

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.

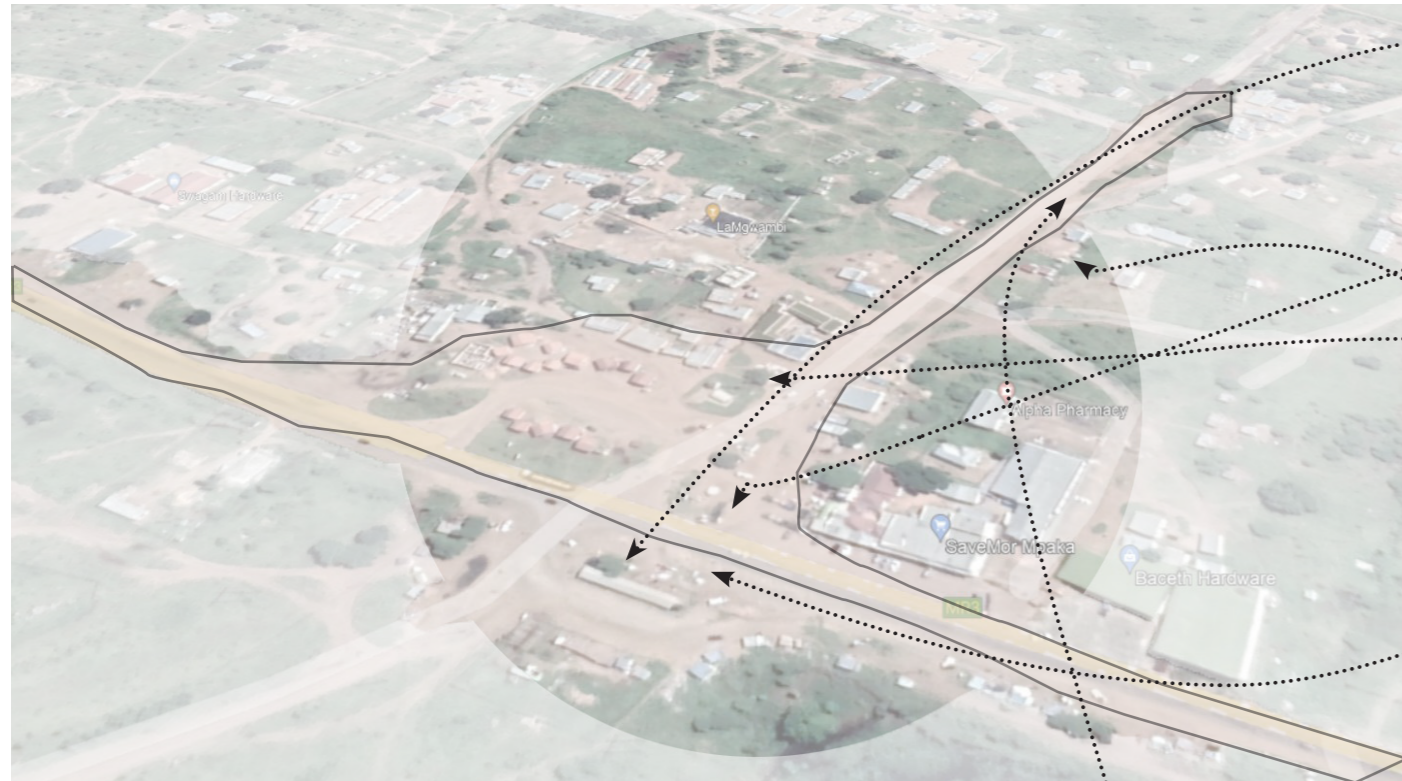


Derelict Street condition of the site (Author 2021)

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.

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 in-



Mapping the street

ed (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).

formal 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).

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, 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 en-

hancement, 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

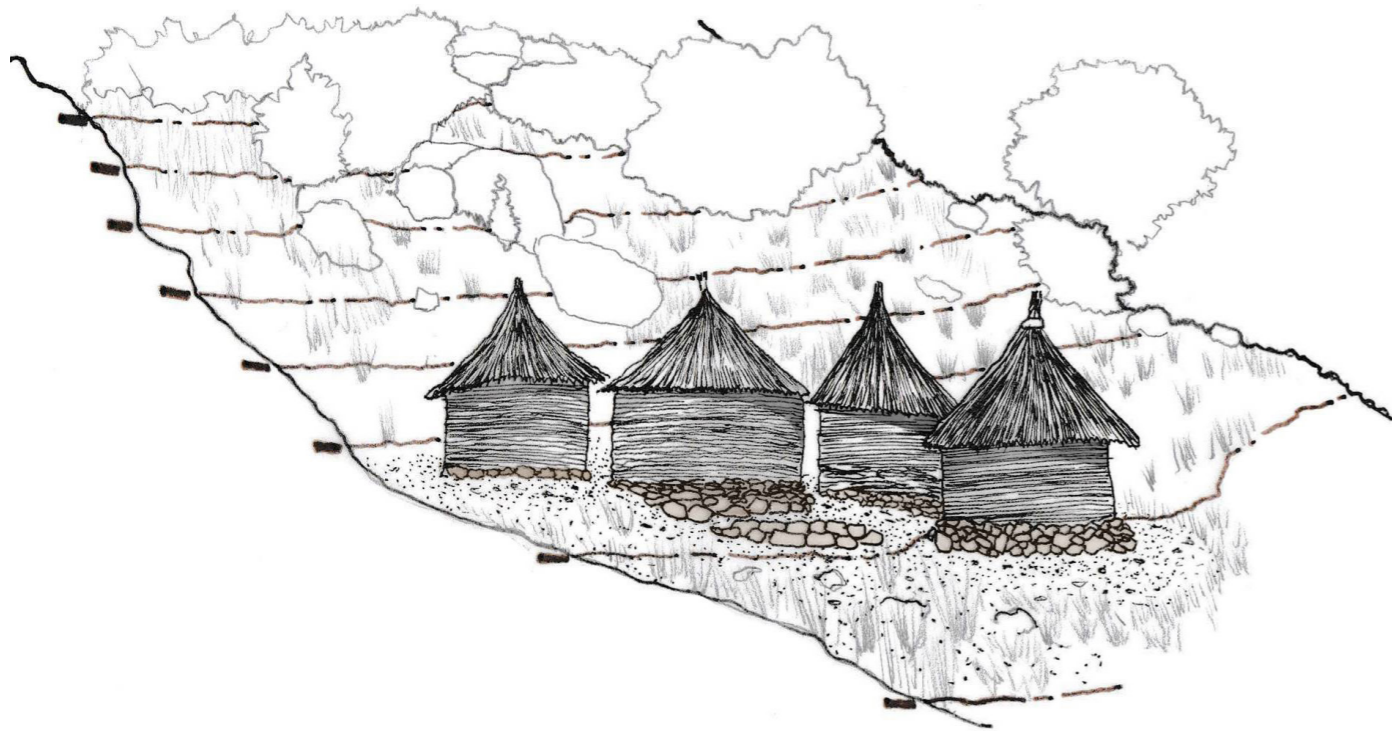


Image (Author 2021)

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



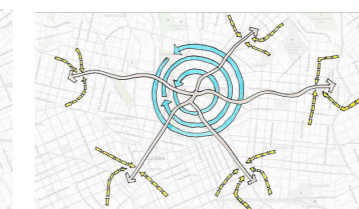
INTEGRATED CONNECTIVITY



Grey buses drive on Express routes with few stops



Orange buses bring people from the outline to the Express routes



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

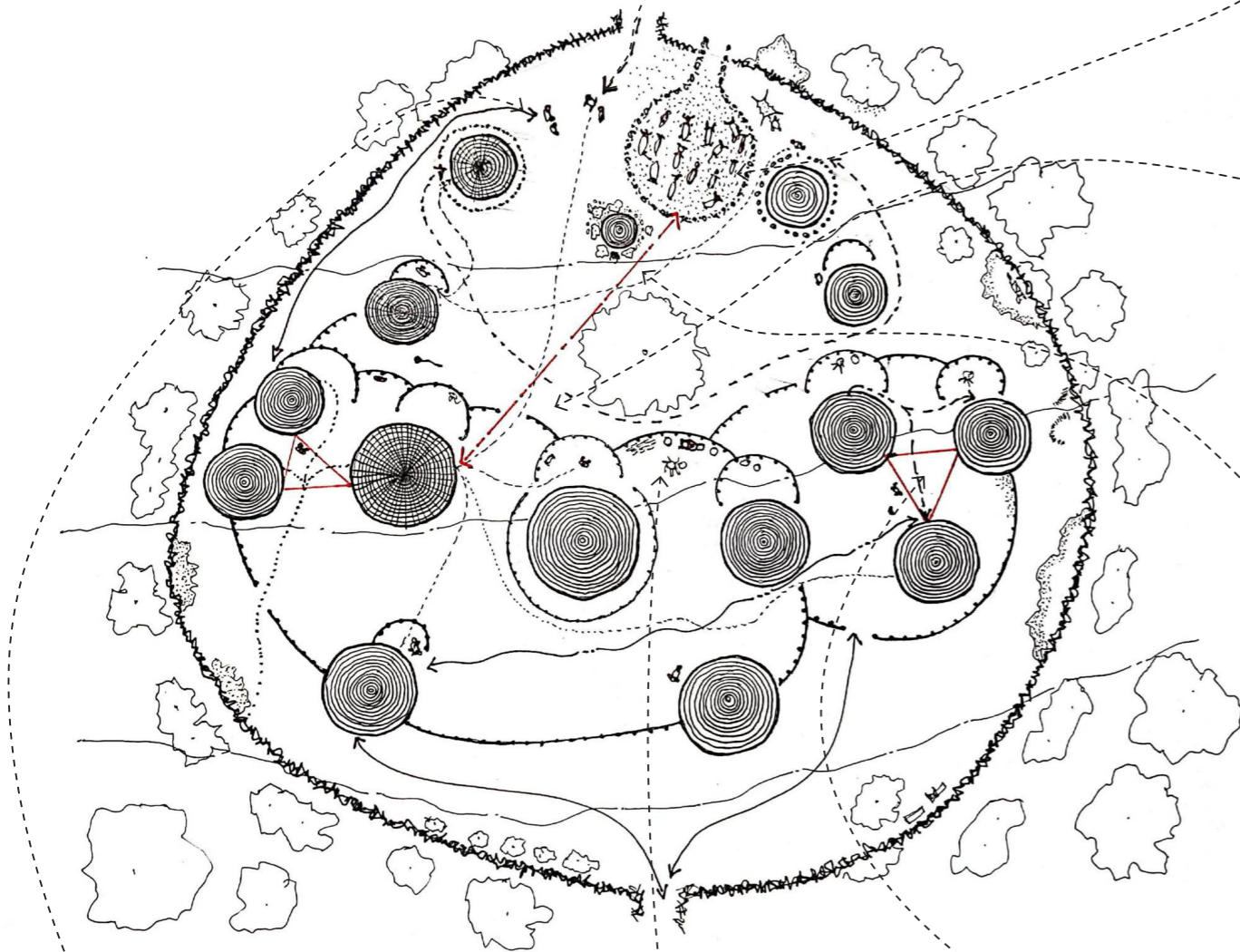
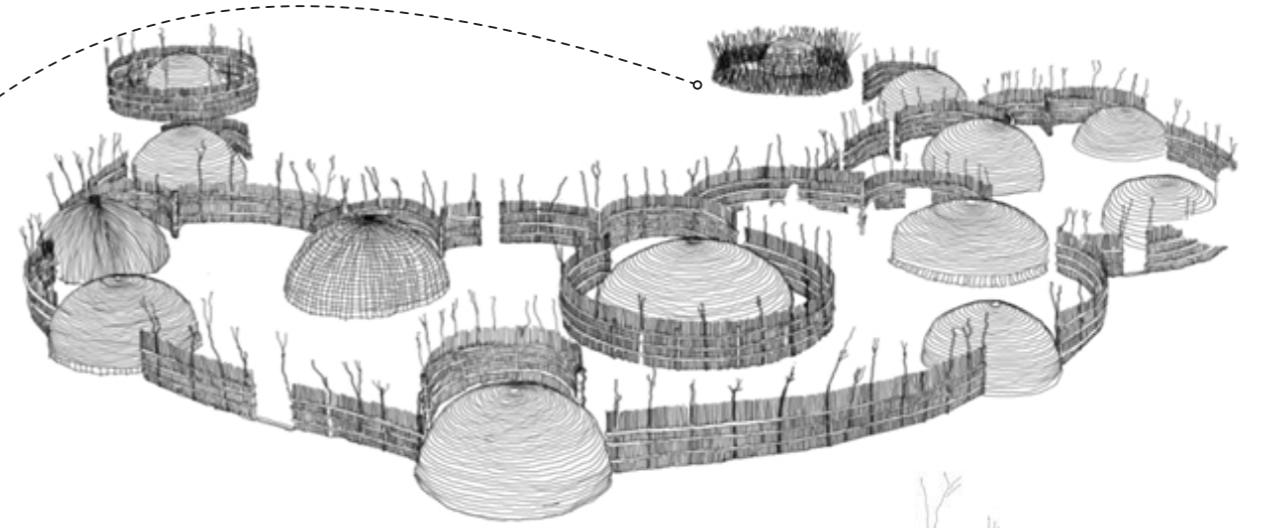


Green buses link some suburbs directly in to the city center and has many more stops than the Express routes with few stops

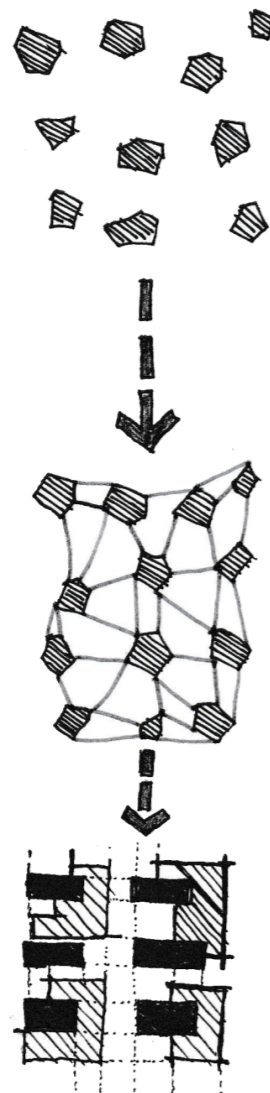
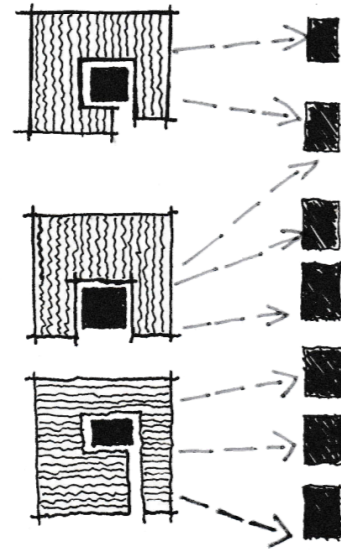
Case Study 2.2.2

Mantenga Cultural Village

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



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.

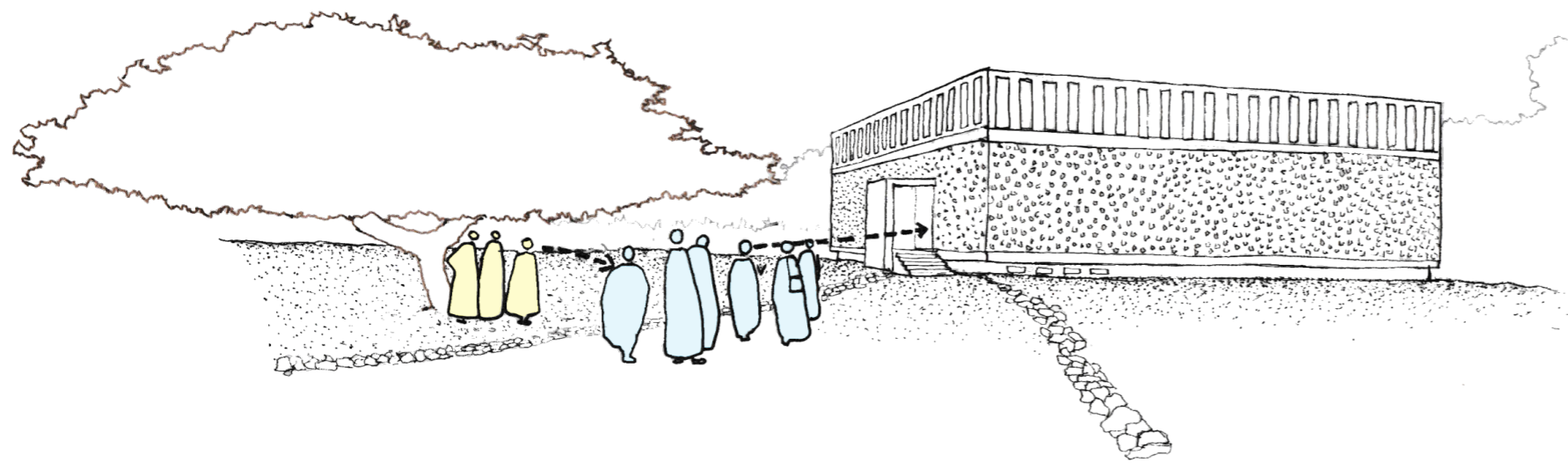
Culture and Heritage

UNESCO - PROTECTED MERO ROYAL BATHS IN SUDAN

Project Location: Sudan

Project Architect: Kere Architects

Project Informants: Historic

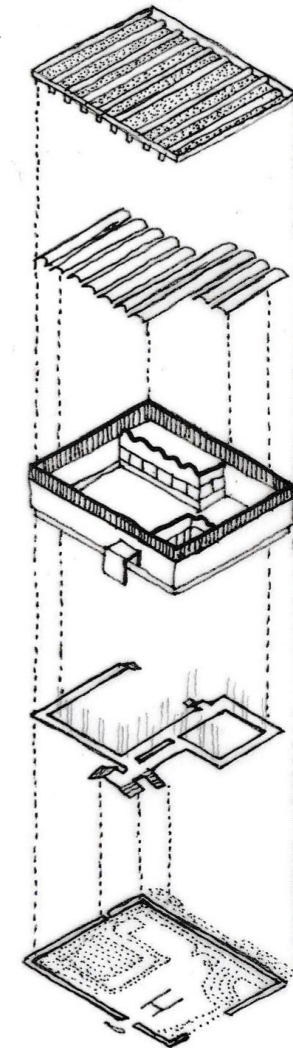


Long span double- envelope roof

Exterior and interior walls

Suspended walkway

Archaeological site

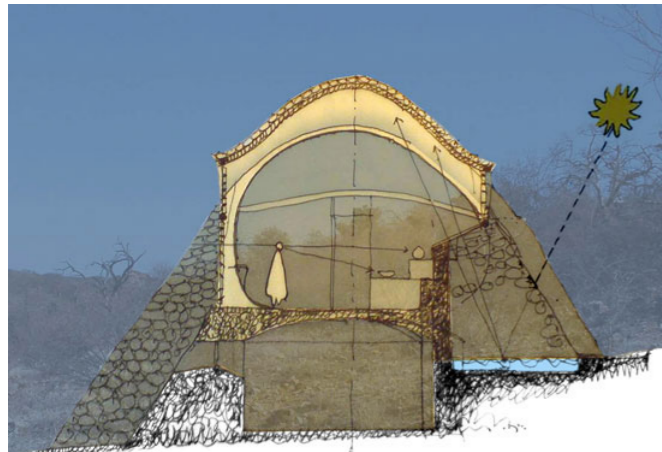


Kéré Architecture's proposal for a protective shelter preserves and celebrates the heritage of the site.

Climate Adaptation

MAPUNGUBWE INTERPRETATION CENTRE

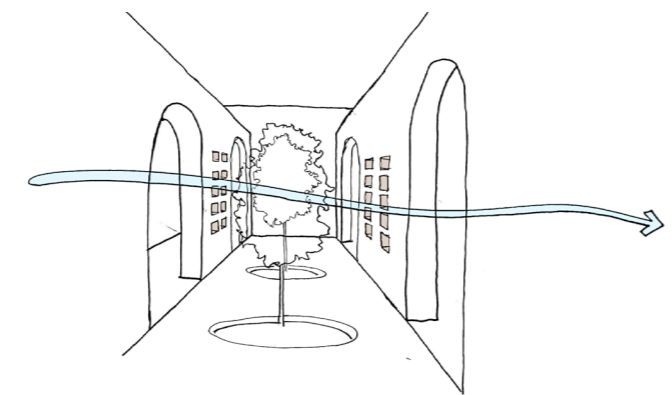
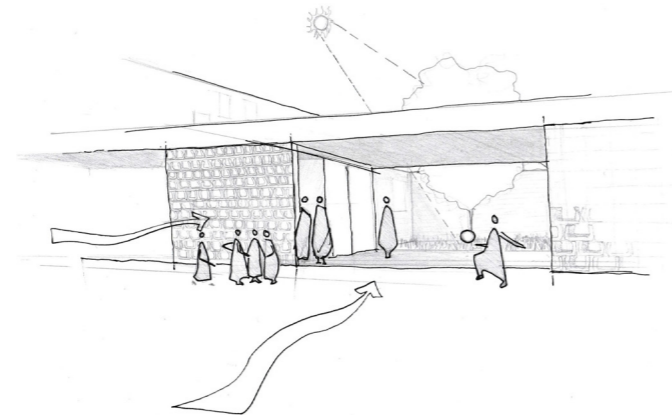
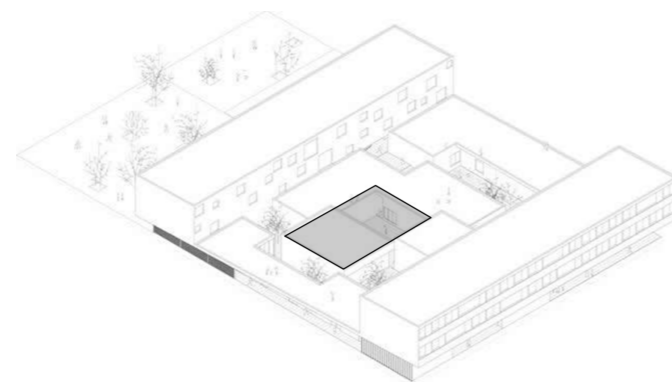
Project Location: Limpopo
Project Architect: Peter Rich
Project Informants: Climate control



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

Local + Modern Material

VELE SECONDARY SCHOOL IN VHEMBE DISTRICT, LIMPOMPO

Project Location: Limpopo
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

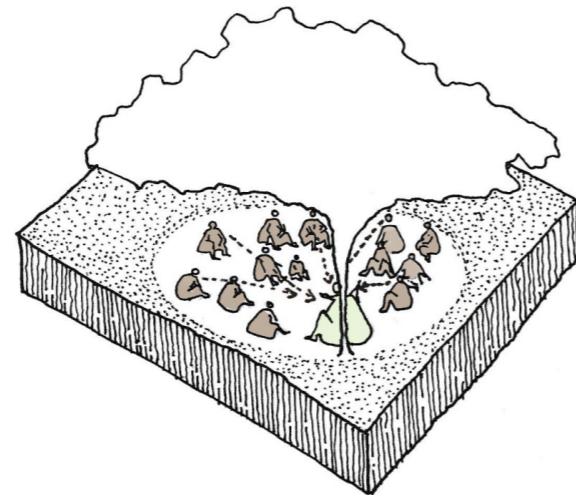
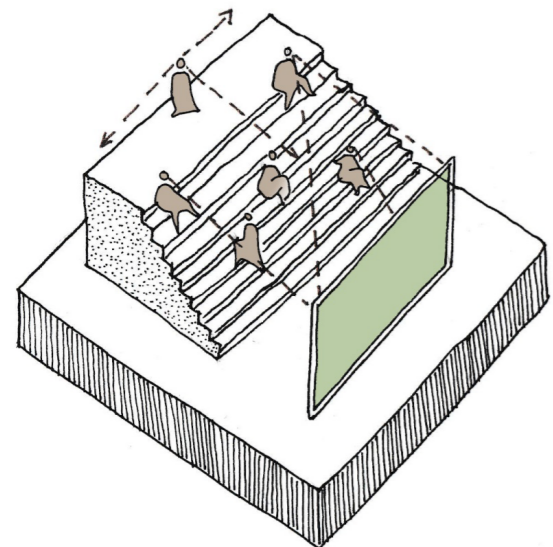
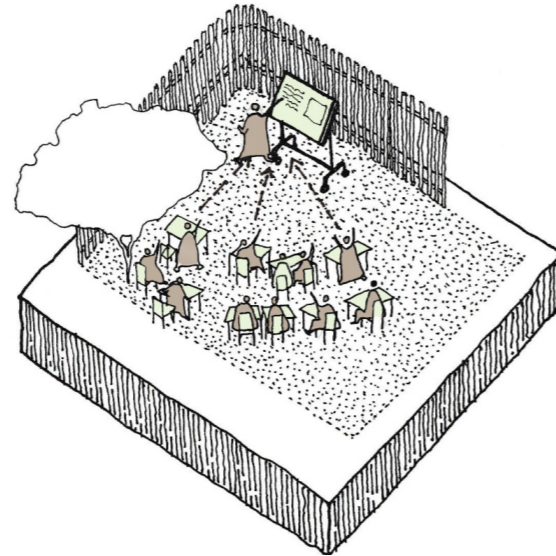
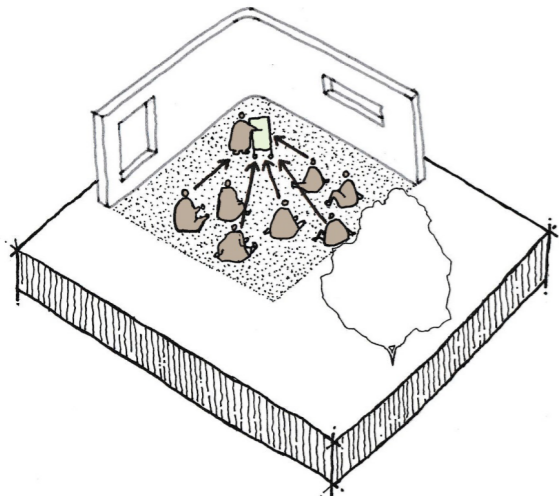
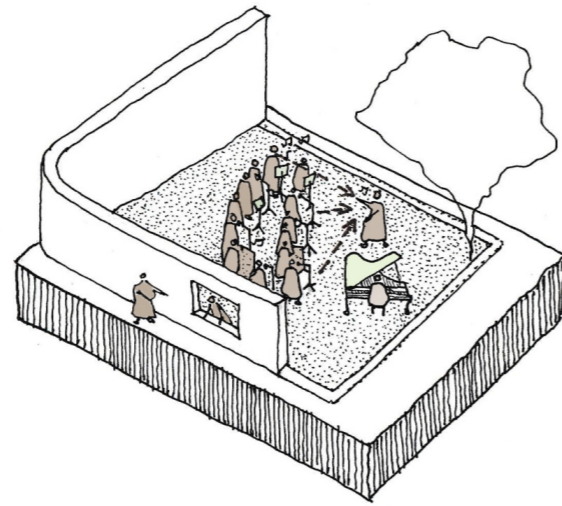
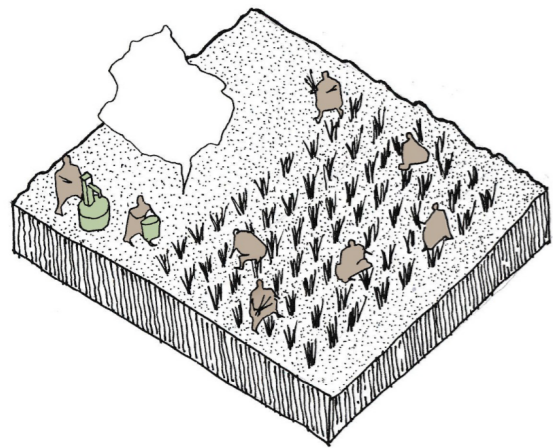
Project Location: Limpopo
Project Architect: Sharon Davis Design
Project Informants: Materiality



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



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 than 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.

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 de-

rived 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

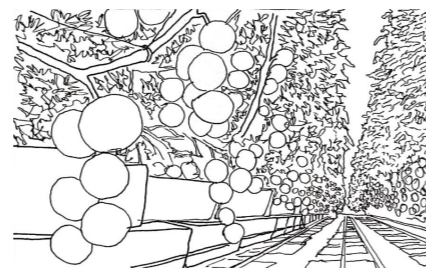
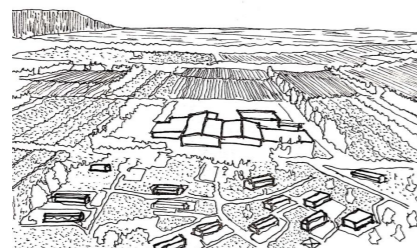
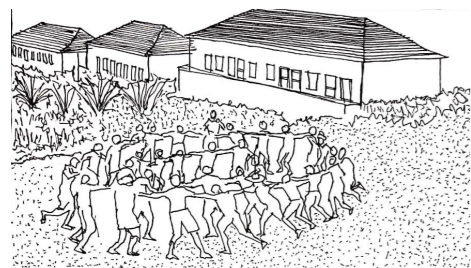
Gehl (2010, p. 33) states that the quality of outdoor spaces determines the quality of outdoor social activities. In general, people like to take shorter pathways to reach certain destinations (Matan, 2018, p. 386). Therefore, in respect to the current study, the Mpaka primary and secondary circu-

lation 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 re-

sult, 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 de-

velop 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).

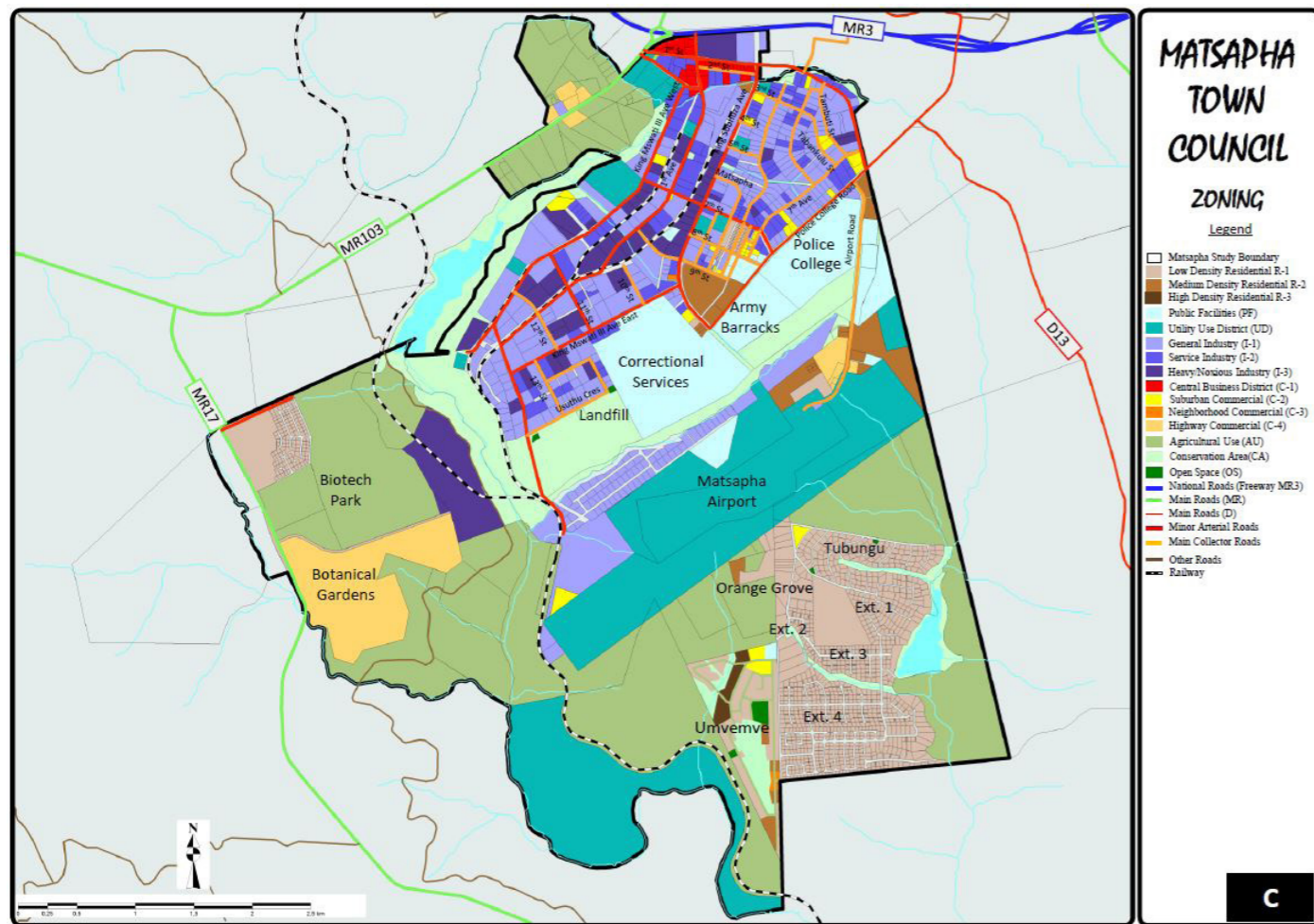


Figure 2.1: Nodes along Site (Matsapha Municipality, 2019, p. 130)

2.7.1 Zoning the site

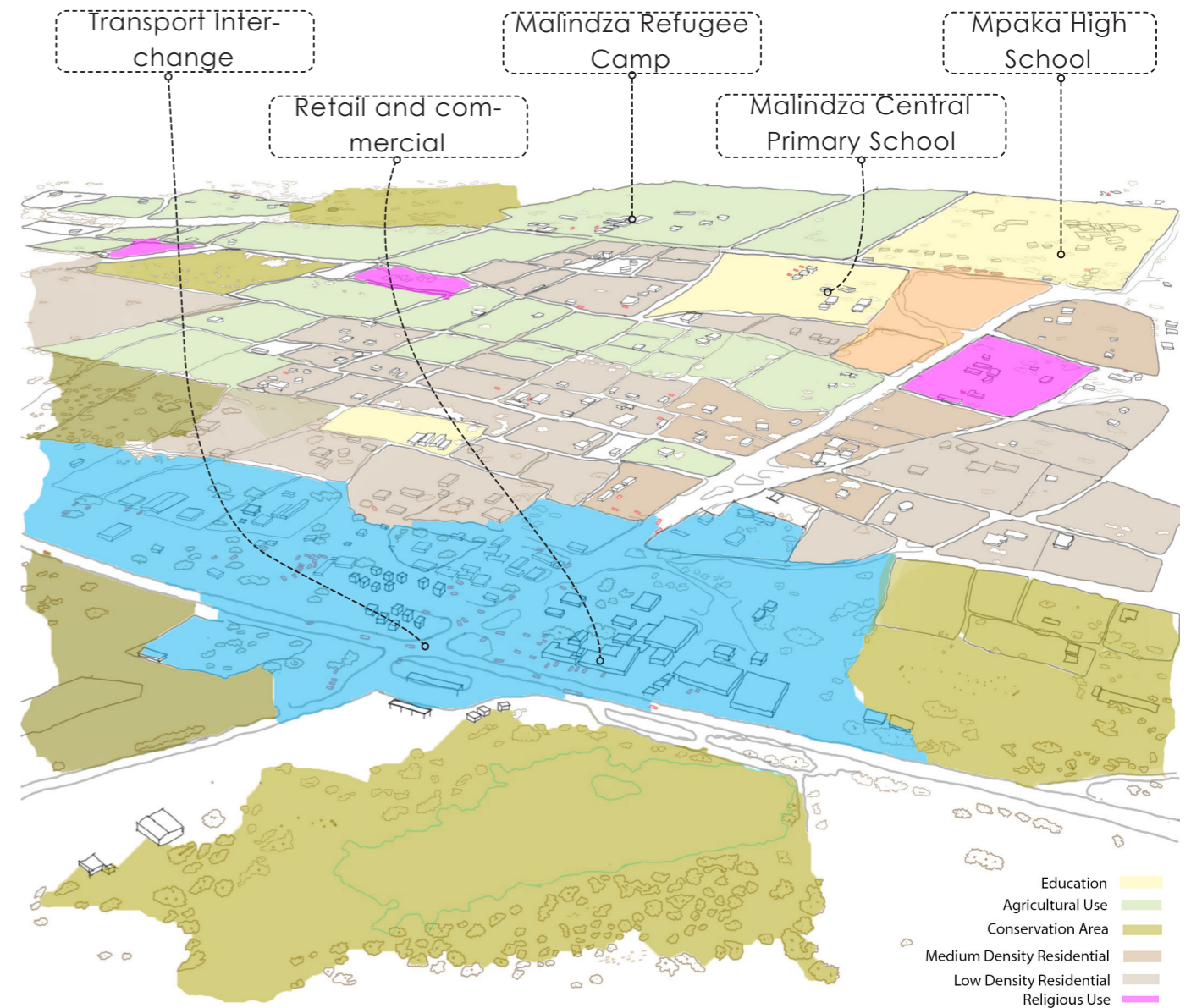


Figure 2.2: Anticipated Zoning

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 node 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

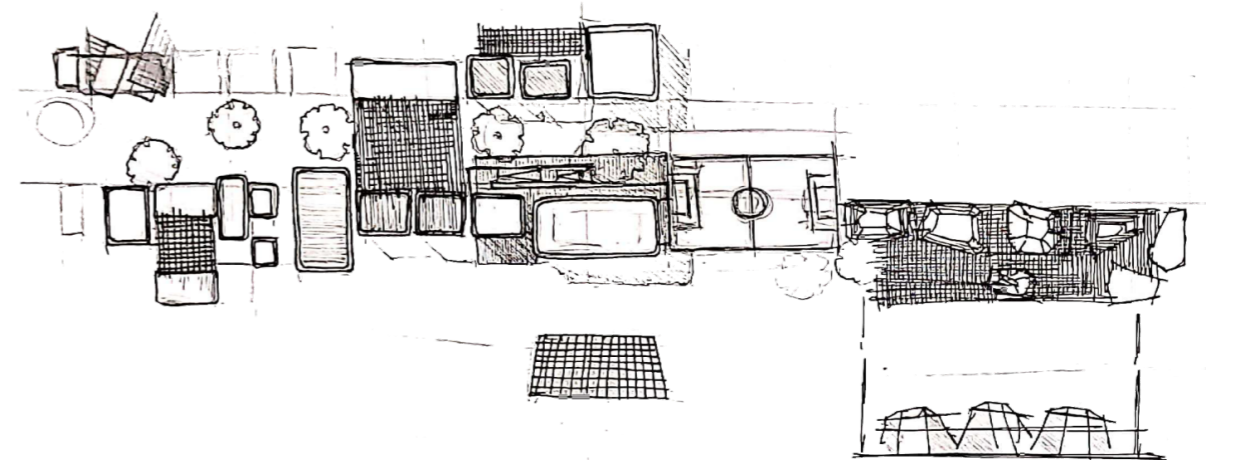
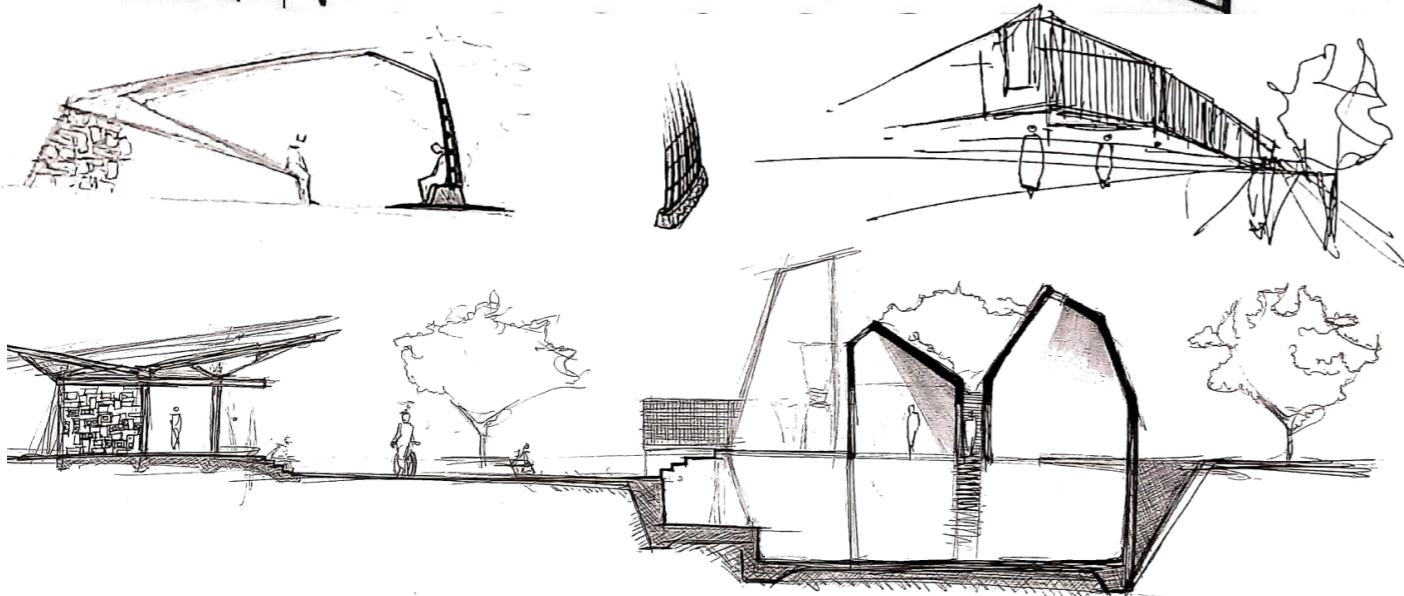
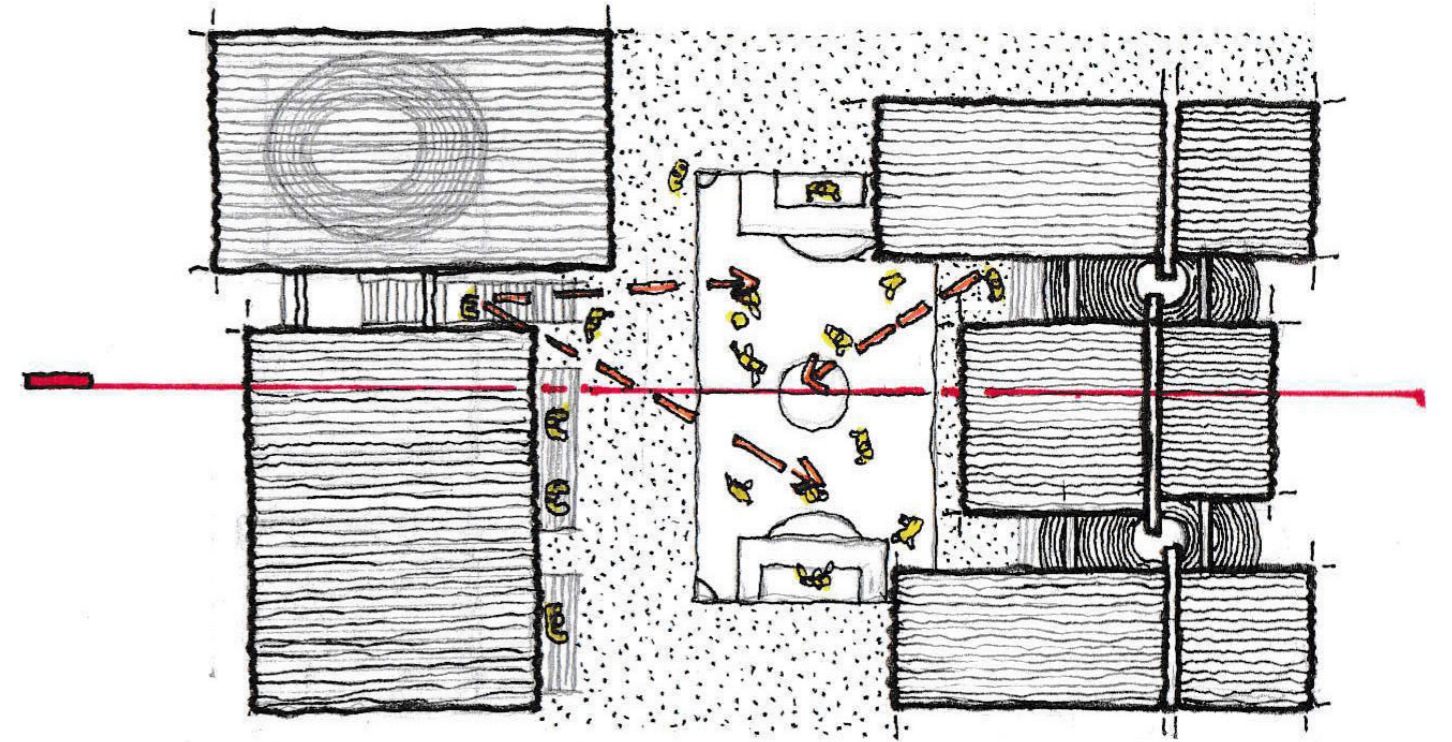
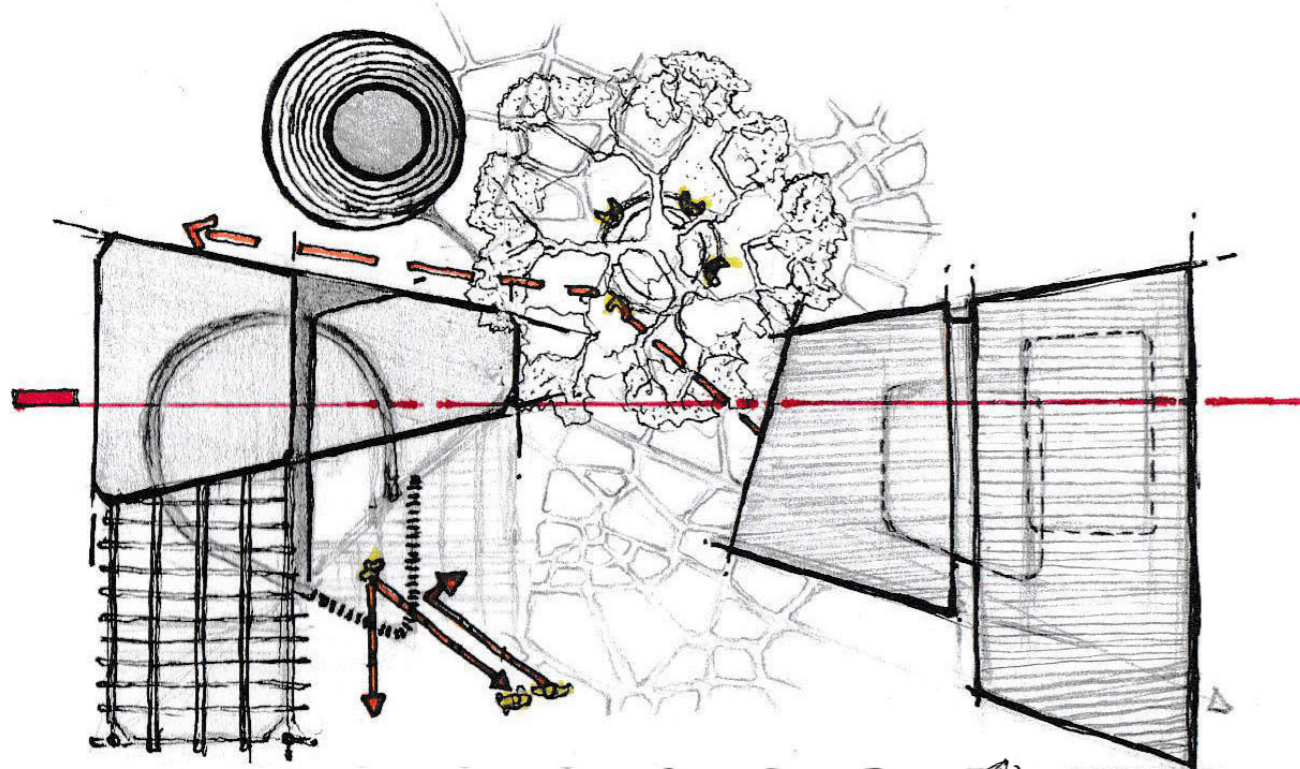
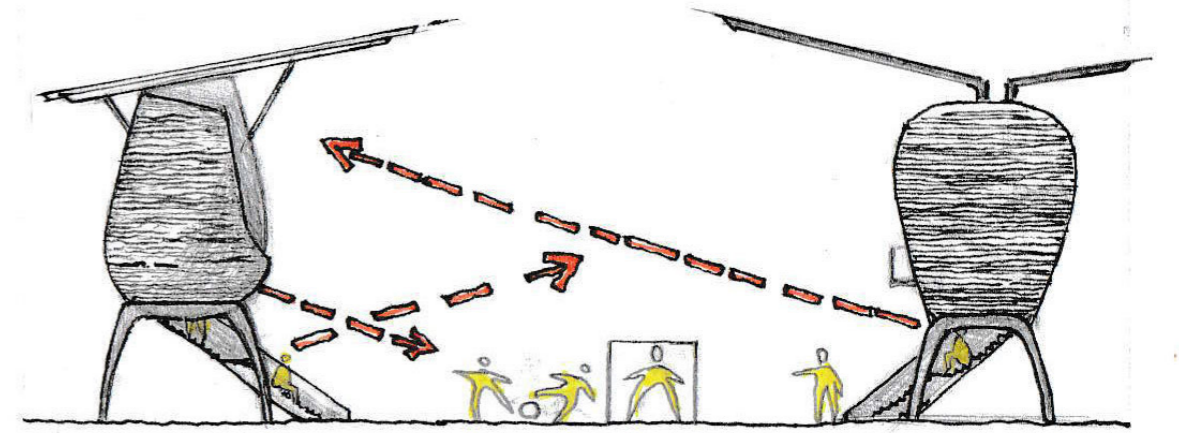
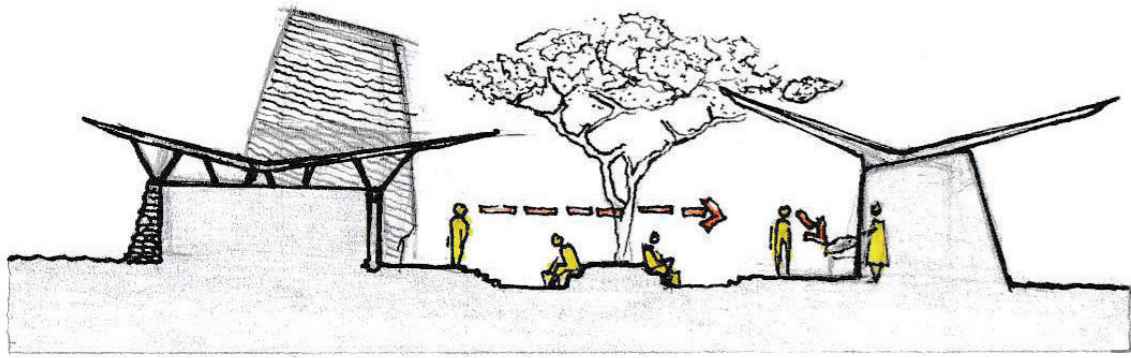
As noted previously, the aim of this framework is to develop an urban transect that enhances existing corridors that intersect along the spine. The design proposal, thus, attempts to demonstrate how the selected two nodes might be 'stitched' together. While the following demonstration highlights the 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.

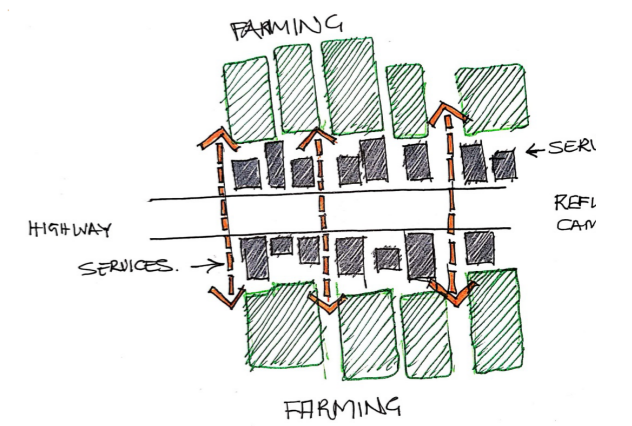
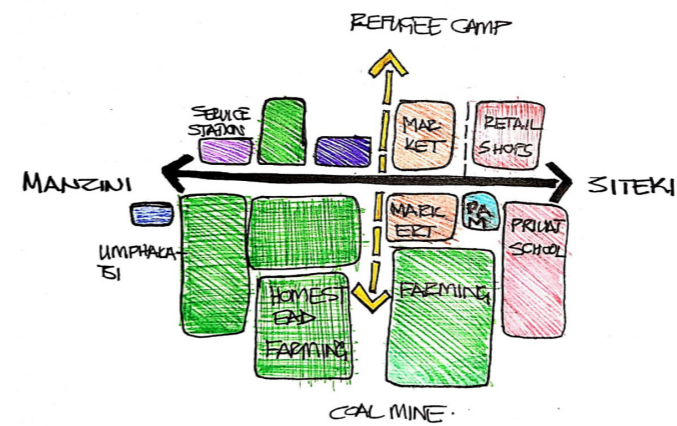


Figure 2.3: Seven Propose Nodes of the Development Framework

2.8 Concept Exploration



2.9 Model exploration



2.10 The Transect Strip Master plan

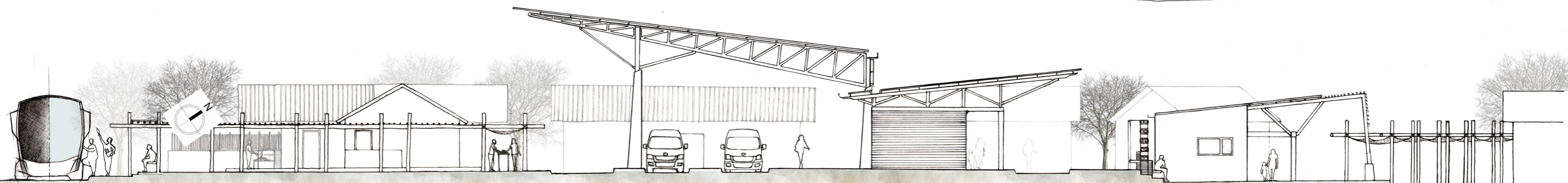
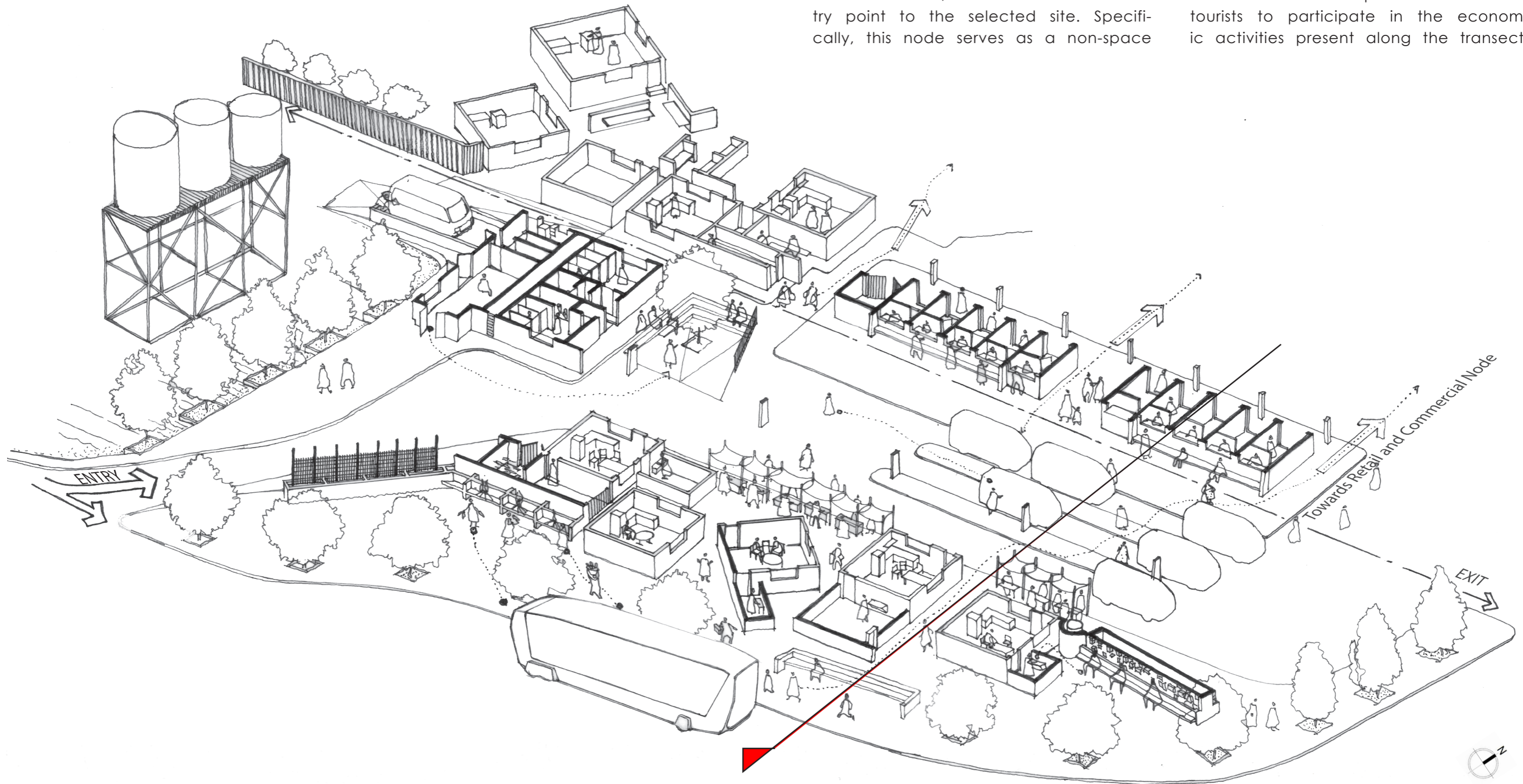


2.10.1 Urban development strategies (along node 1 and 3)

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

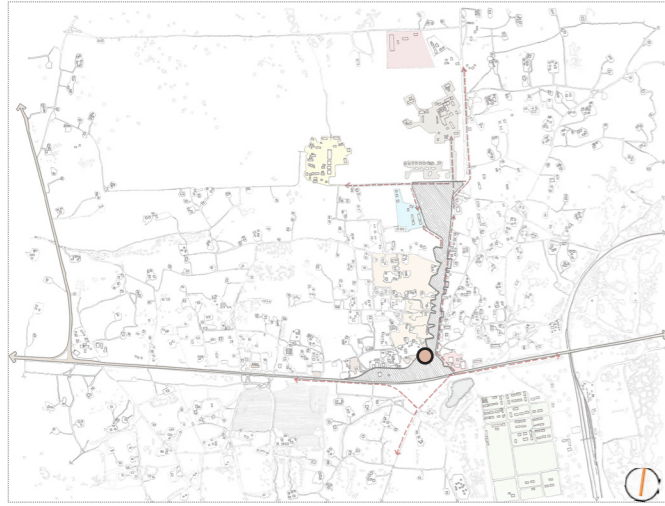
for commuters and provides access for tourists to participate in the economic activities present along the transect.



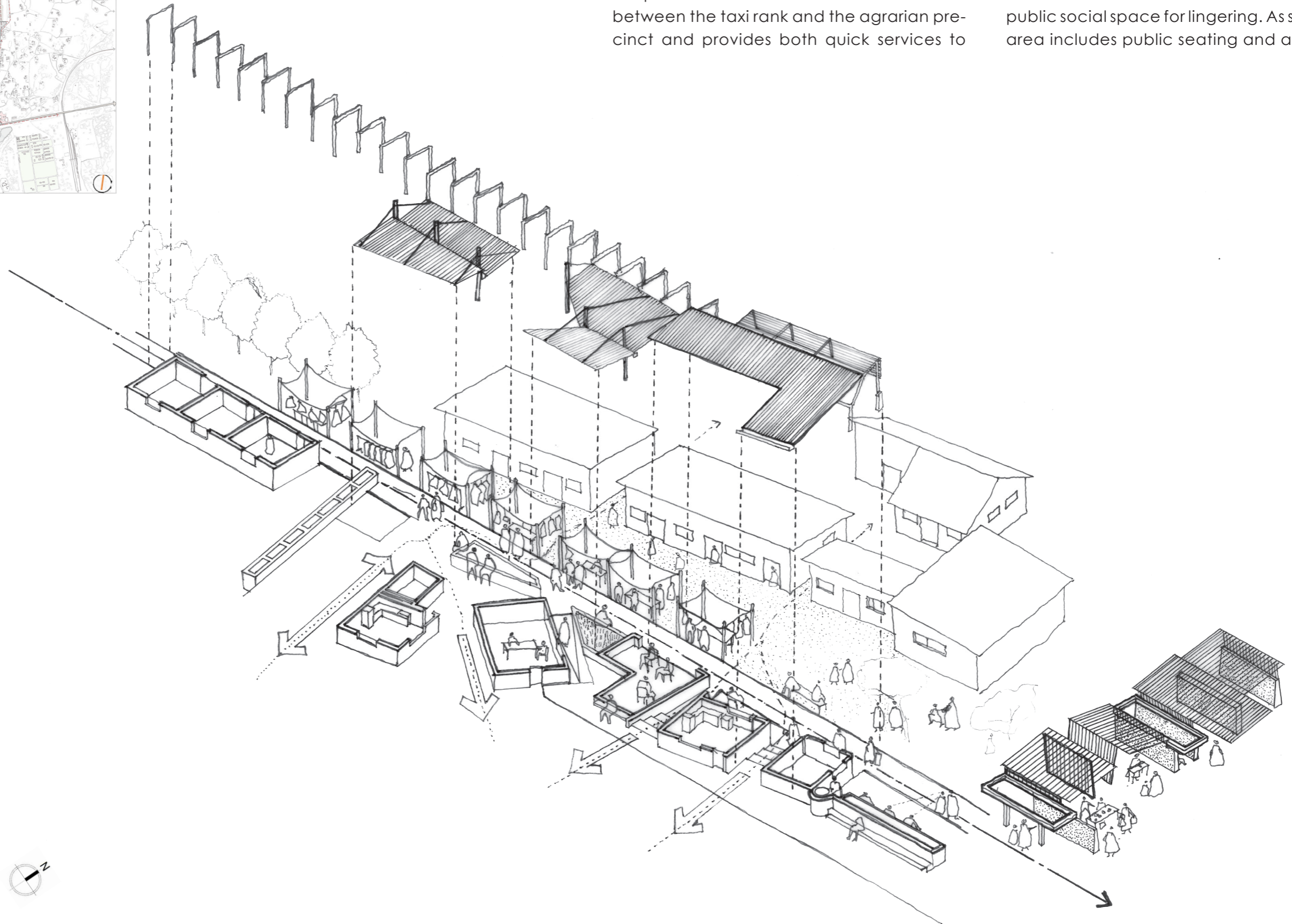
COMMERCIAL AND RETAIL ZONE:

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.

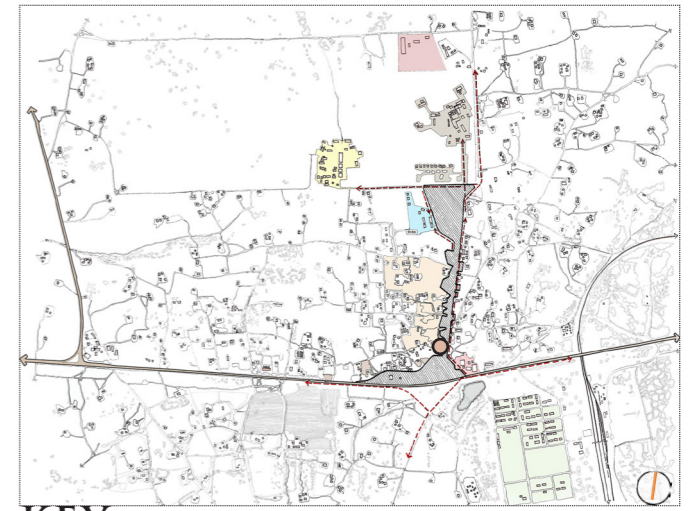


KEY
LOCATION ●

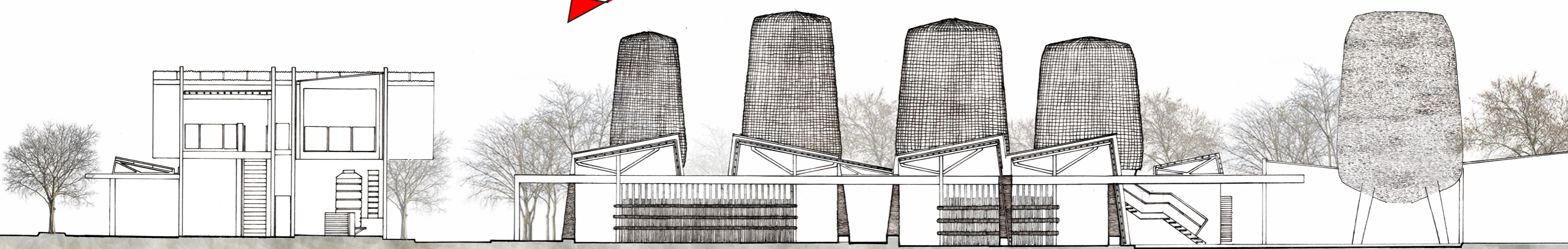
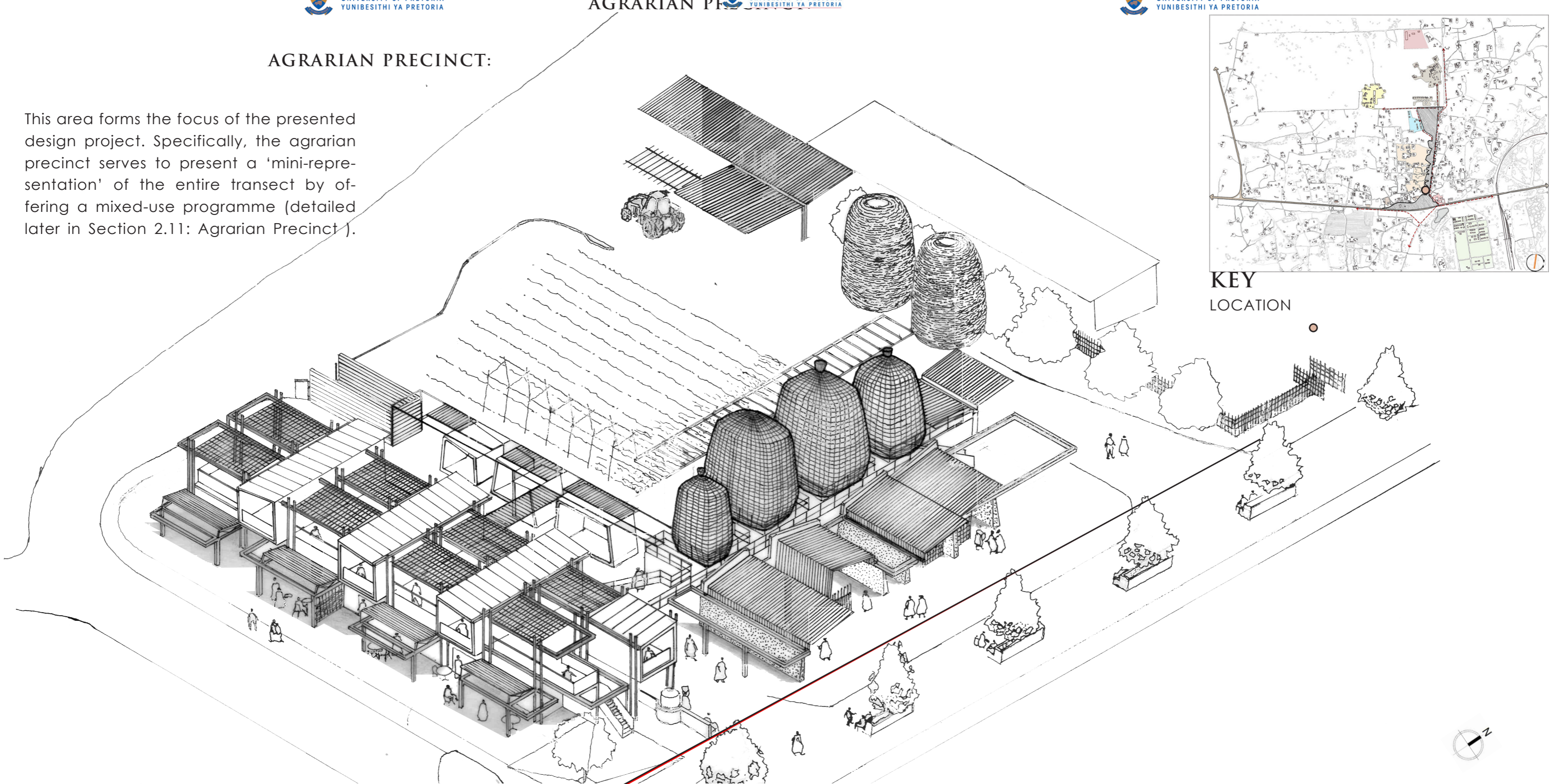


AGRARIAN PRECINCT:

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).



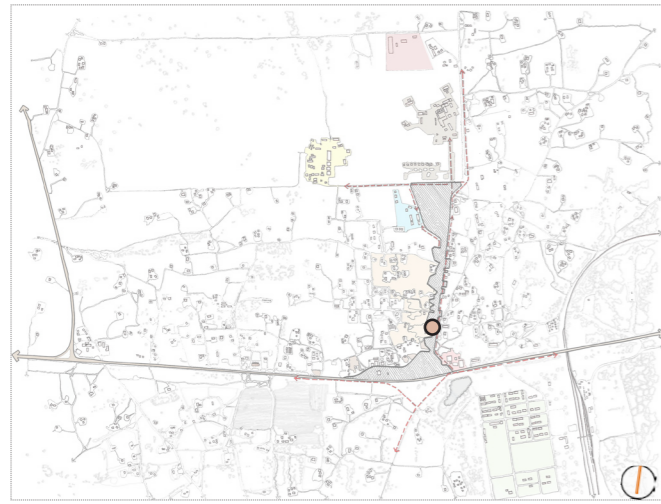
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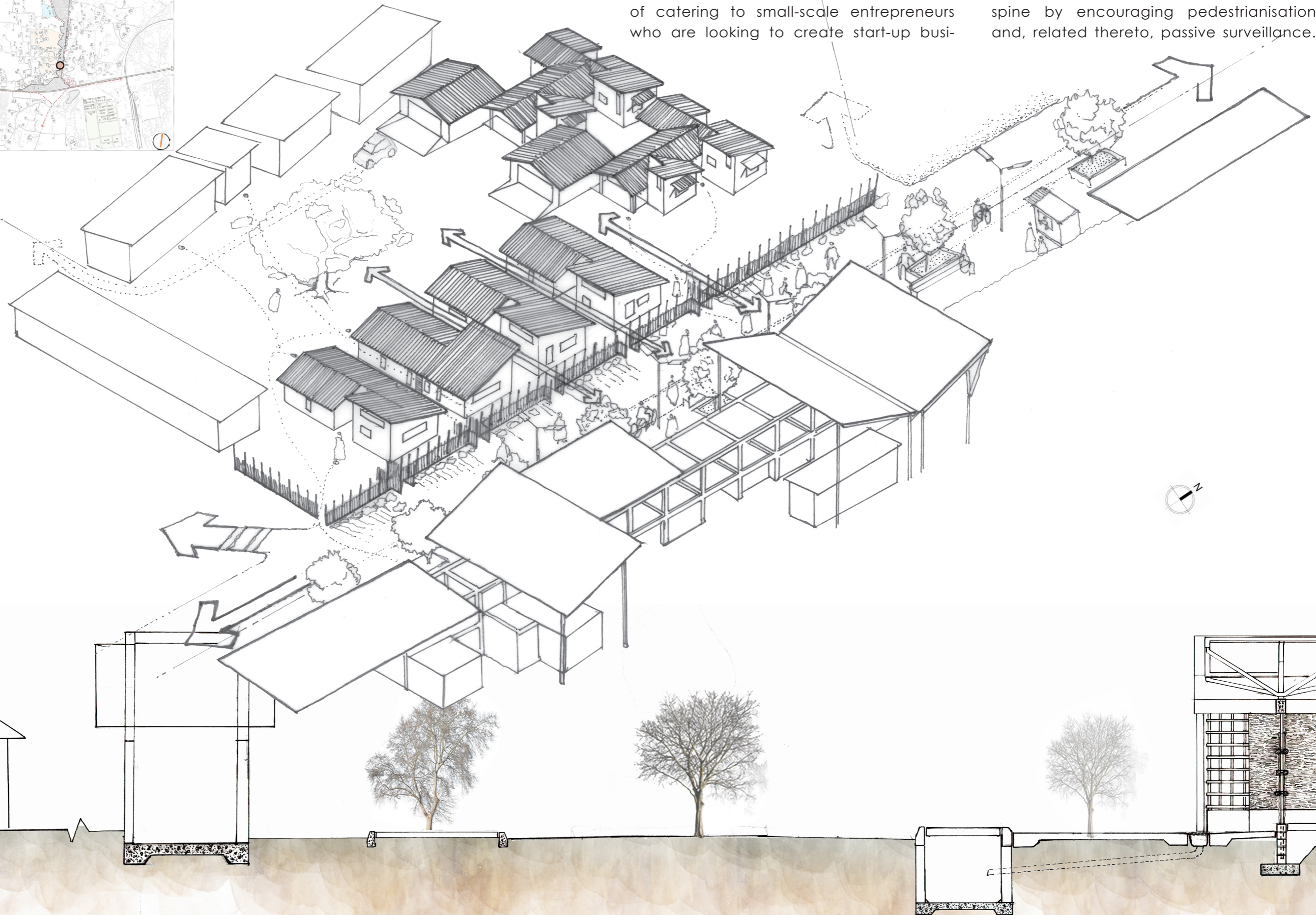
LOW-INCOME RESIDENTIAL AREA

This component provides medium-to-long-term accommodation for the purpose of catering to small-scale entrepreneurs who are looking to create start-up busi-

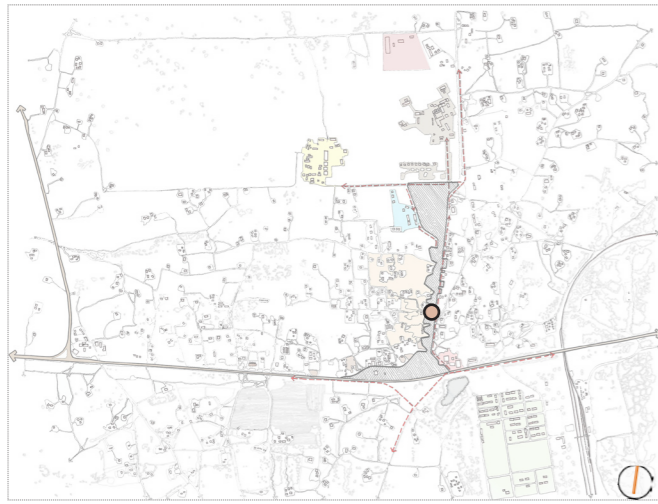
nesses in the area. The area is, thus, arranged in such a way that it activates the spine by encouraging pedestrianisation and, related thereto, passive surveillance.



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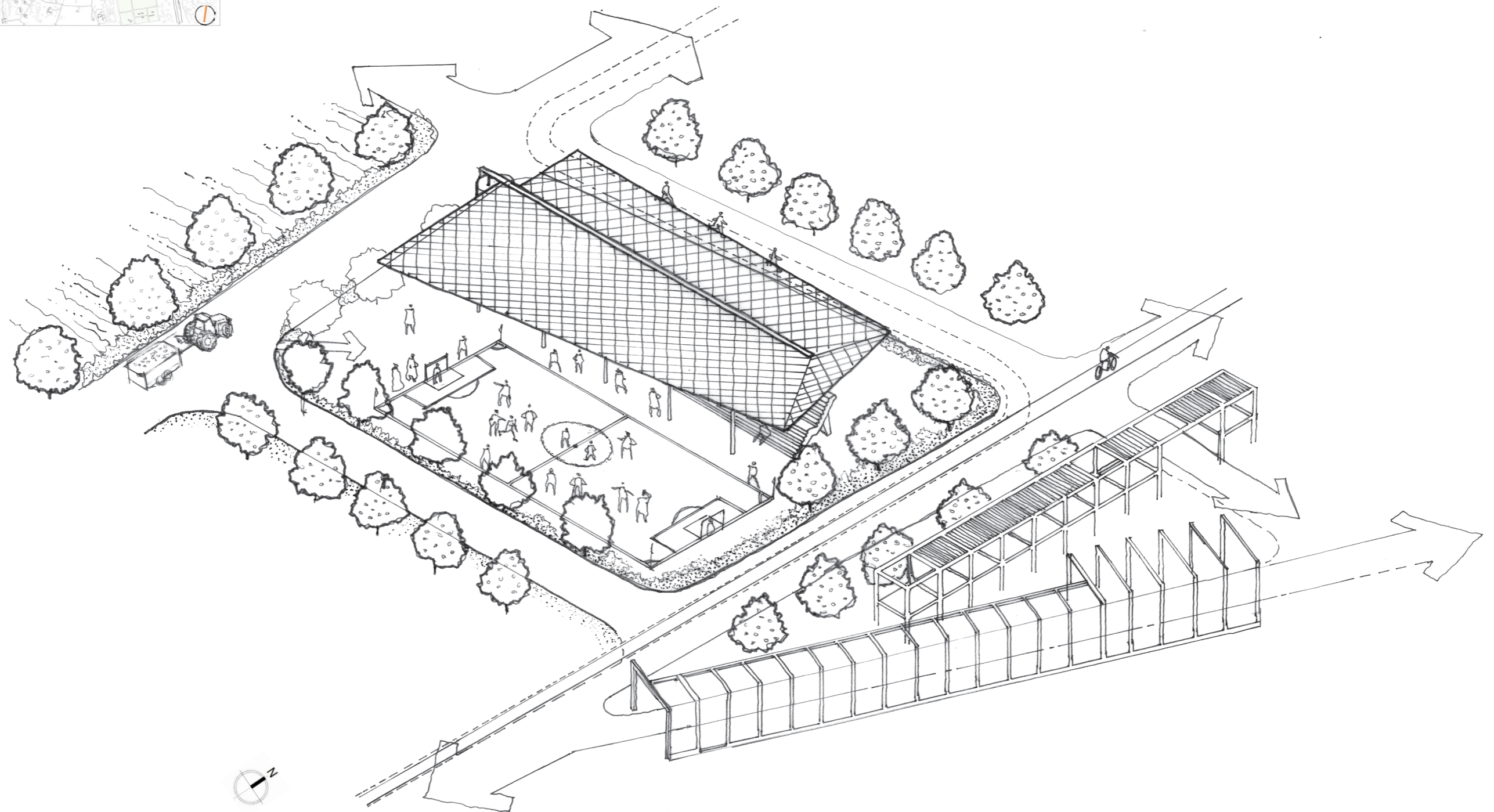
SPORTS AND RECREATION FACILITIES:



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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. Further-

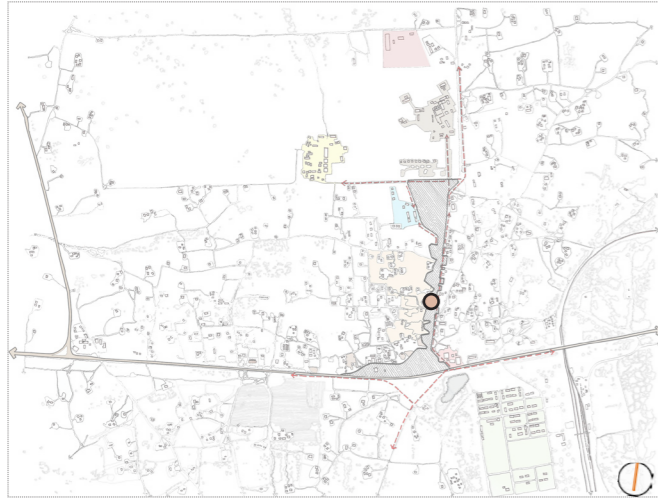
more, various indigenous and fruit trees would be planted as anchor nodes along the corridors that link the refugee camp and the Malindza vocational school. These corridors would serve as spaces for physical transportation (e.g., jogging and cycling).



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 stabilisation of the economy



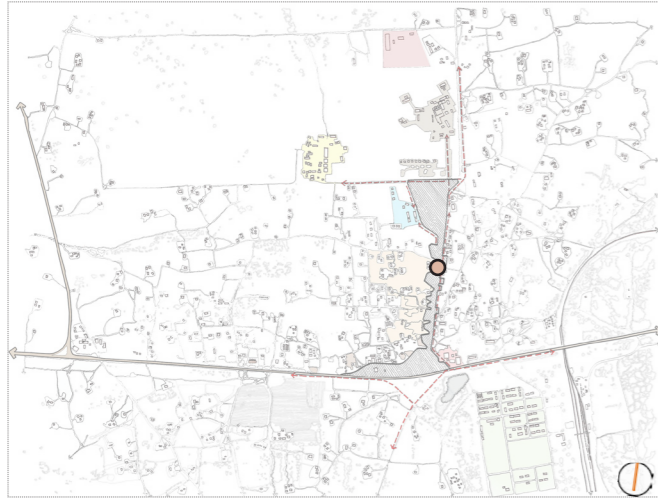
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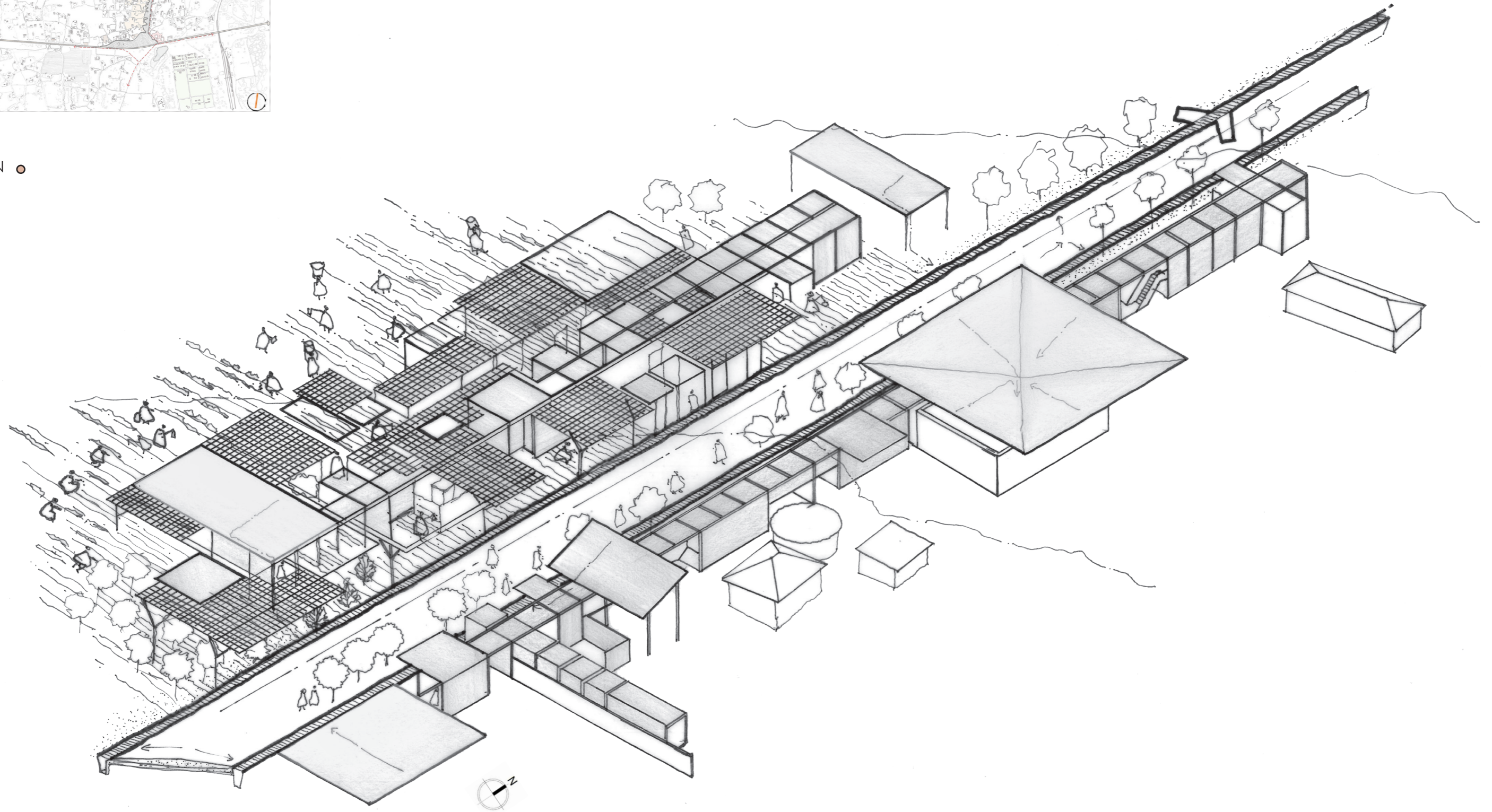
LARGE-SCALE FARMING:

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.



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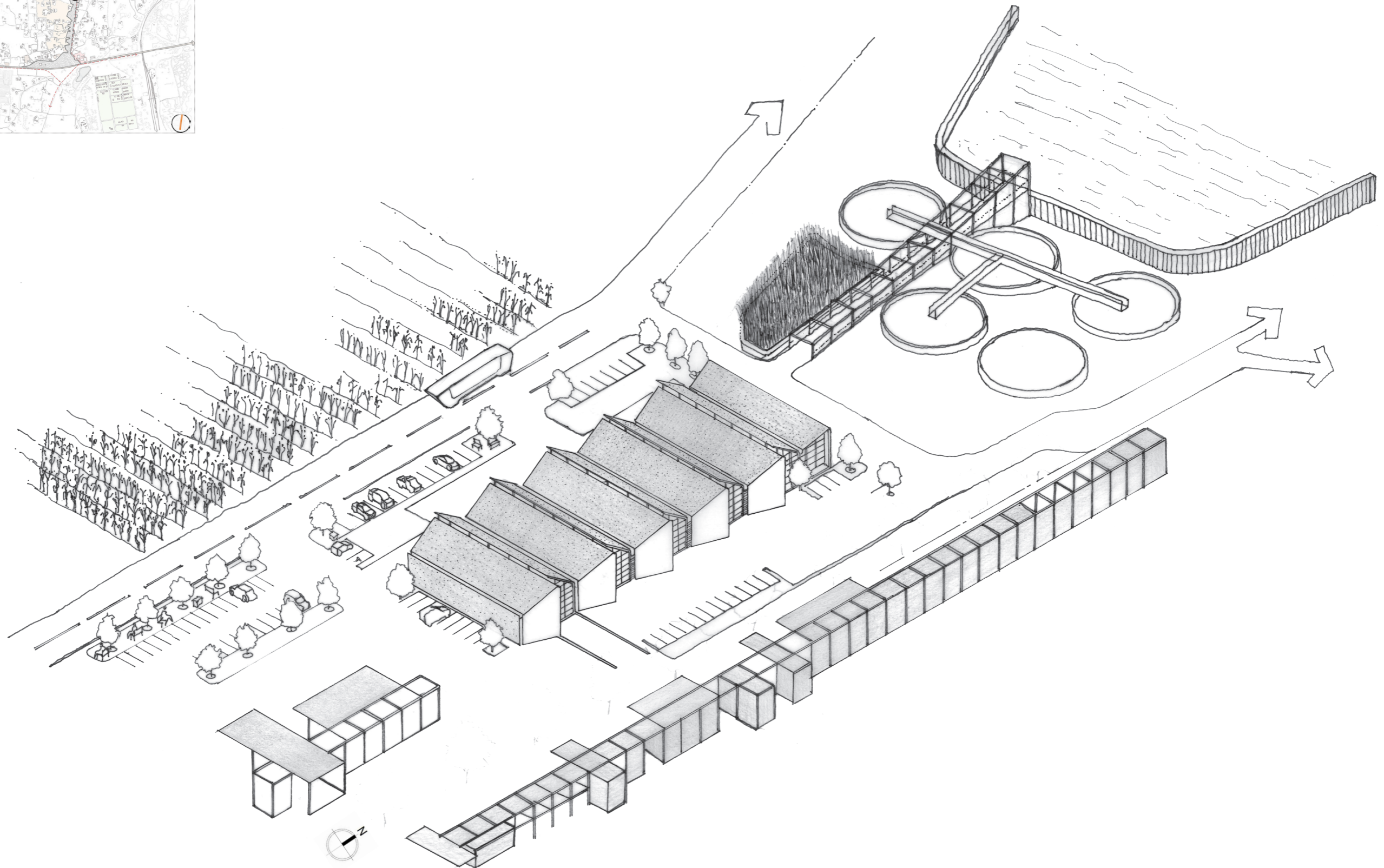
SMALL-SCALE INDUSTRIAL ZONE:

Water plays an important role in the successful running of this particular project. Therefore, a water recycling plant is nec-

essary, 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:

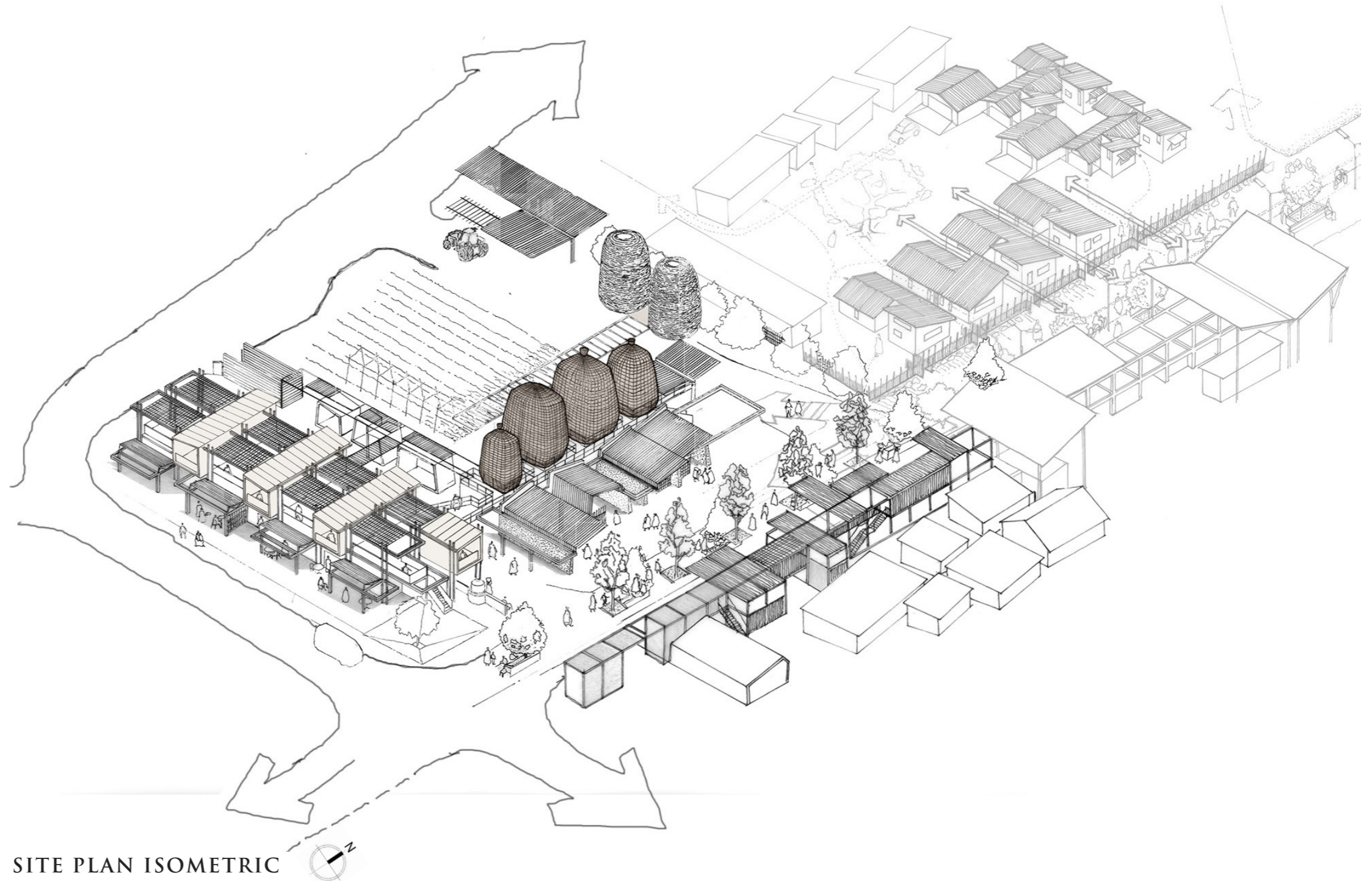
The educational aspect will not only focus on formal education but will attempt to address other forms of education, such as informal skills-education (e.g., the knitting of mats). The aim of this exercise is to expand skills knowledge through delegation, training, and the sharing of new skills. Functioning 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-

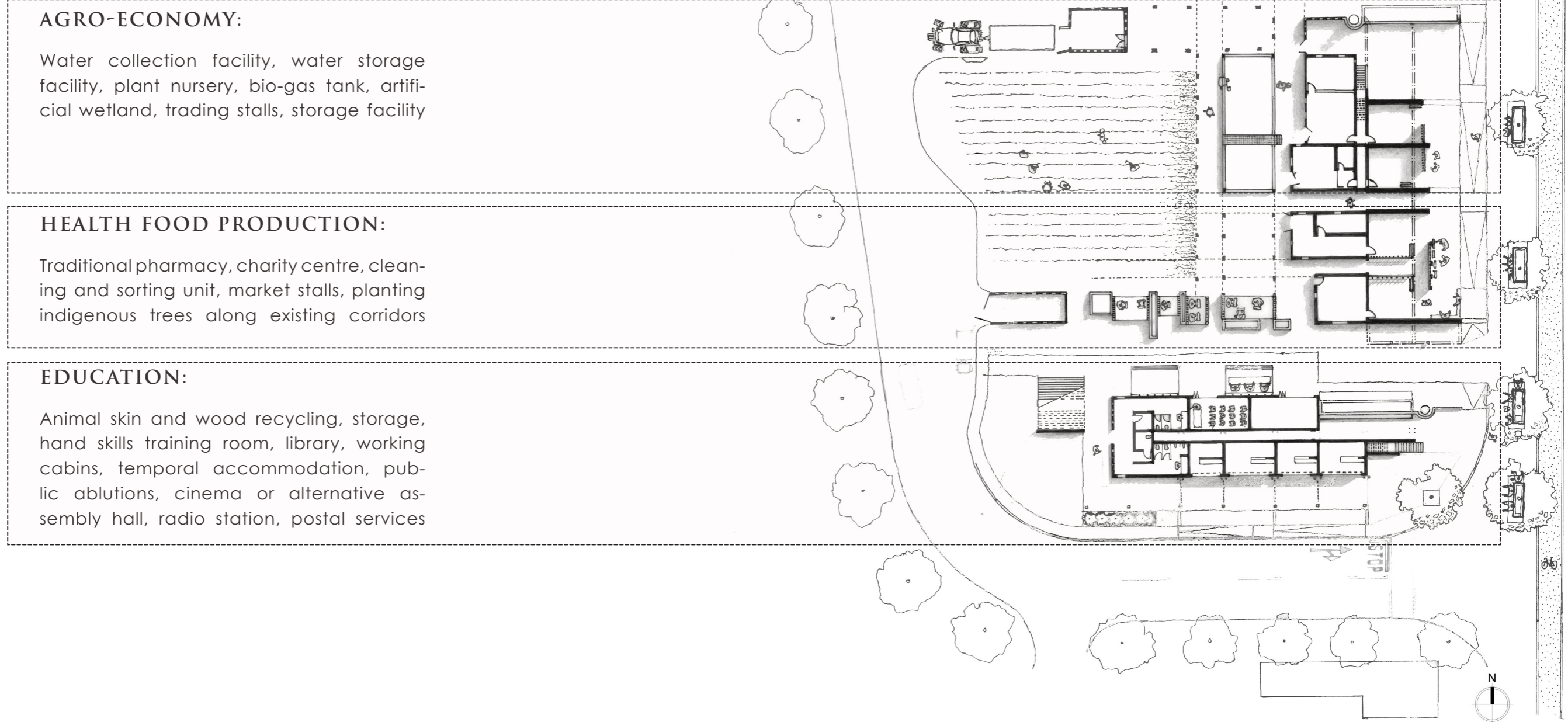


SITE PLAN ISOMETRIC

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.

Ground Floor Plan

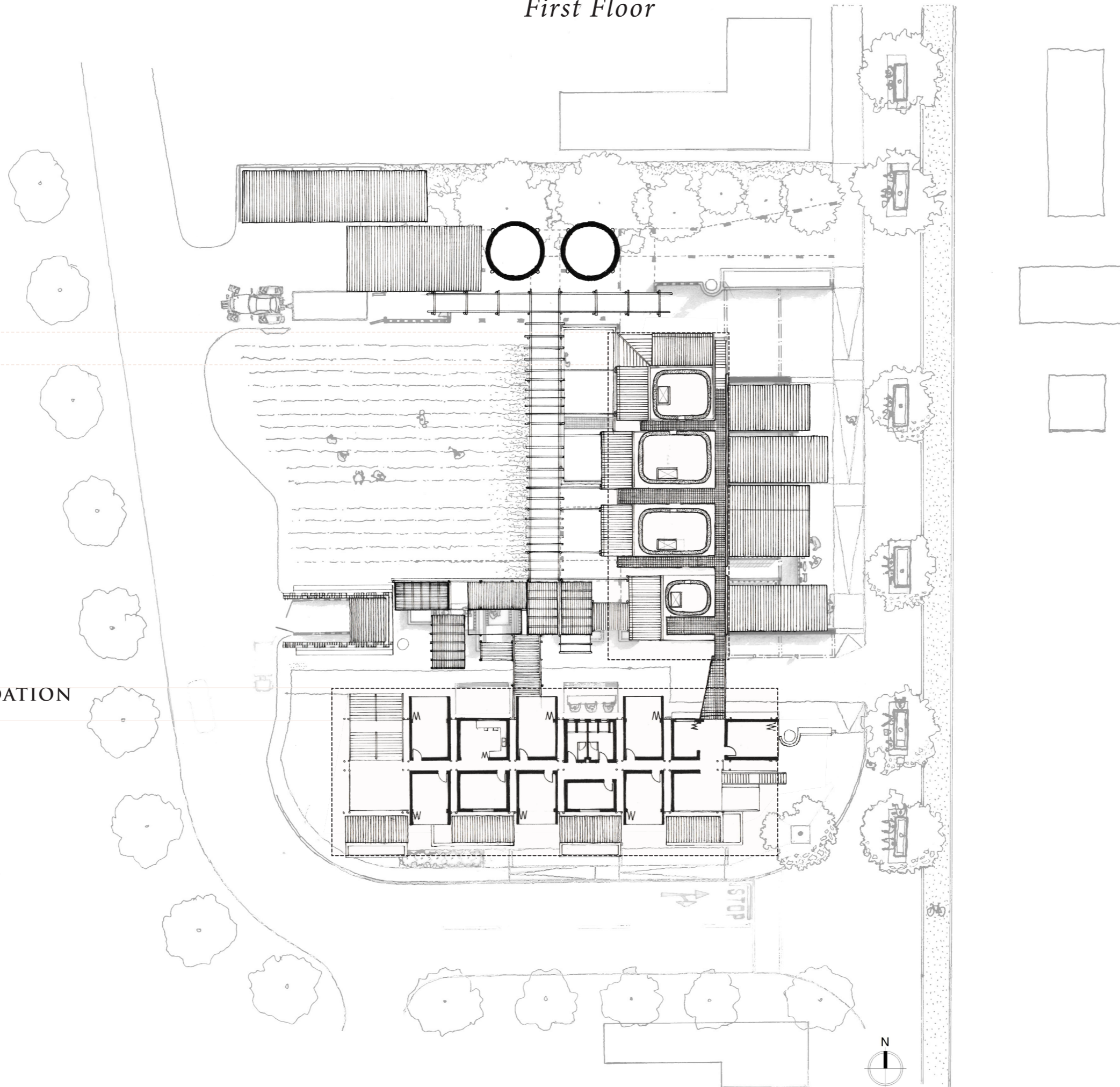
2.12 Accommodation schedule



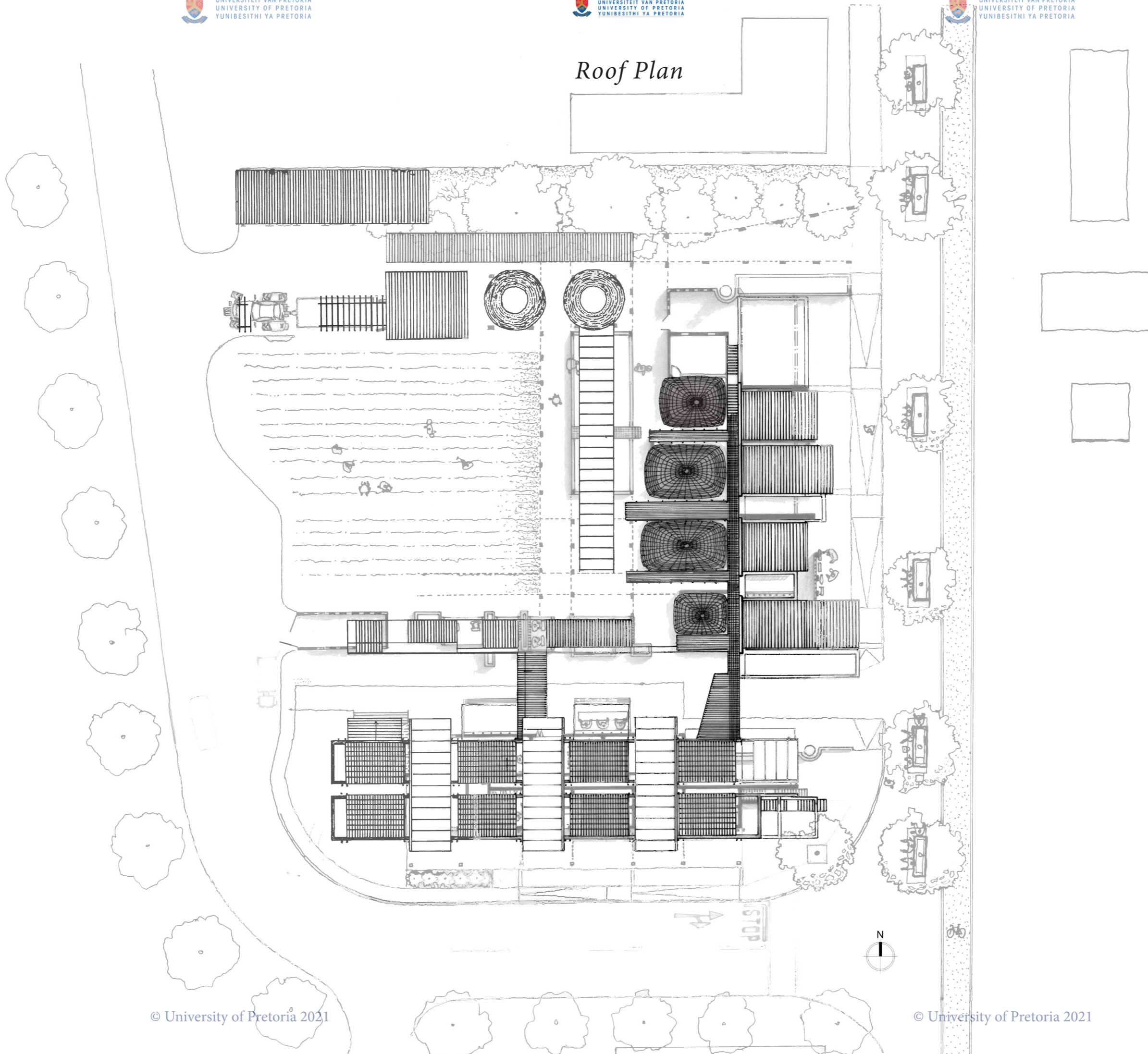
First Floor

GRAIN SILO

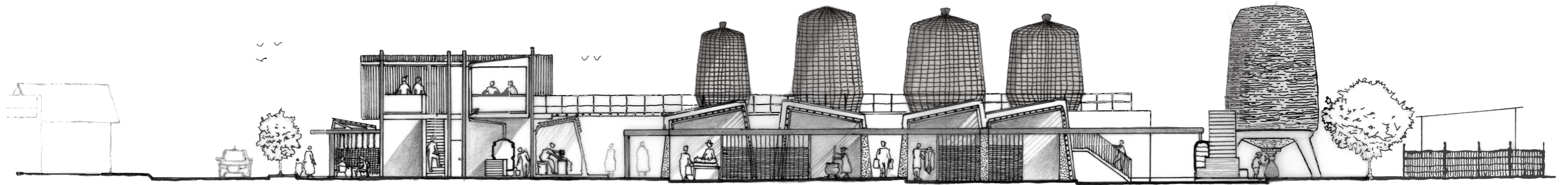
TEMPORARY ACCOMMODATION



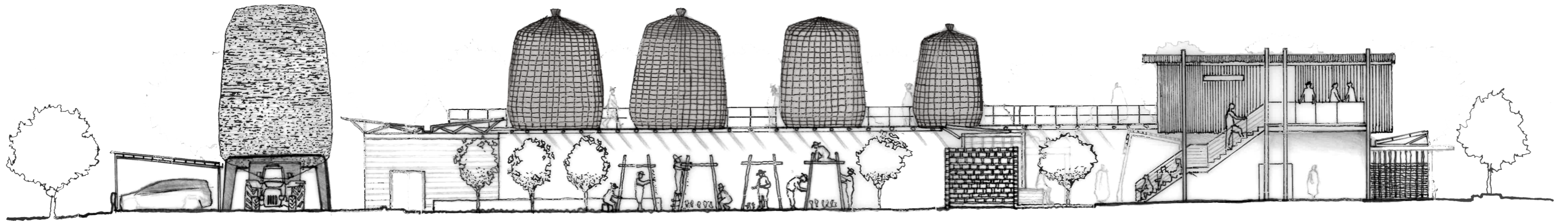
Roof Plan



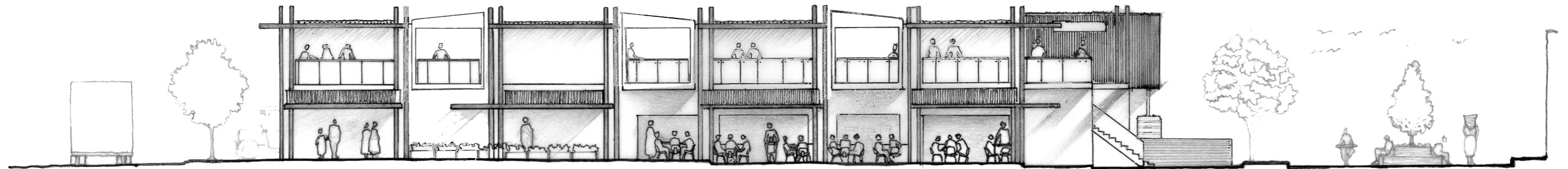
Elevations



EAST ELEVATION 1:100



WEST ELEVATION 1:100



SOUTH ELEVATION 1:100