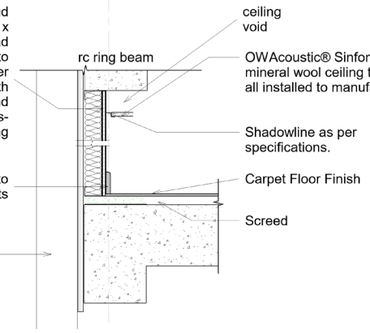


SECTION A-A



131

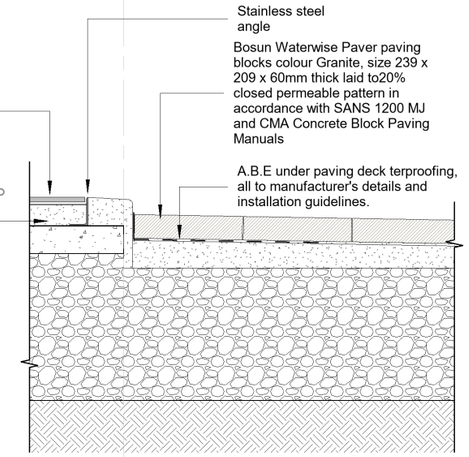
Gyproc 3000 high GypWall SoundBloc Ultrasteel Stud Drywall, consisting of stud and track system with 70 x 50mm studs at 600mm centres friction fitted into head track and floor track with 63mm insulation inserted into cavity of partitioning and cladded with an interior layer of 12,5mm thick Gyproc SoundBloc board fixed with 25mm and 42mm Screws at 220mm centres and resilient bars to one, external claddind wall consist of s-rib steel sheeting



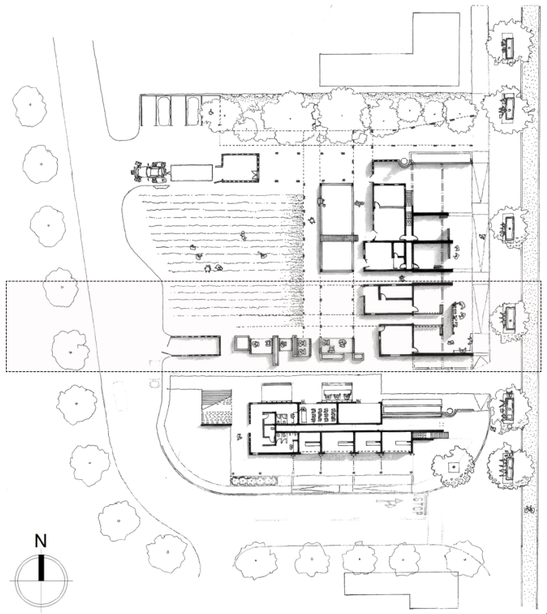
130

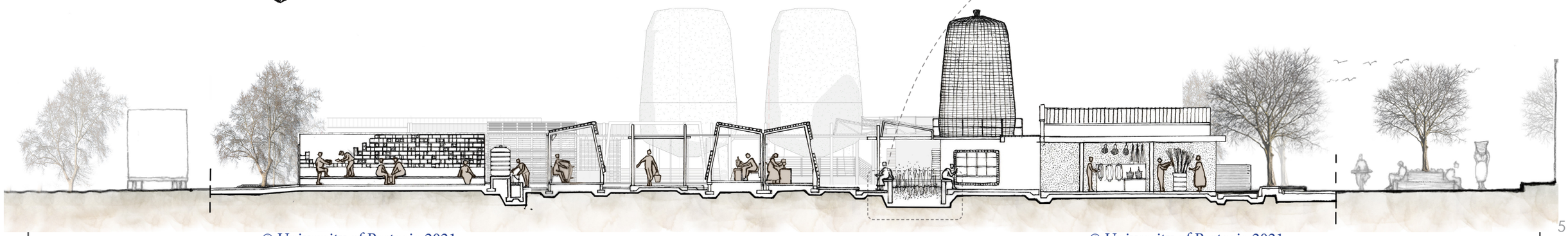
600x600mm full bodied porcelain tiles. Specs to be confirmed and approved.

60mm recess in rc surfacebe to with 45mm screed.



HEALTH FOOD PRODUCTION:





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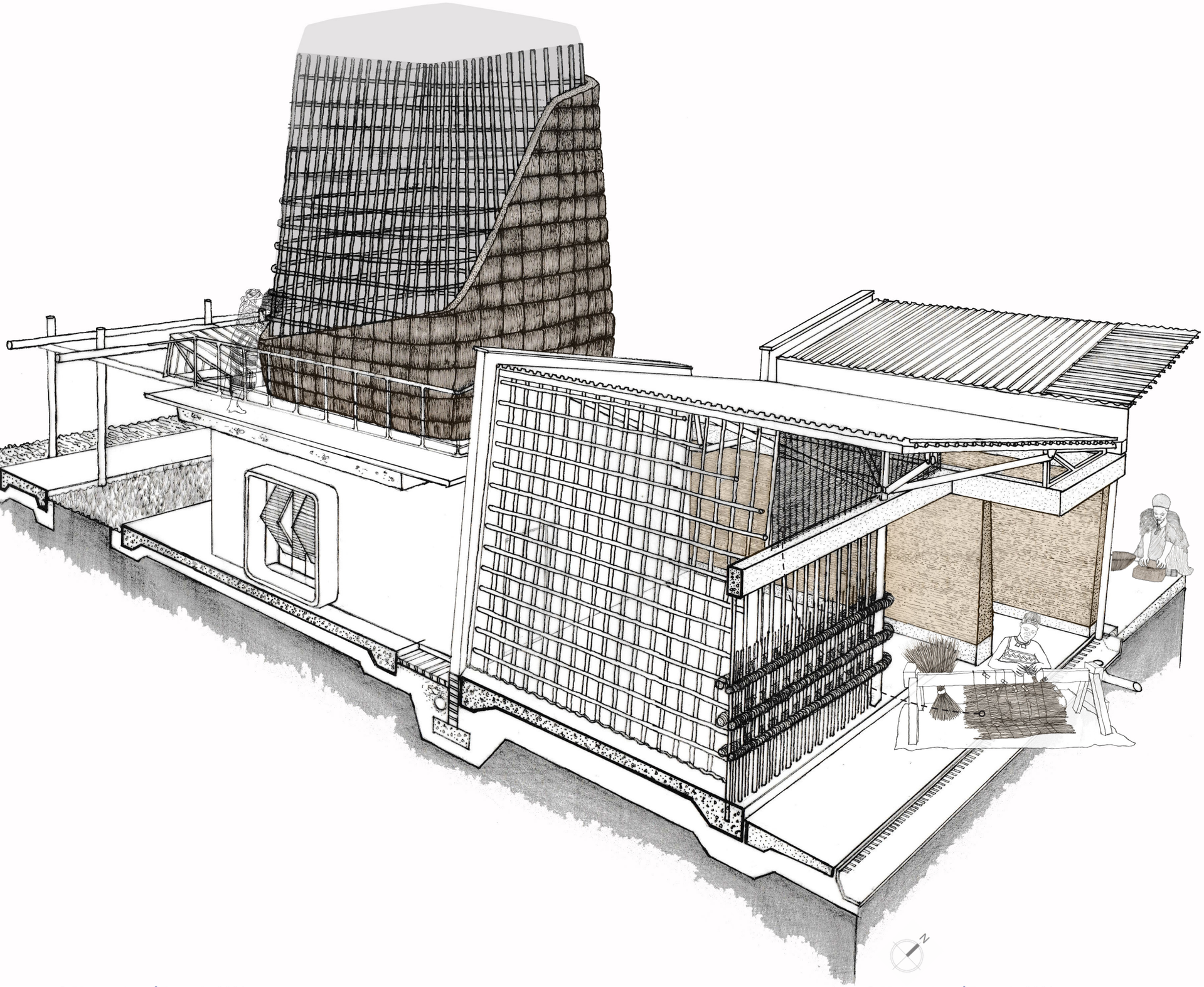
Local Skill+Contractor Interface



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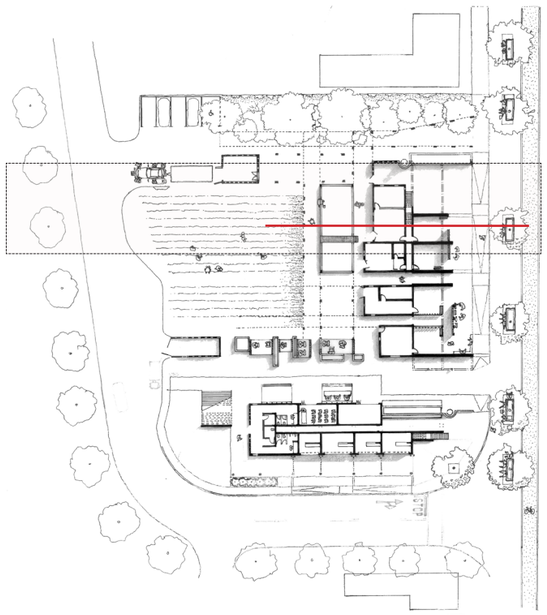
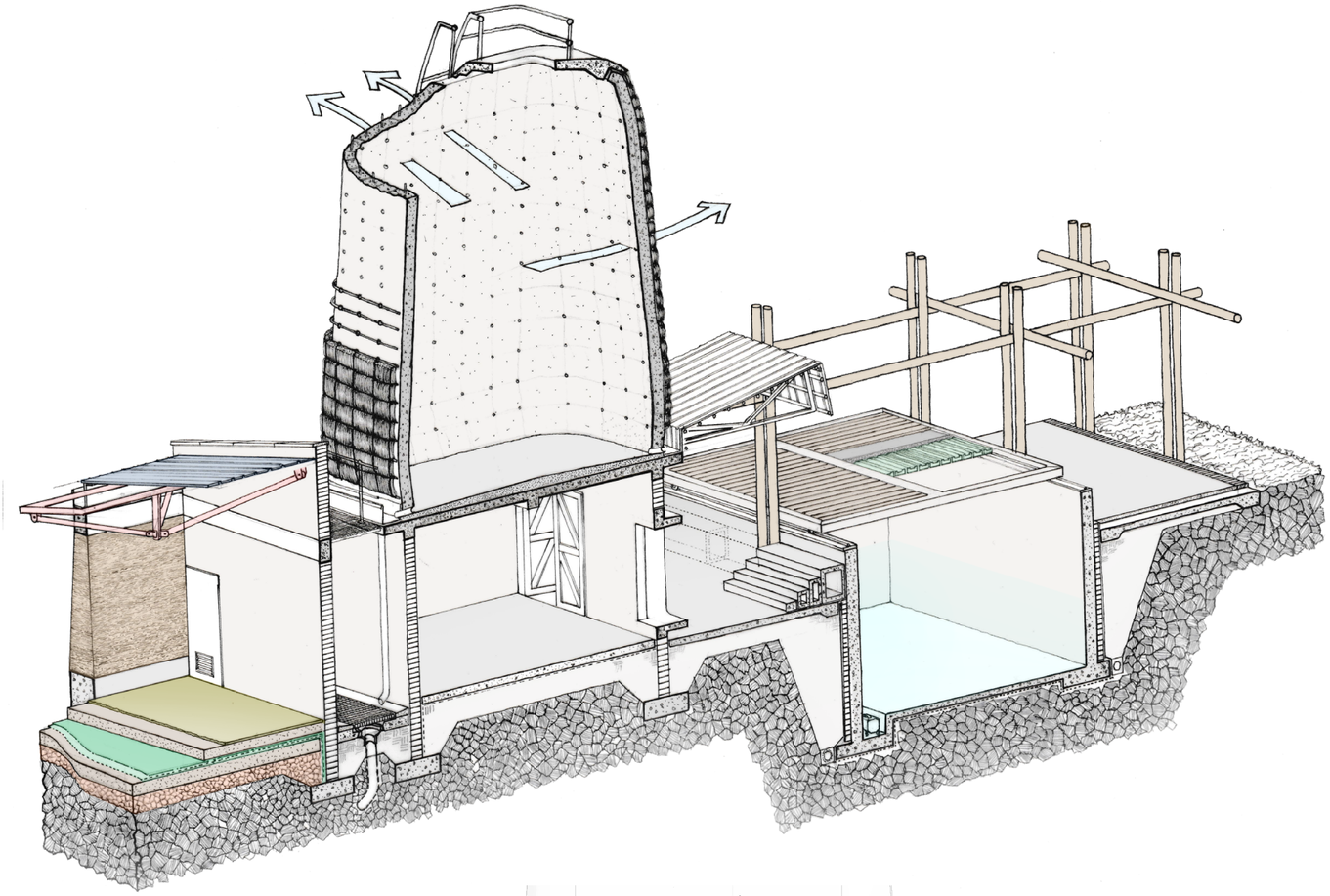
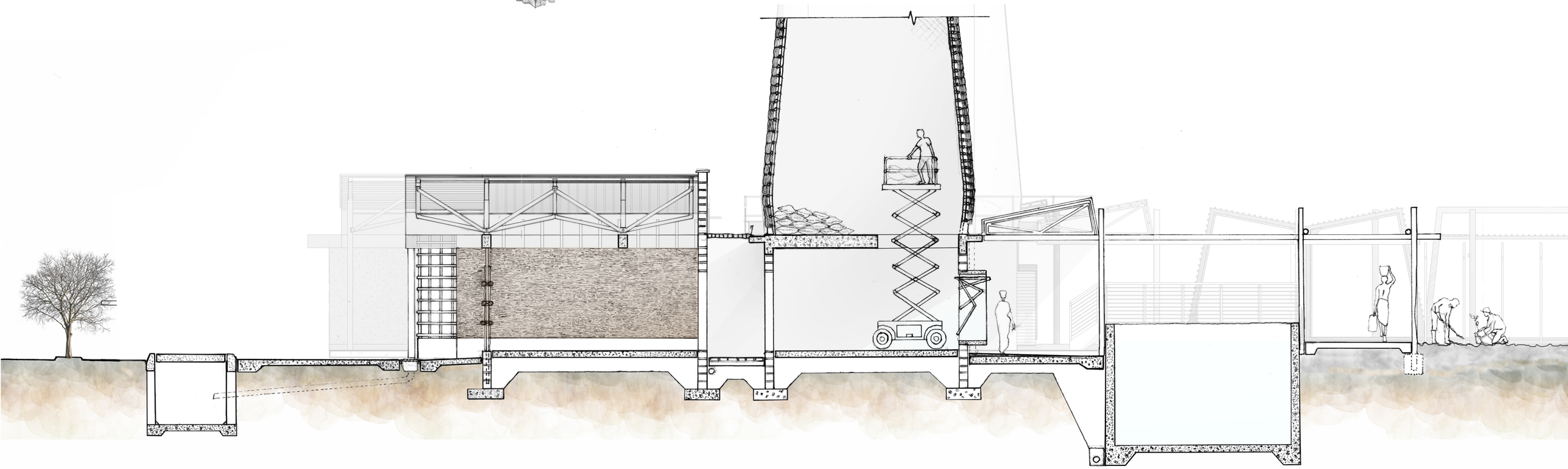
AGRO-ECONOMY:







3.16 Sefaira

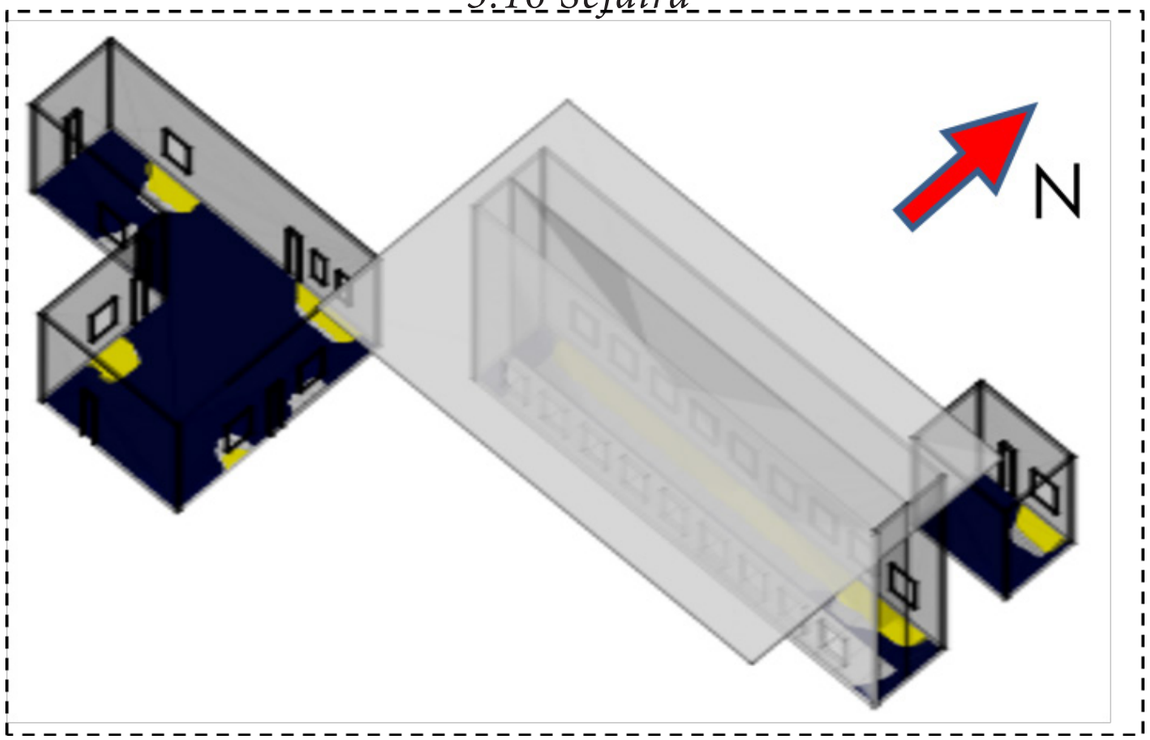
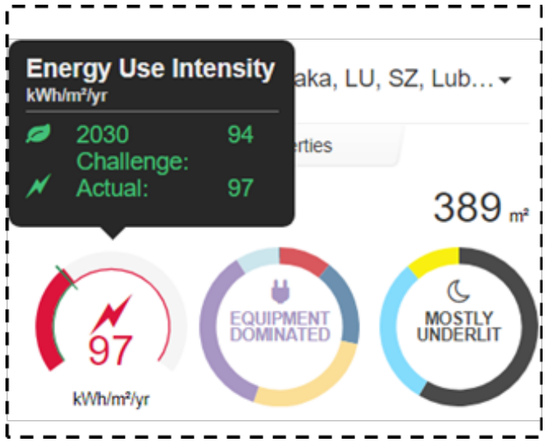
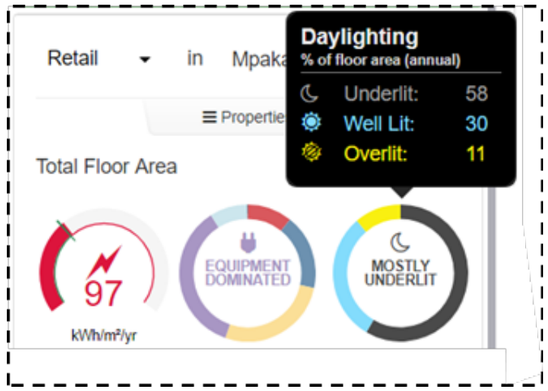
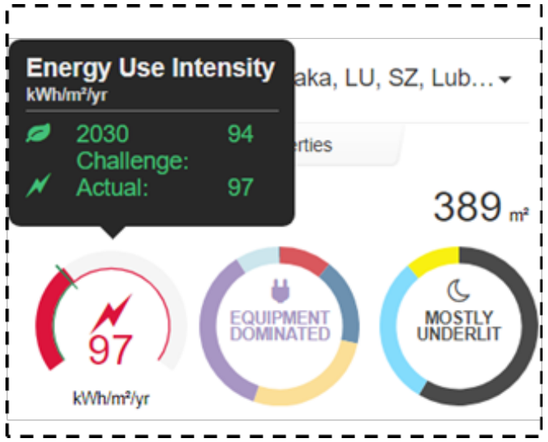
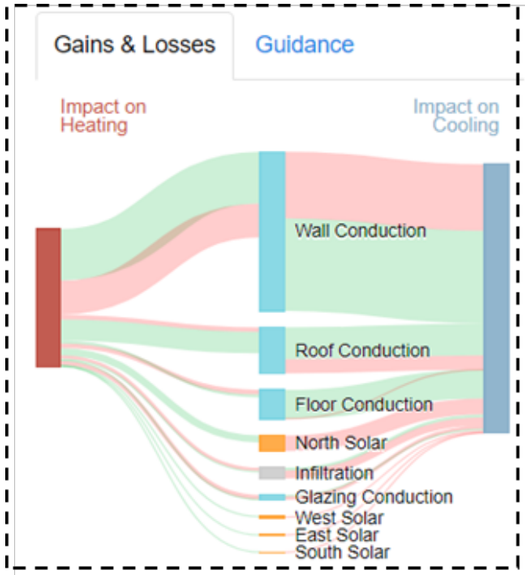


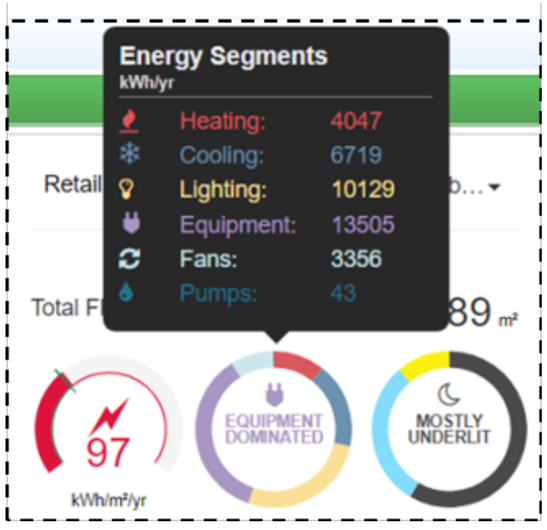
Figure 3.15.1: Solar heat gain (Author, 2021)











3.17 SBAT Rating

SUSTAINABLE BUILDING ASSESSMENT TOOL RESIDENTIAL

1,04

	Achieved
SB SBAT REPORT	**4,7**

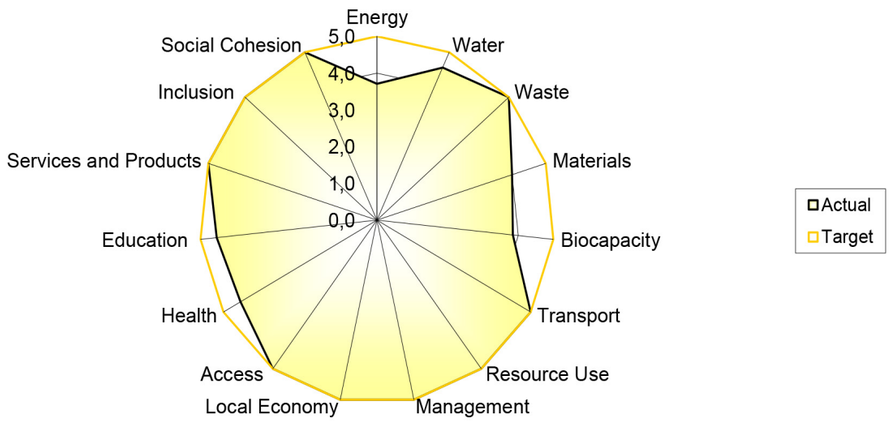
SB1 Project

Agrarian Precint	0

SB2 Address

Mpaka Eswatini	0

SB3 SBAT Graph



SB4 Environmental, Social and Economic Performance	Score
Environmental	4,2
Economic	5,0
Social	4,8
SBAT Rating	4,7

SB5 EF and HDI Factors	Score
EF Factor	4,5
HDI Factor	4,7

SB6 Targets	Percentage
Environmental	84
Economic	100
Social	96

SB7 Self Assessment: Information supplied and and confirmed by

Name	Date
Signature	

SB8 Validation: Documentation validated by

Name	Date
Signature	

SB9 Validation Report Version

IVR

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Essay 4: Critical Reflection

The following sections is about a critical conclusion of the design outcomes, that provide a coherent reflection on the dissertation process while postulating a way forward for the career.

Critical thinking (Author, 2021)

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4.1.1 Original Normative Position

As noted previously, this project has been set out to create a sustainable development infrastructure that minimises the use of imported materials and promotes the use of locally available materials. Reflecting on this design approach, the project has demonstrated a possible symbiotic relationship between local vernacular and modern materials. In addition, the exercise of skills-sharing between contractors and locals promoted by this design initiative could demonstrate a more sustainable method in modern construction. While the notion of interfacing permanent and temporary building materials may seem to create the need for reoccurring maintenance in the future, since the local community is directly involved in taking authorship of their hard-earned infrastructure, it is predicted that the responsibility to maintain and preserve said infrastructure will be of priority to them. The 'triple bottom line' demonstrated by Douglas Farr and discussed earlier, therefore, proves to be a more sustainable social, economic, environmental means of creating better livelihoods.

4.1.2 Dissertation Foundations

This dissertation was based on the theoretical premise that agrarian urbanism recognises, promotes, and preserves individualism. The study, thus, attempted to argue for a more focussed developmental approach in a rural setting in order to demonstrate sustainable and individualistic improvement of the area, rather than further promote reliance on centralised governments. With the increase in job insecurities and the persistent lockdown threats posed by the Covid-19 pandemic, many are beginning to weigh the benefits of investing more in pastoral areas versus staying in cities (Freear et al., 2021 , p. 1). This presented project has, therefore, focussed on a rural development framework in an attempt to create a more resilient socio-economic approach.

4.1.3 Research Explorations

Several research explorations were conducted using a mixed-methods approach. Therefore, the results presented in this study demonstrate scientific assurance that the manifestation of this project could better create economically viable environments for the Mpaka community.

4.1.4 Design Iterations and Conclusions

The development framework approach adopted in this study presents a significant opportunity to demonstrate, functionally, the urban transect. However, the challenge faced throughout the iteration process relates to how best to contextualise the design. To address this issue, and in order to avoid creating a project that has elements of universalism, which takes away the relevance and sense of identity for the community in question, an iteration process of using modern tectonic and stereotomic vernacular systems has been implemented. In addition, the community itself has been included and, thus, forms an integral part of the project's process to produce a more locally relevant project.

4.1.5 Technology Iterations and Conclusions

Indigenous technical skill in working with vernacular materials appears to be slowly disappearing (Alrashed, Asif, & Burek, 2017, p. 19). This presented project has, therefore, attempted to revive these skills and materials. It should be noted that while many technological challenges occur when attempting to integrate modern materials and indigenous building systems, the presented aspects reveal a worthwhile exercise in finding new ways of preserving local vernacular by integrating them with contemporary architecture.

4.1.6 Extension: What this Dissertation Could Mean for a Career in Architecture

This study attempted to challenge the perception that vernacular architecture is unsustainable (i.e., that it includes many temporal aspects) while modern architecture appears to be more sustainable through its provision of more permanent architectural solutions. Specifically, this notion has been challenged by embracing both vernacular and modern aspects in a bid to create a longer-lasting solution than either approach could demonstrate alone. Attempts at densifying urban centres in order to create resilient cities tends to be met with various gentrification-related challenges . Since 70% of the population of Eswatini lives in rural areas, a focussed development framework in a pastoral setting that uses agrarian urbanism demonstrates a more sensible solution.

4.2 Outcome: Reflections on the Dissertation and Architectural Process

The initial project inception was based on the idea that the presented project holds the potential to manifest in real life. As a result, this approach brought about a constructive challenge in assuring that the design development process was conducted in a realistic and sensitive manner. This presented project also demonstrates how academic principles can be applied in real-life situations. Overall, it is possible to confirm that this exercise provides a significant extension into future architectural endeavours and sets up the necessary skills for such a career.

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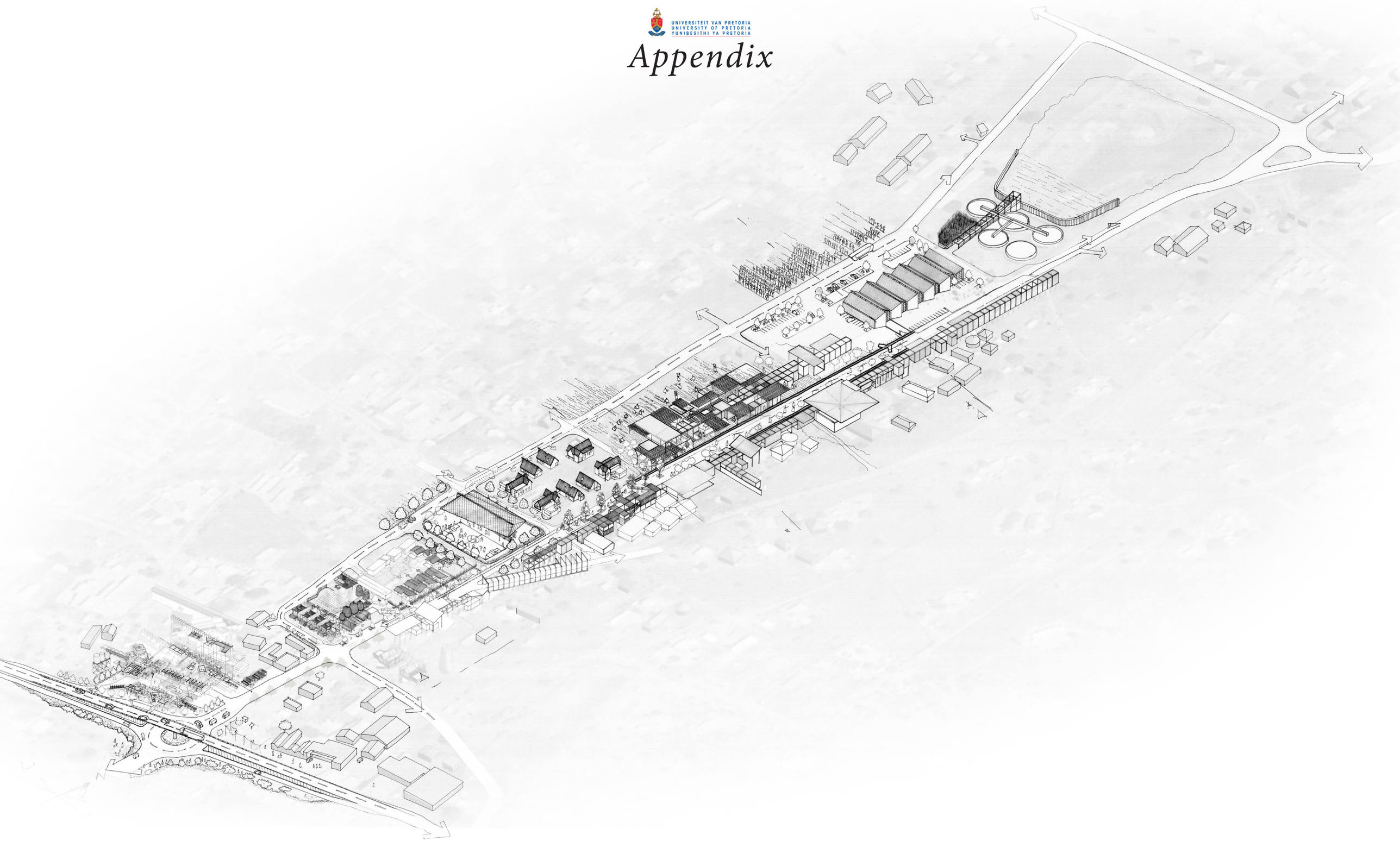
Appendix



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SITE PLAN

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Pedestrian approach

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Informal space

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Market Stalls

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Pedestrian entrance 2

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Public Interface

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Delivery yard

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Agrarian

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Granary Silo

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Water reservoir

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Light infrastructure

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Agrarian

Physical Model

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Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la Boetšenere, Tikologo ya Kago le Theknolotši ya Tshedimošo

9 June 2021

Reference number: EBIT/79/2021

Ms A van Aswegen
Department: Architecture
University of Pretoria
Pretoria
0083

Dear Ms A van Aswegen

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Conditional approval is granted.

This means that the research project entitled "Masters Professional Mini-Dissertation in Architecture, Landscape Architecture and Interior Architecture (Group / Blanket)" is approved under the strict conditions indicated below. If these conditions are not met, approval is withdrawn automatically.

Conditions for approval
This application is approved based on the summaries provided.
Applications from each student (including application forms and all necessary supporting documents such as questionnaire/interview questions, permission letters, informed consent form, etc) will need to be checked internally by the course coordinator/ supervisor. A checklist will need to be signed off after the checking.
All of the above will need to be archived in the department and at the end of the course a flash disc / CD clearly marked with the course code and the protocol number of this application will be required to be provided to EBIT REC administrator.
No data to be collected without first obtaining permission letters. The permission letter from the organisation(s) must be signed by an authorized person and the name of the organisation(s) cannot be disclosed without consent.
Where students want to collect demographic the necessary motivation is in place.

This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Code of Ethics for Scholarly Activities of the University of Pretoria, or the Policy and Procedures for Responsible Research of the University of Pretoria. These documents are available on the website of the EBIT Ethics Committee.

If action is taken beyond the approved application, approval is withdrawn automatically.

According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of the EBIT Research Ethics Office.

The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof K.-Y. Chan
Chair: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

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